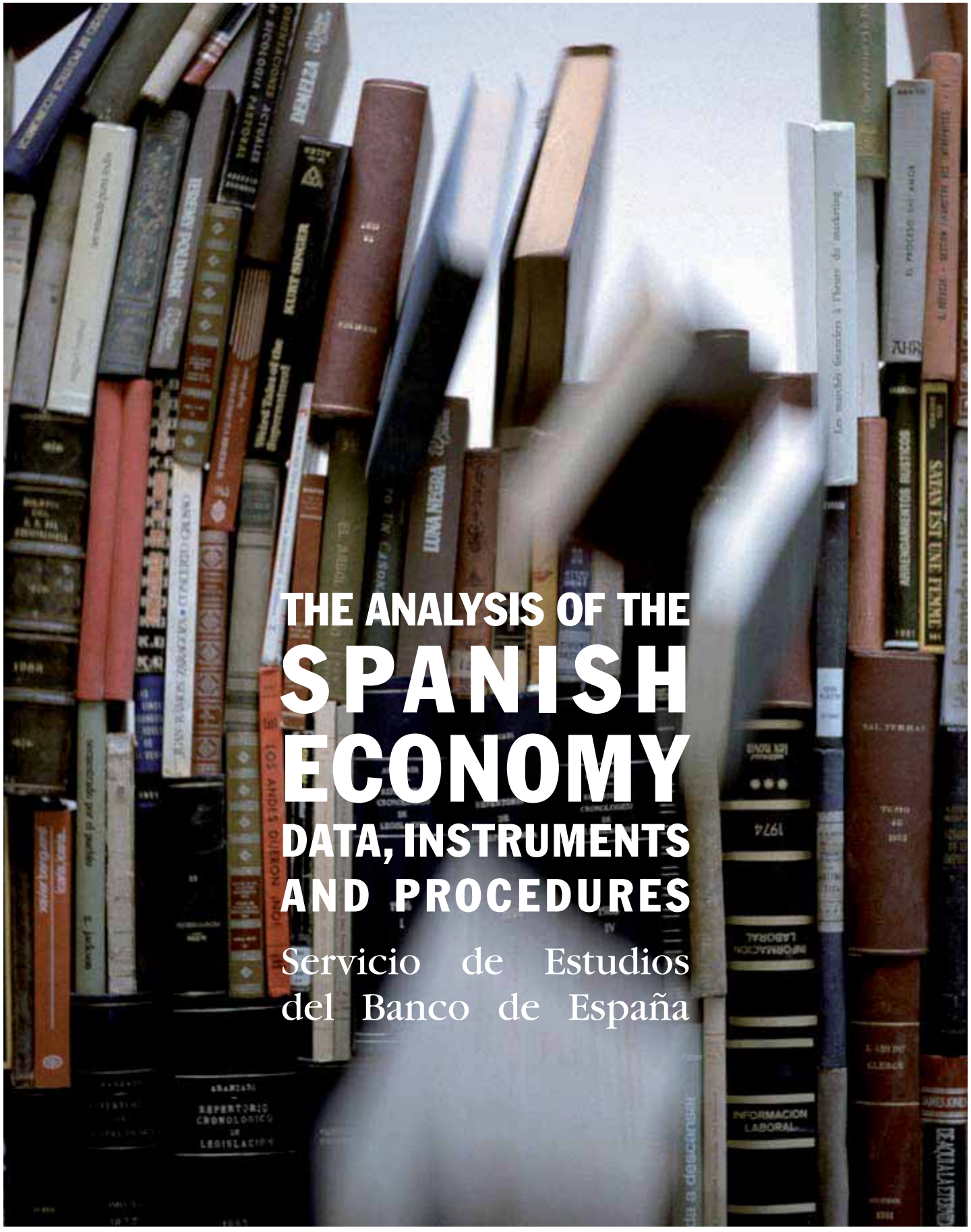

THE ANALYSIS OF THE SPANISH ECONOMY

DATA, INSTRUMENTS AND PROCEDURES

Servicio de Estudios
del Banco de España

The analysis of the Spanish economy

Servicio de Estudios of Banco de España

The analysis of the Spanish economy

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MACROECONOMIC POLICY FRAMEWORK

Foreword

Luis Ángel Rojo

Central banks embarked on a learning experience from the outset of their operations, drawing, over time, from theoretical and practical developments in connection with the monetary policy objectives they pursued. Observation of the relationships between the money supply, price levels and the exchange rate; examination and refining of monetary standards and convertibility; analysis of the transmission of effects from monetary impulses to interest rates, economic activity and prices; the causes and effects of capital movements; and the impact of monetary shocks on banking systems were all building blocks for classical monetary theory and the liberal policy it inspired, which wa s considered the prevailing orthodoxy on the eve of the First World War.

As we know, the period between the two World Wars was a particularly complex one. The end of the first conflict was followed by intense monetary-based fluctuations that gave way, following a relative period of peace, to the Great Depression of the 1930s, with its negative effects on prices and exchange rates, economic activity and employment. Such serious shocks provided substantial impetus for monetary analysis in the hands of the great economists of the time, and for the study of the monetary policy measures implemented by central banks. At the end of the interwar period, monetary theory and policy, integrated into models primarily inspired by Keynes, set out to contribute, along with fiscal policy, to the stability of effective demand in the economy.

For the first few years of the second post-war period, monetary thought adopted lax positions: if effective demand was unstable, it did not seem possible either to consider monetary policy as very stable. If the aggregate demand for money was unstable, its elasticity to the interest rate high and, conversely, the elasticity of demand for goods and services in re-

lation to the interest rate low, the confidence placed in monetary policy to regulate effective demand was scant and substantially less than that fiscal policy enjoyed. Monetary policy was accordingly relegated to a purely ancillary function.

Only in the late 1940s did the monetary policies thus established begin to give way, their laxity having made them inflationary and a source of external imbalances. Theoretical and empirical studies gave less weight to instability attributed to demand for money in favour of the elasticity of effective demand to the interest rate. As a result, during the 1950s more confidence was placed in the effectiveness of monetary policy as a regulatory tool for effective demand, and Keynesian economics came to adopt the Neoclassical Synthesis form that would become the standard macroeconomic model for almost two decades. Although monetary policy regained some of its importance in these models, it continued to take second place to fiscal policy in the regulation of economies.

The set of identities, behavioural relationships and functions comprising the Keynesian Neoclassical Synthesis Model combined a set of observable variables that provided for advances in the study of macroeconomics with an attendant refinement of knowledge through testing against real events. Economics would seem to have finally achieved its longstanding aspiration of becoming an empirical science. This did not equate to willingness on the part of economists to reduce their knowledge and interpretation of specific historical circumstances to pure empiricism, or to overlook some of the important methodological differences between the natural and social sciences. The empirical method, however, emphasised the development of econometrics in support of theory, while supplanting it from time to time, and promised a body of empirically tested, positive knowledge. As a result, non-observable factors would tend to become less important in the analysis.

In this connection, a cumulative research programme was proposed in which central banks were prepared to participate: the process of formulation, testing and corroborating or rejecting assumptions would set the stage for empirically grounded progress in economic knowledge. Relying on assumptions corroborated and theories developed with these underpinnings, econometric models could be constructed and estimated with increasing scope and complexity, offering ever more refined descriptions of the structure and operation of specific economies. The development of computer sciences would promise to overcome the practical problems in model estimation. Econometric models offering an increasingly firm grounding in short-term economic knowledge and regulation therefore flourished during the 1960s and early 1970s.

It seemed possible, based on this research programme, to formulate macroeconomic policies with an increasingly accurate scientific foundation. Once adequately specified, the large-scale models would be estimated on the basis of data from a sufficient sample period, with the confidence that, if the model were correct, the estimated structural parameters would be stable and invariant in respect of economic policy decisions. As a result, econometric models could be used to prepare forecasts contingent on certain values of specific variables controlled by the authorities. And with this approach, the impact of alternative or simultaneous economic policy measures could be studied. The aim was thus to reach specific employment and inflation targets compatible with the authorities' wishes.

It was not long, however, before problems arose in this programme of action. During the late 1960s, highly expansive U.S. economic policy weakened the dollar, prompting its de-

preciation and, finally, the abandonment of the Bretton Woods System. International prices of many commodities and, above all, of oil, surged, generating substantial decreases in the real terms of trade for crude oil importing countries and placing them in complex situations where inflation processes ran in parallel with substantial recessions. At first, the countries affected by these situations tried to address them with programmes designed to combat recession through expansive demand policies, while co-ordinating with major interest groups, and particularly trade unions, to reach incomes agreements to contain inflation and provide for readier adjustments.

These policies ended in outright failure. In Europe, only Germany, with its relatively restrictive demand policy, and the group of countries that continued to peg their currencies to the deutsche mark, achieved moderate inflation rates by the end of the 1970s. It was likewise seen, at the end of this process, that the economies with greater scope of action in terms of prices and exchange rates were also those which achieved better results in output and employment.

Thus ended the period of absolute Keynesian dominance. Its relative ineffectiveness in combating the crisis led to a shift in favour of the theoretical positions of Friedman's monetarism which, with the support of abundant empirical studies, rejected effective demand instability while affirming the high degree of stability in the money demand function, its relatively low elasticity to interest rates, the transmission of effects of monetary impulses through a broad range of interest rates and rates of return, and the persistent action of monetary measures on nominal variables, albeit with only transient effects, and at the cost of subjecting real variables to substantial shocks. According to this theory, in the long term monetary impulses affected nominal variables, and particularly prices, but did not seem to have significant effects on real variables, the latter being determined by real factors. In the short and medium terms, monetary accelerations and decelerations affected the monetary and real components of income. But while their effects on the former were permanent, their effects on the latter were temporary. Hence the difficulties of a monetary policy aiming at persistent stimulus of real output above the "normal" or "natural" rate, which would require steady accelerations in the quantity of money. The desired higher growth rates in real output could only be maintained with additional monetary impulses, generating increasing inflation rates. (Similarly, monetary decelerations would lead to declines in prices, provided that prices were downwardly flexible. Otherwise, it would be a slow process to overcome the induced contraction in real output).

Under the monetarism philosophy, the relationship between the unemployment rate and the inflation rate should not be stable or permanent. The authorities could not choose an effective unemployment rate below the "natural" level or hold it at a limited cost of inflation. To maintain the effective unemployment rate below the "natural" level, the authorities should be prepared to apply repeated monetary impulses and to accept successive nominal wage and price increases; and the more frequent these are, the more rapid the adjustment in workers' expectations of further inflation. If monetary acceleration were not maintained, the effective unemployment rate would move towards the "natural" rate.

Monetary theory, in short, had changed substantially: it was now thought that economies did not require stabilisation policies as frequent as those considered appropriate during early Keynesianism. Monetary policy was now considered a more powerful weapon than fiscal policy, and therefore action in this connection was more dangerous.

Monetarists, moreover, believed that economists, and particularly those in central banks, tended to overlook the destabilising power of discretionary, activist monetary policies. Monetarists therefore proposed monetary policies based on the "rules versus discretion" criteria, the ultimate aim of which was growth in monetary income consistent with achieving medium- and long-term price stability, pursuing this latter goal using as an intermediate target the stable growth rate of a monetary aggregate that had proven to be highly stable in empirical studies. As monetarist thought gained ground in central banks during the 1970s, central bank research shifted to the selection of the most stable monetary aggregates and to the establishment of the objectives pursued.

Friedman and his followers' attention to the expectations formation process and the role of expectations in many economic processes led, during the 1970s, to a resurgence of John Muth's criticism launched in 1961 on expectations formation in economics, and to the adoption of the assumption that agents behave rationally in forming their expectations regarding economic variables. This approach was tantamount to assuming that agents' expectations were formed through the effective use of all relevant information available to them at the time, information on not only the past and the present, but also on the future, e.g. regarding agents' expectations of significant economic policy shifts. Rational expectations did not, of course, imply an absence of forecasting errors. The effective values of a given variable could differ from rationally prepared forecasts, perhaps because the information available to agents was incomplete, or owing to the existence of unforeseeable uncertainties in the system.

During the early 1970s, Robert E. Lucas and his colleagues developed the models of the so-called New Classical Economics school, incorporating the assumption of rational expectations into continuous equilibrium models. These models caused a stir, particularly in the field of theoretical macroeconomics. They described competitive economies with fully flexible prices that continuously maintained market equilibria, with agents who behaved optimally, and whose rationality extended even to the development of their expectations. In these models, the impact of monetary impulses would depend on how the public would incorporate them into its expectations, in terms of intensity and effects: if an expected expansive impulse should lead to a real wage increase, the result would be an increase in the supply of labour, employment and output; if, on the contrary, the expansive monetary impulse were lost in price increases not accompanied by real wage rises, there would be no stimulating effect on the real economic variables. The result would therefore depend on the public's expectations as to future general price levels, such expectations being based on partial, incomplete information that is increasingly unclear the more removed prices are from their immediate environment, and on the experience of general price level performance in that economy. If the country were characterised by its inflationary propensity and by the marked volatility of its prices, workers would tend to interpret the monetary impulse as basically inflationary and would not make more labour available. If, on the contrary, the country were characterised by price stability, workers would interpret increases in nominal wages as a solid promise of increased real wages, and would make more of their labour available, inducing increases in output and employment. In sum, monetary impulses anticipated by the public and treated as inflationary will be neutral in respect of the economy's real variables; if not anticipated by the public, these impulses will affect the real variables, but only

on temporarily. When brought to workers' attention, and incorporated into their expectations as inflationary impulses, the expansive effects on output and employment will taper off. The authorities may insist on surprise or deceit, but workers will quickly learn and react with increasing speed, cancelling out the real effects pursued by monetary policy. (Similarly, deflationary monetary policies, if unexpected or unanticipated, will have contractive effects on output and employment. If, on the contrary, the policies are anticipated, painless disinflation will ensue and nominal wages and prices will fall without affecting the supply of labour and employment).

In short, systematic, anticipated monetary impulses that agents incorporate into the relevant information used in forming their expectations do not, in these models, have effects on the real variables of the economy in any term. Surprise, unanticipated monetary impulses may affect real variables in the short term, but only very temporarily, as the abundance and speed of information in today's world will enable agents to correct their errors of perception quickly. Indeed, both the anticipated and unanticipated components of monetary impulses will have persistent effects on price levels and the rate of inflation. Since the real effects of monetary impulses will be non-existent or fleeting, and will always leave in their trail permanent increases in inflation, continuous equilibrium models with rational expectations propound the advisability of eliminating monetary surprises, abandoning discretionary, activist policies, and adhering to stable rules of growth in the money supply aimed at achieving price stability.

These theoretical underpinnings, the guiding principles of the new monetary policies as from the 1970s, appeared in opposition to the basic concepts of Keynesian monetary thought that dominated in the past. In contrast to Keynes' concern with the instability of private-sector demand and his proposal to support economic stabilisation with compensatory demand policies of a fiscal nature, giving only a secondary role to monetary policies, subsequent policies would attribute less importance to private-sector instability and the leeway given to stabilisation policies. In contrast to the instability and the questionable role that Keynesianism attributed to monetary policy as a cyclical compensation instrument, subsequent policies underscored the relative stability of the demand for money and the potential of monetary impulses, to the extent of pointing out the risk that monetary measures (more energetic than fiscal ones) might act as factors of economic instability and accentuated fluctuations. In contrast to the Keynesian acceptance that monetary impulses could have persistent effects on real variables in the short term, later policies questioned their capacity to affect real variables in the short term and on a sustained basis, as they could be expected to have regular and lasting effects on monetary variables. In contrast to the Keynesian view that encouraged the authorities, using discretionary monetary policies, to seek optimal positions in each programming subperiod (in terms of unemployment and inflation rates, for example), subsequent views, seeing policy as a set of strategies between the authorities and the public, insisted that the authorities pursue controlled policies to maintain the rate of growth in the money supply announced to the public, and to which the public had adapted its price expectations. This was because subsequent discretionary deviations from this path, in pursuit of enhanced social welfare, obtained through higher levels of output and employment, would generate increases in the inflation rate and upward revisions in the public's price expectations. And ultimately,

inconsistent monetary policy over time would lead to a combination of unemployment and inflation rates less favourable to social welfare than the combination perceived as the point of departure in the monetary strategy. A better option would have been for the authorities (the central bank) to forgo their discretionality and follow the initially announced rules.

Through inconsistent monetary policy over time, i.e. in having failed to comply with the initially proposed rules of stability, the central bank will have lost credibility, with the public aware that the central bank would prefer to reduce the unemployment rate at the cost of higher inflation levels. The announcement of resumption on the part of the central bank of a policy of greater stability would therefore be met by mistrust by the public. The public will prove very resistant to revising its inflation expectations downwards, and that will greatly hamper the announced new stability policy. The process of reducing the inflation rate will be slow and costly in terms of employment and output.

Should the cost the monetary authority attributes to higher inflation be successfully raised, the public would be less fearful in its expectations of new expansive impulses, enabling a downward shift in the monetary equilibrium path, i.e. toward lower inflation rates, with the unemployment rate remaining at its natural level. In many countries, this situation has led to the introduction of substantial reforms in the institutional structure of monetary policy. The most noteworthy reform entailed removing monetary policy from the purview of governments, which are consistently subject to multiple pressures, and entrusting its design and implementation to independent central banks, also vested by law with maintaining price stability as a primary objective. Such reforms can be strengthened by appointing a conservative expert as governor of the bank, who attributes a higher cost to inflation than does society at large. The governor's anti-inflationary propensity should be strengthened through a contractual relationship that makes his or her tenure and compensation contingent on price stability policy performance.

Those in favour of subjecting central banks to rules that apply credible restrictions to future monetary policy conduct, and who do not believe that institutional independence alone can eliminate the risk of inflation inherent in discretionality, may advocate retaining price activity as the central bank's only concern, requiring observance of highly stringent standards. Few economists, however, now advise such a drastic reduction in monetary policy objectives, and no central bank is prepared to forgo in full the use of monetary policy to achieve real short-term economic stabilisation effects. As a result, central banks subject to stringent rules, and whose objectives are explicitly and predominantly price stability, normally reserve some margin of policy flexibility. Accordingly, their objectives, whether intermediate ones expressed in terms of rates of change in certain monetary aggregates, or direct objectives defined in terms of rates of change in prices, are set as a range to allow some flexibility in the short term. Objectives, too, are therefore normally defined so that supply shocks do not require an immediate monetary policy reaction, and may be partially and gradually accommodated, to prevent the adjustment imposing appreciable shocks on the real variables. The margins of flexibility could be expected to vary, of course, from one central bank to another, as would also be true for the emphasis placed on the objective of inflation as a dominant factor, and the reserves introduced to prevent strict pursuit of such an objective from generating high levels of instability in the real economy.

Commitments undertaken by central banks, in the form of rules on meeting certain intermediate targets as an expression of their willingness to maintain monetary discipline must, from time to time, be abandoned as impossible or unreliable. This was true for the objective of maintaining an exchange rate pegged to a stable currency in the wake of the exchange shocks during the 1970s; and during the 1980s and 1990s, with the objectives of maintaining growth rates in specific monetary aggregates within certain limits, following the substantial instability observed in their velocity and demand functions, resulting from deregulation policies and the introduction of numerous financial innovations. In such cases, central banks should adopt new strategies that inspire public confidence that a disciplined monetary policy will be maintained. Many central banks have in recent years directly adopted inflation rate targets and used the short-term nominal interest rate as a basic monetary instrument.

Under this strategy, the central bank announces formal inflation rate targets for one or more horizons, indicating maintenance of a low, stable inflation rate as a dominant monetary policy aim. A direct inflation target is not a rule. In fact, the shift to this strategy implies gaining room for flexibility and discretionality to address supply shocks and unexpected developments, but the bank has to be accountable for the policy it implements, and its potential impact on longer-term inflation. The strategy with direct inflation targets has been characterised as a hybrid position entailing restricted discretionality.

Given the current circumstances of central banks, it can be said that the debate between those who defend strict rules of monetary discipline and those who advocate discretionality in implementing "optimal" policy over time has lost much of the edge that characterised it a few decades ago. Rules-based strategies offering the central bank reasonable room for flexibility, discretionality practised by authorities who attribute a high cost to inflation and restricted discretionality normally associated with direct inflation targeting strategies can all lead to disciplined monetary policies capable of earning public credibility. While price stability is predominant among a central bank's objectives, headroom is still maintained so that monetary policy can contribute to real short-term economic stability in special circumstances.

This relative convergence of monetary policy strategies is an expression of the observed convergence, to a large extent, in their theoretical underpinnings during recent years. On the one hand, the Keynesian models have adopted the assumption of rational expectations, since their introduction during the 1970s, as the best available approach, to date, for understanding the formation of expectations by economic agents. They have accepted the basic criticism directed at them in terms of their introduction of *ad hoc* assumptions to generate price rigidities, without sufficient rational microeconomic underpinnings, which are the cause of imbalances and difficulties in restoring equilibrium. They have attempted, and not always successfully, to provide rational bases for the rigidities they introduced. While retaining margins for stabilisation policies, they admitted the limits and risks the latter entail, and also they share the misgivings about discretional, activist monetary policies. On the other hand, continuous equilibrium models with rational expectations have experienced notable difficulties in the empirical verification of what is known as the monetary policy ineffectiveness proposition and the basic difference between the real effects generated by systematic monetary impulses and surprise impulses; they have had to face substantial

differences in the impact of monetary impulses resulting from minor changes introduced into the information structure of the models; and they have resorted, in many cases, to the introduction of price and wage rigidities that justify the observed duration of the fluctuations and real effects prompted by monetary impulses.

This has all led to the spread of monetary policies more conducive to price stability than in the past, but which do not rule out the reservation of headroom, which varies from one central bank to the next, to permit a monetary contribution to real short-term economic stability in specific situations. Substantial results have been obtained with these strategies in recent years. The average inflation rate declined from 9 percent to 2 percent per annum in industrial (OECD) countries between the first half of the 1980s and the initial years of the 21st century, and from 31 percent to 6 percent in the developing countries during the same period. In recent years, central banks have therefore tended find themselves in "low-inflation settings" where, although monetary stability is never conclusively entrenched, their work is made easier by the credibility they have acquired.

General framework

1. Analysis of the Spanish economy from Banco de España´s perspective

José Luis Malo de Molina

1 Objectives of the book

Throughout its 75-year history, the *Servicio de Estudios*[1] has devoted substantial effort to the analysis of the Spanish economy, in support of the core functions of Banco de España. Its work has gained particular relevance in recent decades as a result of the increasing focus on monetary policy and the growing importance of financial developments.

The results of the analytical work of the *Servicio de Estudios* have been projected both domestically and internationally. From the domestic standpoint, the *Servicio de Estudios* has essentially been responsible for providing information in support of monetary policy decisions, monetary strategy formulation and the day-to-day management of the instrumental variables in order to achieve macroeconomic and financial stability. At the same time, the *Servicio de Estudios* has provided advisory support to economic policy managers in other areas, reflecting the Bank's specific institutional standpoint and its own objectives. At the external level, the analysis of the Spanish economy has proved to be a key mechanism in communication and transparency, as well as a very powerful means to influence the formation of expectations, thereby helping enhance monetary policy effectiveness. In estab-

[1] The name "Servicio de Estudios" ("Research Department") has long carried considerable weight and has always been immediately recognisable among Spanish academics and professional practitioners in the field of economics. Currently, its official name in English is the Directorate General Economics, Statistics and Research (DGESR); however, it has been deemed desirable to retain the traditional Spanish name in the English version of this book.

lishing an appropriate framework for effective external communication, the analytical work of the *Servicio de Estudios* also serves in a social persuasion capacity to seek sufficient support for the objectives of macroeconomic and financial stability and preservation of the value of the currency.

The *Servicio de Estudios* has pursued its analysis of the Spanish economy with a broad range of instruments. These include a wide variety of studies and research projects on specific or methodological issues, as well as monthly, quarterly and annual reports covering Spanish economic trends from the real and financial standpoints, or discussing some of their more relevant aspects, such as the business situation, the labour market, financial markets, etc.

The central focus of the *Servicio de Estudios* has consistently been to hone its analytical techniques, which have been made available in a variety of publications. There has, however, been no systematic effort to publish these techniques to date. This book intends to draw together and disseminate the analytical methods currently used by the *Servicio de Estudios* of Banco de España to assess Spain's economic and financial situation, and its future outlook. It therefore aims to enhance transparency in respect of analytical techniques and their practical applications, and to provide information that may be of interest in certain academic circles, and in other areas more closely related to economic policy and the financial markets.

The book will accordingly address analysis of the Spanish economy from the standpoint of its membership in the Economic and Monetary Union (EMU), which entails substantial innovations in the traditional analytical practices in economies with full monetary policy sovereignty. Monetary integration has clearly led to changes in Banco de España's functions. While it participates in the single monetary policy of the Eurosystem, it does not take decisions on its own. Two significant consequences arise from this.

First, to contribute to the design and management of the common monetary policy, the *Servicio de Estudios* has had to assume analysis of the euro area as the area proper to Spanish monetary policy, so as to obtain reasoned, autonomous opinions on strategy configuration and decisions on interest rates in the area. In this connection, the *Servicio de Estudios* also must monitor the key European policies such as the Stability and Growth Pact (SGP), the overall thrust of economic policy, and the stability programmes and structural reforms, among others.

Further, owing to the requirements and the restrictions it entails, EMU membership, by contrast, introduces a certain shift in the focus of the analysis of the Spanish economy. Banco de España's fundamental objective continues to be to maintain macroeconomic and financial stability. Participation in EMU ensures the continuation of a regime of stability and safeguards interest rates and financial variables from shocks potentially deriving from any episodes of uncertainty that may occur in connection with the national economic policy stance. But this does not preclude new disequilibria emerging, which cannot be combated with monetary policy instruments. Under these conditioning factors, analysis of the Spanish economy should particularly heed the repercussions arising from the fact that the most appropriate monetary policy for the euro area as a whole may not coincide with what the Spanish economy's domestic situation requires. Banco de España must be prepared to act, in these circumstances, as the voice of the Eurosystem before the problems in the Spanish

economy, to convey to agents and to the authorities the requirements derived from the common monetary policy.

This introductory chapter will address a number of questions that shape the content of this book. We shall begin with a review of Banco de España's experience in the role of economic analysis in exercising its institutional functions, particularly in the current framework resulting from EMU participation. We shall subsequently focus on the various areas of Spanish economic analysis conducted by the *Servicio de Estudios* and the special features stemming from Banco de España's specific objectives. We shall then devote some time to a discussion of economic forecasting as a focus of integration and element of interaction for the various analytical approaches. A central component of applied economic analysis, economic forecasting is a recurrent theme throughout this book. Its general characteristics should therefore be presented from the outset so it may be understood. The last section provides a summary discussion on the structure adopted to present the key topics addressed in the various chapters of the book.

2 Banco de España's experience

The path Banco de España has followed in addressing its analytical tasks has run parallel to the rate at which it has assumed the inherent functions of a central bank. Economic history has explained the factors that led to the belated development of such functions and the delay in discharging its economic analysis responsibilities. The *Servicio de Estudios* was established in late 1930, against an international background marked by seriously heightening risks of macroeconomic instability and as a consequence of all the challenges the situation posed. For many years, Banco de España's subordination to the requirements of the Public Treasury inhibited development of an active monetary policy, in an economy constrained by numerous interventionist mechanisms, rigid protectionism and a clear tendency toward instability. Economic analysis was not a priority at that time.

The establishment of an active monetary policy, as a pre-requisite for the macroeconomic stabilisation and international integration that the modernisation of the economy demanded, provided essential impetus to the development of analytical tasks, with the twofold aim of setting an appropriate monetary policy strategy in place and assessing the conjunctural situation. The disequilibria generated during the 1970s in the difficult context of political transition accentuated the weight of monetary policy tasks and amplified the challenges Banco de España faced in the area of economic analysis [see Rojo and Pérez (1977)]. The ever more stringent requirements arising from international integration subsequently led to conflicts over the stance of national policies, posing difficult dilemmas for the monetary authorities, who required an increasingly broad analytical arsenal to cope with the growing complexity of macroeconomic problems. We shall attempt to provide an overview of this trajectory in the paragraphs below [see Malo de Molina (2003)].

During the mid-1970s, efforts to recover the stabilising functions of monetary policy were up against the scant social support accorded to Spain's economic stability objectives at that time. Deep-seated price- and income-indexation habits strengthened the inertia of inflationary pressures and raised the cost of stability policies. The construction of an active

monetary policy capable of exerting effective control on inflationary trends proved an enormously complex task requiring simultaneous progress on multiple fronts: the strengthening of Banco de España as a monetary authority; the development of operating models of monetary policy strategy in terms of stability objectives; the design of effective mechanisms for intervention on the money and exchange markets; and the securing of increasing social support for its stability targets and sufficient credibility for its anti-inflationary monetary policy stance.

This situation required numerous reforms in the institutional framework for monetary policy, and the use of a broad mix of strategies ranging from more traditional monetary aggregate targets (with various options) to direct inflation targets; and ultimately, the irrevocable fixing of exchange rates vis-à-vis the euro. This approach required the constant refinement of operating procedures, in keeping with the rapid changes taking place in the markets.

During the early 1970s, the authorities began with the introduction of a two-level liquidity control strategy. At the first level, a number of end targets were established in terms of inflation and growth in output, pursued through the control of a broad money aggregate (first M3 and subsequently liquid assets held by the public), which served as an intermediate monetary policy target. At the second level, Banco de España controlled an instrumental variable (first bank reserves and subsequently the reference rate) which was presumed to be closely related to the intermediate target.

In the presence of an oil price supply shock, this strategy was initially applied with a very large measure of gradualism, although, with the institutional reinforcement that the inclusion of monetary targets under the Moncloa Pacts entailed, the tightening of monetary policy as the key anti-inflationary instrument was becoming increasingly evident. The effectiveness of this approach, against a background of substantial price pressures and insufficient co-operation in other economic policy areas, weakened as economic activity and markets progressively grew and as cross-border financial flows intensified. These developments blurred the boundaries of the monetary aggregate under control, requiring its constant redefinition; they interfered with the monetary impulse transmission mechanism; and they increased interaction between domestic financial variables and the increasingly sizable and volatile international financial flows.

The economy's gradual external exposure brought to light increasing implications for external monetary policy equilibrium, with growing importance assigned to the behaviour of the exchange rate. This focus, amid frequent frictions between domestic targets and the exchange rate, culminated with the peseta's incorporation into the exchange-rate mechanism of the European Monetary System (EMS) in 1989. This step strengthened the stability mechanisms, opened the doors to the nominal convergence process and led to the establishment of a number of mechanisms which, despite the inevitable difficulties along the way, would ultimately be useful in the future access to the euro. This option, however, involved ambitious requirements in terms of socio-economic policy consistency which, if not adequately met, would lead to serious monetary policy dilemmas, requiring a choice to be made between prioritising domestic stability requirements and meeting exchange rate commitments. The unbalanced economic policy mixes used during the initial convergence efforts led to a systematic deviation from the targets set for the monetary aggregates and a substantial real appreciation of the peseta, with the resulting erosion of competitiveness.

That inevitably led to a sequence of devaluations of the peseta that began with the September 1992 EMS crisis. Among many other issues, this situation meant a grave forfeit of monetary policy credibility and led to a loss of the nominal anchor for the economy.

The return to the path of convergence, following the period of turbulence between 1992 and 1994, required a serious economic policy shift entailing a far-reaching change in the monetary policy model, affecting both institutional arrangements and the targeting framework. In terms of monetary policy strategy, Banco de España opted to implement a direct inflation targeting model that defined suitable medium-term references to move on a path of convergence towards the price stability levels in the core European Union (EU) countries.

This new strategy, which secured the vital support of enhanced fiscal policy discipline, made it possible to restore credibility and increase the stability-geared effectiveness of monetary policy, contributing decisively to the attainment of the convergence criteria that would allow Spain to enter EMU as a founding country. Once the markets perceived that this approach was highly likely to succeed, a series of expectations and confidence mechanisms that substantially alleviated the risks that might have been expected during the final phase of the process were launched. Thereafter, the relevant monetary strategy and decisions for Spain have been those established by the Eurosystem, for the euro area as a whole, in a context of fully integrated money markets and full interest rate convergence.

Banco de España's response to all of the monetary policy challenges it has faced over time, particularly in recent decades, has shaped the analytical tasks of the *Servicio de Estudios,* which has traditionally focused on major issues arising from the requirements of macroeconomic and financial stability in Spain. It is beyond the scope of this work to provide an historical review of this type, which can be found in detail in Martín Aceña (2000). We should, however, confirm that the entire analytical arsenal currently used by Banco de España, which this book specifically is designed to cover, stems from the rich contributions the *Servicio de Estudios* has made, throughout its history, to the analysis of the Spanish economy and the formulation of proposals on economic policy in general, and on monetary policy in particular. Luis Ángel Rojo, as Director of the *Servicio de Estudios* (1970-1988), Deputy Governor (1988-1992) and Governor (1992-2000), has been a key figure throughout the process, as the main inspiration and planner. His extensive published works on economic analysis and the Spanish economy provide numerous references on the theoretical and empirical challenges of the *Servicio de Estudios* [see, for example, Rojo (2004)]. His words on the role of the *Servicio de Estudios* are particularly relevant. According to Rojo, "Monetary policy cannot be driven by events. On the contrary, monetary decisions, which are pivotal to the behaviour of the general price level in the medium and long run, must be based on reasoned assumptions about the future course of the economy and on its likely impact on prices, on the means of transmission of the effects ensuing from monetary policy decisions and on the lags and the intensity with which these effects will unfold. This requires the accumulation of far-reaching statistical information, most of which is generated by the *Servicio de Estudios* itself; the continuous revision of theoretical assumptions using the appropriate empirical fundaments; the ongoing preparation and updating of forecasts; the continuous examination of the behaviour of other economic policy areas that affect monetary policy operating conditions and results; and the likewise continuous analysis of changes in international factors which, as has become clear in recent years, have a very

substantial bearing on Banco de España's policy strategy and implementation" [Rojo (1997), p. 50].

As discussed above, EMU integration changed the nature of Banco de España's responsibilities in the conduct of monetary policy, increasing – rather than reducing – its analytical responsibilities, owing to the complexity of the new situation. The growing importance of monetary policy in the stabilisation strategy led to Banco de España's autonomy, as confirmed by law. Under the current Law on Autonomy of Banco de España, approved in 1994 and amended in 1998 for full adaptation to the requirements of the Treaty establishing the EMU, Banco de España was entrusted with the tasks of applying the single monetary policy of the European Union in Spain. Under this legislation, Banco de España is responsible for defining and executing Community monetary policy [Article 7, Section 3 (b)]. As a result, according to the statute of the European System of Central Banks (ESCB), Banco de España participates in the design and implementation of monetary policy for the euro through the Governor's participation in the Governing Council of the European Central Bank (ECB) and through the participation of its experts in the broad system of committees within the Eurosystem. To carry out these functions, the Bank is fully independent from the national and community authorities, and has the required analytical and statistical capacities.

Within the Eurosystem, the national central banks (NCBs) participate in a federal structure in which their governing bodies (Governing Council of the ECB) take unified decisions on strategy design and the management of instrumental variables, and are responsible for uniform communication under the principle of one voice. While Banco de España's analytical autonomy with reference to monitoring of the euro area and single monetary policy design and implementation is pursued within the Eurosystem, its external communications are subject to the system's rules of unified action.

The reality of EMU is quite particular, as unified monetary policy coexists with the maintenance of other national policies which, though subject to a number of common guidelines, certain rules of discipline, and co-ordination and mutual supervision mechanisms, are under the sovereign jurisdiction of the member countries. The lack of consistency between national policies and the common monetary policy stance is possibly the main source of disequilibria within the EMU macroeconomic system. The EU institutions (particularly the Council, the Commission and the ECB) have some authority to point out these problems when they take on a Community dimension that may affect the credibility and effectiveness of the area's institutional framework.

Member countries are responsible for adapting their national economies to the requirements derived from the common monetary policy, and the national central banks, as indicated, are the voice of the Eurosystem in identifying and addressing potential problems. Analyses of the Eurosystem and their attendant messages refer to the area as a whole, and only in extreme cases can they move to the level of specific national issues. This is the task of the NCBs and is a source of new analytical challenges owing to the complexity of the new macroeconomic system.

To carry out these tasks, it is incumbent on Banco de España to publish regular reports on developments in the Spanish economy. The preamble of the Law on Autonomy of Banco de España states, in this connection, that "The Bank may report to Parliament and the government on any obstacles that hinder monetary policy from achieving price stability,

which will help permit an appropriate balance in overall economic policy-making." The list of functions entrusted to the Bank specifically establishes the function to "advise the government, and prepare any reports and studies deemed necessary" [Article 7, Section 5 (e)], in the framework of Section 2 of the same article, which states that, "without prejudice to its primary objective of maintaining price stability and fulfilling its duties as a member of the ESCB in accordance with the terms of article 105.1 of the Treaty, the Bank shall support the general economic policy of the government." Text drafted by the legislature closely parallels the statement of the objectives of the ESCB in Article 2 of its Statute. The Bank is also required, in discharging its duties, to "compile and publish statistics related to its functions and assist the ECB in the compilation of the statistical information needed for the fulfilment of the ESCB's functions" [Letter (f) of the same section].

EMU membership therefore has not altered Banco de España's mission to advise the government on its economic policy conduct, on the basis of its analytical independence and in compliance with the objectives of macroeconomic and financial stability incumbent on it.

3 Banco de España's different analytical frameworks and specialised focus

A central bank performs a broad range of analytical functions. Knowledge of the real economic situation and the basis for economic policy decisions is ultimately the aim of economics as a social science, which, as we know, is eminently prescriptive in nature. A central bank's analytical concerns cover virtually all of the broad spectrum of applied economics, although their specific focus is derived from the bank's objectives and functions.

Applied analyses may pursue a wide variety of goals that are determined largely by the objectives of the institutions or players that undertake them. For example, the International Monetary Fund (IMF), which is responsible for maintaining a series of fundamental equilibria in the world economy, essentially to prevent disruptions in international markets, might conduct different types of analyses than the European Commission (EC), which is responsible for multilateral supervision in respect of compliance with the Treaties and adherence to the main EU economic policy guidelines. We can easily imagine the differences that might exist between the type of work carried out by institutions that use analyses to try to anticipate financial market activity and to obtain benchmarks for their own purposes, from others, such as universities or economic institutes, which aim to contribute to an objective, independent knowledge of the real situation, as befits their professional standing. All of these differences are clearly reflected in the specific features of the approaches adopted and in the scope of their implications.

The differences between analyses conducted by managers of different economic policy areas, where the assigned objectives and the role of the variables under their direct or indirect influence are predominant, are particularly important. For the fiscal authorities, proper use of analytical techniques is essential in formulating macroeconomic scenarios to support the content of budget policy and to assess the impact of alternative measures. General government budget figures are of little use unless considered in a macroeconomic context that normally should cover a medium-term time horizon. Further, without a sufficiently developed analytical system, it is impossible to assess the macroeconomic impact of the budget

and its own impact on the general government account balance and on trends in the stock of public debt. The requirements to be met by the stability programmes of the EU member countries, which are relatively standardised under Community regulations, provide an eloquent example of the central place that applied analysis occupies in fiscal assessment and programming techniques. Clearly, in such cases, there is a specialised area that applies particular precision and detail in processing the data and variables related to the economic performance of general government.

Central banks must optimise their analytical and diagnostic capacities to perform their assigned functions in the areas of monetary policy and macroeconomic and financial stability. Monetary policy is the most flexible economic policy component and the most powerful one in the short term, but it is conducted amid substantial uncertainty, as the information on the current state of the economy available at any given time when monetary policy measures are required is generally insufficient. In Alan Greenspan's words, "Uncertainty is not just an important feature of the monetary policy landscape; it is the defining characteristic of that landscape" [Greenspan (2003)]. To minimise the risks posed in conducting this policy, it has proven essential to manage statistical data and theoretical and empirical analysis tools as efficiently as possible. The sound use of analysis is essential to avoid, as far as possible, the erratic, procyclical, or destabilising behaviours that have perturbed the economic history of industrial countries and have been the focus of concern for economic policy analysts and managers, although there are clearly limits to the statistical, analytical and empirical tools that can prevent us from avoiding all forecasting and diagnostic errors, and inappropriately timid or overly bold responses.

A better perception of the economic situation and forecasting of its future course are some of the prerequisites for optimal use of monetary policy instruments. Ongoing assessment of the limits to the knowledge on which authorities and agents base their actions is important to reduce errors derived from misperception or inexperience. It is therefore not surprising that central banks should have particularly bolstered their economic analysis departments and cultivated open channels of communication with the academic community. Central banks use the results of academic research as an important input for their analytical work, which in turn provides beneficial contributions to the academic debate. This type of relationship, expressed in the various fora and platforms that have proliferated in recent years, has generated worthwhile synergies in important areas of economic analysis.

A central bank's approach also entails certain biases attributed to specialisation, besides of course those derived from the normative, positive monetary policy approach. The analysis of price formation and inflation rate determinants is central owing to the importance of macroeconomic stability among the assigned institutional objectives. Mechanisms used to influence the economy attach great importance to the role of financial variables in their relationships with real variables and to agents' behavioural relationships, which determine the transmission of monetary impulses[2]. Balance sheets and financial flows are also to the fore owing to their potential effects on financial stability and bearing on spending decisions.

[2] Numerous examples of the importance of these aspects of analysis conducted by Banco de España can be found in the book entitled *La política monetaria y la inflación en España* (1997).

Unquestionably, the analytical approach of a central bank such as Banco de España places special emphasis on the factors that affect the stabilising action of macroeconomic policies. This approach should not, however, be understood as a pre-eminence of growth and inflation analysis, in a short and medium-term time horizon. This is true for a number of reasons. First, although monetary policy has the greatest capacity to influence the economy in the short and medium terms, long-term performance, i.e. the economy's capacity for capitalisation and growth, has decisive effects on conjunctural developments and influences the scope for monetary policy action. For the same reason, the approach should not be limited to macro-magnitudes alone, as knowledge of the microeconomic fundamentals underlying aggregate behaviour is essential. Second, real aspects of the economy cannot be analysed adequately without considering their interaction with monetary and financial factors, which can be influenced more directly by monetary policy. Indeed, analysis of financial flows and their impact on agents' decisions and trends in macroeconomic variables is the most specific feature of a central bank's analytical approach. Third, knowledge of the institutional and regulatory framework in which markets, agents and institutional sectors operate is essential to understand properly their economic conduct and to assess their influence on the key variables. The real situation cannot be accurately analysed without a thorough knowledge of the institutional framework in which economic activity takes place. This assertion is particularly important in certain sectors where the role of economic policy measures is telling, as is the case for the labour market, financial markets, the public sector, etc.

It therefore cannot be said that the specific focus of Banco de España's analysis is determined by an approach by topic, i.e. an approach that is microeconomic or macroeconomic, conjunctural or structural, strictly economic or institutional, current or historical. Rather, its approach is determined by the range of topics that have priority in the Bank's operations, in light of the actual state of the economy, and which become priorities on its research agenda, in working programmes and in the focuses of reports, as indicated in the contents of this book, outlined in the last part of this chapter.

The central bank's approach to these areas of analysis has much in common with the methods used in academic circles. Notable in this connection is the use of rigorous analytical approaches and of a broad range of techniques designed for empirical and econometric studies, including the most sophisticated mechanisms, as we shall discuss in the next segment. The central bank's focus, however, is characterised by its clear orientation towards providing the foundations for monetary policy decisions, maintaining macroeconomic and financial stability, and advising the government in other economic policy areas. It aims to combine analytical rigour with a specific goals-oriented approach, to obtain results applicable to its task as an economic policy manager.

For its analytical tasks, the central bank draws on a diversified, progressive analytical base, occasionally using competitive conceptual approaches on a complementary basis. This somewhat eclectic use of economic theory is a legitimate means of assessing a highly complex reality brought about by widely diverse influences, as the available theoretical models are based on simplistic assumptions. Rather than aiming to discriminate between the explanatory capacity of alternative assumptions – although this is one of the objectives of research work – the use of theoretical fundamentals in economic analysis aims instead to

find the most complete, plausible view of the features of the reality to be addressed by economic policy.

A wide variety of empirical models is also used, depending on the nature of the problems studied, on the general or partial framework of analysis and on the time horizon involved. Empirical models are a fundamental tool for understanding relationships between variables, so that they can be interpreted consistently with the available theoretical mechanisms, for projecting these variables on the basis of the estimated relationships, for formulating forecasts consistent with observed performance and with the information included in the indicators, and for evaluating the impact of economic policy measures and potential shocks. Kacapyr says, "For politicians, economists, businesspersons, and others concerned with the state of the economy, forecasts help shape the debate over economic policy" [Kacapyr (1996), p. 5].

In Banco de España's case, and as Spain is part of the Eurosystem, its economic analysis should be integrated into and co-ordinated with the euro area as a whole. Banco de España's task is to provide the Spanish input for common analysis of the area, while determining the implications of single monetary policy decisions on the Spanish economy, in terms of its macroeconomic and financial stability, thereby making it possible to identify potential conflicts with other aspects of the economy that may jeopardise the objectives of convergence and growth in the long term.

Both tasks are reflected in a wide variety of instruments that enable the monetary authority to communicate the results of its activities in the media and in fora characterised by very different levels of economic language and information requirements, ranging from interaction within Banco de España and internal communication within the Eurosystem of the information required for monetary policy decision-making, to dialogue with the academic world, exchanges of opinions and co-operation with other economic authorities, and the dissemination of worthwhile results to the public at large.

4 Economic forecasting exercises as a focus to integrate different areas of economic analysis

Time is a fundamental dimension in all economic processes. It is impossible to characterise the state of an economy, to identify its main problems and to diagnose relevant policy action without analysing trends in its macroeconomic aggregates over time. From this standpoint, forecasting the more or less immediate future is an essential input in identifying and assessing the trends that shape the present juncture. Economic policies in general, and monetary policy most particularly, must operate on a forward-looking basis, in light of the lags with which their instruments influence the relevant variables. Accordingly, their effectiveness hinges crucially on knowledge of the real situation that can be used to project present trends into the future. Economic forecasting is policy managers' main tool to delimit as far as possible the uncertainty in which they operate.

For this reason, most of Banco de España's analytical and empirical work amounts, more or less directly, to short- and medium-term macroeconomic forecasting. Forecasting exercises are a form of integrated analysis, which combines substantially conjunctural con-

tents, econometric modelling output and broadly structural knowledge acquired through research to obtain a coherent quantitative expression of the economic situation, in the form of a dynamic projection of National Accounts time series into the future. These projections essentially take the form of time trends in the set of macroeconomic aggregates, with the level of disaggregation and detail that the optimisation of estimation techniques advises. Table 1 reflects a typical version of the presentation of forecasts in this format. In this table, GDP is the central variable and is arrived at both on the side of the different components of demand and on the side of the aggregation of sectoral value-added figures. In fact, the forecasting of the macroeconomic aggregates requires the projection of an extensive set of the auxiliary tables and accounts that comprise Spanish National Accounts. A selection of those underlying the forecasting example in Table 1 is provided by way of example in an annex to this book.

The results of the forecasting exercises carried out by Banco de España are used in internal reports which, within the Eurosystem, make up its contribution to single monetary policy decision-making, support its diagnostic studies of the Spanish economy and provide essential inputs in the preparation of quarterly reports and the annual report, which are its principal external communication channel.

The purpose of these exercises is to provide an overall, quantified view of the key macro-magnitudes and to project an integrated scenario of their future course, to be used as a diagnostic assessment for the trends underpinning their performance and to assess the risks to which they are subject. The scope of this exercise should therefore not be limited to the numerical result of projections of the macroeconomic aggregates over time. The quality of the forecasts depends on their capacity to provide a structured, coherent interpretation of the economic reality analysed. The driving factors of growth, cyclical behaviour, the risks and opportunities they face and their economic policy implications must be described. The purpose of this introductory chapter is to provide an overview of the economic forecasting activity underpinning the structure of this book, as a focus for integration of the various analytical approaches and a point of interaction between the different subject areas.

4.1 Some thoughts on economic forecasting

It is difficult to provide a detailed presentation of the core of Banco de España's forecasting system without at least touching on some of the methodological factors comprising this sector of applied economics. As a forecasting exercise involves preparing a representation of an economy's most probable future, it is a vast, complex subject intrinsically shrouded in uncertainty. In academic circles, economic forecasting is presented as deriving from the application of econometric models drawing on various methodological bases. The lengthy experience of specialists in this area, however, has led to a more subtle definition: "Historically, the theory of forecasting that underpinned actual practice in economics has been based on two key assumptions: that the model was a good representation of the economy, and that the structure of the economy would remain relatively unchanged. In reality, forecast models are misspecified, the economy is subject to unanticipated shifts,

TABLE 1 KEY MACROECONOMIC AGGREGATES (a)

IN PERCENTAGE

	2002	2003	2004	2003				2004			
				Q I	Q II	Q III	Q IV	Q I	Q II	Q III	Q IV
1. Domestic final consumption expenditure	3.1	3.1	3.8	3.1	2.9	3.2	3.2	3.7	3.8	3.8	4.0
1.1. Domestic final consumption expenditure of households and NPISHs	2.9	2.9	3.5	2.9	2.7	3.0	2.9	3.4	3.6	3.5	3.5
1.2. Final consumption expenditure of gen. gvt.	4.1	3.9	4.9	4.0	3.5	3.8	4.2	4.6	4.7	4.8	5.4
2. Gross capital formation	1.8	3.4	5.4	0.1	2.6	7.0	4.4	3.5	5.6	6.7	6.1
2.1. Fixed capital	1.7	3.2	4.6	3.4	3.6	3.1	2.6	2.7	4.0	5.8	6.0
Capital goods	*-5.4*	*1.0*	*5.8*	*1.7*	*1.7*	*1.0*	*-0.3*	*-0.4*	*4.3*	*9.8*	*9.4*
Construction	*5.2*	*4.3*	*4.4*	*4.2*	*4.6*	*4.1*	*4.2*	*4.2*	*4.1*	*4.6*	*4.9*
Other products	*3.0*	*3.0*	*3.2*	*3.4*	*3.3*	*2.9*	*2.4*	*2.5*	*3.0*	*3.5*	*3.8*
2.2. Change in inventories (b)	0.0	0.1	0.2	-0.8	-0.2	0.9	0.4	0.2	0.4	0.2	0.0
3. Domestic demand (1 + 2)	2.8	3.2	4.2	2.4	2.8	4.1	3.5	3.6	4.3	4.5	4.5
Domestic demand (not incl. chg. in inv.)	2.8	3.1	4.0	3.2	3.1	3.2	3.1	3.4	3.9	4.3	4.5
4. Exports of goods and services	1.2	2.6	4.5	1.9	3.9	3.1	1.6	5.5	3.3	4.1	5.2
4.1. Goods	3.0	3.9	6.9	2.9	5.3	4.7	2.7	8.2	5.7	6.5	7.4
4.2. Services	-2.6	-0.4	-1.5	-0.5	0.5	-0.6	-1.1	-0.9	-2.7	-2.1	-0.3
Tourism	*-7.3*	*-0.3*	*-1.8*	*-3.1*	*0.9*	*0.5*	*0.7*	*0.1*	*-3.2*	*-2.0*	*-2.0*
5. FINAL DEMAND (3 + 4)	2.4	3.1	4.3	2.2	3.1	3.9	3.1	4.0	4.0	4.4	4.6
6. Imports of goods and services	3.1	4.8	9.0	2.8	4.7	7.9	3.7	8.0	8.2	9.5	10.2
6.1. Goods	3.4	5.2	9.9	2.5	4.8	9.2	4.1	8.6	9.1	10.5	11.1
6.2. Services	1.6	2.8	4.5	4.1	4.1	1.3	1.8	4.7	3.6	4.4	5.4
Tourism	*4.9*	*5.0*	*21.8*	*1.2*	*3.7*	*5.0*	*9.9*	*23.0*	*21.2*	*17.4*	*25.7*
Contribution of net external demand	*-0.6*	*-0.8*	*-1.7*	*-0.4*	*-0.4*	*-1.6*	*-0.8*	*-1.0*	*-1.7*	*-2.0*	*-1.9*
7. GROSS DOMESTIC PRODUCT (5 – 6)	2.2	2.5	2.7	2.1	2.5	2.6	2.8	2.7	2.6	2.6	2.7
MEMORANDUM ITEMS											
Lending capacity (+) or borrowing requirement (–) of the nation (% of GDP) (c)	-1.6	-2.1	-4.2	-3.4	-1.6	-2.6	-0.9	-4.4	-4.0	-5.1	-3.4
General government lending capacity (+) or borrowing requirement (–) (% of GDP) (d)	-0.1	0.4	-0.3	—	—	—	—	—	—	—	—
Domestic final consumption deflator of households and NPISHs	3.4	3.1	3.0	3.6	2.9	3.1	2.9	2.5	2.9	3.3	3.3
GDP deflator	4.5	4.0	4.4	4.7	3.8	3.7	3.8	4.1	4.4	4.5	4.7
Total employment (e)	1.4	1.7	2.1	1.3	1.5	2.0	2.1	2.1	2.0	2.1	2.2

SOURCES: National Statistics Institute and Banco de España.

a. Year-on-year rates of change based on seasonally adjusted data. Constant prices.
b. Contributions to GDP growth.
c. Gross data.
d. Definition in accordance with the Excessive Deficit Protocol.
e. Equivalent jobs.

and the failure to make accurate predictions is relatively common" [Hendry and Ericsson (2001), p. 1].

Admittedly, progress in economic forecasting theory has given us increasingly refined techniques to assess alternative predictions and to reflect a more dynamic performance of the economic structure. But as the authors of the most sophisticated methods have had to acknowledge, even the best econometric models are always a simplified representation incorporating certain shortcomings. A diverse combination of models must therefore be used to harness their comparative advantages, and strategies based on the comparison of results obtained with competitive or complementary methods must be employed. According to Hendry and Ericsson, cited above, "There are numerous ways of generating economic forecasts. Many are a mix of science – based on rigorously tested econometric systems – and judgment, occasioned by unexpected events: the future is not always like the present or the past" [Hendry and Ericsson (2001), p. 186]. Or, according to Stephen Hall, "[…] economic forecasting is far from an exact science; there is a real gulf between the treatment of forecasting given in most statistics textbooks and the practices of real world forecasters […] While the technical aspects of forecasting are developing rapidly, there is still a need for the expert forecaster who blends a complex combination of real world institutional knowledge with formal academic modelling techniques to produce a credible view of the future" [Hall (1994), p. ix].

Unfortunately, "There is no universally optimal method for blending all of the ingredients for an economic forecast. Even if we ignore all the concerns about data reliability and revisions, all the questions over the impact of recent policy changes, and all the speculation over possible exogenous shocks to the economy, there still remains the question about which basic forecasting technique is best" [Kacapyr (1996), p. 14]. The analyst's judgement therefore inevitably intervenes in various phases of the forecasting process, such as in the selection of statistical information sources and quantitative prediction techniques; in the identification of endogenous and exogenous variables; the construction of structural equations; the use of reduced forms; correction to reflect omitted variables; the specification of expectation formation processes; the selection of methods to assess alternative results and their ranking to obtain an integrated, coherent view; and last, the adjustment of model forecasts to reflect omissions.

We must bear in mind that uncertainty is at the heart of the problems faced in economic forecasting, that the main source of uncertainty is precisely, in Singer's very well-known words, "what we don't know we don't know" [Singer (1997), p. 37], and that it therefore lies outside the scope of any modelling strategy. It is the analyst's task to combine appropriately economic theory, the exploitation of available statistics sources and econometric analysis. But this combination must be subject to an explicit structure where the use of best practices in statistics forecasting techniques minimises false inferences based on the past and the forecasting errors potentially deriving therefrom.

A vital and increasingly difficult factor is to choose a suitable combination of structural and non-structural forecasting approaches. Structural approaches are defined as those that include and exploit the economic data through the prism of an explicit economic theory. By contrast, non-structural methods are fundamentally based on observed correlations between time series. This process depends on the relative success of the available

theoretical approaches at a given point in time in explaining macroeconomic developments. According to Diebold, "The hallmark of macroeconomic forecasting over the next twenty years will be marriage of the best of the non-structural and structural approaches, facilitated by advances in numerical and simulation techniques that will help macroeconomists to solve, estimate, simulate, and yes, *forecast* with rich models" [Diebold (1998), p. 189], an area in which the author admits that dynamic general equilibrium models offer great potential.

4.2 Banco de España's forecasting activities

Economic forecasting exercises hinge on the conceptual structure and statistical base provided by the national accounts. Accounting identities and definitions used in these exercises establish the framework of consistency criteria that must be met by any quantifications prepared at different time horizons and with different time frequencies. The national accounts are prepared with quarterly (CNTR) and annual (CNA) frequency. The former provide internally consistent estimates of a broad set of macroeconomic variables (output, demand, employment, wages and deflators). The latter incorporate these estimates into a broader annual framework in which the different accounts (output, generation of income, distribution of income, etc.) for the various branches of activity and institutional sectors (households, firms, general government and external sector) are also available. The annual national accounts provide an integrated quantitative representation of the economy that ensures a consistent relationship between variables and makes it possible to analyse macroeconomic equilibria and to conduct consistency checks. The quarterly and annual financial accounts (FASE) prepared by Banco de España incorporate, under the same conceptual framework, the financial component reflecting the behaviour of the institutional sectors and their stocks and flows, constituting the counterpart of their real equilibria and relationships.

Economic forecasting is an ongoing task carried out in successive rounds of complete exercises executed at previously defined time intervals – normally two or four times per year. Known quarterly and annual National Accounts series are the starting point for any of these exercises. Quarterly series are more current than annual ones, which are available less frequently and with greater lags. A substantial amount of disaggregated, dispersed statistical information is also available on indicators that are quite varied but nevertheless important for the behaviour of the National Accounts variables, and extend further into the future than those corresponding to the latest available quarterly accounts.

In preparing a scenario for the future course of the aggregates, two different time horizons are envisaged owing to the need (i) to incorporate the latest information, to maximise the capacity to forecast the more immediate future; and (ii) to provide a medium-term scenario which, as it incorporates relationships between relevant variables, can be interpreted in terms of economic agents' basic decisions, and can be used to analyse the basic economic equilibria. Owing to the existence of these time horizons, the most appropriate forecasting instruments must be selected for each case and appropriate mechanisms designed to combine the results obtained for each time horizon, so as to produce an integrated view ensuring that the results obtained for different time horizons are intertemporally consistent.

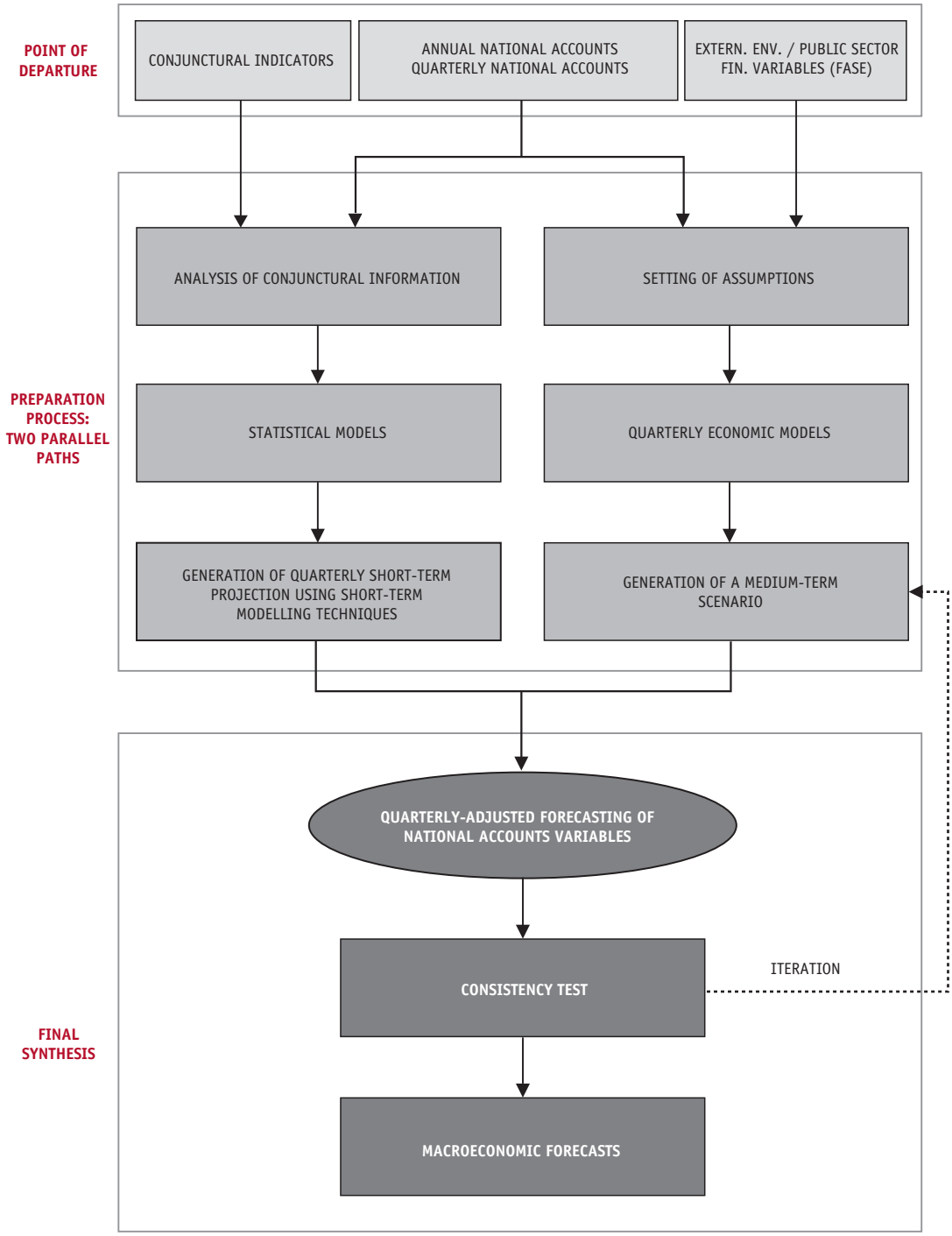
The main problems lie in the fact that different methodologies must be used to address different time horizons, as different information sets are applied in the two cases, requiring different analytical and econometric tools. In nearer time horizons, there are advantages with statistical techniques that make it possible to project different National Accounts aggregates based on indicators reflecting more forward-looking information, and those that maintain close short-term relationships that can be reflected in purely statistical time series and transfer function models. By contrast, in medium-term forecasting, econometric models drawing on economic theory and that properly represent the underlying behavioural relationships are essential.

The methodology used by the *Servicio de Estudios* of Banco de España [see Malo de Molina and L´Hotellerie (2004)] addresses the problems that arise in working with data of different frequency and different time horizons, through a combination of two parallel analytical paths that converge into one set of forecasts using an iterative process. One of these paths consists of using quantitative and qualitative analysis techniques with available short-term indicators to project Quarterly national Accounts (QNA) variables. When aggregated to reflect the National Accounts constraints, these projections provide a set of forecasts for two or three quarters following the latest known QNA information. The second path focuses on generating an annual and quarterly scenario two or three years ahead of the current year. These medium-term forecasts are based on external assumptions that define the external, fiscal and financial environment of the exercise, and they are obtained from a series of structural or reduced-form macroeconometric models. As the results obtained through both paths may not coincide in the shorter time horizons onto which they are superimposed, a process of iteration between the two approaches must be established to integrate them into one set of annual and quarterly forecasts for the entire time horizon of the projection exercise. During the iteration process, a series of consistency checks must be executed to help analysts decide which results should receive priority. Scheme 1 provides a synoptic representation of this procedure which, as a central focus of this book, merits discussion in this introductory chapter.

The first forecasting path, shown on the left in Scheme 1, consists as discussed of projecting the QNA data for the quarters immediately following the latest published figures. The latest conjunctural information is used as a basis for the projections, with the aim of replicating the set of baseline information used by those who prepare the QNA, or at least a broad subset of this information. This procedure entails two types of analysis: first, for each macro-magnitude, all available relevant indicators are analysed and assessed with univariate models and signal extraction techniques[3]. This overall approach provides the most comprehensive possible assessment of the moment of change in the various QNA variables. Further, by selecting the indicators that historically register greater correlations with the variables being projected, or by preparing a synthetic indicator based on the most relevant ones, analysts estimate a full set of transfer functions between these indicators and the QNA variables, which can be used to prepare a quantitative projection of these variables two or three quarters ahead, in seasonally adjusted terms.

[3] See Espasa and Cancelo (1993) for an in-depth examination of this type of technique and its application to conjunctural analysis.

SCHEME 1 MACROECONOMIC FORECASTING



These projections are interpreted to reflect all available conjunctural information, derived not only from quantitative indicators, but also from known institutional developments and opinion reports. During this phase of the process, as in others, the analysts' judgement, which combines quantitative and qualitative considerations, inevitably comes into play, thereby precluding use of pre-established rules or relationships. This is sensitive territory as it potentially entails some degree of discretion, possibly at the expense of the necessary analytical stringency. To avoid such risks, the assessments must remain on an eminently technical plane, so that the theoretical and empirical mechanisms, professional experience and independence of the experts support the quality of the results and uphold their standing.

This process is used to prepare short-term forecasts of the QNA variables two to three quarters ahead of the latest official publication. Estimation of the first of these quarters refers in fact to a more recent past period in respect of the time of preparation, although for which the QNA data are still pending. Owing to the method used to prepare these quarterly projections, the necessary consistency among the annual average figures produced cannot be achieved with time aggregation alone. To achieve this consistency, the preparation of medium-term forecasts using econometric models must be broached.

The main instrument in generating quarterly and annual medium-term econometric projections (two to three years ahead), i.e. the path depicted on the right in Scheme 1, is Banco de España's Quarterly Model of the Spanish Economy, although other reduced-form models (satellite models) are also used on an auxiliary basis for some sectors of the economic structure. The estimates are based on a set of assumptions on performance during the forecasting horizon for the variables considered exogenous. These assumptions refer primarily to the external context (growth in world trade and output, international prices, the exchange rate, oil and input prices, etc.), to the variables under control of the fiscal authorities in the form of government fiscal policy and to a number of financial variables such as interest rates and projected trends in the securities markets. The values selected for these variables significantly influence the forecasts that are produced and accordingly must be used to calibrate the risks posed to the scenario considered most probable.

A wide variety of carefully calibrated information sources are used to establish the external assumptions. Some information is obtained from international organisations, while in other cases it is from the *Servicio de Estudios* itself. In all cases, however, the information must be configured in a format consistent with the definition of the exogenous variables incorporated into the econometric models to be used. Assumptions normally used for interest rates and the exchange rate are technical, and consist of maintaining the same level as at the beginning of the exercise, or reflected in trends derived from futures markets for these variables. Further, from the standpoint of Spain's joining EMU, specification of a complete scenario for the euro area is particularly important in the external environment, owing to the close trade relationships existing with the area and to the considerable influence that economic trends in the area can have on other highly important variables for the Spanish economy.

Once the exogenous variables have been established with the assumptions for the exercise, the projections obtained with the quarterly model provide a medium-term scenario for the established time horizon, which is consistent with the empirically tested and analytically

justified relationships between the key macroeconomic variables. These projections are reflected in the quarterly trend paths of the key macroeconomic variables, defined in seasonally adjusted terms and with a level of disaggregation, by operation and institutional sector, corresponding approximately to the Quarterly and Annual National Accounts [see Wilman and Estrada (2002) and Estrada et al. (2004)]. Similarly, satellite models, which provide a more detailed reflection of a relevant subset of the economy such as the external sector, consumer demand, or the labour market and price formation, can be used to fine-tune and improve the original forecasts prepared using the Banco de España quarterly macroeconomic model (MTBE) forecasts. In this framework, the equations on the performance of some variables cannot be specified with the desired degree of precision.

The interaction between the two parallel forecasting paths begins with the inclusion of short-term estimates obtained through analysis of conjunctural information, with projections from the quarterly model annualised by interpolation. This approach involves adapting the short-term projection profiles for different variables so that their annual average profiles are compatible with those derived from the scenario generated by the model. This gives an initial set of summary forecasts in which, logically, the weight of quarterly projections based on the most current indicators is significant only in the short term, while the model itself will establish the quarterly dynamics beginning two or three quarters ahead. Conjunctural information will therefore have a substantial impact on the annual forecasts, primarily during the first year of the forecasting horizon, and will gain in importance as the end of the exercise approaches. Box 1 describes the relationships between the different degrees of lags with which the information is available and its use in preparing future projections of quarterly and annual National Accounts series.

The first set of summary forecasts is subject to a series of accounting and, above all, economic consistency checks. In the first case, we must try to ensure that the accounting identities are observed for each period and that the time aggregation procedures used are subject to appropriate corrections. In the latter case, the implications derived for a series of non-explicit variables in the exercise, such as business margins, sectoral lending capacity or borrowing requirements, financial and credit aggregates, and sectoral financial risk (measured with the financial accounts), *inter alia,* must be assessed. Some aspects of the medium-term scenario and short-term projections may require modification as a result of these checks. The changes are incorporated into the quarterly econometric model equations using a number of additive factors, and their residual values will be registered as positive or negative to reflect relevant information obtained using other tools. Implicit residual analysis can be used in turn to verify the level of disparity between the new forecasts and those derived directly from external assumptions and estimated performance relationships, constituting a further element of comparison. This process is repeated in successive iterations until a final set of forecasts is produced that the analysts consider satisfactory.

So far we have described the method used to specify a medium-term central forecasting scenario. The analysis, however, should go beyond simply estimating a central numerical forecast and should use this scenario as a basis to identify the strengths and weaknesses, challenges and, above all, the risks that accompany its possible development. In this connection, MTBE simulations will help determine the sensitivity of the central scenario to changes in the external assumptions, or other variables, that are representative of the identi-

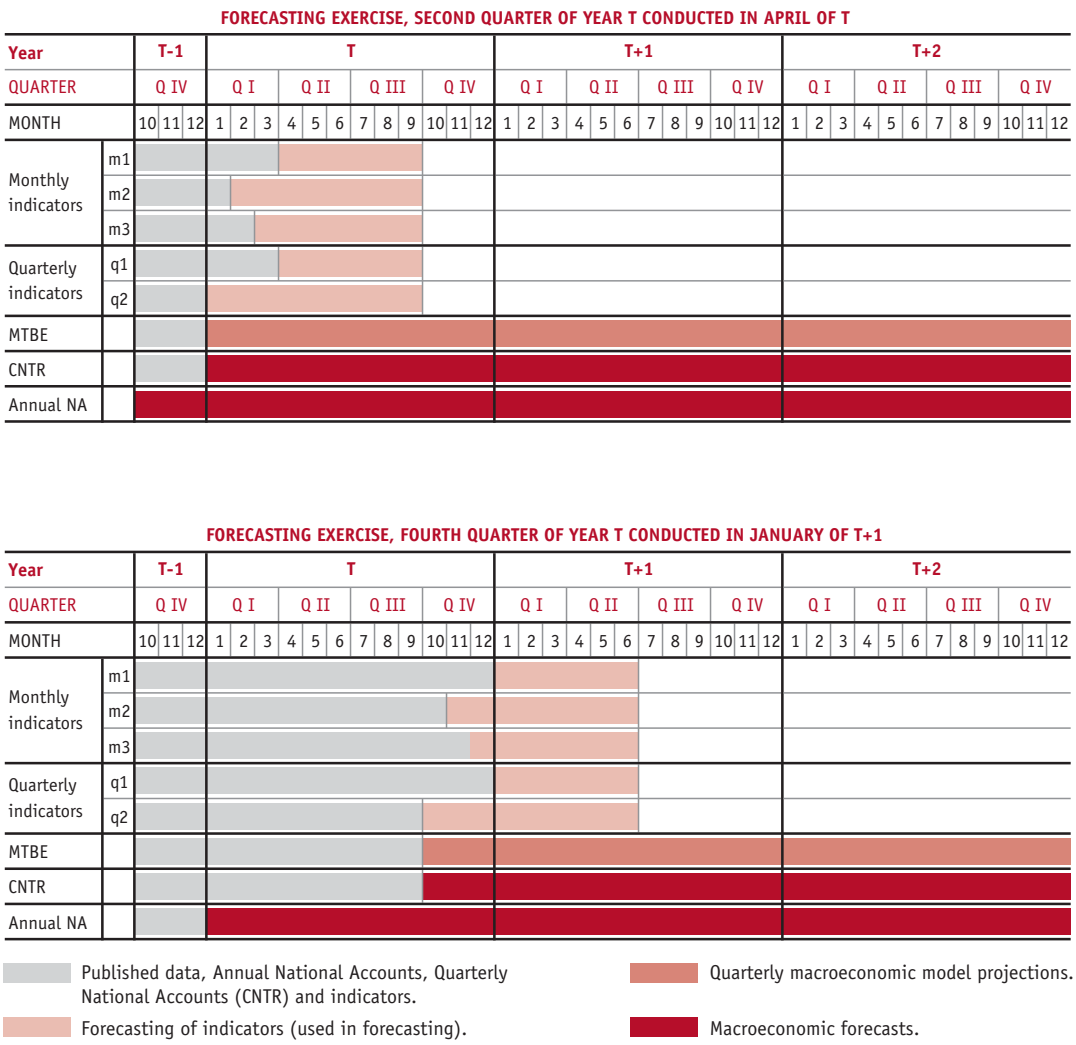
BOX 1 INFORMATION FLOWS AND THE MACROECONOMIC FORECASTING SEQUENCE

The purpose of this box is to illustrate the time sequence structure for available information in conducting a macroeconomic forecasting exercise with the resulting macroeconomic forecasting horizons. The horizon for forecasting exercises carried out on a quarterly basis begins in a past quarter for which the QNA data have yet to be published, and covers a period of two to three years. Estimation of the first quarter covered by the exercise is based on new conjunctural information published after the most recent QNA data. On one hand, fuller information is available on the preceding quarters, since much – especially quarterly – information is disseminated later than the QNA estimates themselves. On the other, more advanced conjunctural information exists in reference to some months of the current quarter, although such information is scant in principle as the exercises are normally conducted during the first month of the period. However, trends identified for earlier quarters, revised to reflect the new information, along with more contemporaneous short-term indicators, provide the main base for projecting the QNA aggregates in reference to the first quarter and, to a lesser extent, to the second quarter of the forecasting horizon. Quarters further into the future must be forecast primarily on the basis of the quarterly model, as the influence of the conjunctural data on these forecasts will become increasingly diluted. Specifically, the combination of both sets of information, namely that provided by the conjunctural indicators and the quarterly model projections, in one consistent set of macroeconomic forecasts is an essential component of the forecasting exercise.

As discussed in the main text, although forecasts are prepared quarterly, macroeconomic equilibrium and consistency analyses are normally conducted on an annual basis. From this standpoint, it is important to bear in mind that annual forecasts (averages of four quarters) will be affected differently depending on the origin of the forecast (annual averages are affected differently when the exercise begins with the estimation of a fourth quarter than when it begins with a first quarter) and the remoteness in time of the period considered.

To illustrate this, the accompanying scheme represents two polar cases. The first example corresponds to a forecasting exercise originating with the estimate of the first quarter of year T carried out in April of that year; and the second example shows an exercise beginning with the fourth quarter of year T carried out in January of year T + 1.

From the standpoint of estimating the beginning quarter of the exercise, approximately the same information will be available in both cases. In general, the most current indicators are monthly and qualitative, such as opinion surveys aimed at consumers and business leaders, or purchasing managers' indices. Full information is also normally available for that quarter on automobile sales, social security registrations, registered unemployment and consumer prices. However, a substantial portion of the monthly information, generally the most robust, is available on an incomplete basis for this initial period: this is true for industrial production, service activity and foreign trade. Where the quarterly indicators are concerned, only in the case of the Labour Force Survey (EPA) is information received on this beginning quarter, precisely when the exercise is



completed. The remaining quarterly indicators, some of which are very relevant (such as labour costs or construction activity) are only available for earlier periods. One method to be used in such cases is to project trends in the quarterly indicators based on partial, although more forward-looking, monthly information. As indicated above and reflected in the scheme, the influence of this short-term conjunctural information on forecasts extends one or two further quarters, as the trends in the indicators incorporated into the estimate for the first forecasting quarter will affect the forecasts for the immediately following quarters.

From the standpoint of annual estimates, the influence of short-term information in both examples is quite different. In the first case, in which the beginning quarter of the exercise is the first quarter of year T, the influence of conjunctural information on the annual figure

is relatively small, as it only significantly affects the first half of the year, and becomes completely diluted by the end of the year. By contrast, in the second example, in which the exercise begins in the fourth quarter of T, the figure for this year is fully determined through the estimation of that quarter with indicators. The other two possible cases, i.e. when the forecast begins in the second or third quarter of year T, are intermediate cases in which the conjunctural information will have a greater influence in determining the annual average for T, in relation to the first example.

Finally, while from the quarterly standpoint the available conjunctural information is approximately the same in all forecasting exercises, and its influence on the quarterly estimates extends for only a few quarters, the impact of this information on annual average growth in GDP and on the main macroeconomic aggregates obtained from the forecasting exercise is very different depending on the quarter in which the exercise began.

fied risks. Assessment of sectoral financial situations is another way to determine the vulnerabilities to which the economy may be subject in the time horizon studied.

The central scenario and the risks defined in its environment are a fundamental input in the diagnosis of the economic situation and in making economic policy recommendations. Forecasts are therefore much more than simply a projection of the macroeconomic framework in time, as they provide a rigorous base for risk assessment and are highly valuable for identifying problems and justifying decisions.

5 An approach to the methods used to analyse the Spanish economy

In keeping with the aim of this book to draw together and disseminate the analytical methods the *Servicio de Estudios* of Banco de España uses in analysing the Spanish economy, its content has been structured to make an organised presentation of the many underlying factors of the analytical strategy compatible with a central focus on the method of preparing forecasts, which constitutes the foundation of regular economic reporting. We have selected a structure, first of all, to address some important questions involving the general framework of the Spanish economy, and subsequently to present the use of statistical information and econometric modelling. The central focus is a presentation of the methods used to assess the effects of monetary and fiscal policies and to examine the conjunctural workings of the different areas of the economy (demand decisions, output and the labour market, prices and financial developments). Last, we shall address analytical techniques in respect of the structural aspects considered most important.

Before we begin the presentation of the content, we should explain that this is a collectively authored book, the product of a tradition of teamwork forged by those who have helped to make the *Servicio de Estudios* a prestigious centre for Spanish economic analysis. Each chapter, however, bears only the names of the authors responsible for its development and writing, according to the agreed structure and the guidelines developed in a process of

collective discussion and assessment. The bibliographies at the end of each chapter list contributions from further members of the *Servicio de Estudios* who, although not listed as authors, have made significant contributions to the state of knowledge the chapter attempts to convey.

Following this introductory chapter, the section on the general framework will continue with a chapter prepared by Juan Peñalosa and Fernando Restoy addressing the implications of the Spanish economy's integration into EMU and into the new international context. While the book's focus is eminently domestic, in this era of globalisation, economic relations are taking on a transnational character with decisive effects on the nature and scope of the developments bearing on all national economies. This assertion is particularly clear for the Spanish economy, owing to the importance of its opening up in shaping some of its most important current features, with greater implications for the workings of the economy and economic policy.

This chapter aims to highlight the importance of the changes derived from Spain's integration into the European Union and its participation in EMU, which affect its growth patterns and possibilities, and the available economic policy instruments. To that end, it analyses the institutional framework derived from European integration, particularly as a result of the single market and the content of the Union's macroeconomic and structural policies, and discusses the repercussions on Spanish economic analysis. These factors include, *inter alia,* the shift in focus on analysis of the external setting, emphasis on comparative studies, types of possible disequilibria and the adjustment mechanisms used to address them. Once within EMU, the analysis of the euro area takes on a new dimension, as the attendant developments affect the common monetary policy, which is the relevant one for the Spanish economy. The euro area is situated on middle ground amid domestic and purely external areas. The analysis of the external factors that affect it is therefore organised in two areas: the external environment of the euro area and the analysis *per se* of the area and its effects on the monetary and financial conditions of the Spanish economy. With regard to the second implication above, membership in a plurinational monetary integration area clearly requires regular monitoring of macroeconomic divergences between Spain and EMU as a whole that may arise as a result of Spain's reduced scope for action with national instruments, making comparative issues very important. The most analytically significant repercussion is the change that has occurred in the macroeconomic regime, which affects both the type of disequilibria that may occur (when interest rates and exchange rates do not correspond to domestic conditions and when the balance of payments constraint is relaxed) and the available economic adjustment mechanisms, which become more limited and complex. All of these factors substantially affect the methods of analysis and possible economic policy responses.

The next chapter, by Julio Segura, provides a summary of the basic features of the Spanish economy, to provide a reference framework for reading the book, as it is structured in a series of segments, each focusing on a specific topic or sector, rather than using a general approach. Without using an historical or comparative approach, however, the key features of the Spanish economy can only be understood with reference to the rapid process of modernisation it has undergone in recent decades and to the framework of the more advanced economies, with which the differences are narrowing and similarities, in terms of integration, are

growing. The point of departure is a description of the factor endowment underpinning Spain's growth, from a broad standpoint that includes demographic developments, employment and labour skills, and technological and physical capital. The review attempts to identify the sources of dynamic performance underlying the pattern followed, as well as the shortcomings registered, in comparative terms, in labour use and development, and in the level of capitalisation and technological development. The analysis of competitiveness, derived from productive and commercial specialisation of the economy, plays a central role, and is used as a guide to classify the main avenues of macroeconomic workings. Special emphasis is placed on the challenges posed by the transient nature of some of the drivers of the recent expansion, and the role of market liberalisation in promoting competition is highlighted, indicating the shortcomings remaining in this connection. The general framework is completed with a discussion of the organisation, relative weight and functions of general government and its effects on economic activity, and an analysis of the structure of agents' expenditure, wealth and debt, including a general description of financial flows in the economy.

Following the chapters that establish the general framework, a second section will focus on methodological instruments. In keeping with the nature of this book, these chapters will focus on the more general aspects of statistical sources and forecasting and modelling tools, as a more detailed presentation of these issues will logically be provided in the chapters focusing on specific sectors or topics comprising the presentation of the analytical and forecasting system of the *Servicio de Estudios*.

Information is the basic input for analysis and is essentially – though not solely – obtained from economic statistics. For effective applied analysis, it is essential to have an adequate statistical base and an effective knowledge of this base to optimise its use. While a relatively profound treatment of statistical sources for the Spanish economy would exceed the space allowance for a book focusing as a priority on analytical methods, it is essential to outline a general framework to highlight the central role of statistics management within the analytical system. This is the objective of Chapter 4, prepared by Rafael Álvarez and José María Bonilla, entitled "Statistical information for analysis of the Spanish economy". The chapter focuses on general thoughts involving problems and decisions that analysts must address in the systematisation of a situation that would have been impossible to summarise in a few pages owing to the multiplicity of the statistical sources involved. It highlights the close parallelism that has existed between the development of statistical bases and increases in analytical capacity, and, as in Banco de España's case, this has frequently entailed a substantial statistical workload to prepare the missing statistics within its area of competence and to compile, systematise, or process databases from other sources to adapt them to the requirements of the analytical work at hand.

Presentation of the path and situation of the Spanish statistical system brings to light the enormous progress made in recent decades in fine-tuning the State statistical planning system and, most particularly, the impetus received from European requirements, particularly as a result of the requirements derived from the establishment of EMU. This chapter also discusses some of the lingering gaps requiring priority attention in the reform agenda in future statistics plans. The detailed description of the features of key statistics used in the analysis of the Spanish economy was prepared by Rafael Álvarez in the form of 13 notes organised by topic, as an appendix, to serve as a reference for all chapters of the book.

Following an assessment and presentation of the Spanish statistics system, the chapter will focus on the use of statistical data in economic analysis and forecasting, providing significant examples to illustrate the problems that analysts typically face. Special emphasis is placed on time-series analysis techniques as instruments in data processing and interpretation, and in the forecasting of short-term variables, an area to which the *Servicio de Estudios* has made distinguished contributions, as applied to the Spanish economy, as well as in the development of new techniques and tools. The wealth and diversity of economic information, however, prevent any one-size-fits-all approach with the automated application of a set of techniques, no matter how sophisticated and refined they may be. Analysts must draw instead on a diverse, specialised body of knowledge deriving from the cumulative expertise of highly qualified teams. This knowledge, therefore, is not easily conveyed. The chapter, however, attempts to present the work of the *Servicio de Estudios* with examples of the analysis of some important economic indicators.

Chapter 5, by Ángel Estrada and Javier Vallés, is devoted to economic modelling and forecasting instruments used by the *Servicio de Estudios* and that are a fundamental component of its analytical strategy, in which short- and medium-term forecasting exercises occupy a distinguished position, as we have discussed. For a summary approach to the broad range of statistical and econometric tools used, the chapter outlines the specific mechanics of forecasting exercises, followed by a detailed discussion of the most important aspects involved, highlighting the comparative advantages of the different types of instruments and how they are selected and combined. The description of forecasting exercises discusses the formulation of internal and external assumptions, making the distinction between the euro area and the rest of the world, and explains the techniques used to address uncertainty in the central scenario, or to assess its implicit risks. According to the structure discussed above, an explanation is given first of short-term projection tools based on information from available conjunctural indicators, particularly the method used to project key GDP components based on the most closely related indicators in each case. Effective use of the advantages derived from a disaggregated method such as this necessarily entails resolving the discrepancies that arise in aggregation on the expenditure and value added sides.

The macroeconometric model is the centrepiece of medium-term forecasting. This chapter presents its theoretical underpinnings and the main features derived from its estimation, used to configure the aggregate functioning of the economy, as the specific results of the key equations are listed in the corresponding sections. It also presents the results of two simulation exercises to illustrate some of the techniques used to assess departures from the most likely scenario. The compact, integrated nature of the model ensures consistency with theoretical principles, although it limits the possibilities of exploiting all available information. To that end, other satellite models are used that have complementary functions to fine-tune forecasts in different time horizons and to delve more deeply into the workings of some economic sectors. Four satellite models used extensively by Banco de España, which will also be referred to in later chapters, are described. First of all, modelling of different components of household expenditure, including consumption of durable goods, non-durable goods and domestic household investment, determined using variables such as financial wealth, is discussed. This section also includes household consumption and debt equations, alternative estimates of the non-accelerating inflation rate of unemployment (NAIRU), and

an alternative forecasting model based on autoregressive vectors and Bayesian estimation techniques. The chapter ends with a summary of the procedures used to integrate short-term forecasts obtained on the basis of indicators and the key results from satellite models in the forecasting scenario generated by the macroeconometric model.

The structure of the book continues with a four-chapter section on monetary and fiscal policies. The structure reflects the fact that, in the present context of EMU integration, aggregate demand policies contain a certain exogenous component that is particularly pronounced in the case of monetary policy, as this is decided at the supranational level to reflect the requirements of a much broader area. Chapter 6, prepared by Ignacio Hernando and Jorge Martínez, addresses the monetary transmission mechanism at the level of the euro area as a whole, and more specifically in the Spanish economy. Analysis is made of the channels of transmission through the interest rate, which includes substitution, user cost and income effects, through changes in the value of wealth, through credit availability and through the exchange rate, combining empirical evidence obtained on each of these components with the theoretical underpinnings used to complement and quantify their interpretation. Transmission to the final behaviour of prices receives special attention, and the impact of monetary policy decisions on performance in economic activity and inflation is quantified so that results can be compared with those of other countries in the euro area, and any differences that may exist are assessed as potential factors to amplify divergences.

Chapter 7, by Roberto Blanco and Alberto Cabrero, completes the transmission analysis with indicators normally used to assess the monetary and financial conditions in which agents' expenditure decisions are made. Further monetary-policy-sensitive financial variables important for the behaviour of aggregate demand are added to the traditional indicators based on interest rates, the exchange rate and prices of other assets. Through analytical monitoring of these variables, analysts can determine the level of monetary tightness or absence thereof, in absolute terms and in comparison with the rest of the euro area countries. Accordingly, this is an important component of macroeconomic assessment and economic policy diagnosis. It is difficult for conventional macroeconomic models to reflect the complexity of monetary impulses, particularly those deriving from financial pressures undergone by firms and households, as they can generate non-linear reactions that require more advanced use of specific satellite models and microeconomic data sources. Many indications pointing to changes in the macroeconomic and financial structure of the economy have tended to accentuate the sensitivity of private-sector expenditure to changes in interest rates or asset prices, making this sector of analysis even more important.

Fiscal policy is the other central component of macroeconomic stability. In Chapter 8, José Manuel González-Páramo provides a comprehensive review of the foundations and suitability of budgetary discipline rules, both generally and in the specific case of EMU, when countries relinquish monetary sovereignty while retaining the use of fiscal instruments in support of their own objectives. This chapter provides a summary of the arguments supporting the setting of rules of stability providing for co-ordination among the various levels of government involved, the assurance of long-term sustainability, enhanced countercyclical response capacity and the assessment of the role of these rules in light of the European experience, which has made it possible to establish the monetary union and for the Spanish economy to benefit from fiscal consolidation. Experiences illustrating con-

sistency between fiscal sustainability and its short-term stabilisation role, and therefore complementarity between the objectives of budgetary stability and economic growth, support the validity of a number of arguments that leave little room for discretion or activism. The chapter addresses the latest version of the debate on fiscal rules that arose in Europe in connection with the Stability and Growth Pact, after some of the impetus from the Maastricht Treaty was lost. The author points out that none of the problems occurring in recent years can be attributed to the rules designed for the launch of monetary union. The current crisis is, rather, the result of failure to comply with these rules during boom periods. While reform of the Pact maintains the central disciplining criteria, it adds a number of paths of interpretation and complexities, in terms of application, that can undermine the efficiency of the EMU framework of discipline. The new framework strengthens the importance of national regulations in establishing simple, transparent rules that ensure fiscal control, a requirement which, where Spain is concerned, attaches great importance to the role of budgetary stability laws.

Analytical monitoring of fiscal policy is addressed in Chapter 9, by Pablo Hernández de Cos and Eloísa Ortega. As public revenue and expenditure affect multiple aspects of the economy, fiscal policy analysis has a number of different facets. Projection of the general government sector account, which requires a number of specialised techniques, is clearly a central element in forecasting. In addition, however, the importance of budgetary stability in maintaining balanced growth and the requirements on the sustainability of public finances deriving from EMU membership require the development of appropriate instruments to assess the fiscal trajectory and its contribution to economic stabilisation, as monetary instruments are not available to address domestic requirements. Statistical and modelling techniques, aimed at assessing the influence of cyclical fluctuations on the various public finances accounts and setting the budgetary policy stance by distinguishing between discretionary measures versus the effects of the automatic stabilisers, are highly important and pose substantial analytical challenges. Analysis of the dynamics of public debt in relation to budget balances, in turn, provides a more complete, transparent view of the real course of budgetary consolidation. Last, the challenges of population ageing for the financial sustainability of the public sector and the role of fiscal quality in stimulating growth and productivity considerably broaden the agenda of topics in this area.

The section of the book devoted to the functioning of the economy focuses on the central issue in the use of economic forecasts in conjunctural analysis. Real output growth estimates are the result, as indicated throughout this introduction, of a simultaneous approximation exercise reflecting the general equilibrium situation in which the macroeconomic variables are determined. When ranking the different areas involved, the broad range of analytical instruments and the relative abundance of available information give the expenditure side approach an advantage over the value-added approach, regardless of the theoretical basis of the analytical framework concerned. Admittedly, this superiority is clearly the result of a predominance of Keynesian concepts in the development of applied macroeconomics, but it is no less true that agents' expenditure decisions are at the heart of conjunctural analysis, from any theoretical standpoint.

Chapters 10 and 11 summarise this approach from the expenditure standpoint. The discussion begins with net external demand, as it depends on a set of external variables that

are exogenous in nature for the purposes of forecasting exercises. To that end, Chapter 10, by José María Bonilla and Ana Buisán, also incorporates the techniques used to describe the external context in which the economy operates, with special emphasis on analysis of the euro area. Since Spain joined EMU, Banco de España has been required to develop its own analytical toolkit on the area, not only because developments in the area determine the monetary policy that is relevant to Spain, with all the implications this entails, but also because its contribution, as a member of the Eurosystem, to the definition of the common monetary policy is dependent on the quality of its own analysis of the area. Having established the external context, the chapter focuses on the tools used in the diagnosis and forecasting of exports and imports of goods and services, including econometric models of varying scopes, and the use in the short term of the appropriate conjunctural economic indicators. Imports have fewer linkages to the external context, as they depend closely on final demand; however, for the sake of conceptual homogeneity and empirical treatment, they should be addressed simultaneously with exports. This approach can also be used to assess the external position of the economy and to draw substantive conclusions regarding its competitiveness.

In Chapter 11, Pilar L´Hotellerie Fallois and Teresa Sastre address the demand decisions of households and firms. Along with net external and public-sector demand, which are studied in other chapters, that completes the expenditure side GDP assessment. In sectorising the treatment of expenditure by agent, the aim is for their decisions to be based on the results of an optimisation process that can be formulated with empirical models based on solid theoretical foundations. The econometric models used to monitor and forecast household private consumption and residential investment and corporate productive investment are presented. In parallel, a presentation is also made of the broad range of instruments used to exploit the variety of conjunctural information available on these aggregates, whose performance explains most GDP trends. The use of these tools will therefore play an important role in short-term diagnosis and requires a precise, detailed knowledge of the methodologies and procedures applied.

Following the economic approaches using key expenditure components, in Chapter 12, prepared by Ángel Estrada and Mario Izquierdo and entitled “Output and the labour market,” the supply-side approach is addressed. This chapter focuses on the supply-side block of the quarterly model, derived from an aggregate production function, and is supplemented with a disaggregated approach applied to eight expenditure categories and five branches to describe the technological features of the key activity sectors in the market economy. The use of available indicators to monitor productive activity is also described in detail. As the functioning of the labour market plays a key role in determining supply conditions, its most relevant institutional features, along with the main indicators and tools used to analyse wage formation, employment supply and demand, and the behaviour of unemployment, including, *inter alia,* the NAIRU, its determinants and significance, are all addressed here. Along these lines, the chapter concludes with the methods used to estimate the economy’s growth potential and to distinguish the long-term factors of growth from cyclical movements.

From a central bank’s standpoint, inflation analysis and forecasting occupy a central position in arranging and organising work and allocating resources, owing to the vital impor-

tance of price stability as a monetary policy objective. When Banco de España adopted a direct inflation targeting strategy, the *Servicio de Estudios* in 1997 published the earlier cited book on inflation and monetary policy. This new book was of course bound to include a chapter providing an update, summary and overview of the wide variety of statistical and analytical tools used to investigate price formation and performance. In Chapter 13, Luis Julián Álvarez and Pablo Burriel take as a starting point basic cost and price analysis in the National Accounts framework, based on the breakdown of the final demand deflator to reflect its components by type of expenditure, and using the supply-side approach based on the relationship between average production costs and various deflators obtained from the economy's production and generation of income accounts. A substantial effort was made to draw together the varied series of indicators and instruments used to study short-term dynamics in key prices, the most important of which, of course, is proper treatment of the consumer price index (CPI). Modelling strategies used to capture all the forces intervening in inflationary trends are also presented. Among the factors that require most attention as a result of Spain's membership of an area of price stability is the persistence of inflation, which is the subject of a specific research effort within the Eurosystem.

A central bank's emphasis on the financial aspect of economic analysis is reflected in its special attention to the investment and financing decisions of different sectors and their implications for the net wealth and expenditure of households and non-financial corporations. This topic is addressed in Chapter 14 by Juan Ayuso and Ana del Río. Financial decisions are not approached in isolation, but instead, as closely related to factors that affect behavioural patterns in real variables. These decisions are analysed bearing in mind both the transactions that move financial flows from lending sectors to users of funds and the means by which flows are channelled through the markets or financial intermediaries. Such an analysis aims first, to assess the soundness and efficiency of the mechanisms through which financial resources are allocated; and further, to assist in identifying the financial risks that may affect the macroeconomic scenarios considered most likely.

This section, devoted predominantly to topics in conjunctural analysis, ends with a transitional chapter into the next section, which addresses more structural issues. Chapter 15, by David López-Salido and Gabriel Pérez Quirós, discusses some aspects of comparative analysis with Spain's neighbouring economies, which have become increasingly important as Spanish economic integration has progressed. Also, with EMU membership, these aspects have come to occupy a predominant place in the diagnosis of Spain's position in the area and in policymaking. Among the many dimensions of comparative analysis, we have selected the three most important. First, we find techniques to analyse the real convergence process, closely related to the determinants of long-term growth. By breaking down changes in the per-capita income differential into its explanatory factors, we can situate this process in relation to the contribution of demographic developments in the labour market and productive efficiency, which leads, in turn, to the comparative analysis of development in physical and human capital and the capacity to incorporate technological progress. Second, from a shorter-term analytical framework, the authors present the diagnostic methods used to address cyclical similarities between Spain and the rest of the European countries, and some of their possible interpretations and implications. The third selected topic is inflation differentials, which has become one of the most

controversial issues in Spain's experience with EMU membership. The authors give an overview of the conceptual framework and analytical discussions prepared by the *Servicio de Estudios* to identify the underlying key factors in its interpretation, including those derived from cyclical differentiation and the structural components implicit in the process of real convergence *per se,* or associated with the existence of market rigidities that constitute a source of potential loss of competitiveness.

The selection of structural topics begins with Chapter 16, devoted to productivity, use of factors and potential growth, and authored by David López-Salido, Soledad Núñez and Sergio Puente. In the long run, the economy's capacity to sustainably increase the level of well-being is closely related to performance in productivity, as there are limits to how intensively the labour factor can be used. Growth accounting methodology, which can be employed to break down contributions by different factors, is used to analyse this question. In particular, the authors describe the different methods used to break down the contributions from intermediate consumption, the labour factor – including changes in the composition of employment and the level of skills – and capital, and to estimate total factor productivity and to identify some of the many elements underpinning its performance, so as to isolate as precisely as possible the share that can be attributed to technical progress. In its application to productivity performance in Spain, the aggregate approach is combined with the study of the contribution of the various productive sectors, with special emphasis on the behaviour of sectors producing information and communication technologies (ICT) goods and services, which play a very important role in the generation and dissemination of technological innovations.

An economy's capacity for sustained growth in an environment of high exposure to the process of globalisation and rapid technological innovation depends substantially on its competitiveness, particularly when a macroeconomic regime is adopted in which recourse to exchange rate adjustment is not possible. Hence the importance of the analysis of competitiveness, the topic of Chapter 17 by Soledad Bravo and Esther Gordo. The aim is to focus on the broad range of mechanisms, from more traditional indicators based on relative costs and prices, or performance of trade flows and market shares, to the determinants of potential growth and the comparative level of well-being. From this standpoint, diagnosing competitive position is not a simple matter, as there is no single synthetic indicator that can be used for that purpose. Instead, a broad battery of embedded variables must be used within the concept studied. Further, information is scant in many relevant areas. This chapter presents the methods used to study competitiveness at the aggregate level, as in the case of market services and manufacturing, with special reference to the tourism sector.

In the structural topics underlying Spanish economic analysis, the functioning of the markets for factors, goods and services, the capacity to absorb technological innovations and to adjust to different types of shocks take on an increasingly high profile. Chapter 18, entitled "Microeconomic policies" and authored by María de los Llanos Matea and Eloísa Ortega, addresses all of these issues from the twin standpoint of their impact on aggregate economic adjustment and their role in determining long-term growth potential. Inefficiencies in the microeconomic functioning of these markets, closely related to regulatory issues, are a source of inflationary inertia, persistent unemployment and inhibition of technological innovation, and they ultimately limit growth potential. This area is accordingly a

priority focus for economic policy, particularly in light of the liberalising dynamics required in connection with increased international integration and the European requirements relating to the single market and the Lisbon Agenda, and also now participation in EMU has narrowed the scope for action available with traditional aggregate demand management policies.

Topics have been selected that have become of greater relative importance for the workings of the economy, beginning with the analysis of the institutional problems affecting labour market adjustment and the basis for the relevant reform policies. This course of action has been a central focus of the economic policy debate in recent decades. More recently, this aspect has been expanded to include other markets for goods and services, which would require measures to liberalise their regulatory framework and far-reaching productive and commercial restructuring. Specific cases include certain network industries; the markets for land, housing and rental properties; and the retail distribution sector. The analytical progress made is evident in all of them, but they also face challenges in respect of the design of effective methods to assess policies in such a broad, diverse area that has so many information gaps. Last, in this framework, the authors also address the monitoring of policies to promote technological development with a broad range of indicators, addressing the importance of ICT sectors in the overall economy and the level at which new technologies are present in Spanish society. The working methods adopted in this area have made it possible to expand the study of the productivity gap in the Spanish economy and its pattern of real convergence.

Efficiency and profitability in the intermediation function of the financial system are clearly among the structural challenges requiring special attention from Banco de España. This is true not only because it is assigned specific and highly important responsibilities in this area, or owing to its role in monetary policy transmission, but also because it is a pillar of the financing of expenditure, the generation and allocation of savings, and the overall stability of the economy. Chapter 19, by Roberto Blanco and Víctor García Vaquero, addresses these issues and presents the key analytical instruments used to monitor structural developments in the Spanish financial system. This chapter places special emphasis on issues related to integration, competition and efficiency in the sector, and the as yet relatively undeveloped methods for assessing the system's resilience in the face of hypothetical pressures. This topic closes a framework of carefully selected key components of Banco de España's analysis of the Spanish economy, from the general standpoint set out in this chapter.

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2. Impact of EMU integration and the new international context

Juan Peñalosa and Fernando Restoy

1 Introduction

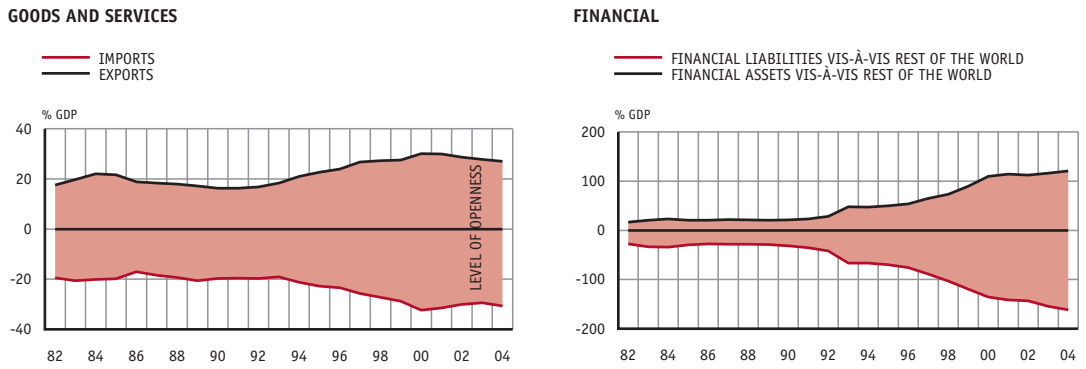
Economic, trade and financial relations in the world economy have intensified in recent years. *Globalisation* of economic activity, driven largely by progress in transportation and telecommunications, has been supported by the gradual opening up of the national economies. These developments reflect the increasingly widespread belief that, despite the institutional flaws that may be perceived in the world economy, the international exchange of goods and capital promotes social welfare.

Globalisation of economic relations affects the origin, transmission and impact of shocks that prove important in the evolution of national economies. Developments that initially affected a specific area or market now spread more intensely and rapidly to other regions and sectors. The financial markets are playing an increasingly important role in this transmission mechanism. In a context where financial flows are becoming internationalised, the financial markets also serve as a powerful disciplinary element for domestic economic policies.

These changes in the world economy also affect the performance of private agents and the priorities of the public authorities, as they all must adapt to a new environment in which flexibility, efficiency and capacity for innovation are essential factors to ensure competitiveness and strengthen the economy's capacity to withstand external shocks.

The Spanish economy has also been part of these processes. Its level of trade and financial openness has in fact increased substantially in recent times (see Chart 1). During the last decade alone, the ratio of trade volume (exports plus imports) to GDP increased by more than 50 percent, while total financial assets and liabilities vis-à-vis the rest of

CHART 1 OPENNESS OF THE SPANISH ECONOMY



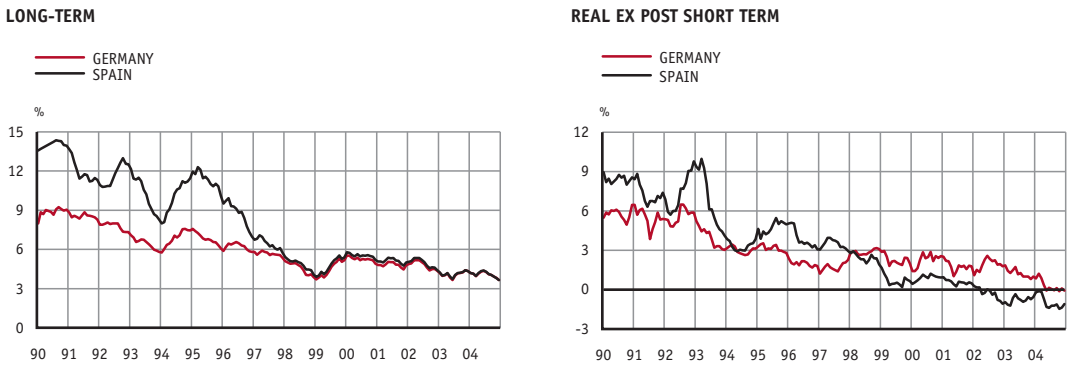
SOURCE: European Commission.

the world tripled in terms of national product. This evolution is the result of an intense economic modernisation process that has enabled Spain to overcome its heritage of protectionism and broad public sector intervention in many areas of economic activity.

The Spanish economy's openness has been promoted largely by Spain's entry into the European Union (EU) at a time when the European countries have made substantial progress in an unprecedented process of economic integration. Accordingly, barriers to the free circulation of goods and factors in the EU have been gradually dismantled, while relations with the rest of the world have intensified. In addition to entry into the EU and the signing of the Single European Act in 1986, the milestones in Spain's participation in the European integration process include the peseta's inclusion in the Exchange Rate Mechanism (ERM) beginning in 1989, and incorporation into Stage Three of Economic and Monetary Union (EMU) in 1999. Not only has this process been a clear source of progress in terms of greater economic flexibility and liberalisation, it has also decisively helped Spain achieve an appreciable level of macroeconomic stability that has been fully compatible with the continuation of the real convergence process.

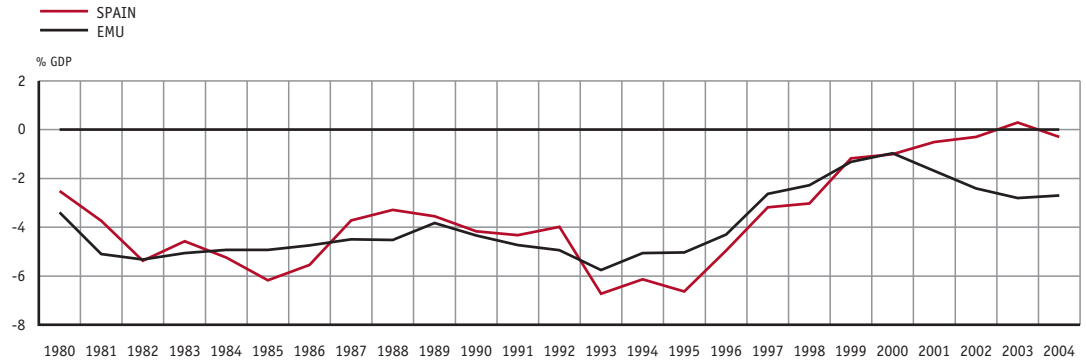
The lack of tradition of macroeconomic stability in Spain had been a longstanding factor of uncertainty that dampened the country's economic growth. The public budget was frequently subjected to pressure from various social groups, and was used as a mechanism to settle numerous conflicts, generating biased expenditure increases and government deficits. This lack of discipline set a poor example for the other social players and led to persistent inflationary tensions, despite the restrictive tone of monetary and exchange policy. In due course, price instability buoyed up long-term interest rates and led to exchange crises reflecting a lack of confidence in the Spanish economic outlook. In this context, monetary policy efforts to offset these effects produced short-term interest rates far exceeding those in other, more stable countries, in both nominal and real terms. As a result, economic activity systematically unfolded in an adverse financial environment (See Chart 2).

CHART 2 INTEREST RATE CONVERGENCE



SOURCES: ECB and Banco de España.

CHART 3 BUDGET BALANCE



SOURCE: European Commission.

Spain's participation in the process of monetary union has been a vital factor in overcoming this unfavourable situation. In addition to the effective fiscal consolidation measures adopted during the mid-1990s and progress in combating inflation, political momentum was given to the project to introduce the single currency in Europe. This approach supported agents' expectations that Spain would remain on the nominal convergence path and would consolidate a stable macroeconomic environment further to EMU participation. Gradual reductions in the public deficit (see Chart 3) and in interest rates to the levels prevailing in the core European countries gave rise to a virtuous cycle in which dynamic economic performance driven by improved financial conditions further fuelled the credibility of the process.

The stability achieved by the Spanish economy generally places it in a favourable position to continue its progress toward real convergence. The challenges to be faced in the future, however, are not negligible, if we consider the substantial growth in international competition derived from globalisation of economic activity and, above all, EMU integration, and the reduction in the number of economic policy tools this situation entails. As a result of these profound changes, important aspects of the working of the economy and the role of public policy have changed as well, thus affecting the analytical approach best suited to the new context.

This chapter will attempt to give a precise description of the major changes in the Spanish economy's environment, their effects on its development and their influence on the analytical approaches to be used. Section 2 will describe the specific features of the EMU economic policy framework and the limits they place on the scope to use national economic policy instruments. Section 3 will examine how integration into the monetary union has changed the nature of the problems potentially arising in the Spanish economy and the analytical approaches Banco de España uses against this backdrop. Section 4 will present a few brief closing comments.

2 EMU economic policy framework

Substantial progress has been made in the process of European construction in recent decades, as the objectives and interests shared by EU countries have grown. To sustain and drive this increasing integration, it has proven essential to increase the level of policy co-ordination and to broaden the range of decisions adopted collectively among all member countries. Although progress has been made in all aspects of this process, namely the policy, institutional and legal areas, it has been the development of closer economic relations that has been crucial for progress in European construction. All EU countries have followed this path simultaneously for many years. Since 1999, however, a smaller group of nations have developed closer ties by joining EMU, although it is hoped that the rest of the EU Member States will also become part of this process in the future.

From the economic standpoint, EU membership requires States to share a similar approach to their economic workings and the role of economic policy, based on compliance with the principles of an open market economy with free competition, and the belief that a high degree of macroeconomic stability is a prerequisite for high, sustained levels of growth. These principles have dominated the lengthy process through which the EU has progressed, with the consistent aim of maintaining fundamental macroeconomic equilibria and eliminating barriers to the free circulation of goods and services, capital and labour among member countries. Establishment of the single market in 1992 is one of the fundamental milestones in the process.

Although subsidiarity, defined as maximum decision-making at the decentralised level, is also one of the basic principles of EU organisation, the objective of ensuring that the single market functions adequately and enhancing its development requires establishment of homogeneous standards and co-ordination of a number of economic policy instruments,

TABLE 1 ECONOMIC POLICIES IN THE EU

Policy	Objectives	Common Instruments	Type of Co-ordination
1. Single market			
Internal market	Single market	Legislation	Centralisation
Competition	Free competition	Legislation	
Foreign trade	Trade liberalisation	Agreements on trade and external representation	
Agriculture	Agricultural market regulation	Rules on competition and market organisation	
2. Macroeconomic policies			
Monetary policy	Price stability	Interest rates	Centralisation
Fiscal policy	Discipline		Multilateral surveillance based on the Treaty, Stability and Growth Pact, Excessive Deficit Procedure and Broad Economic Policy Guidelines
3. Structural policies			
Markets for labour and capital goods	Enhance operation: greater efficiency and flexibility	No	Open co-ordination method. Broad Economic Policy Guidelines; Cologne Process (wage bargaining, informal macroeconomic dialogue with social players), Luxembourg Process (employment policies) and Cardiff Process (markets for goods and capital)

SOURCES: OECD (2002) and Banco de España.

which reduces the national authorities' autonomy to influence their own economies. Some regulatory areas are subject to relatively precise European legislation, implemented directly under the authority of the European Commission. Monetary policy decision-making has also been centralised with establishment of the European Central Bank, although the governors of the national central banks (NCBs) belong to the main governing body of that institution, and implementation is decentralised. Co-ordination is weakest in the area of fiscal policy, although national government action in this framework is limited by binding regulations and multilateral monitoring and surveillance procedures. Last, the scope for autonomy is even greater for measures related to the functioning of the markets for productive factors and goods, with the establishment of only a number of general objectives (that are often not quantified and are never obligatory), along with regular progress assessment procedures (see Table 1).

2.1 The single market

The most important economic policy components in the operation of a single market are those that have been centralised to the greatest degree. It is vital to protect free competition in this process of integration, as compliance with this principle is the only way to avoid discrimination and to optimise the efficiency gains obtained through access to broader, more open markets [see Bayoumi et al. (2003)]. The single market therefore requires elimination of the restrictions to competition and, in particular, protectionist practices that the national authorities may attempt to introduce or maintain in some way to give local firms a better position in the market. These conditions clearly expose European firms to substantial competitive pressure that also represents a macroeconomic challenge for EU countries, since their capacity to protect domestic production is seriously limited, and the shifting of economic activities abroad might ultimately be expected.

The European Commission plays the essential role of detecting potential discrimination in trade, acquisition of companies in connection with the nationality of the investors and oversight of initiatives to provide public assistance to ailing firms. Of course, this capacity for control by the European Commission cannot prevent conflicts from arising, as there are some exceptions to the general principles outlined above, and national authorities may interpret the impact of measures adopted at the national level in different ways. Moreover, within the EU, Member States have no capacity to adopt trade arrangements with the rest of the world, since they are subject to a common policy in this framework that is implemented through the European Commission's participation in international negotiations.

Regulatory harmonisation affects other areas, such as consumption or the labour market, and derives from the need to ensure free circulation of goods and labour throughout the EU. Centralised decisions are made in some cases, such as in agriculture, where the market is highly regulated under a number of common guidelines that establish reference prices and transfer terms for specific sectors and producers, along with maximum production quantities for each type of good, and export subsidy levels. The capacity to establish some taxes, indirect ones in particular, is also limited and a harmonisation process has been implemented to establish more uniform taxation rates. A similar system applies to certain special duties on tobacco and alcohol, requiring any changes the national authorities may introduce to be consistent with some common guidelines geared to promoting harmonisation.

Substantial progress has been made in recent years in one dimension of the single market that is vital in its development: the integration of the financial markets. The Financial Services Action Plan approved by the European Council in 1999 aims to achieve integration of the markets for financial services in 2005 through approval of many regulations whose aim is the elimination of market segmentation, thereby facilitating financial transactions between agents from different countries. Although most of the legislative bases have already been approved, expeditious, uniform application of these standards at the national level still remains for integration to be fully operational. Measures have also been adopted to prevent countries from engaging in tax competition to attract savings from non-residents, such as the agreement of the authorities in all EU countries for more homogeneous tax treatment of capital gains realised by non-residents.

2.2 Macroeconomic policies

The existence of different national currencies, in any case, posed a significant obstacle to the completion of the single market. Regardless of the rules protecting free competition throughout the Union, exchange movements could provide substantial, immediate advantages for some countries (and firms) at the expense of others. To correct this problem in the single market, exchange rate arrangements were established, under which the national authorities agreed to maintain a certain level of stability among their currencies. Experience showed, however, that the Exchange Rate Mechanism did not avoid devaluations and led to occasional speculative crises potentially detrimental to the stability of the economies affected. It was therefore considered that only a single currency would allow a true single market to be achieved. This objective was already established in the Delors Report of 1989 and was later included in the Treaty on European Union signed in 1992.

Monetary Union, initiated in 1999, involves much more than elimination of bilateral exchange rates. EMU countries share the single monetary policy defined by the ECB taking into account the situation and outlook of the euro area as a whole, and implemented to ensure uniformity in transactions carried out in the area money markets, regardless of where the participants are located. Therefore, the ECB determines the interest rates applied as reference rates for all financial transactions denominated in euro.

In this connection, and although some barriers to competition still exist, introduction of the single currency in 1999 can be considered a definitive step toward the culmination of the single market, although it still does not apply to all EU member countries[1]. Establishment of the euro, in fact, marked a clear distinction between countries that have joined EMU and those that retain their own currencies, in terms of the availability of their own stabilisation mechanisms. In particular, monetary conditions (comprising short-term interest rates and exchange rates) became exogenous variables for each country in the euro area.

The prospect of introducing a single currency in Europe also meant that some arrangements would have to be agreed to establish some degree of co-ordination of national fiscal policies, so as to avoid inadequate macroeconomic policy mixes, and to limit disequilibria potentially affecting agents' confidence in the stability of the common currency and the functioning of monetary union. In this connection, a regime of budgetary discipline and fiscal policy co-ordination was introduced, as detailed in the Treaty on European Union and the regulations of the Stability and Growth Pact. This arrangement incorporates elements of surveillance, warning and ultimately penalties for non-compliant EMU Member States. A multilateral surveillance and co-ordination process is thus in place under which all EU Member States submit annual stability and convergence programmes to serve as a basis to assess whether budget developments follow the established rules. If such developments are considered to violate the limits established in the Treaty, the *Excessive Deficit Procedure* is triggered to strengthen fiscal control and to make recommendations to correct the imbalance. Most decisions in this procedure, however, are taken by the ECOFIN Council. As is true for monetary policy, there is therefore no centralised decision-making with one inde-

[1] As indicated by Dierx et al. (2004), introduction of the euro also strengthens the single market through increased competition.

pendent body, nor are there legislative instruments to trigger automatic coercive measures. Policy criteria are therefore quite important in interpreting the regulations, as recent experience has shown [See Peñalosa (2004)].

In any case, fiscal policy restrictions (even if not stringently applied) and, particularly, the establishment of a single monetary policy mean that substantially fewer demand-side policy instruments are available to the national authorities. Forgoing these instruments should, in any case, be viewed in the proper context. For example, according to Canzoneri et al. (1997), exchange rate fluctuations contributed little in the past to stabilise the economic impact of shocks registered in the major European countries. Without bilateral exchange rates, relative prices within EMU clearly cannot be adjusted quickly to solve potential competitiveness problems. Economic policy should therefore attempt to stop potential nominal disequilibria before they provoke adverse effects on economic activity that may be difficult to reverse [see Malo de Molina (1999)].

2.3 Structural policies

The foregoing limits in demand policies entail two types of implications: first, economic structures in EMU countries should become closer to reduce the probability of asymmetric shocks, as fewer national economic policy instruments are available; and second, should such disturbances arise, it is important for countries to have a number of sufficiently flexible adaptation mechanisms that minimise the costs of adjustment. With these considerations, the rigidities that prevent the market for goods and productive factors from operating efficiently must be eliminated, in order to adequately mobilise available resources, guarantee sustained growth in economic activity and retain the ability to address any unexpected adverse developments that may occur.

Although these policies are clearly linked to the development and consolidation of the single market, in this framework the national authorities have relatively broad scope to design and implement measures related to the markets for goods and services, labour and capital. Co-ordination mechanisms are relatively loose, as they are based on exchange of information, discussion of best practices, dialogue among the authorities, establishment of codes of conduct and peer pressure. Some criteria shared by all countries, however, have led to the establishment of explicit objectives for national economic policies and collective progress surveillance procedures. These targets are updated regularly in the *Broad Economic Policy Guidelines* that constitute the working agenda for EU countries in the economic policy area. Compliance is regularly assessed, although no mechanisms are provided other than peer pressure to encourage progress or penalise non-compliance. The key recommendations valid for the period 2003-2005, related to these reforms targeting the European countries and Spain, as included in the document approved in 2003 by the European Council, are provided in Box 1.

This area of economic policy is, in any case, the focus of increasing attention. Although the consolidation of the single market and the environment of macroeconomic stability, through the single monetary policy and fiscal discipline, clearly contribute to sustained growth, structural reform policies should enable the European economy to achieve levels of

BOX 1

RECOMMENDATIONS ON STRUCTURAL REFORM IN EU COUNTRIES FOR THE PERIOD 2003-2005[1]

On the EU economic policy agenda, reforms are considered the fundamental tool to increase European growth potential, as they provide the mechanism to achieve greater and better use of labour and to increase productivity. In both frameworks, recommendations by the European countries for the period 2003-2005 focus on the following issues:

	General recommendations for all EU countries	Recommendations specific to Spain
Towards full employment (more and better jobs)	Review the combined incentive effects of unemployment subsidies and taxes on labour	Increase the female participation rate by providing childcare facilities and promoting part-time contracts
	Ensure that wage bargaining systems allow wages to reflect productivity of workers and firms considered individually	Phase out indexation provisions and encourage wage negotiations to reflect productivity differentials at the regional and the firm levels
	Eliminate barriers to flexible use of employment	Reduce labour market segmentation across different types of contracts
	Facilitate labour mobility	Promote the rental market and land supply to promote labour mobility
Towards a competitive and dynamic knowledge-based economy, with increasing productivity and business dynamism	Consolidate the single market, eliminating any barriers that may persist by: • Increasing the transposition rate of internal-market directives; • Giving adequate resources to competition and regulatory authorities • Reducing State aid • Stimulating effective competition in network industries	Enforce effective competition in sectors such as electricity and retail distribution
	Accelerate the integration of capital markets	
	Generate a supportive environment for enterpreneurship by improving the regulatory environment and simplifying the corporate tax system	Reduce the administrative burden on business
	Promote R&D investment	
	Increase the efficiency of public spending and direct it towards investment in physical and human capital	

[1] As provided in the Broad Economic Policy Guidelines for 2003, approved by the European Council.

competitiveness essential to ensure economic prosperity in an increasingly globalised environment. Lack of impetus in developing these reforms is considered to be the main factor in the limited growth potential in the European economy and the observed vulnerability to different types of shocks during the period 2001-2004 [see European Commission (2004)].

In this connection, the main economic objective now established in the European Union is to comply, by the end of this decade, with what is known as the Lisbon Agenda, which establishes the prerequisites to make the EU the world's most dynamic, innovative region, through adoption of the measures required to enhance labour market flexibility, to increase competition in the goods and services markets, and to create a more favourable environment for innovation and dissemination of better technologies. Although the 2005 progress review in connection with this agenda was not encouraging, owing to accumulated delays registered for most of the established objectives, this exercise should be useful in revitalising the reform impetus in Europe, as some deficiencies have been detected in the strategy in question, and a more pragmatic approach has been defined to strengthen the level of support for the reforms from the authorities.

In short, the current institutional framework for EMU meets the objective of progress in establishing an integrated economic area where different economic policies are fully consistent with the principles of free competition, an open market economy and macroeconomic stability. Although the regulatory framework of the Community restricts the scope of action available to the authorities in different degrees depending on the field involved, EMU membership generally entails substantial limits to the capacity to use administrative or regulatory procedures and demand policies to correct problems that economic agents may face at any given time. The successful path for a national economy within EMU therefore requires availability of public policies and mechanisms to ensure medium-term competitiveness and promote effective adjustment to adverse economic developments. This situation in general suggests substantial shifts in the focuses of economic analysis.

3 Implications for the analysis of the Spanish economy

As we have observed, in recent years the Spanish economy has undergone substantial change as a result of its opening up and liberalisation in a progressively globalised environment, particularly further to joining the Economic and Monetary Union. The changes in the framework in which the Spanish economy operates, described in earlier sections, have also meant substantial change in the relative importance of the underlying factors in economic growth potential, the nature and implications of shocks and the available economic policy tools. Efforts to learn about the Spanish economy have therefore also undergone a profound reorganisation that has affected the agenda of priorities, analytical approaches and the technical tools used. By contrast, Banco de España's membership of the Eurosystem and, through it, participation in generating the analyses that underpin the ECB's decisions, have meant that much of the work is done in collaboration with the other central banks in the euro area, in the form of co-ordinated forecasting exercises, joint occasional papers and analytical studies by teams of researchers in different areas.

The most important changes in working approaches can be summarised in four major areas: analysis of the external environment, emphasis on comparative studies, attention to new adjustment mechanisms and generation of disequilibria, and assessment of the policies that remain under the realm of the national authorities.

3.1 Analysis of the external environment

3.1.1 Monitoring of international economic developments

In the past, moderate economic openness and the limited role of the financial markets in the international propagation of shocks explained the modest attention devoted to analysis of the Spanish economy's external environment and, generally, the focus limited to trends in export markets and international raw materials prices. During the 1990s, strengthened ties with the EU and membership of the Exchange Rate Mechanism of the European Monetary System (EMS) led to greater emphasis on the assessment of the European economy as its increased influence on domestic economic and financial conditions became more perceptible.

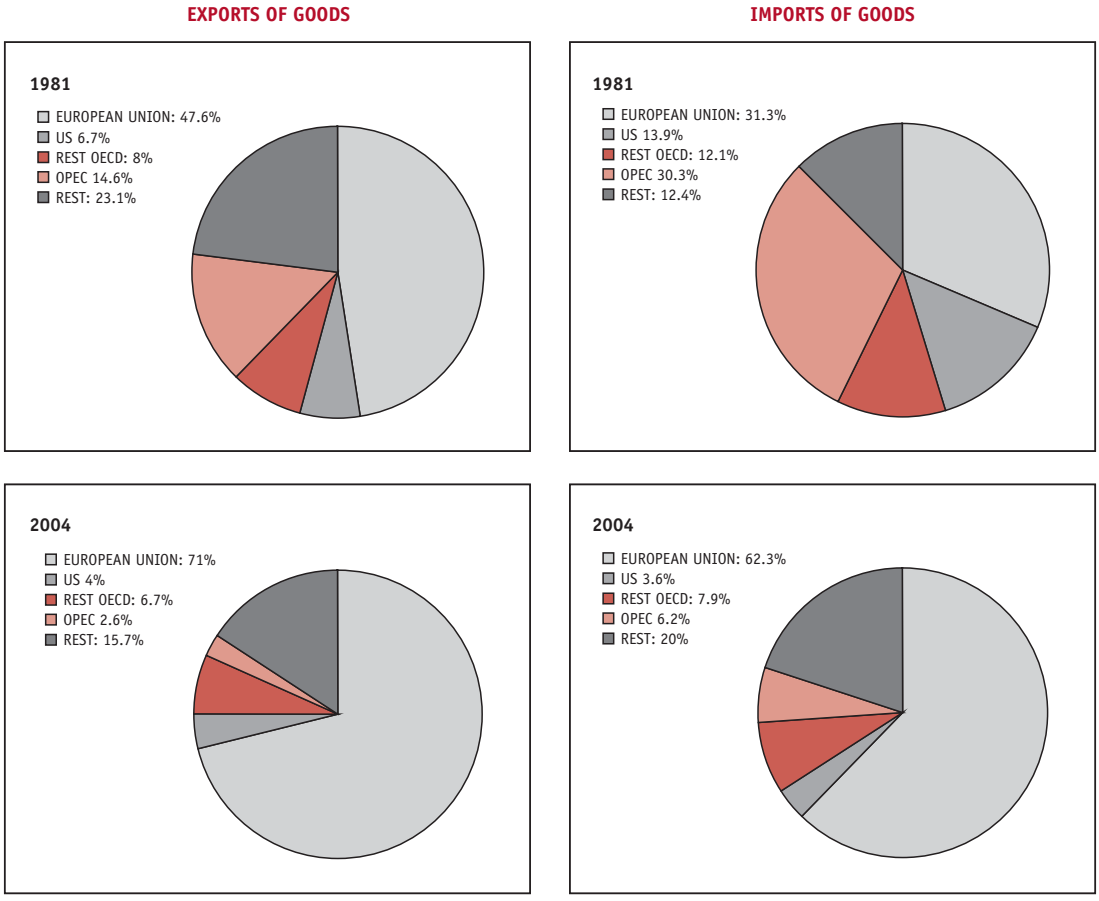
In any case, although detailed monitoring of key international economic developments has gradually gained importance, the influence of the external environment on the outlook for the Spanish economy has not until recently justified earmarking of resources required to conduct independent analyses on international economics issues and active participation in the relevant multilateral forums, particularly in the European environment.

The situation has changed radically in recent years. First, as we observed in Section 1, the Spanish economy's trade openness has increased so much in the past 10 years that the share of exports in national product now exceeds gross capital formation. Accordingly, monitoring of external markets is now just as important as effective assessment of domestic expenditure determinants.

An increasing international focus on the activities of Spanish firms has also led to considerable expansion in the channels through which changes in the external environment influence the Spanish economy. Substantial growth in foreign direct investment has required more intense monitoring of the economies involved, such as those in Latin America, which have been the principal recipients of Spanish financing. We find this type of analysis to be vital in gaining a better understanding of the factors that affect external investment and trends in the balance sheets of firms with interests in the area, this being a determinant factor in capital accumulation in the Spanish economy.

Beyond these analyses of specific economic areas, globalisation of financial activity has attracted greater attention to trends in the international financial markets. In an increasingly interrelated world where investor portfolios are becoming more internationally diversified, financial market prices tend to respond in parallel to economic shocks that initially may only affect one geographic area. The same path observed in stock exchange indices, reflecting events such as the crisis in the U.S. new technologies sector, or the accounting scandals in that country during the early years of this decade, are good examples. More recently, the surge in prices on the world-wide public debt markets – which, despite the different situation and macroeconomic outlook, in 2003, placed long-term interest rates at all time lows

CHART 4 GEOGRAPHIC BREAKDOWN OF SPAIN'S FOREIGN TRADE



SOURCE: Banco de España.

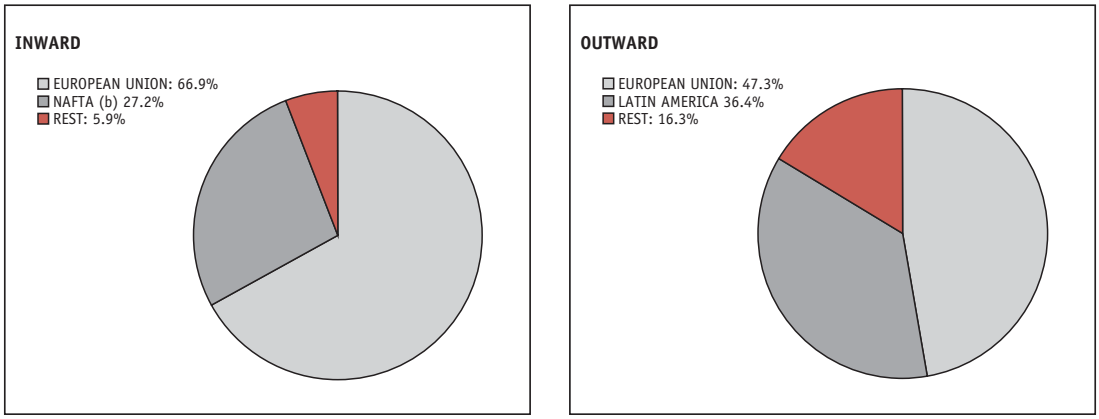
in the U.S. and in Europe – also illustrates the parallel behaviour of price trends for similar assets issued in different countries as a result of market integration and intense interdependence among macroeconomic trends in different areas. Monitoring of international financial markets and flows is therefore becoming an increasingly important component in analysing financing conditions in the Spanish economy.

3.1.2 Monitoring the European economy

Of course, the priority focus in analysing the external environment of the Spanish economy is the EU and, particularly, EMU member countries. Increasing financial and trade integration have meant that the EU countries are Spain's principal trade partners, as they purchase nearly three fourths of Spain's exports (see Chart 4). The area is also Spain's

CHART 5 GEOGRAPHIC BREAKDOWN OF SPAIN'S DIRECT INVESTMENT (a)

AVERAGE 1999-2003



SOURCE: Banco de España.

a. Excluding direct investment from monetary financial institutions.
b. US, Canada and Mexico.

principal foreign investor and the main destination of its direct investment flows, exceeding Latin America (see Chart 5). Gradual economic integration has led to a clear increase in the correlation between the economic cycles in Spain and in Europe, reflecting growing dependence of trends in Spanish economic activity on the economic situation in the EU.[2]

Clearly, the shift in focus in analysing the Spanish economy's external environment, however, is explained, above all, by participation in EMU. As the common monetary and exchange rate policy is set taking into account the economic situation and outlook of the euro area as a whole, monitoring of these developments has proven to be an essential ingredient in the analysis of the monetary and financial determinants that shape economic activity in Spain.

We should also bear in mind that Banco de España helps prepare the analyses conducted in support of monetary policy decisions through participation of its experts in the Eurosystem committees. As its governor is a member of the Governing Council of the European Central Bank, the *Servicios de Estudios* of Banco de España must be prepared to advise him or her on the most appropriate stance for euro area monetary policy. As the ECB takes a position on different aspects of the European economy and the actions of the authorities that may ultimately affect the achievement of objectives, implementation, or transmission mechanisms for monetary policy, Banco de España should also conduct work allowing it to support its active participation in the internal debate and contribute to shaping decision-making and communication in the Eurosystem. This framework includes

[2] See Cabrero et al. (2003), Camacho et al. (2004) and Micco et al. (2003).

studies published by the ECB on issues related to fiscal policies, structural reforms, inflation differentials and the functioning of the markets for goods, labour and capital in EMU. Its capacity to analyse trends, the economic outlook and, in general, the working of the Monetary Union, covering its key cyclical and structural aspects, has therefore been substantially enhanced.

As described in Section 2, Spain's membership of the EU also involves undertaking a set of regulatory instruments, economic policy commitments and multilateral surveillance procedures that potentially pose substantial limits on the scope of action available to the national authorities in the area of macroeconomic developments. We therefore find analysis of developments in the EU, in connection with fiscal and structural policies, important in assessing Spain's economic outlook. Since Community decisions draw from the perceived requirements of the European economy, we require a detailed knowledge of the vicissitudes of national economies and the factors affecting the policies applied in each of the countries affected in order to monitor the decision-making process at the European level.

The debate on application in some countries of fiscal discipline procedures provided in the Treaty and Stability and Growth Pact is a recent example. The only way to assess this issue, which affects the core of the existing economic policy co-ordination mechanisms in Europe and reflects the difficulty in arbitrating domestic and Community interests, is to combine monitoring of established regulatory procedures with knowledge of economic trends and the political situation in the member countries.

3.2 Emphasis on comparative studies

Economic openness, globalisation of activity and participation in a multinational economic area have led directly to the need for ongoing assessment of the economy's capacity to compete in increasingly open and integrated markets. As a result of the restricted scope for action in implementing stabilisation policies, potential macroeconomic divergences between Spain and EMU as a whole must be tracked on a regular basis.

Although the availability and intensity of labour and capital use will logically continue to exert significant influence on potential output, in the new international environment the concept of competitiveness is gaining increasing importance as a determinant factor in economic prosperity. Not only must we observe the customary relative cost and price indicators; competitive analysis also requires a multidimensional focus that incorporates comparative studies on factor quality, efficiency in productive processes and, most importantly, general economic productivity [see Bravo and Gordo (2003)]. There is also a wide variety of comparative frameworks, and the key geographic areas must be addressed. These should include the United States, which should serve as a reference for any analysis on the influence of innovation and the incorporation of new technologies on competitiveness, and the Southeast Asian countries, particularly China, whose commercial weight in the world economy has increased substantially in recent years. Comparative studies with EU countries, however, logically receive priority interest, as most of Spain's trade relations are based in the area. Incorporation in 2004 of 10 new countries, many of which having similar comparative advantages to the Spanish economy, has also

created the need to enhance our knowledge of the effects of this expansion on Spain's external competitiveness.

Within the European framework, competitiveness analysis serves as an essential factor in assessing the real convergence process. As one of the objectives of Spain's economic integration process, regular monitoring of the welfare differential between Spain and the rest of the EU should logically be maintained using the customary battery of indicators, along with studies to identify obstacles to Spain's more rapid convergence with more advanced countries.

In the shorter term, by reducing the number of stabilisation instruments available to the authorities, EMU membership justifies special emphasis on analysis of Spain's economic cycle vis-à-vis the rest of the economies in the euro area. Studies have been conducted for that purpose, and indicators generated to describe the Spanish economy's differential exposure to certain types of shocks and potential discrepancies between transmission patterns for Spain's key macroeconomic variables. Last, tools have been developed to assess the effective common monetary policy stance, its implications for the prevailing financial conditions and its influence on aggregate demand developments in the Spanish economy.

In a context where the Spanish economy is gradually adapting to the patterns corresponding to an environment of macroeconomic stability, the core EMU countries constitute an important reference in understanding the new behaviour of agents, affecting variables as diverse as trends in wages, domestic expenditure determinants and financial decisions.

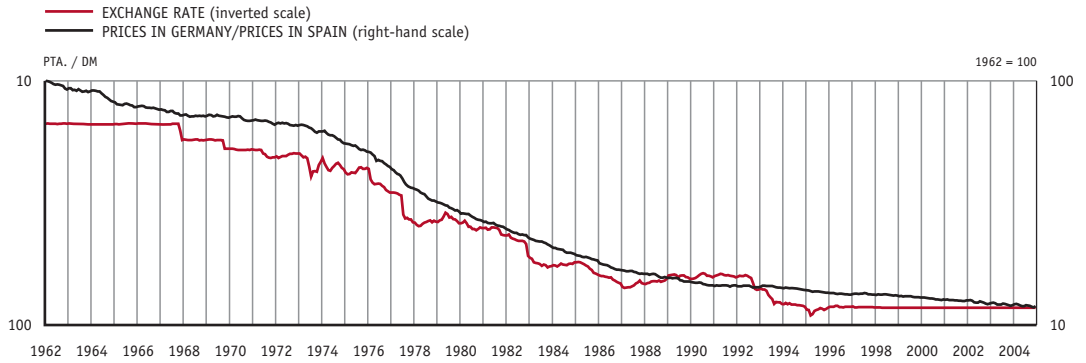
3.3 Adjustment mechanisms and potential imbalances

As we have discussed, membership in a monetary union facilitates absorption of certain types of shocks. For example, difficulties in the domestic financial system are less significant when the financial markets are sufficiently integrated. Similarly, the Spanish economy has substantially reduced its exposure to exchange rate fluctuations and its fixed-income and equity markets no longer register the volatility induced by the absence of a highly stable macroeconomic environment.

Although cyclical convergence as achieved in the EU inherently reduces the probability of adverse idiosyncratic developments, we cannot expect monetary union to eliminate them. In any case, the absence of a national economy's own interest and exchange rates changes the way specific shocks are manifested in the national economies, the channels through which they affect the key macroeconomic variables and the relevant economic policy recommendations.

More specifically, the existence of a single currency entails a substantial change in the adjustment mechanisms available to address external disequilibria. In countries with lesser traditions of macroeconomic stability, the inability of the domestic currency to depreciate against that of its partners in the Union eliminates exchange risk for investors, which reduces the required interest rate level, while encouraging greater and more stable capital inflows into these economies, facilitating external deficit financing [see Blanchard and Giavazzi (2002) and Peñalosa (2002)]. This new feature contrasts with the Spanish economy's experience in recent decades, when periods of expansion and accumulated competitiveness losses buoyed up relative inflation levels, regularly generating serious balance of payments

CHART 6 PESETA/DM EXCHANGE RATE AND RELATIVE PRICES BETWEEN SPAIN AND GERMANY



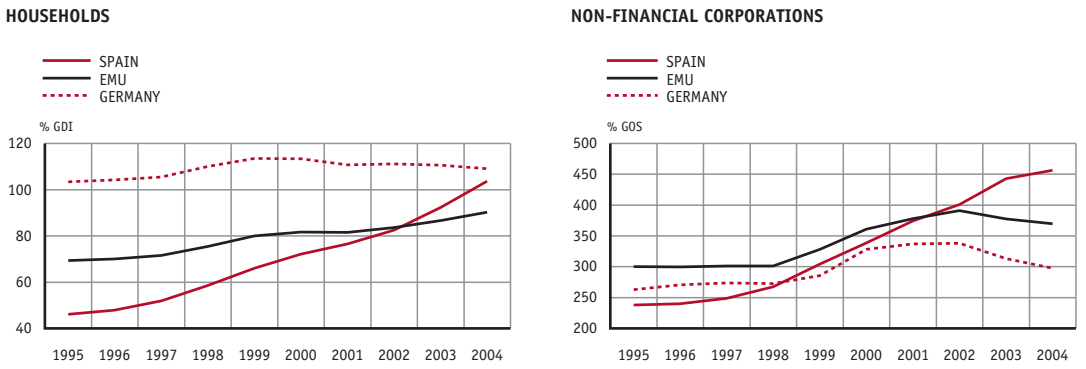
SOURCE: Banco de España.

disequilibria, requiring currency devaluations and a phase of adjustment prior to the deterioration in the real terms of trade (see Chart 6).

Similarly, substantial changes in the Spanish economy's financial environment also led to notable changes in the behaviour of economic agents. The significant decline in interest rates beginning in 1996 encouraged indebtedness in households and non-financial firms (see Chart 7), driven by lower finance costs and greater access to the credit markets for certain agents, who could afford to incur debt at the lower interest rate levels. Rapid growth in debt arranged by the private sector was accompanied by an expansion of the real property market, reflected with a pronounced increase in construction investment and, above all, in prices for housing, purchased substantially through financing obtained by households.

Entering the Economic and Monetary Union therefore expanded the tolerable disequilibrium threshold at any given time between domestic economic agents' resources and expenditure. The increase in the overall economy's recourse to external saving, or recourse by firms and households to external financing might therefore mean that players have adapted efficiently to the new environment that offers them enhanced facilities, through the financial system, to cover present expenditure with future income. Certain disequilibria, however, may also reflect an imperfect working of the economy or questionable financial decisions potentially leading to adverse effects on economic growth. Within a monetary union, these developments are not only often difficult to detect; their correction can be more problematic and therefore early identification is particularly advisable. For example, in light of the difficulties frequently involved in nominal wage adjustment, the fact that devaluation is impossible tends to increase the probability that competitiveness problems potentially underlying the observation of persistent trade deficits will ultimately require a sudden adjustment in economic activity and employment as a mechanism to force real cost moderation. Similarly, as the authorities have no autonomy to adjust domestic interest rates, it is more probable that excessive growth in debt may subsequently trigger an intense correction in expenditure decisions as a result of shocks in expected revenue, asset prices or finance costs.

CHART 7 DEBT OF HOUSEHOLDS AND NON-FINANCIAL CORPORATIONS



SOURCES: European Commission and Banco de España.

For all of these reasons, one of the priority objectives in analysing the new context should be to identify developments in the Spanish economy that, although partially explained by agents' adjustment to the new prevailing economic and financial conditions, may generate risks in maintaining a stable path of economic growth. Against this backdrop, two frameworks have received preferential attention. First, the economic activity impulse might exert excessive pressure on domestic costs and prices, thereby affecting economic competitiveness. Second, potential imbalances in private sector assets or housing prices may adversely affect performance in domestic expenditure patterns.

Owing to the external position's inferior informative power on trends in competitiveness, analysis of the first question requires a detailed study of price and cost formation. Analysts should, more specifically, determine whether the greater increase in prices in comparison with those in the euro area is simply a response to an advanced cyclical position at a given time. Similarly, analysts should study whether the persistent inflation differentials registered can be explained by export sector productivity growth, as we might expect in an economy undergoing a real convergence process. We should also analyse whether, in contrast, there are real and nominal rigidities in the product and labour markets that, in a context of imperfect competition, justify the presence of price growth rates systematically exceeding the EMU average.

If, as seems to have occurred in the early days of Monetary Union, the latter effect is predominant [see, for example, Estrada and López-Salido (2002) and Ortega (2003)], relative price trends should not be given merely a role of stabilising economic fluctuations, or considered a logical consequence of the process of equalising price levels with more advanced countries. On the contrary, it is relevant to address, as in a number of different studies, the welfare effects of imperfections that generate inflation differentials, and to analyse their potential short and long-term impact on competitiveness in Spanish exports.

The second framework that has required increasing attention is the analysis of the non-financial private sector balance sheet position. The changes that occurred in the size and

composition of corporate and household balance sheets and their linkages to the real asset inflation process require a more thorough macrofinancial analysis to identify potential areas of vulnerability in the net wealth position of agents and to assess the sustainability of real property prices. The macroeconomic outlook is clearly influenced directly by the probability assigned to the occurrence of episodes of financial fragility or crisis in the asset markets. Once again, an important problem in analysis is to determine how much of these developments are attributable to structural changes in the economy associated with the new macroeconomic environment, the development of the financial system, or demographic trends, to adequately assess the risk factors.

Using this approach, the changes described in corporate and household balance sheets have substantially increased the importance of financial analysis in assessing probable developments in the economy and the monetary policy transmission mechanism. Specifically, there is evidence that the effects of changes in interest rates and prices of financial and real assets might have increased substantially during the latter half of the last century as a result of growth in private sector debt and changes in composition of household assets [see Malo de Molina and Restoy (2004)].

This increased influence of financial variables on macroeconomic developments is reflected in the new versions of Banco de España's quarterly model. At the same time, models and indicators built with microeconomic data have come into increasingly intensified use to supplement analysis of the influence of the financial situation of firms and households on economic activity.

3.4 Economic policy analysis

The analysis conducted by a central bank of non-monetary policies is traditionally justified by their influence on relevant macroeconomic conditions and on the mechanism for transmitting the actions of the monetary authorities. In the framework of EMU, the need to maintain a rigorous analysis of the activities of the national economic authorities is reinforced by the limited incentives available to them at times to adopt decisions compatible with the objective of promoting sustained growth [see Restoy (1996)]. Regardless of any long-term benefits that the national economy may derive from rigorous policies, we should bear in mind that fiscal adjustments, particularly in adverse macroeconomic conditions, and structural reforms that can be costly in the short term tend to suffer as a result of election cycles. Further, in light of the lower cost of financing public debt since the beginning of EMU and the insufficient size of spreads in countries having different levels of debt, the markets do not seem to impose significant disciplinary effects on government fiscal policy decisions (see Chart 8). In these conditions, banks can legitimately assert their independence to call for the authorities to support activities to promote economic efficiency and stability, through publications and appearances by their senior officials in the relevant fora at the national and Community levels.

In the framework of the Eurosystem, one of the most important contributions from national central banks to the joint analysis on which decisions are based is rigorous assessment of domestic policies in each member country. These analyses have implications for

CHART 8 LONG TERM INTEREST RATES AND PUBLIC DEBT

SOURCES: European Commission and Banco de España.

the conduct of the common monetary policy as well as for the Eurosystem's stance in economic policy debates within the EU. Against this backdrop, regular studies should be conducted to assess the stance of fiscal policy in Spain and the compatibility of the Spanish government's fiscal policy with the requirements under the Treaty on European Union and the Stability and Growth Pact, and to assess the level of compliance with the established objectives in the area of structural policies, such as those registered in the Broad Economic Policy Guidelines.

Analysis of the Spanish government's economic policy decisions, however, is logically also motivated by domestic concerns. Owing to the importance in analysis of factors related to economic competitiveness – as a fundamental ingredient of real convergence – and monitoring of macroeconomic and financial equilibria, fiscal and structural policies are logically assessed to reflect their contribution to potential growth and stability.

Analysis of progress in enhancing labour market flexibility, promoting product market competition and stimulating innovation and incorporation of new technologies is therefore promoted in the framework of studying economic growth capacity and competitiveness. The same justification applies to regular assessment of the quality of public finances and their capacity to address the challenges that the ageing of the population entails.

The contribution of economic policies to macroeconomic stability is analysed, prioritarily, to assess its capacity to offset potential discrepancies between the prevailing monetary policy stance in the euro area and the cyclical position of the Spanish economy. For example, owing to the relatively lax financial conditions prevailing during the initial years of monetary union, the analysis provided arguments to support the need to maintain a restrictive budget policy stance to moderate the scope of some disequilibria registered in the Spanish economy.

The capacity of economic policies to strengthen the effectiveness of mechanisms designed to facilitate absorption of shocks should therefore be addressed. It is important to observe how certain lingering rigidities in the product and factor markets or imperfections

in the fiscal system can promote developments such as persistent pernicious wage or inflation differentials, or an excessive increase in real property prices.

4 Final comments

The Spanish economy's immersion in the process of globalisation, and particularly trade, economic and financial integration into the EU and membership in EMU, have substantially changed the factors that explain growth in the Spanish economy, the nature of shocks, adjustment processes and the role of economic policies. In this chapter, we have described these changes and pointed out their repercussions on the objectives pursued and the analytical approaches used in Banco de España's studies.

It is important, however, to underscore that economic analysis and available empirical evidence have yet to answer all the questions posed by the involvement of an economy in a multinational monetary union. Further, as a result of the changes described in agents' behaviour patterns, models estimated with historical data corresponding to different regimes should be used with caution. In the coming years, a demanding working agenda must therefore be addressed, to gradually enhance the knowledge of the national economy in the context of its participation in monetary union and to develop analytical and forecasting models fully adapted to the new institutional environment.

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3. Basic features of the Spanish economy

Julio Segura

1 Introduction

Spanish GDP levels in 2004 represented 12.2 percent of those in the European Monetary Union (EMU) – surpassed only by Germany, France and Italy, and occupying seventh place in the world. In per-capita terms[1], Spain achieved 91.8 percent of the EMU average, constituting a gain of approximately 13 percentage points (pp) as against the figures registered at the end of the sharp expansionary phase during the latter half of the 1980s. As we shall observe throughout this chapter, Spain's current basic features – structural as well as politico-economic – are substantially similar to the EMU average, although the differences were quite pronounced in 1970, not to mention the golden decades of European growth. These findings highlight two features of the Spanish economy: first, its size and activity place Spain among the world's leading economies, although its weight has yet to be adequately acknowledged in the international organisations; and second, the process that has placed Spain in this position has been more accelerated than in its neighbouring countries.

The reasons for Spain's delay in beginning its stride to modernisation and European economic integration are well known. Two decades of autocracy following the end of the Civil War, derived from the political isolation of the dictatorship marginalised Spain in the process of intense economic growth that followed the Second World War and that drove sub-

Author's note. I would like specifically to thank Fernando Restoy for his work as editor of this chapter. His comments and criticism greatly improved the first, as well as the subsequent, versions of the chapter.

[1] At current prices and purchasing power.

stantial expansion in the economies of Western Europe in a climate of economic stability and social peace. Spain was also excluded from the European economic integration process that began in 1951 under the Treaty of Paris establishing the European Coal and Steel Community (ECSC), the predecessor of the Treaties of Rome, leading to the creation of the European Economic Community (EEC) in 1957[2].

This isolationism had substantial repercussions on the Spanish economy. First, the latter was unable to benefit from European economic expansion until well into the 1960s. We recall that in 1952, Spain had yet to regain its pre Civil War revenue level – and this expansion brought with it, *inter alia,* substantial public investment in infrastructure, intense technology transfers derived from robust growth in world trade and foreign investment, development of national technological sectors, and consolidation of social security systems and free universal access to preferential goods – such as health and education – that promoted considerable growth in productivity.

The second negative aspect of autocracy was the survival of a highly inefficient institutional economic framework, with adverse effects that persisted in the long term. To mention a few examples: insufficient development in the public sector, which, in the early 1960s, represented only 20 percent of national expenditure – as compared with levels of more than 40 percent in Western Europe; an obsolete tax system that did not include the synthetic income tax until 1977 or value-added tax (VAT) until 1986; and rigid intervention in a number of labour and capital markets, regulated with crude quantitative instruments.

The clearest manifestation of the costs of isolationism, however, is perhaps the fact that all periods of sharp economic growth in Spain during the latter half of the 20th Century were preceded with operations aiming at economic liberalisation and opening: the Stabilisation Plan of 1959; the preferential agreement of 1970; more recently, Spain's full accession to the EEC and the signing of the Single European Act in 1986; and last, incorporation in 1998 into Stage Three of Economic and Monetary Union (EMU).

The objective of this chapter is not to provide an account of the lengthy process reviewed above, but to attempt to summarise the current basic features of the Spanish economy in order to establish a frame of reference for the rest of the book. Rather than an historical focus, then, this discussion will use comparisons at different times between Spain's current situation and certain significant dates in the past. Rather than a comparative approach, we shall comment on a number of different issues for EMU and other specific economies. Rather than providing a detailed account of all important aspects of the Spanish economy, we shall address only those comprising key focuses of the Bank's analytical and research work.

The chapter is organised as follows: Section 2 summarises the basic features of the Spanish economy's factor endowment, as broadly defined, including population, employment, level of skill, and physical and technological resources; Section 3 is devoted to analysis of productive and commercial specialisation and competitiveness, and Section 4 includes a paragraph that attempts to justify why, despite the Spanish economy's good differential performance as compared with the West European economies, the topic of productivity and competitiveness is more important, even now, than a decade ago. The two

[2] And EURATOM, which, along with the ECSA and EEC, constituted the European Communities.

subsequent sections describe two structural aspects that are important from the standpoint of competitiveness: Section 5 addresses the processes of market liberalisation, its level of competition and the regulatory features of the Spanish economy; and Section 6 discusses relative weight, functions and financing of general government. Section 7 analyses the financing structure, composition of wealth and debt of agents, and provides a summary description of some financial aspects of the Spanish economy. Last, Section 8 will provide a brief summary of this overview.

2 Factor endowment

2.1 Population

During the period 1970-2004, the *Spanish population* registered a growth rate of 29.7 percent, from 33.8 million to 44 million – far exceeding the EMU average of 13.6 percent. This performance, however, entails two different phases. The first demographic transition, characterised by equilibrium between birth and mortality rates leading to slow but stable population growth, occurred in Spain with a lag of one decade behind the EMU countries. This delay began to narrow from the 1970s. The second transition, characterised by a decline in fertility, population ageing and a trend toward stagnation, or perhaps decline, was observed in Spain with more intensity than in the rest of EMU.

The natural increase in the Spanish population until 1990 exceeded the EMU level, although it was similar to the Organisation for Economic Cooperation and Development (OECD) average and declined slightly during the 1990s. This situation is explained by two factors. The first is a more pronounced decline in the birth rate beginning in 1970, which exceeded the EMU average to drop clearly below that level in 2002 as a result of the sharp reduction in Spanish fertility rates which, in 1975, had been among the highest in the EMU (3 children per woman), and became lowest 20 years later (1.2 children per woman). The second factor is a mortality rate that followed the downturn observed in all countries in the area.

Beginning particularly in 1996, however, demographic trends were affected by the increasing importance of immigration, as illustrated by the fact that natural Spanish population growth only explained 10 percent of its dynamics, and the remaining 90 percent was attributable to the increase in foreign residents. To illustrate the importance of this factor, the foreign population in Spain increased from 0.7 percent in 1990 to 8.4 percent at end-2004, i.e. the number of active foreign nationals to all intents and purposes increased tenfold between 1996 and 2004.

These developments, combined with the increased life expectancy from 71.9 years of age in 1970 to 78.3 years in 2002 – similar to EMU levels – led to a substantial ageing of the population, as we observe in Table 1. During the period considered, the percentage of children under 15 years of age declined by 13 pp – four points above the EMU level – and the percentage of persons over 64 years of age increased by 7 pp – two points above the EMU level. The end result is an age structure practically identical in Spain and EMU, although, considering the more youthful Spanish population in 1970, it is indicative of a much more rapid transition process.

TABLE 1 AGE STRUCTURE OF THE POPULATION (a)

	Age					
	0-14		15-64		≥ 65	
	1970	2003	1970	2003	1970	2003
Spain	27.9	15.0	62.3	68.0	9.8	16.9
EMU	25.0	15.9	63.0	67.2	12.0	16.9

SOURCE: World Development Indicators Database, World Bank.

a. Data in percentages.

Last, where *population projections* are concerned, this aging trend has become strongly accentuated. Eurostat's baseline scenario estimates for 2000-2050 include, for EMU as a whole, a decline of just under 4 pp in the population under 20 years of age and an increase of more than 12 pp in those over 60, who will represent one third of the total population, leading to an explosion in the dependency ratio – the number of persons of retirement age per 100 working age people – from 38 percent at the turn of the century to 50 percent in 2050[3]. In the Spanish case, this ageing is more pronounced: by 2050, one third of the population will be in the over 65 age group – rather than 60 as in EMU – and the dependency rate will exceed the EMU level by 12 pp.

This process of population ageing, increased dependency rate and greater relative weight of immigration is a source of well-known medium-term problems for the Spanish economy. It will entail increasing the percentages of GDP earmarked to finance public pensions and expenditure on health services, or significant changes in both programmes; further, the population of low-income dependents will increase; and finally, it will generate social integration problems affecting the education system.

2.2 Participation, employment and quality of the labour force

Changes in the *participation rate* – the proportion of assets held by the working age population – depend to a large extent on the economic cycle and, in this connection, performance of the Spanish economy is not substantially different from EMU. The level, however, presents a very distinct structural characteristic: lower values. In 2003, the total EMU participation rate amounted to 69.3 percent while the Spanish level – following a number of years of substantial growth – was 67.7 percent, a difference that widens if we consider the female rate, which was 60.2 percent and 55.1 percent, respectively. This situation reflects the rigidity of the workday, the insufficient relative weight of part-time contracting and dif-

[3] These calculations reflect a retirement age of 65. If we presume a retirement age of 60, the dependency rate in 2050 will be 71 percent, although growth rates in this level from 2000 are quite similar.

ficulties in reconciling working and family life, attributable to different causes ranging from regulatory factors (e.g. working hours) to social roles (such as household division of labour), and shortages of certain types of services (for example, childcare centres). To illustrate the quantitative importance of this gap, it is estimated that half of the current per-capita GDP differential between EMU and Spain is attributable to low participation rates.

Nonetheless, the Spanish labour supply increased substantially during the last decade, with an average annual growth rate of approximately 3 percent. The two basic factors underlying these dynamics were immigration, which explains more than 40 percent of this growth figure; and the increase in female participation, which, while remaining at levels below the EMU average, has accelerated in recent years to account for more than one third of the growth in the labour supply during the initial years of the 21st Century.

Where *employment, unemployment and their trends over time* are concerned, four differential features should be pointed out in the Spanish economy.

The first feature is a modest relative capacity, until quite recently, to generate employment. From a situation during the 1960s where the Spanish economy required real growth rates of over 3 percent to generate net employment, the period 1986-1996 presents a number of moderate figures, of 2.4 percent of GDP and 2.8 percent for employment and, in 1996-2004, of 3.3 percent and 3.7 percent, respectively. Perhaps the most significant factor, however, is that, during the past three years of moderate growth (2.4 percent), employment has grown at the same rate.

The second feature is broad movements in employment during expansion and depression phases. Employment cycles in the Spanish economy are more pronounced than those of EMU: more relative job elimination during crises (2 million during 1975-1985) and higher levels of job creation during expansion periods (4 million during 1985-1990; 2 million during 1997-2000).

The third factor is the substantial rate of temporary employment. The level of 32 percent reached one year after the 1984 labour reform, that tripled the EMU average, has not fallen below 30 percent in two decades, despite the reforms of 1994 and 1997, whose declared objective was to reduce temporary arrangements. Owing to the greater relative importance of seasonal activities, the temporary component of the Spanish economy should clearly be somewhat higher than the EMU average, although a temporary rate of more than 20 percent in industry, 25 percent in services and 55 percent in agriculture and construction, after adjustment for the causality of temporary employment cancelled in the 1984[4] reform, can only be attributed to the higher cost of indefinite contracting.

The last differential assessment factor refers to unemployment rates, which continue to be the highest in EMU, although the differential of 8 pp during the mid-1990s was narrowed to the current level of just over 3 pp. Further, persistent high levels of long-term unemployment that in 2003 represented 40 percent of total unemployment, were concentrated

[4] Under the principle of causality, a temporary contract can only be offered for a temporary activity. Temporary contracts to stimulate employment – the centrepiece of the 1984 reform – departed from this principle, allowing such contracts to be offered for inherently non-temporary work, although only for a maximum of three years, after which the temporary contract would expire with an certain indemnity (lower for indefinite contracts) or be converted to an indefinite contract.

TABLE 2 STRUCTURE OF EMPLOYMENT BY SECTOR (a)

	Agriculture		Industry		Services	
	1985	2004	1985	2004	1985	2004
Spain	18.4	5.4	31.8	30.1	49.8	64.5
EMU	16.2	4.5	30.3	25.5	53.4	70.0

SOURCE: World Development Indicators Database, World Bank.

a. Data in percentages.

with three specific groups: women, unskilled youths seeking their first jobs and persons over 45 years of age.

These features of Spanish employment are indicative of a fairly flexible labour market for the wrong reason – its high level of temporary arrangements – to offset the rigidities of indefinite contracting and its high comparative costs – and the wage bargaining structure[5].

Where the *sectoral structure of employment* is concerned, Table 2 shows that the Spanish trend is similar to the trend in Europe: a decline in the share of agricultural employment, a slight reduction in the relative share of industry and a sharp increase in the share of services. The absolute differences, however, are registered in the higher (lower) absorption of primary (tertiary) employment in the Spanish economy. These differences will be analysed in greater detail in the next section, in connection with the value-added structure.

Last, regarding *labour quality and qualification,* while it is not an easy matter to find straightforward indicators, these factors can be assessed with two types of information: (i) educational characteristics of the total population; and (ii) with reference to the same characteristics for workers. Where the former is concerned, in 2001, the Spanish population 25-64 years of age with secondary studies was 40 percent, as compared with the OECD average of 64 percent. The picture, however, is much more optimistic if we analyse the percentages by age group, as the comparison between the mere 17 percent in the 55-64 years age group and the appreciable 57 percent for the 25-34 year group indicates a substantial, rapid improvement, i.e. a convergence toward more advanced countries, as the 32 pp gap with the OECD average in the older group narrows to 17 pp in the youngest sector.

The percentages in reference to higher education are much greater: approximately 24 percent for the total population, similar to the OECD average. In addition, the convergence process has been complete and rapid: in the 55-64 year age group, only 10 percent of the population had attended higher education (15 pp below the OECD average), and in the 25-34 year age group, 36 percent of Spanish nationals attended higher education (9 pp above the OECD average), while this figure was only 16 percent in 1991.

In the wake of these results there was a substantial expenditure effort in education, which, in 2001, represented 4.9 percent of Spain's GDP – 1.3 pp below the OECD average but slightly higher than the levels observed in Italy and Germany (5.3 percent). However,

[5] Chapter 18 describes these structural elements in greater detail.

average expenditure per student in Spain, in respect of the OECD average, is 80 percent for early childhood education and reaches 95 percent in primary and secondary education, although it only slightly exceeds 60 percent for higher education.

All of these data imply a substantial improvement in Spanish education levels, clearly the result of the universal availability of primary education and better access to higher education, although quality is questionable at the ends of the spectrum: early childhood and higher education.

This evolution has been reflected in education levels of the employed population, in which, in 2001, approximately 52 percent had studied at the primary level, 20 percent at the secondary level and 28 percent in higher education. These data compare quite favourably with those from one decade earlier (78 percent, 6 percent and 6 percent, respectively, meaning that approximately 10 percent of workers were insufficiently educated), although they indicate a significant anomaly. The excessive weight of workers having attended primary studies – which exceeds the German level by 39 pp and the French level by 21 pp – and the extremely high percentage of worker having attended higher education – similar to German and French levels – indicate an insufficient weight of workers having attended secondary education, that in the core EMU countries, with the exception of Italy, is situated above 50 percent, evidence a substantial mismatch between the level of studies completed and the level required for the position.

2.3 Capital and technology

The *level of capitalisation* in the Spanish economy has increased tremendously since 1980, where our examination of these figures begins. The capital/labour ratio increased by 21.2 percent during the 1980s, 23.4 percent during the 1990s and 7.8 percent during the period 2001-2004, the growth rates being far higher if we consider only productive capital (36.8 percent, 34.8 percent and 9.2 percent, respectively). This situation, the result of a gross capital formation ratio of approximately 24 percent of GDP during the past 15 years, an investment effort exceeding the EU 15 rate by 4 pp per annum, led in 2004 to a productive capital/labour ratio level similar to the EU 15, as against 81.5 percent in 1980. There is, however, a significant difference in composition. Specifically, despite substantial public investment which led to an increase in the public capital/population ratio during the period 1980-2004 from 35 percent of EU 15 to 89 percent, there is a persistent shortfall in the infrastructure endowment.

We also observe a mismatch when we analyse the *technology* indicators. For aggregate purposes, it suffices to point out that in 2002, the percentage of technological capital stock over GDP was just under 45 percent of the EU 15 average; research and development expenditure amounted to 53 percent, with a relatively greater effort in the public sector, amounting to 60 percent of the average European levels. The situation is no better in the area of new technologies (information and communication technologies – ICT), an essential component of total factor productivity growth in the past two decades, and quite specifically, U.S. performance in this area from the mid-1990s: in 2003, ICT expenditure was 1.1 pp lower than the EU 15 level and 2.5 pp below the level of the U.S. The gap is even

wider in the area of information technologies: per-capita expenditure on these technologies in Spain came to 70 percent of the European average and was just over 40 percent of the U.S. level; while the level of households having Internet access was 25 percent in Spain, 45 percent in Europe and 55 percent in the U.S.

From the standpoint of productive factors, the Spanish economy's most pronounced deficiency is clearly its shortage of technological capital, one of the fundamental factors in growth potential for any economy. This is reflected in the historic trends in total factor productivity[6]. Owing to the border distance effect, productivity grew at substantially high rates – albeit declining – and clearly exceeded those in the EU 15 from 1960 until the mid 1980s. Since then, despite maintaining an appreciable distance from the European average, as we have observed, Spain's average annual total factor productivity growth rates were approximately 0.5 pp per annum below European levels of 0.6 percent in 1985-2000 and fell about 0.2 percent during the two-year period 2001-2002[7]. These figures contrast more sharply with those of the U.S., whose total factor productivity grew 3 percent during the latter half of the 1990s and no less than 2 percent during the first few years of the 21st Century.

3 Productive and commercial specialisation: competitiveness of the Spanish economy

Table 3 provides recent trends in the *aggregate sectoral structure of value added* (VA) in Spain and in EMU. Once again, as occurred with the sectoral composition of employment (Table 2), trends are quite similar in both economies: some weight shifted from the primary sector and industry to services. We find at least three important differences, however, when we analyse this information.

The first difference refers to the composition of the industrial sector, in which Spain's construction sector occupies much more weight than it does in EMU, while VA for manufacturing is less dynamic. The diagnosis of these developments becomes a greater concern if we consider an initial breakdown of manufacturing into the 13 sectors of the NACE-CLIO (R25) classification and classify them into the three OECD groups to reflect performance of product demand – using the income elasticity approach – and technological content, identified through potential productivity gains. Trends since full EEC accession show that, in the Spanish economy, there was a relative decline in the share of manufacturing sectors with low levels of demand and technology, substantially in favour those registering moderate demand and technological content, with a slight quantity increase in the share of sectors registering more dynamic demand and high technological content. This situation contrasts not only with economies such as the U.S. or Japan, but with the EMU average itself, where the shift away from the less dynamic sector has

[6] Chapter 16 reviews the available empirical evidence on the relationship between technological capital and productivity.

[7] OECD estimates. Total factor productivity is calculated as a residual and therefore non-trivial estimation problems may produce negative values for the rate of change, whose economic interpretation is difficult to justify. This indicator should therefore be considered in comparative terms and with caution.

TABLE 3 STRUCTURE OF VALUE ADDED BY SECTOR (a)

	Agriculture		Industry		Services	
	1985	2004	1985	2004	1985	2004
Spain	6.3	3.0	36.2	28.6	57.5	68.4
EMU	4.1	2.2	36.6	27.0	59.3	70.8

SOURCE: World Development Indicators Database, World Bank.

a. Data in percentages.

been more pronounced than in Spain to benefit the more advanced technology sectors rather than the intermediate ones.

This industrial value added composition is indicative of the difficulties Spain's manufacturing industry is experiencing in addressing the increased competition generated by the European integration process, owing to changes in unit costs of labour, increased costs of some intermediate inputs derived from higher inflation levels in services protected from competition, and insufficient technological resources, as discussed above.

The second relative difference is the greater weight of construction VA in the Spanish economy as compared with Europe: for example, in 2004, construction represented 8.6 percent of Spanish VA and 5.1 percent of VA for EMU. Until the mid-1990s, the difference was attributed fundamentally to the public infrastructure investment effort aimed at reducing the accumulated lag from the early 1980s; and beginning in 1995, strong sustained growth in construction activities was attributed to the strength of residential investment.

The third differential feature refers to value added in services, where we observe the greater weight of growth in non-market services in Spain than in EMU and less dynamic performance in services related to new information and communication technologies.

These developments were reflected in – and in part triggered by – developments in and composition of Spanish *foreign trade.* Spain is an economy whose openness – exports plus imports as a percentage of GDP – has increased steadily since its full accession to the EEC in 1986. From an openness of 38 percent at that time (14 pp below the EU level), Spanish openness increased to 50 percent (8 pp below the EU figures) 10 years later, to its present level of approximately 60 percent. This significant increase in the level of openness, however, registers a substantial difference as compared with the EU: in Spain, it entails a negative contribution from the external sector to growth, while these levels were moderately positive in the EU. Cyclical fluctuations aside, for the period 1986-2004, the average annual negative (positive) contribution of the external sector to Spanish (EU) GDP was –0.6 percent (0 percent). Further, the Spanish current account deficit in 2004 amounted to 4.9 percent of GDP, practically double its 2003 level with an increase of approximately 40 percent in the trade deficit.

All of these figures point to a gradual loss of competitiveness in the Spanish economy. To analyse recent trends, the distinction should be made between the period between full EEC accession and the introduction of the euro, and from then until the present.

During the decade 1986-1996, the openness of the Spanish economy accelerated, generating an increase in export activity and import penetration – primarily from the EU. During this period, export shares for EU countries grew moderately, while Spanish exports surged, particularly within the European area. Import penetration also increased. Its relative weight doubled to represent one third of Spanish apparent consumption of manufactured goods in 1996. Throughout the period, the index of comparative advantage in trade (the balance of trade as a percentage of total trade volume) deteriorated, concentrated primarily during the initial years of the decade, although the effective real exchange rate for the peseta improved owing to depreciation in the nominal exchange rate.

When the euro was introduced, permanent establishment of exchange rates eliminated recourse to competitive devaluations to offset declines in competitiveness derived from the internal nominal income determination process and from relative productivity losses. Until 2001, Spain's share of exports to EMU countries continued to grow, subsequently stabilising and beginning a process of relative decline in 2002 despite reduced margins on goods subject to external competition. More recently, Spanish export levels have been sustained in EMU while declining in the rest of the world.

Import penetration in Spanish final demand has continued to increase.

These developments should be assessed with care. The increase in Spain's openness and, in general, in its external trade, dispels all doubts as to the beneficial effects from the standpoint of economic efficiency. By contrast, some more recent increases in import penetration can be attributed to the process of appreciation in the euro, to the positive growth differential in the Spanish economy and, to the extent that this factor is particularly important where capital goods are concerned, reflects a better domestic demand composition. Further, some of the more recent erosion in the share of exports to countries outside the euro area can also be attributed to the appreciation in that currency. Last, there is a cyclical component to the tremendous growth in trade and the income account deficits: the Spanish economy registers substantial growth rates, higher than those in the euro area, which is its main export customer. This performance, however, still entails a genuinely negative component: gradual erosion in competitiveness. From the price standpoint, the Spanish inflation differential of approximately 1 pp per annum in respect of the EU presumes a cumulative loss of competitiveness[8], that, in the long term, can only be offset with differential growth levels in productivity and/or reduced margins and/or costs.

Where factor costs are concerned, as external corporate financing has reached an unprecedented low, it is difficult to consider that developments in this area might permit increased differentials. The labour factor is a different matter. While performance in collective bargaining appears to be moderate, generalisation of the automatic review clause to reflect the difference between government inflation targets and the observed real level means that wages, in practice, are indexed to past inflation. Further, we find that the performance of margins is differentiated by sector: tradable goods are adjusted to maintain

[8] Which for some time offset the initial advantage derived from establishing a permanent exchange rate for the peseta undervalued by approximately 6 percent, which clearly is one factor in explaining the positive performance in Spanish foreign trade during the early years of EMU.

competitiveness; services protected from competition – the core of Spanish inflation – perform anticyclically and, as a result, price increases in these intermediate inputs adversely affect competitiveness.

Last, moderate growth in labour productivity – below the EU average – is not useful in offsetting nominal wage dynamics, ultimately producing unfavourable trends in Spanish unit labour costs. During the period 1996-2003, these costs rose an annual average of 2.7 percent, as against the EU level of 1.8 percent, hence Spanish level exceeded the EU level by 7.5 pp during the seven year period.

An economy's competitiveness depends not only on prices, nominal costs and unit labour costs, but also on total productivity of factors, certain intangible assets and the institutional framework. As indicated in Section 2.3, growth in total Spanish factor productivity has been lower than the EU 15 level, on average, since 1985. As a result, between 1995 and 2004, Spain lost ground of just under 5 pp in this area with relation to Europe. If we consider that the human resource endowment per worker increased more rapidly in Spain than in the EU 15, the diagnosis will indicate insufficiencies in the Spanish economy's technological endowment.

Where other factors are concerned, international competition will focus increasingly on product differentiation, promotion of brands, development of commercial networks and certain intangible assets related to technical and human resources, where Spain also registers substantial differential deficits.

Last, although the institutional framework is more difficult to describe specifically, there is abundant evidence of conditions for macroeconomic stability, quality of corporate strategies, microeconomic environment and quality of its constituent public institutions – in addition to the endowment and quality of productive factors and public capital – determinant factors in an economy's competitiveness.

According to *The Global Competitiveness Report 2004-2005,* which calculates different competitiveness indicators for a group of 104 countries, Spain occupied 23rd place in 2004 – the same as in 2003 – situating the country approximately 10 places behind its position in terms of per-capita GDP and somewhat behind in terms of absolute GDP level. While the value of this type of study is quite relative, there is one aspect of Spain's position that merits assessment: the differences in ranking by group of indicators analysed.

In terms of the macroeconomic environment, Spain is in 16th place, 20th in terms of technological endowment, 26th in corporate competitiveness and quality of corporate strategies, and 34th in quality of public institutions. Indicative information that the Spanish economy registers significant gaps – in addition to those discussed above – in the microeconomic environment and in public institutions. Both issues are addressed in Section 5.

4 Why is competitiveness so important – particularly now?

The latter half of the 1990s was a period of sharp growth in world trade and economic activity. The Spanish economy followed – and benefited from – this international pattern. Its good differential record, however, in terms of economic activity and employment, as compared with the EU 15 or EMU, was maintained during the recent years of sluggish Europe-

an growth. One interpretation of these results could be that the Spanish economy is relatively robust and that therefore its future growth potential diagnoses, to date, have been somewhat pessimistic. This is a dangerous interpretation, as, to some extent, the differential results can be attributed to the beginning, in 1995, of an adjustment process in respect of disequilibria in basic aggregates, completed with success, with a view to meeting nominal convergence criteria required under the Treaty on European Union to enter Stage Three of EMU. In other words, during the period 1995-1998, the expansive effects in the Spanish economy occurred in a phased process and were therefore not likely to recur.

These effects – whose importance cannot easily be exaggerated – were the decline in interest rates, control of inflation, budget consolidation and nominal competitiveness gains derived from establishment of a permanent exchange rate for the peseta.

The first, and clearly the most important, effect was the *decline in interest rates* in the Spanish economy that, during the period 1993-1999, covered the broad range of 11.3-2.7 percent for the reference rate, 10.6-3 percent for treasury bills and 13.1-3.1 percent for commercial paper. This concurrently reduced the cost of external financing for firms, which soon fell to the range of just over 4 percent; reduced public debt service, promoting a reduction in the public deficit, and was an essential factor in the increase in household debt for purchase of real property, supporting substantial activity in the construction industry.

Inflation, estimated with the private consumption deflator, began to decline in 1993 from 5.7 percent registered that year to 4.7 percent in 1994 and 1995, to 3.4 percent in 1996, 2.6 percent in 1997 and 1.9 percent in 1998. Clearly, a fundamental factor in explaining this path is the monetary policy implemented by Banco de España from the effective date of the Law on Autonomy of 1994. In October of the same year, Banco de España made substantial changes to its monetary policy design, and moved to the definition of inflation targets for the medium term (two years). Following an initial phase of increasing interest rates to fight high inflation levels, Banco de España began to reduce interest rates as it progressed in compliance with the Maastricht criteria, to achieve convergence with the rates prevailing in the countries more stable when monetary union began. Reflecting the time lag between interest rate movements and their full effects on inflation, Banco de España deserves full credit for their control, when we observe the annual sequence of inflation rates and reference rates as described.

The third positive impact was *the fiscal consolidation process.* The Spanish economy, which was experiencing substantial deficit levels exceeding 7 percent of GDP during the crisis years of the early 1990s, reduced them to under 5 percent in 1995 and to 2.8 percent during the subsequent three-year period, in line with the average for EMU countries. Despite its substantial quantitative importance, fiscal consolidation entailed a number of grey areas, particularly in terms of structural quantity and sufficiency. Available estimates indicated that two thirds of the adjustment was attributable to cyclical factors and that the structural surplus was therefore modest for a phase of substantial growth. The adjustment, however, must also be assessed in quantitative terms: public debt, which in 1995 amounted to 64 percent of GDP, is now 49 percent (20 pp below the EMU average).

The fourth expansive impulse (see note 8), as discussed above, is derived from incorporation into the *euro area* in 1999 and the benefits of full monetary integration into a macroeconomically stable, high-income area.

On the whole, in a short period of time, the Spanish economy achieved some of the conditions of macroeconomic stability that had been eluding it[9], permitting a more balanced monetary and fiscal policy mix and promoting productive investment, ending a lengthy period during which lax fiscal policy was intended to offset an over-restrictive monetary policy that was partially responsible for the slow recovery from the acute crisis of the early 1990s.

These four impulses largely explain the Spanish economy's differentiated performance in respect of EMU, which is more significant in relative terms beginning in 2001 than in previous years. The important factor in this context, however, is that it entails once-and-for-all impulses whose differential effects are limited in time. The most important matter is not for expectations to indicate higher interest rates or persistent inflation problems in sectors protected from competition, but that the Spanish economy has already fully absorbed the positive effects discussed above, and that their positive differential forces should not be expected to continue. The foregoing correlates with the possibility of maintaining a long-term growth differential dependent on relative improvements in productivity and competitiveness that the Spanish economy is capable of achieving, as, in a common monetary area, relative competitiveness losses can only be adjusted through employment and production.

5 Markets: liberalisation and competition

During the last quarter of a century, the Spanish economy has undergone profound liberalisation, the intensity of which is reflected in part by its initial high level of protectionism and regulation. This process was driven by two types of forces: domestic forces derived from economic policy decisions aiming to overcome the crisis of the 1970s and to enhance the competitiveness and flexibility of the Spanish economy; and external forces derived from international agreements undertaken in connection with the signing of the treaty on accession to the EEC in 1986 and the obligation to complete the internal market of the Community.

The overall process, that began during the early 1980s with the first privatisations of public corporations to address the overhanging industrial crisis that had begun during the preceding decade, progressed at a steady rate and intensified beginning in 1996, leading to the present situation, where the level of importance of the Spanish public corporations sector is similar or even below levels in EMU countries having a greater traditions of public enterprise[10]. Among others, corporations in the chemicals, steel and metallurgy, capital goods, telecommunication, energy and air transport sectors were privatised. This privatisation process began initially with some liberalising measures, primarily related to rents and business hours, followed, from the early 1990s, with deregulatory measures particularly important in essential services sectors such as telecommunications, transportation and electricity.

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[9] Reflected by 16th place in respect of the macroeconomic stability indicator, as against 26th for the competitiveness indicator, as discussed in the foregoing section.

[10] At the time, not including television and broadcast agency RTVE, news service EFE and minimum legal participation in radio agency REE, the maximum possible privatisations remaining could amount to an estimated €2,000 million.

The basic liberalising impetus of productive activity, however, was derived from the undertakings assumed in connection with the EEC aimed at creating the internal market of the community: starting from a high level of protection, dismantling of tariffs in connection with the EEC, adoption of the common external tariff with outside countries, elimination of tax adjustments at the borders and of all types of export subsidies, meant that, in 1992, all Spanish corporations producing tradable goods were exposed to international competition, with the notable exception of output regulated by Common Agricultural Policy (CAP) and coal mining, for which high levels of protection in the EEC were maintained.

In the financial framework, liberalisation commenced in the wake of the banking crisis that began in 1978, with a rapid series of events thereafter: fully unrestricted interest rates and fees in 1987, elimination of geographic restrictions to trustee savings bank activities in 1989, reorganisation of the public banking system in 1991, full liberalisation of capital flows and effective elimination of investment coefficients in 1992, and elimination of the last public bank in early 1998.

Last, the labour market was subject to two reforms during the 1990s – although there was a somewhat important legislative initiative in 1991-1992 – both with the declared objective of reducing high rates of temporary contracting. The 1994 initiative, in the wake of the 1992-1993 crisis, among other objectives, reinstated the principle of causation in temporary contracting, transferred many issues previously regulated by law to collective bargaining, promoted part-time contracting, streamlined the definition of fair dismissal, ended the monopoly of the National Employment Institute, INEM, as the contracting office and, in summary, provided substantial impetus for deregulation of the labour market. The 1997 reform, whose declared objective was consistent with the 1994 reform in terms of reducing temporary arrangements, was agreed by unions and employers without government intervention, and expanded treatment in some areas: it established a new form of indefinite contracting that moderately reduced the costs of dismissal, under the new contracting arrangement, from 45 to 33 days per year worked in case of dismissal deemed unfair; expanded the new definition of fair dismissal, and streamlined the requirements for part-time contracting[11].

Despite its clear importance and expeditiousness, the liberalisation and deregulation process led to some insufficiencies and gaps that now call for structural reforms in order to improve the Spanish economy's competitiveness and potential growth capacity.

In the privatisation of public corporations, aside from issues related to structure and price, there are two negative factors. First, some public utilities have not used privatisation to establish a business structure in the sector to promote competition, which has ultimately resulted largely in the transfer of monopolistic or oligopolistic revenue from the public to the private sectors, without substantial competitiveness gains, although some cases did involve increases in efficiency. Second, privatisations did not involve changes in management teams and therefore continued to be substantially dependent on the government.

Substantial omissions have been observed in connection with market liberalisation processes. The most important omissions have affected housing, ranging from land to leasing, with substantial effects on the dynamics of housing prices and Spanish household debt in

[11] Part time employment conditions, however, became more restrictive in 1997-1998.

recent years. Issues such as business hours, pharmacy offices, professional colleges and a broad range of services also continue to be protected from competition.

Last, these reforms overlooked some important labour market issues. In the 1994 reform, the aim was to avoid increasing the political costs of a reform that ended in a general strike; and in the 1997 reform was limited to implementation of agreements negotiated between unions and employers. Generally there is broad agreement that the two most important – and controversial – pending issues are the cost of the dismissal-unemployment coverage tandem that adversely affects incentives to find new jobs and therefore also affects employability of the unemployed; and the collective bargaining structure, which entails problems in coordinating the various levels involved, making it a difficult matter to adapt the corporate wage structure to productivity differentials.

6 Public sector

Major transformations in the Spanish public sector occurred largely during the late 1970s and early 1980s, coinciding with the democratic transition and end of the crisis that began in 1973.

The first major transformation was the modernisation of public finance. From the revenue standpoint, replacement of the old output tax with a synthetic income tax (IRPF) dates back to 1977 and the introduction of value-added tax (VAT) dates back to 1986 in connection with the agreements derived from full accession to the EEC. From the expenditure standpoint, obligatory, free education up to 16 years of age, establishment of a national health system, universal pensions and expanded unemployment coverage occurred throughout the 1980s.

As a result of this process, public expenditure increased from only 25 percent of GDP in 1970 to 40 percent in 1986, which is its current level. From an initial expenditure level of 15 pp of GDP below the EU average, this gap was narrowed to 11 pp in 1990 and, thereafter, the cyclical profile of Spanish public expenditure has been quite similar to levels in the EU. Expenditure dynamics slowed during 1986-1988 and rallied to peak at the height of the crisis during the early 1990s. This figure rose to almost 50 percent in 1993 with a deficit of approximately 7 percent of GDP and an unemployment rate of 22 percent. At that point, the trend reversed in 2000 to regain the 1986 level of 40 percent, which has been sustained to date with some minor cyclical fluctuations.

In summary, since the beginning of the 1990s, the level of Spanish public expenditure came to approximately 4 pp of GDP below the average for the EU, both the cyclical dynamics and the public revenue and expenditure structures are situated at average levels for Europe.

The second major transformation of the Spanish public sector is derived from the development of the State of Regional (Autonomous) Governments *[Estado de las Autonomías],* following approval of the statutes of the different regional (autonomous) governments *[Comunidades Autónomas]* (RGs), entailing substantial transfers of expenditure. Between 1985 and 2000, consolidated public expenditure by RGs increased from 10 percent to 17 percent, at the expense of state expenditure. The process has been pursued intensely and, on its completion, the Spanish economy will be the most decentralised in the EU.

TABLE 4 NON-FINANCIAL OPERATIONS, GENERAL GOVERNMENT: USES

	1995		2004	
	% total	% GDP	% total	% GDP
Total uses	100	45.0	100	40.5
Current uses	86.2	38.8	86.2	34.9
Final consumption	40.1	18.0	44.3	17.9
Employee compensation	*25.1*	*11.3*	*25.6*	*10.4*
Social benefits in cash	30.9	13.3	30.2	12.2
Effective interest paid	11.6	5.2	5.4	2.2
Subsidies	2.4	1.1	2.6	1.1
Other current transfers	1.2	0.6	3.7	1.5
Use of capital	13.8	6.2	13.8	5.6
Gross capital formation	8.4	3.8	9.0	3.7
Investment aid and transfers	5.4	2.4	4.8	1.9

SOURCES: IGAE and Banco de España.

Table 4 provides the structure of Spanish public expenditure at two dates: 1995, which is when the budget consolidation process began, and 2004.

As we observe, despite the very different economic cycles between these two dates and the expenditure differential of 5 pp of GDP, its composition by major expenditure component is substantially similar. Compensation of public workers represents one fourth of expenditure and the increased relative weight of final consumption is largely attributable to the increase in health expenditure, while the weight of general services and pure public property – defence, justice and security – remained constant. Cash social benefits are tenths above 30 percent of total public expenditure, although the composition varies substantially: the share of unemployment insurance is decreasing[12] and pension expenditure is on the rise. The greatest reduction corresponds to interest payments, for the twofold purpose slashing interest rates during this period and reducing current sovereign debt from 63.9 percent to 48.9 percent of GDP. Last, the relative weight of capital expenditure was reduced substantially with a loss of 0.6 pp of GDP during this period, owing above all to the reduction in investment aid and capital transfers. This reduction became more pronounced during the initial years of the period considered as the budget consolidation effort was borne primarily by public investment.

Although the relative level of Spanish public expenditure is lower than the EU average and its time and structural dynamics are similar, it does entail a number of problems. Clearly the most important issue is pension expenditure sustainability, aggravated by the aging of the population, increased rate of dependency and low participation rate, as analysed in Sec-

[12] From a maximum of 3.5 percent of GDP in 1993 when the unemployment rate reached 22 percent.

TABLE 5 NON-FINANCIAL OPERATIONS, GENERAL GOVERNMENT: RESOURCES

	1995		2004	
	% total	% GDP	% total	% GDP
Total resources	100	38.8	100	40.2
Current resources	96.4	37.4	98.1	39.5
Taxes on production and imports	26.3	10.2	30.7	12.3
Taxes on income and net wealth	26.0	10.1	26.6	10.7
Social security payments	33.5	13.0	33.8	13.6
Other current revenue	10.6	4.1	7.0	2.9
Capital resources	3.6	1.4	1.9	0.8
Tax on capital	0.8	0.3	1.1	0.4
Investment aid and transfers	2.8	1.1	0.8	0.3

SOURCES: IGAE and Banco de España.

tion 2. Second, the dynamics of health expenditure, where the new population aging trend[13], prices of medicines – as compared with their therapeutic efficacy – and the cost of medical technology constitute the most substantial expansive factors. Last, there is a problem of efficiency. The Spanish government has many *ex ante* and *ex post* legality controls on expenditure, although it to all intents and purposes lacks the mechanisms required for *ex post* assessment of efficacy in expenditure programmes. Implementation of such mechanisms would entail not only greater discipline in quantitative formulation of objectives for each expenditure programme, but, above all, it provided a suitable tool to modify public policy design.

On the revenue side, Table 5 presents the structure and trends in public revenue between 1995 and 2004.

In this case, we also observe stability in major categories of the public resource structure. The share of indirect taxes increased to some extent and direct taxes represent one fourth of the total[14], while social contributions represent one third. The remaining current revenue contribution declined owing to reduced interest rates and, to some extent, to the more modest rate of privatisations.

International comparisons are more difficult to interpret in terms of revenue than expenditure, owing to the existence of substantial differences in the tax systems and the relative weight of social security payments. Average tax pressure – taxes plus contributions as a share of GDP – is slightly higher than 35 percent, with levels similar to the OECD, but 5 pp below the EU average[15]. The greater weight of Spanish social security contributions, whose

[13] Average health expenditure for a person over 65 years of age is four times that of younger persons.

[14] Of which, two thirds from the personal income tax (IRPF) and one fourth from the corporate tax.

[15] Figures similar to the UK and Germany, although much lower than those for the Nordic countries, France, Austria and Belgium.

participation in public revenue is 4 pp above the EU average, is offset with lower individual income taxes – that, in the EU, represent 7 pp more of total revenue – and the somewhat greater weight of indirect taxation[16], while corporate taxation is in line with the average.

The area where we observe more systematic differences between Spain and the EU is in average effective rates, all of which are lower in Spain. In 2003, the average effective rate for labour was 5.5 pp below the EU level – exceeding only the UK, Ireland and Portugal; for capital, 2.5 pp lower – exceeding only Greece, Ireland and Germany; for indirect taxation, 2 pp lower. It is therefore difficult to maintain that Spanish tax pressure is a potential factor in relative loss of competitiveness.

Like most OECD countries, Spain has changed the features of its direct taxation programme many times during the past two decades. Spanish evolution in general has paralleled its neighbouring economies, which have moved toward "extensive tax reforms" having three features: simplification of taxes, greater weight of horizontal equity – equal treatment for equal parties – at the expense of vertical treatment – different treatment for different parties – and minimising the distortion effects on capital formation and investment decisions. This approach has led to reductions in the number of IRPF brackets, substantial reductions in maximum marginal rates and minimum exemptions, revision of some deductions and their placement in the contribution or assessment base, some exemptions for returns on capital more common in the Nordic and Anglo-Saxon countries, and attempted convergence in personal and corporate rates.

In summary, the Spanish economy's public sector is now quite similar to that of its European partners: it is in the lower range in terms of size, overall tax pressure and effective rates on factors of production and consumption. In recent years, it has also completed a substantial fiscal consolidation process, promoted largely by a broad expansion phase that began in 1994. Problems remain – common to most industrial countries, but important just the same – relating to the future value of the commitments acquired in certain expenditure areas whose performance depends vitally on the level of population aging, as well as on the insufficiency of public capital endowments as a share of per-capita GDP. Public expenditure efficiency could be improved with introduction of assessment procedures to enhance public policy design. It is also probable that future elasticity of public revenue in respect of GDP will not continue to increase unless the declared bases continue to increase[17], casting doubts on the rate at which tax reductions have occurred with substantial revenue costs, that, while increasing disposable income and helping to maintain the strength of private consumption, have potential effects on future fiscal sufficiency. Some aspects of the Spanish taxation system also leave scope for improvement, particularly tax benefits, deduction structure, differential treatment of saving instruments and efficacy in the fight against fraud. This situation generally seems to be more indicative of problems in the institutional design and management efficacy than profound changes in the tax or public expenditure structure, except where pensions are concerned.

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[16] Although the main indirect resource, VAT, is harmonized in the EU, there are differences from country to country in the application of reduced rates and special taxes.

[17] For example, increased VAT revenue in the upward cyclical phase, attributable to increases in housing prices, and therefore not sustainable for an indefinite period of time.

TABLE 6 BALANCE, FINANCIAL BALANCE SHEET, SPAIN

% GDP

	1996	2004
Net financial assets	-22.6	-44.3
Financial institutions	2.1	3.5
General government	-52.4	-34.9
Non-financial companies	-79.6	-109.3
Households and NPISHs	107.3	96.5
Rest of the world	22.6	44.3
MEMORANDUM ITEMS		
GDP (€ bn)	464.3	798.6

SOURCE: Banco de España.

7 Financing of the Spanish economy and the financial sector

According to Table 6, the Spanish economy registers a domestic financing deficit that, apart from cyclical factors that are important when two specific dates are selected, grew substantially during the period 1996-2003 to represent more than one third of GDP in current terms. This is attributable three fourths to greater financing requirements for non-financial corporations and one fourth to the decline in relative terms of net household assets despite an 82 percent increase in nominal terms during the period considered. The process of public account consolidations freed up 16.5 pp of GDP, and nominal financing requirements for general government substantially remained constant during the seven year period. As described in the foregoing section, general government financing is assessed through analysis of the changes during recent years in the financing structure of non-financial corporations and households.

Table 7 presents the financial balance of households and non-profit institutions serving households (NPISHs) in 1986[18], 1996 and 2004.

The most outstanding feature is the tremendous increase in the size of the household and NPISHs financial balance, which quintupled in nominal terms in 17 years, although growth in liabilities (assets) is much higher (lower) in 1996-2003 than during the previous decade.

The second outstanding feature is the increased importance of real property assets and the reconfiguration of financial assets, with a clear decline in the share of the more liquid end of the range of financial assets, whose share in payment mechanisms declined by 20 pp, largely absorbed by new instruments issued by non-bank financial intermediaries (insurance, investment and pensions funds). This change indicates the importance of the financial disintermediation process that occurred in the Spanish economy during the period considered; and the diversification in the savings mechanisms this process makes available to households[19].

[18] The first year of the financial accounts of the Spanish economy.

[19] The relative weight of shares is higher than reflected in Table 7. If, for example, in 2003, we consider non-fixed rate securities investment funds (FIM), the 25.4 percent participation of shares increases to 31 percent.

TABLE 7 FINANCIAL ASSETS AND LIABILITIES, HOUSEHOLDS AND NPISHs

% TOTAL

	1986	1996	2004
Financial assets (€ bn)	225.2	699.3	1,365.7
Cash and deposits	61.4	46.7	39.8
Shares and holdings	24.0	20.2	26.2
Investment funds	0.9	13.9	12.4
Pension funds	—	4.8	6.3
Insurance technical reserves	2.9	6.0	8.8
Other	10.8	8.4	6.5
Liabilities (€ bn)	100.0	201.0	595.1
Short-term loans	—	7.5	4.7
Long-term loans	—	69.2	84.4
Other accounts payable	—	23.3	10.9
Net financial assets (€ bn)	125.2	496.3	770.5
% GDP	72.4	106.9	96.5
MEMORANDUM ITEMS			
Financial assets/total assets (%)	Not available	34.7	24.3

SOURCE: Banco de España.

The third feature is the sharp increase in the share of long-term loans in household liabilities, directly related to growth in mortgage credit to acquire housing, stimulated by low interest rates, dynamic performance in employment and household disposable income, and increased housing prices, which practically doubled in real terms during the period 1996-2003.

As a result of these trends, household debt as a share of gross household disposable income doubled during the second period shown in Table 7, to reach values in excess of 100 percent in 2004, above the EMU average, although finance charges for interest represent only 4.2 percent, and the total finance burden, including amortisation of capital, represents approximately 14 percent of household disposable income. This process has been associated with the significant reduction in the household financing capacity – driven by the considerable increase in consumption and residential investment – which reached negative values for the first time in 2004.

In summary, total assets held by Spanish households increased sharply to recent levels reaching six times the level of GDP. Although the weight of real property holdings has increased substantially, the structure of household financial assets has diversified, with a shift from more liquid and less sophisticated instruments in favour of variable return instruments, pension funds and insurance. In addition, the level of debt has increased in recent years at substantial, sustained rates, rapidly reaching EMU average levels. The current situation is stable, with a relatively modest financial burden in connection with low interest rates – although the increase in debt and reduced financial saving in terms of income entail

TABLE 8 FINANCIAL ASSETS AND LIABILITES, NON-FINANCIAL COMPANIES

% TOTAL

	1986	1996	2004
Financial assets (€ bn)	124.5	481.4	1,552.7
Financial liabilities (€ bn)	209.2	850.9	2,425.8
Non-share assets	9.2	2.5	0.5
Shares and holdings	23.8	47.1	47.7
Loans	38.9	22.8	27.7
Other accounts payable	24.8	26.7	24.0
Other	3.3	0.9	0.0
Financial assets/liabilities (%)	59.4	56.6	64.0

SOURCE: Banco de España.

an increase in the sensitivity of the net wealth position to any erosion that may occur in financial conditions or other adverse developments such as housing price declines or less dynamic employment performance.

Table 8 provides a summary of trends and the current financial position of non-financial companies. As we observe, growth in balances has been even greater in this case than for households and, in 2003, non-financial corporations presented a net debt of 103.2 percent of GDP, only slightly above household net wealth levels.

In terms of trends in the liability structure, the most prominent features are the shift away from loans to financing with shares and the decreased share of financing with fixed return issues, which represented only 2.5 percent in 2003. Both approaches were supplemented during the decade 1986-1996, and commercial credit maintained its relative weight in corporate financing throughout the period.

On the whole, the net wealth position of Spanish corporations in 2004 seems stable following a protracted process to restructure debt and reduce finance costs through low interest rates that led to an external financing cost of slightly more than 4 percent, yielding interest payments below 20 percent of results from operations.

All of the changes described in this section are indicative of rapid, substantial financial development in the Spanish economy, as shown, for example, by financial assets representing just over 400 percent of Spanish GDP in 1986, and exceeding 700 percent 15 years later. This development parallels the Spanish finance system itself, driven, following the banking crisis of the mid 1980s, by the process of deregulation and liberalisation – the main features of which are discussed in Section 5 – and as a result of increasing competition among credit institutions, which now lead the EU in terms of solvency and operating quality.

Although its basic features are comparable with the EU, the Spanish financial system, its institutions and instruments register substantial differences when compared with the U.S. A fundamental difference is the share of bank credit to corporations, which, in relative terms, is four times higher in Spain than in the U.S. This situation is largely attributed to the historical linkages between banking and industry and the comparatively delayed, insuf-

ficient development of the securities markets. Although the Spanish banking system became "deindustrialised" while maintaining significant industrial investments and becoming involved in management of non-financial corporations, its weight in their financing continues to be substantial. The level of Spanish stock exchange capitalisation is also modest, although, during 1985-2000, marketable securities gained 20 pp in the Spanish economy's total financial assets. In addition, although the level of distinermediation has increased substantially, the relative weight of non-bank intermediaries – investment funds, pensions and insurance companies – remains limited. Last, fixed return instruments also carry less weight in financing of Spanish corporations than for U.S. firms, attributable largely to insufficient development of some instruments such as securitisation. Despite substantial levels of growth in recent years, the latter represents only 38 percent of the outstanding balance on private fixed return investments.

These differences are indicative of a relative delay in diversification of corporate financing sources, largely associated with insufficient development – and integration at the European scale – of the capital markets, substantial transaction costs, limited transparency and, in some cases, regulations that make development of new instruments a difficult matter.

8 The Spanish economy at the beginning of the 21st Century

In just over two decades, the profound process of democratisation and modernisation of Spanish society transformed an economy subject to substantial intervention and protection from external competition into one whose basic economic and institutional features are comparable to the most advanced countries, while narrowing the per-capita income differential in respect of the EU average by approximately 13 pp. This process was catalysed by major operations to open the country to the outside, the most important milestones of which are full accession to the EEC in 1986 and integration into the euro area in 1999.

In recent years, insufficient performance in the key European economies has meant that Spain offers positive differential performance in economic activity and employment, largely resulting from expansive impulses entailing lower interest rates, the process of budget consolidation and full monetary integration into a highly stable area.

The effects of some of these impulses are inherently less sustainable and it is quite probable that the differential effect has to all intents and purposes lost steam, allowing the Spanish economy to enjoy several years of appreciable macroeconomic stability. With the reasonable assumption that this climate will continue, and in the absence of greater risks in the world economic situation – such as rapid increases in interest rates, sudden depreciation in the dollar and surges in crude oil prices – we have every reason to believe that, in the medium term, the Spanish economy may continue to show positive growth differentials as compared with the EU. By contrast, we also note structural problems that complicate the long term diagnosis, including insufficient growth in total productivity of factors and labour, loss of competitiveness manifested by increased import penetration and a trade deficit near 5 percent of GDP, insufficient competition in some service and public utility sectors, and persistent labour market rigidities adversely affecting the quality and conditions of the employment generated.

These problems limit the Spanish economy's potential growth capacity, which is the only feasible alternative to continue the process of real convergence with more developed economies in the long term. Growth potential, assuming sustained conditions of aggregate stability, depends fundamentally on the level of use and quality of productive factors, flexible operation of factor and product markets, and the quality of public institutions, i.e. growth in this area requires macroeconomic policies.

Judging from the analysis conducted in this chapter, some reforms may be considered essential, as discussed in the appropriate sections, although our analysis is not intended to be comprehensive.

With reference to the *quality of productive factors,* the best known gap in the Spanish economy is the particularly pronounced technological deficit, as documented, in new information and communication technologies. Where *market operation* is concerned, the importance of the labour market makes it an essential point. While the market is performing dynamically in generating employment, it continues to register rigidities that lead to low participation rates and quality of employment, persistent high rates of unemployment, concentrations of long-term unemployment among women, unskilled young people and persons over 45 years of age, and problems in dynamics of wage bargaining, in terms of level and structure. The real property market, owing to its influence on housing prices and, therefore on household debt and the risk assumed by credit institutions, is a good candidate for profound liberalisation. The service markets are also protected from competition, and are responsible for persistent dual inflation and higher costs of some inputs used by firms and households.

The public service markets, in which the level of competition – owing to its inherent nature and corporate structure – depend largely on the respective regulatory commissions, also merit attention. The quality of some regulatory and oversight institutions, their effective degree of technical independence, operating transparency and avoidance of internal conflicts of interest, leave scope for improvement in some cases. The capital markets would also benefit from measures to promote deepening, enhance integration and transparency, and reduce transaction costs.

Last, where fiscal affairs are concerned, enhanced efficiency in expenditure programmes requires implementation of processes for ex post assessment of public policies. Sustainability requires calculation of effective expenditure commitments to be agreed in the near future, to reflect basic population factors such as population ageing and increased immigration.

The agenda of microeconomic reforms is, accordingly, quite full.

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Analytical elements

4. Statistical information for analysis of the Spanish economy

Rafael Álvarez and José María Bonilla

1 Introduction

Two essential requirements for applied economic analysis are to have good statistics and to use them adequately. Economics, in fact, could not have developed as an empirical science had analysts and researchers not had access to sources of information covering increasingly broad and complex economic sectors. It is therefore not surprising that the pioneer countries in economic progress also were the ones that had access to the best statistics. Development was most commonly driven by the scientific community itself, as its scope broadened and the emergence of more sophisticated analytical methods increased the demand for more substantial statistics. In other cases, availability of data opened up new areas of analysis and research. Today, national statistics systems generally provide effectively generated, timely and easily accessible data series that meet appropriate technical criteria. In an increasingly integrated world, these statistics meet homogeneity and quality criteria established more and more frequently by supranational statistics organisations.

Owing to the insufficient interest and resources the authorities have traditionally devoted to statistics, the statistical system for the modern Spanish economy is a relatively recent development. The World Bank mission to Spain in preparation for the Stabilisation Plan of 1959 reported the dearth of economic information in Spain and the difficulty this presented in describing and analysing the state of Spain's economy. Although substantial progress had been made in some areas – such as monetary and financial statistics – statistics development did not follow a pre-established plan, and statistics were most commonly generated

to address problems on an *ad hoc* basis. For example, the *Servicio de Estudios* was established to address concerns of the Ministry of Finance and the Bank regarding stabilisation of the exchange rate for the peseta and, in general, regarding financial problems in the wake of the Great Depression. The *Servicio de Estudios* was therefore assigned the task of preparing relevant statistics and reports to advise these institutions. This work was reflected in numerous documents and publications produced during that era.[1]

Aside from this partial progress, also made in other areas such as demographic statistics, it would not be until the National Statistics Institute *(Instituto Nacional de Estadística* – INE) took over the tasks of preparing the national accounts during the mid-1960s that adoption of a complete, integrated economic statistics plan for Spain received definitive impetus. In consolidating the effort to quantify the complex network of a nation's economic relations, INE's efforts to prepare the Annual National Accounts (CNA) would require access to information sources covering diverse areas of economic activity hitherto unexplored, or, in some cases, addressed on an isolated basis with insufficient methodological rigour. The Standardised System of National Accounts (SSNA) of the Organisation for Economic Co-operation and Development (OECD) adopted at that time would be replaced during the 1970s with the European System of Integrated Economic Accounts (ESA), a decisive and quite appropriate step still many years away from Spain's integration into the European Community.

Although a detailed account of this process exceeds the scope of this chapter, we should point out the June 1992 publication of the Quarterly National Accounts (CNTR) as a milestone in the maturation process that provided a reference framework for analysis and exercises in macroeconomic forecasting, albeit an incomplete one, as a quarterly approach by institutional sector had yet to be covered. CNTR was an essential source for estimation of quarterly econometric models, and thus for economic research. Until that time, only the annual accounts were available, with the lag that might be expected, forcing a number of institutions to engage in partial quarterly adjustment exercises to produce the key aggregates of the Annual National Accounts, based on the available indicators.[2] Banco de España's preparation of the Financial Accounts of the Spanish Economy – first on an annual basis, then quarterly – would culminate with completion of the Spanish System of National Accounts.

We can therefore affirm that the Spanish economy now has a macroeconomic statistics system that meets the current quality standards of the European Union (EU), with the progress and limits this entails. This book will attempt to review the available statistics and to examine their utility in Spanish economic analysis and, in so doing, to identify gaps remaining to be filled nonetheless. Without attempting to be comprehensive, we should cite sectoral and microeconomic statistics among those that still demand greater attention from the relevant authorities. Within the former, the services sector has traditionally registered the greatest shortcomings, a feature shared with many other countries. This situation has changed substantially in recent times, although some sectors, such as health and education,

[1] See Pablo Martín Aceña (2000).

[2] See, for example, Servicio de Estudios del Banco de España (1975); Julio Rodríguez López (1978), and Ricardo Sanz (1983).

real property and leasing activities, *inter alia,* are still insufficiently represented. We should also not overlook new information and communication technology sectors, owing to their importance in current economic affairs and all areas related to immigration, owing to its socioeconomic importance. Availability of microeconomic information is affected and limited by its high cost in some cases and by the confidentiality of individual data in others. Substantially important databases do, however, exist. For example, Banco de España's Central Balance Sheet Data Office is essential in the study of Spain's non-financial corporations, and the recent Survey of Household Finances (EFF), also conducted by Banco de España, provides valuable information on the financial and net wealth situation of Spanish households.

As discussed at the beginning of this introduction, however, mere access to a number of good statistical bases is insufficient; they must also be used adequately. The analyst's task consists precisely in knowing the data involved in the task, how to asses them and to extract the most relevant information for subsequent use in interpreting the real situation and forecasting its most probable trends with statistical and economic models. The task is a complicated one, as information systems are now designed to provide substantial quantities of data, with very different quality levels, from very different sources, that are logically available with different lags and disparate time coverage. They can at times entail simple, easy to assess economic concepts, while they can also involve more complex variables that are difficult to interpret. Analysts must therefore know the technical characteristics of these data, the institutional context in which they originated and their real economic backdrop. They must also know how to manage adequate statistical and econometric instruments to extract the most relevant signals from them. The "analyst's judgement" is merely the expression of this body of knowledge, that, owing to its diversity and specialisation, generally derives from the work of highly qualified teams.

Some current examples may help us understand the nature of these problems. The difficulty in measuring certain particularly complex concepts – that do not correspond to directly observable events – is the centre of the controversy on the scope of the substantial discrepancies observed in productivity growth in the U.S. and European economies, as there are substantial discrepancies in the measurement methods used. In the U.S. economy, the national accounts fundamentals are corrected for biases derived from changes in quality, using, among other tools, hedonic indices that, as we know, can distinguish the components of price variations explained by changes in product characteristics (quality)[3]. Failing to correct these biases in the national accounts for most European countries – or doing so insufficiently – would undervaluate growth in real GDP and productivity in the economies of the area, which would explain at least part of the European productivity gap[4].

There are also numerous examples of problems potentially originating from the coincidence of various sources of information on trends in a given variable. For example, confusion may originate when assessing a concept that would appear to be as simple and eco-

[3] See Boskin et al. (1996).

[4] An initial assessment of the importance of such biases can be found in Bover, Izquierdo and Matea (2001). This article provides a detailed bibliography on Banco de España's work in this area.

nomically and socially important as unemployment, with data from the National Employment Institute (INEM) registers ("registered unemployment"), rather than using the results of a survey designed specifically to measure trends in the labour force and employment (EPA). Another example is the monthly publication of state budget execution (on a cash basis, and on an accrual basis according to the national accounts methodology) which, owing to changes in the fiscal calendars, transfers of authority between administrations and a number of administrative matters, can provide such different results that only an expert can interpret them. Last, confusion can arise from the data on quarterly GDP growth in different economies, some of which refer to the interquarterly rate of change – annually adjusted or otherwise – while others are based on the interannual rate.

It would seem to follow that a book devoted to presenting the procedures normally used to analyse the Spanish economy is sufficiently justified to begin with a presentation and comments, albeit succinct, on the key available information sources, and to assess the current situation and outlook for Spain's statistics system. This will be the focus of the next section of this chapter. We shall subsequently analyse some of the problems to be addressed when working with economic data series, followed by some brief conclusions and examples of the use of indicators in short-term economic analysis.

2 Key sources of statistics for analysis of the Spanish economy

Even a brief presentation of the Spanish statistics system exceeds the scope of this chapter, which attempts to provide an overview of the system as a source of data underpinning economic analysis. It is quite a difficult matter, however, to discuss a statistics system without referring to the characteristics of the key statistics comprising the system, that are used quite frequently in subsequent chapters of this book. To provide the necessary practical information, without excessive digression, we have organised the presentation of statistical principles as follows: 13 notes appended to this book provide a thorough assessment of the technical characteristics of what are considered the baseline statistics of the Spanish economy from the standpoint of their suitability for economic analysis, while this section will present the more general features of developments in the Spanish statistics system. The notes discuss the availability, scope, progress and shortcomings of different statistics studied, with references to the methodologies used and other factors considered relevant. The discussion includes, *inter alia,* statistics producing agencies, the context and period when each originated, and references to their integration into the National Statistics Plan and current European requirements, making it possible to take stock of recent progress, gaps to be filled and the future outlook. To mention only a few examples, knowledge of all of these features is essential to manage statistics sources effectively and to find adequate solutions to many of the problems that analysts face, such as selection of adequate indicators or their replacement with nearest substitutes; and chaining or interrelation of series to produce the desired frequency or to complete the required database.

Economic statistics is now a discipline that requires substantial accuracy and a high degree of specialisation to master. While we cannot expect analysts to know their sources with the precision of specialised statistics professionals, effective work in applied economics is not

possible without an adequate understanding of the potential and the limits of the data used. Open channels of communication with the professionals responsible for preparing the data are therefore required. The existence of statistics departments in economic research centres is justified not only by the production of certain specific statistics – as is true for the *Servicio de Estudios* of Banco de España – but also because they provide technical support for the work of applied analysts, who must be accountable for appropriate use of available sources. They must, therefore, have a thorough knowledge of the statistics system they manage. The appended notes are designed to serve as a guide to the key technical characteristics to know.

As we have indicated, as a reference for their work, analysts use a *complete system of quarterly national accounts,* which does not mean that, to conduct each specific analysis, complete quarterly accounts as defined in the first note of the annex are required. This is, instead, simply the conceptual framework for the available information, which is most frequently incomplete and many times is not produced with quarterly periodicity. It is essential for the framework of national accounts to lend consistency to overall macroeconomic forecasting exercises, as well as to any type of analytical approach to the concrete aspects of the Spanish economy, whether the analysis refers to the overall economy or is limited to the study of one or more groupings of sectors or branches.

In addition to providing an adequate reference framework, the statistics that institutions make available to analysts *must meet certain generally accepted quality requirements* as established by the International Monetary Fund (IMF), the European Central Bank (ECB) and Eurostat, among other international organisations. The IMF has defined a series of criteria to assess the quality of statistics systems based on a series of quantitative and qualitative indicators. These indicators include, *inter alia,* those on the framework of the series (length, number of variables included in respect of the total required variables, details involving different items, etc.); frequency and scale of revisions and dissemination intervals or timeliness (number of days/months in the lag after the reference period for users to have access to the information). Qualitative indicators, among other matters, are those that involve transparency (conditions of compilation, processing and dissemination), consistency and, especially, relevancy of statistics defined as the extent to which they meet the analysts' requirements and solve problems posed by users. The notes refer repeatedly to these parameters, and particularly to timeliness and relevancy, which are two essential factors in empirical work.

It is not an easy matter to summarise in this brief section the general characteristics of the Spanish statistics system in the state environment – the framework of economic analysis – that has been developing over the years. From the promulgation of Law 12/89 on the Public Statistics Function (LFEP), production of statistics in the state framework, in the Spanish Statistics System, co-ordinated by INE, is carried out by INE itself and by the different ministerial departments and Banco de España, as provided in the four-year National Statistics Plans (PEN). While this decentralised approach to the organisation of statistical work has led to evident progress, experience shows that there is scope for improvement in the general co-ordination of the statistical services of the central government, as well as oversight, control and supervision of the technical expertise these services entail. Further, we should point out the impetus received from the promulgation in 1998 and in subsequent years of European regulations in the area of statistics and, in particular, to the reporting requirements for the European Monetary Union approved by the ECOFIN Council in 1999.

The first PEN, with reference to the period 1993-1996, set priorities, detected weaknesses and established criteria to assess statistics to bring the national statistics system to the level required by a modern democratic Member State of the European Community. This plan, in particular, promoted the production of statistics and identified objectives that were innovative for their time, that in some cases have yet to be attained (preparation of net wealth accounts, for example). Despite co-ordination and quality problems, as well as persistent gaps, the various statistics plans have facilitated introduction of far-reaching improvements. These include, in particular, preparation of Spain's Quarterly National Accounts, with a level comparable to the major European countries, Spanish Regional Accounts (CRE) with annual periodicity; implementation of different European statistics regulations including the Regulation on National Accounts (Regulation ESA 95), among others; calculation of the harmonised consumer price index; progress in production of various short-term economic statistics leading to the production of numerous indicators in reference to economic activity sectors; and last, calculation of business opinion indicators (short term economic survey for industry) and further structural calculations on income and wage costs.

Production of statistics by some ministerial departments has also increased, directly or through collaborative arrangements based on INE initiatives in the design of specific surveys. The active role of the Ministry of Labour and Social Affairs, in all matters relating to the use of social security system records for statistical purposes, is one example of such efforts. Production of complete financial accounts with quarterly periodicity and the balance of payments and international investment position (IIP) with monthly and quarterly periodicity stand out in Banco de España's work. Consolidation of the Central Balance Sheet Data Office as a reference source on the situation of non-financial corporations and preparation of the first Survey of Household Finances (EFF), similar to those prepared by the U.S. Federal Reserve and Bank of Italy, should also be pointed out. Last, establishment of preannounced dissemination calendars for INE publications constitutes evident progress, although this practice has unfortunately yet to be extended to many of the remaining units of the National Statistics System.

In terms of statistical improvement initiatives to meet analysts' requirements, we should mention the 1999 approval by the ECOFIN Council of a number of statistical requirements for economic policy implementation within the European Monetary Union. This document did not address monetary and financial statistics required by the ECB for reporting on euro area monetary policy, as these statistics were being prepared in a timely manner by the Eurosystem. These requirements entailed an appeal to member countries to develop their statistical systems in certain areas and the withdrawal of derogations permitting them to delay preparation of statistics covered by some of the regulations discussed above. In Spain, these European provisions, in addition to supporting the validity of many Spanish statistics that had previously been available, led to the identification of some gaps faced by analysts; and to the provision of legal, political and administrative support required to fill these gaps by establishing relevant time frames and multilateral surveillance of each member country's compliance with the plans. These initiatives include establishment of harmonised methodological bases adapted to the quality criteria discussed above. The ultimate objective of most of these requirements is clearly access to statistics on Europe (euro area, EU 15 and EU 25) with comparable periodicity, availability and timeliness to the U.S. and Japan. It is evident,

however, that the statistics required for each Member State are quite useful in improving analysis of the different national economies.

In this framework, the ECOFIN Council asked Eurostat and ECB for an action plan to be implemented by end-2002 and complied with by mid-2005. The objective of the plan was to enable aggregates to be prepared for the euro area based on information derived from full implementation of ESA 95, with at least 80 percent data coverage for member countries. Data from at least four countries (Germany, France, Italy and Spain) were required for that purpose. Where Spain was concerned, this requirement influenced the national priorities to such an extent that, by end-2004, almost all of the requirements had been met. An industrial price index (IPRI) for all goods intended for the domestic market and for export, another for imported goods, as well as indicators on turnover and inward orders in industry, depending on whether the goods are produced domestically or imported, are pending. Last, in spring 2003, the Council established a list of 19 indicators on consumer prices, quarterly national accounts, general economic activity, prices, labour market and foreign trade, known as Principal European Economic Indicators (PEEI) for which a target date was set in the number of days allowed for dissemination. It is important to bear in mind that, at end-2004, Spain met these requirements, with the exception of the IPRI, as discussed above, and the price index for service corporations. Last, where European initiatives are concerned, approval of the Code of Good Practices in the framework of the Excessive Deficit Protocol should be mentioned, which emphasised the independence of the authorities responsible for preparation of these statistics, their scientific competence and the need to improve quality and transparency of the statistics involved in the process. Where Spain is concerned, the authorities in reference are the Controller General and Accounting Directorate (IGAE) and Banco de España, in addition to the national statistics authority (INE).

The interaction between progress in statistical planning promoted by the Law on the Public Statistics Function and the impetus received from European initiatives led to substantial progress in the Spanish statistics system and to a generally positive assessment of the current state of the Spanish statistics system, as described in detail in the annex on statistical sources. The latest National Statistics Plan, in reference to the period 2005-2008, nonetheless points out a number of areas where scope remains for improvement. Specifically, the plan prioritises the European requirements yet to be met, such as structural indicators in connection with the Lisbon Agenda, competitiveness, sustainable development and the European Social Agenda, among others. It also covers some requirements formulated by Spanish analysts, including preparation of quarterly accounts for all institutional sectors of the quarterly national accounts; the capital stock account for the economy and different sectors, making the distinction between productive and residential capital stock; further statistics related to the measurement of productivity, enhancements to statistics on housing and, in particular, on prices; as compared with those requiring correction of biases attributable to changes in quality, demand extendible to all price indices, including the CPI, among others, and those to date not reflected in the PEN, apparently pending a decision in the European environment; and increased production of statistics on technological innovation and various service sector activities. It is also an important matter to improve measurement of immigration activities, whose limitations now affect, inter alia, estimates derived from the Labour Force Survey (EPA) and are used to calculate productivity figures and in

determining some aggregates of the Spanish National Accounts (CNE), which at end-2004 were pending a change of base, that will be affected by these measurements. Last, analysts are interested in statistical exploitation of the personnel roster of general government with more analytically useful criteria for such an important and specific group. Most of these requirements refer to the current period of the PEN for 2005-2008.

3 Use of statistical data in short-term economic analysis

As discussed in the introduction, experts dedicated to analysing the status of the economy and forecasting its short- and medium-term trends manage a steady flow of data that must be identified and assessed, so that it can considered in the appropriate context. The approach used to integrate all of this information into Banco de España's analyses and studies aims to provide a balanced combination of theoretical and institutional knowledge, econometric modelling procedures, empirical comparison and statistical time series analysis techniques, which can entail working with substantially sophisticated instruments developed over the years in a continuous team effort. Chapter 1 of this book thoroughly analysed the configuration of this process. The purpose of this section is much less ambitious, namely to present and provide a number of significant examples illustrating the problems analysts normally encounter when they work with economic data, and the instruments at their disposal to try to solve them.[5]

First, economic information is highly diverse and, broadly speaking, may cover any type of events affecting economic trends. The impact on the exchange markets of statements by an economic authority and expectations generated by the announcement of a labour market reform are two examples. This section refers, however, exclusively to statistical information on economic variables expressed through time series disseminated regularly and with different periodicities: annual, quarterly, monthly, daily, etc. We shall not in this case consider specific problems derived from work with microeconomic databases, although, as we observe throughout this book, studies conducted with individual data are essential in determining the structural features of the economy, and accordingly to underpin macroeconomic analysis. Specialised econometric techniques used in processing this information fully exceed the objectives of this book.[6]

Macroeconomic information includes highly diverse variables. First, we find the aggregates – GDP, investment, savings, price levels, among many others – that are the empirical expression of concepts defined by economic theory and grouped in general around the national accounts, providing the most complete, integrated set of quantitative information on an economy. Accordingly, their knowledge, diagnosis and forecasting are the focus of most applied analysis.

The field of reference for other variables is much more limited, although no less important. In addition to their specific interest in the analysis of certain sectors, data on automobile registrations, the industrial production index and mortgage market interest rates pro-

[5] A detailed approach to short-term economic analysis techniques can be found in Espasa and Cancelo (1993).

[6] Readers interested in this type of methodological approach may consult Arellano (2003), for example.

vide important information used to forecast future trends in higher ranking variables than indicators, and help to establish economic agent expectations and, in many cases, decisions. Analysts should rank these statistical sources to reflect their technical quality, the type of information they provide and the degree to which they correlate with the variables they represent, using a set of statistical techniques developed over the years.

Extraordinary progress in analytical techniques for time series was made during the latter quarter of the 20th Century – through the pioneer work of Kalman and Bucy (1961) and Box and Jenkins (1970)[7] – entailing a fundamental change in statistical treatment and interpretation of economic series and forecasting their short-term trends. A set of simple, yet powerful tools made available to statistics professionals transformed the methodology of short-term economic analysis and, in general, applied economic research. The *Servicio de Estudios* of Banco de España was a key institution in the application of these new techniques, and made a distinguished contribution, with the work of Espasa, Maravall and others, reflected in a lengthy series of working documents and publications.[8] In some cases, the contributions are not limited simply to the application and dissemination of this methodology, but entail fundamental contributions and development of new, high-quality tools to control and manage time series databases.[9]

3.1 Time series: original and corrected series; rates of change

Much of the work of economic analysts entails analysis of data time series. There are many types of series, each of which has a number of its own specific characteristics. While in some cases, series refer to the value of the variables involved (GDP or credit to corporations), macroeconomic series are most commonly generated in the form of indices (retail sales or the consumer price index – CPI) generated with a substantial number of observations of the activity to be quantified. There are many different types of price indices (which, along with quantity indices, are most commonly used in economics): direct or chained; calculated with arithmetic or geometric formulas; and those entailing different forms of weighting. The key is to know how each type of index behaves and to use the most suitable one for each case whenever possible. Accordingly, if considered appropriate, a chained geometric Laspeyres index can be constructed, although it will always have the base year weightings, which will affect its utility. We also know that a direct Laspeyres index will overvaluate price increases, while a Paasche index will undervaluate them; and that both biases can be compensated by calculating a Fisher index. We also know the properties of chained indices, which can be used to address problems derived from the appearance of new goods and changes in quality, although the analyst must know how to interpret them. While they are adequate to measure price changes between consecutive periods, they are

[7] See Kalman and Bucy (1961) and Box and Jenkins (1970).

[8] The Banco de España publication series includes references to these numerous works, from the mid 1970s and continuing to the present.

[9] See, for example, the numerous works by Gómez and Maravall (1966), Caporello, Maravall and Sánchez (2001) and Caporello and Maravall (2003).

not suitable for calculating changes that have occurred during a period t and the base period, as they will have also been affected by quantity changes.

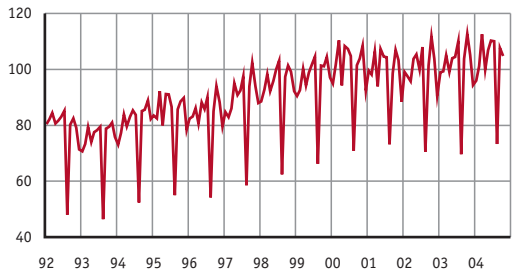
Analysts should be familiar with these problems, and the agencies responsible for preparing the statistics should ensure that the series they make available to users not only contain the technical references required to assess them, but that they also cover complete and sufficiently extended periods of time, and meet homogeneity criteria required for empirical work. This is not always practicable owing to the methodological changes that often must be introduced to improve and adapt them to statistical systems used in Spain's neighbour countries. These issues must also be addressed when publishing only original data from series generated, or series corrected to reflect specific shocks derived from economic events that in most cases make interpretation a more difficult matter. The progress in development of specific techniques for processing time series, as discussed above, has given analysts and institutions access to very useful material in attempting to address all of these problems: series homogenisation, calculation of omitted values, correction to reflect extraneous events and treatment of atypical data, among others, providing, as we shall now observe, access to a broad range of data with which to work, making it possible to select those considered most suitable in each case.

The most common disturbances in economic series are generated by the impact of changes in the calendar on specific economic activities (the number of working days in the month or the dates on which Holy Week falls); those derived from seasonal performance in many productive activities (increased tourism flows during holiday periods, or harvest cycles) and, last, from erratic factors that escape a priori control (impact of a strike or the weather on specific activities). Successive elimination of this type of change using appropriate techniques makes it possible to move from the original data series to the series corrected to reflect the calendar, seasonal events and trend-cycle series. Chart 1 shows the results from applying this type of correction to the industrial production index (IPI) using TRAMO/SEATS programs. As we observe, it is a difficult matter to obtain relevant information, in principle, from the original IPI series, as movements in these series are dominated by economically insignificant factors. Series subject to seasonal adjustment and corrected to reflect the calendar would seem to be best for assessing evolution of the industrial activity. We observe, for example, the substantial recovery in 1999 and the period of virtual stagnation during subsequent years. Last, trend-cycle series eliminate some erratic values that might ultimately be difficult to interpret.

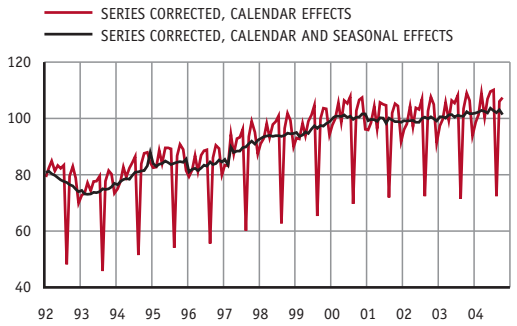
Not all series, however, require correction to determine their most stable trends. The above example shows that series must provide clear, consistent messages; they must not be subject to continuous changes that frequently prove irrelevant; nor should smoothing procedures remove the informative content from the data. Some variables are inherently not subject to shocks, and changes in such variables have a precise economic significance. Series on monetary authority intervention interest rates, or the exchange rate quotations for a given currency, are two examples. In other cases, movements perceived in one variable may respond to changes that have occurred in another variable with which it has a significant analytical interrelationship, that should be identified and assessed. This factor is quite important, above all, in econometric work, which is aimed primarily at using original series to find well-founded relationships between variables. In addition, traditional seasonal ad-

CHART 1 INDUSTRIAL PRODUCTION INDEX (IPI)

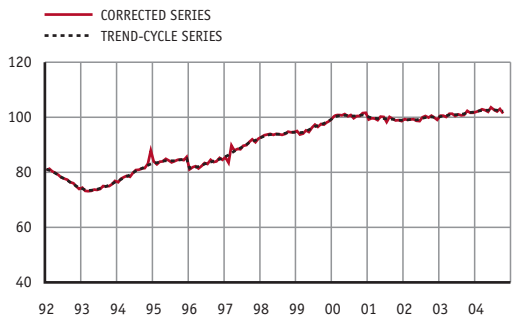
ORIGINAL SERIES



CORRECTION, CALENDAR AND SEASONAL EFFECTS



CORRECTED SERIES AND TREND-CYCLE SERIES

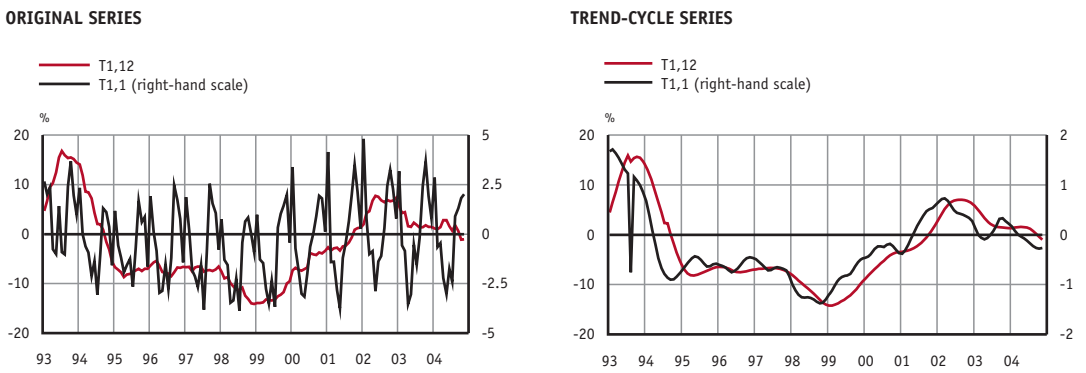


SOURCES: INE (National Statistics Institute) and Banco de España.

justment and trend calculation techniques tend to underutilise the most recent data values to some degree. A rough example would be a rudimentary smoothing method for series, such as the calculation of moving averages for a given number of terms, in which the different values are averaged with those from the immediately preceding periods. As a result of insufficient capacity – even in more sophisticated statistical methods – for adequate processing of the more recent data in estimating series trends, forecasts of future values must be included to avoid excessive reporting lags. This is an important matter to be revisited when we address the use of rates of change.

Our discussion, to this point, has focused on the level of the series. Many economic problems, in fact, can only be analysed adequately if the level of the variables is reflected. For example, there is no point in discussing a country's per capita income growth without knowing the level; and the same applies to productivity, household debt and the public deficit. We often must find a benchmark to understand fully the meaning of these variables. Productivity levels are compared with those in Europe or the U.S.; the public deficit is expressed as a percentage of GDP and household debt as a ratio of household disposable income. Short-term economic analysis, however, is substantially dynamic, focusing in

CHART 2 NON-AGRICULTURAL REGISTERED UNEMPLOYMENT



SOURCES: INEM (National Employment Institute) and Banco de España.

general on rates of change rather than on assessing or forecasting levels of variables. It would not seem relevant to analyse either the level of the CPI or the IPI (though price levels would indeed be worth comparing), and there is little value in knowing the number of new cars registered. This information is usually evaluated through the attendant rates of change, as is generally the case in forecasting exercises involving the major macroeconomic aggregates.

The two types of rates most commonly used in short-term economic analysis are rates in respect of the preceding period (quarter, month, etc.) or in respect of the same period of the previous year. Interquarterly (or intermonthly) rates are generally more unstable than interannual rates, as they entail an automatic, albeit possibly incomplete, seasonal correction. Of course, the more stable series provide less volatile rates. Interquarterly (intermonthly) rate of change calculations use the most immediate information, while interannual rates are determined using the path the series has followed throughout the past four (or 12) periods. For this reason, the interannual rate is said to provide a delayed signal of the rate of change in the variable, and that, to provide equivalent coordinated signals, the rates must be centred, which in some cases is tantamount to accepting longer reporting lags.

This type of problem is illustrated in Chart 2. As we observe in the first diagram, it would not seem that registered non-agricultural unemployment trends could be observed based on the intermonthly rate of the original series, which is highly seasonal. Variability declines substantially in calculation of the interannual rate, whose trajectory is more stable. We observe further improvement when the rates are calculated based on the trend-cycle series (second figure). In the latter case, however, we observe that the intermonthly rate – which is fairly stable when calculated on a trend basis – shifts the interannual trends forward. It would suffice to shift the latter back approximately six months to synchronise movements in the two values. More precisely, then, the interannual rate of a monthly series should be centred with a lag of six months to coordinate with the intermonthly rate, which clearly entails reporting with greater lags, unless, once again, the series is extended with future trend forecasts.

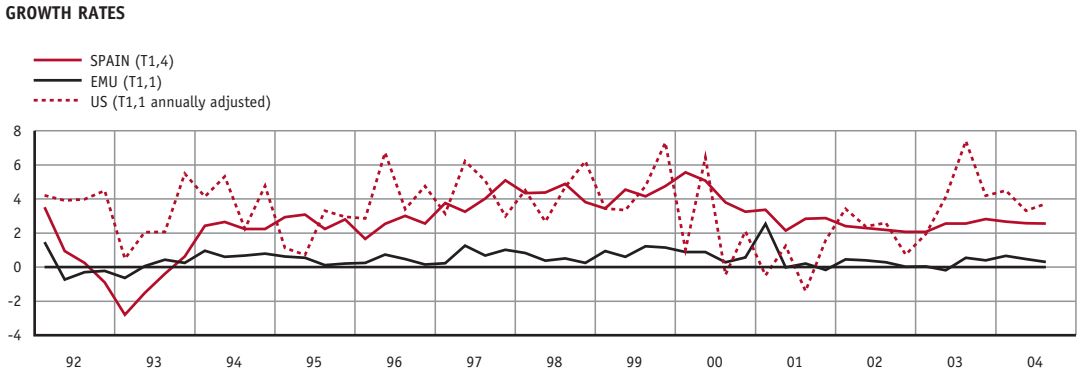
As we will observe in the next section, having high-quality forecasts on short-term trends in key economic indicators is fundamental in assessing such trends in short-term economic analysis. It should be borne in mind, however, that extending a series with forecasts incorporates an inevitable element of uncertainty that affects the ultimate rates of change, which are of greater interest owing to their timeliness. There is no rule of thumb for using rates of change. They all contribute some type of information, including the intermonthly rate of the original series on registered unemployment shown in Chart 2. It is sufficient to compare the value in one month, as erratic as it may be, with the rate observed for the same month of the previous year, to have some idea of the interannual rate of change: if the decline in August of a given year were lower than its level 12 months earlier, the interannual rate would logically have increased. Once again, we are moving between the aim of highly stable rates that may mask significant changes in the series and more volatile rates, for which the information may be contaminated with factors that may prove irrelevant in the future. If forecast trends in the variable were confirmed, the interannual rate of the trend-cycle series (with forecasts), when appropriately shifted or centred, would theoretically serve as a precise, timely signal of its performance, that would be coordinated with the signal provided by the rate in respect of the immediately preceding period. This approach would provide us at any time with information on the most recent – intermonthly – rate of advance and its equivalency in interannual terms, entailing the advantage of being comparable in value to its counterpart calculated in annual terms, which, as we shall observe below, proves to be an adequate reference.

Once again, it would seem that the most important matter is therefore to know one's data series and what type of information each one provides. It is illustrative to consider the confusion that occurs each quarter in certain media with the publication of the figures on annual GDP growth in the major economies, owing to the different types of rates used in each case. Accordingly, growth in the EMU is expressed with the interquarterly growth rate of the series as seasonally corrected; in the U.S., the same rate is used but its rate of change is expressed in annual terms. In Spain, the INE provides analysts with interannual and interquarterly rates (not expressed in annual terms) for different series: original, adjusted and trend-cycle series. Results, however, are reported and assessed primarily based on the interannual rate of the corrected series, although the interquarterly rate of change receives special attention for purposes of comparison with the rest of the EMU countries.

We observe in Chart 3 that the results as published in each area are difficult to compare. EMU results show moderate variability, although they are expressed in more frequent terms than those of Spain and the U.S. As Spain's rates are interannual, they are more stable than those of the U.S., as the greater variability of interquarterly rates is accentuated when they are expressed in annual terms.

The decision to express interquarterly rates in annual terms (equivalent to calculating them to the power of four, or twelve for an intermonthly rate), makes it possible, as we have observed, to express rates of change in the quarterly series in annual terms, which is considered most suitable. This presumes, in fact, that the annual rate, as used to express the national accounts, is most significant and should be used as a point of reference to assess the national accounts results for each quarter. When the EMU growth rate for a given quarter is published and the result is 0.5 percent, for example, it cannot easily be determined

CHART 3 GROSS DOMESTIC PRODUCT



SOURCES: OECD, Eurostat and INE.

whether this figure is consistent with the forecast for the whole year, which might be 2.5 percent, for example. When the interquarterly rate is expressed in annual terms, this problem is solved; on the other hand, when it is implicitly assumed that the economy will maintain this growth rate throughout all four quarters, we find this to be questionable. In addition, as we have observed, series variability is accentuated when their erratic content is raised to a higher level. The interannual rate, used as a priority in Spain, entails none of these inconveniences, although, as we know, it provides information with greater lags. Analysing the interannual as well as the interquarterly rate, which is the normal procedure in Banco de España's short-term economic reports, would seem to be a reasonable option.

It should be borne in mind, finally, that relying mainly on certain rates in reporting results is largely a problem of economic culture. In the U.S., analysts are accustomed to monitoring economic trends through rates that fluctuate broadly and that are subject to substantial revision processes. The opposite may well apply in Spain, possibly as INE used the interannual rate from trend-cycle series (the least variable signal) when it began publishing the quarterly national accounts.

3.2 Analysis of economic indicators

Analysts can use all of these tools to assess the information they receive and to make appropriate judgements on its meaning. Rather than as an isolated event, each indicator should be considered in the framework of evaluating the overall economic context, which is a normal approach for research departments in many institutions. Substantially complete forecasts of the key economic aggregates are used in this connection. Recent trends are monitored continuously, along with interrelations between the key variables, the indicators that best represent them, changes in the international environment and economic disequilibria. Last, economic policy measures implemented and their impact should be reflected at

any given time in the affected variables. For each new piece of information, analysts must attempt to confirm or refute the trends observed to date and compare signs of change in performance with further information to determine how extensively they should be incorporated into forecasting exercises and short-term economic reports.

In today's world, publication of new data on key economic variables is often preceded with the announcement of forecasts on the most probable value anticipated by different institutions in the public or private sector. Anyone familiar with the Spanish economy has at least an approximate idea of the inflation rate, for example, the factors that affect it, its forecast trends and which indicators provide the most effective diagnosis on its performance. A certain opinion on the significance of each new piece of information therefore is quite important as decisions of many economic agents may be influenced more or less directly by that result. To cite a well-known example, this is true for transitory fluctuations in the CPI growth rate, which, if not adequately assessed, ultimately affect wage bargaining and possibly the inflation rate. The short-term economic analyst's task is specifically to formulate a true, verified opinion on the economic data and to communicate it clearly, to assist the economic authorities and private sector agents in decision-making. As we have observed, analysts have adequate and powerful techniques at their disposal, and their proper use will depend on whether those objectives are met.

We shall provide below specific representative examples on analysis of some key indicators in the Spanish economy. It should be borne in mind that there is no mechanically repeatable assessment model, as each indicator has its own specific features and not all are subject to the same focus. The indicators more closely related to quarterly national accounts variables that are used in short-term forecasting exercises and quarterly adjustment of the national accounts logically require greater attention. In any case, for virtually all of these indicators, signal extraction models have been estimated that provide the values for corrected and trend-cycle series, as well as future trend forecasts. Clearly, forecasts obtained using such statistical models are determined as a priority by past performance of the series and, accordingly, they are not an alternative to those provided by econometric models. As explained in Chapter 1, they are necessary for quarterly adjustment and short-term forecasting exercises, and are also quite useful as a benchmark to assess the data in connection with economic indicators. Comparison of estimated model forecasts – one period ahead – with the new observed data provides an initial, and quite relevant, assessment of the indicator, as it enables analysts to assess the extent to which the new available information is (or is not) consistent with the performance patterns hitherto observed. In some cases, estimated models use transfer functions with other related indicators that generally anticipate their trends. This not only improves their forecasting capacity, but also facilitates and enriches the interpretation of any surprise factors contributed by each new observation.

The first step in interpreting the indicator should therefore be to compare each new piece of information with its forecast. Comparisons should theoretically be made with any estimated series and rates. Interannual rates in the original series are normally more erratic, as we have seen, although we should assume that this variability will have been reflected in the models, and therefore comparison among them is appropriate. The information provided by the remaining rates is also relevant, and particularly the interannual rate of the corrected series, which is normally used in presentation of the CNTR figures, and that merits special at-

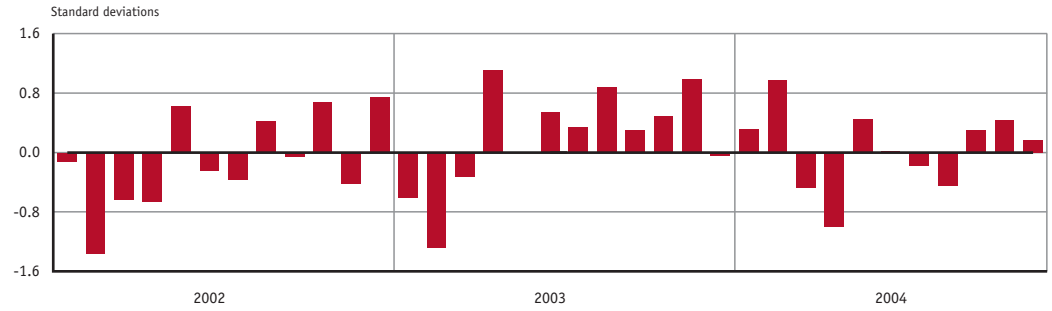
TABLE 1 ANFAC AUTOMOBILE REGISTRATIONS

REAL RATE OF CHANGE

	Change from last observed information					
	November 2004		Cumulative January-November 2004		Forecasts for the following month	
	Observed	Forecast	Observed	Forecast	Dec-04	Jan-Dec 04
Automobile registrations	13.6	12.4	10.9	10.8	7.8	10.7
Individual tourism registrations	9.8	12.1	11.4	11.6	10.6	11.3

	Change in forecasts for 2004			
	Average projected growth, 2004 Date of forecast			Growth observed in
	Sep-04	Oct-04	Nov-04	2003
Automobile registrations	9.9	10.5	10.7	4.2
Individual tourism registrations	11.2	11.6	11.3	3.1

STANDARD FORECASTING ERROR FOR AUTOMOBILE REGISTRATIONS



SOURCE: Banco de España.

tention in forecasting exercises. Forecasting errors are compared with those made during previous periods to determine whether systematic behaviour patterns can be detected. If so, it will be up to the analyst to decide whether the model estimates should be revised, or whether the error is derived from a change in performance of the variable not yet reflected in the statistical model, and that should be monitored as new information is received.

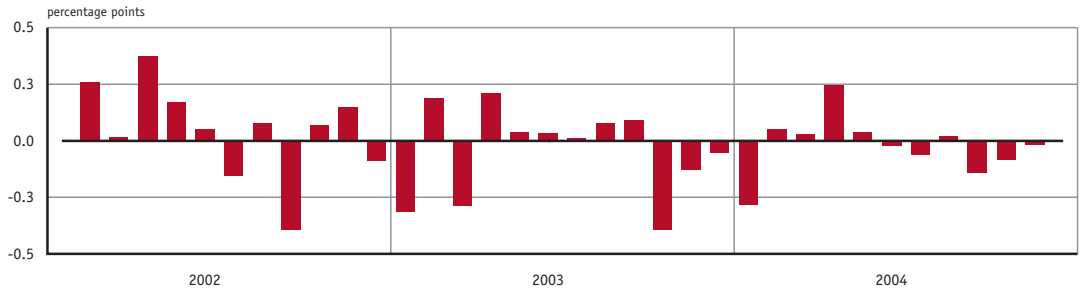
Table 1 provides an initial assessment of the data for automobile registrations for November 2004, provided by the Spanish Association of Automobile and Lorry Manufacturers (ANFAC). As we observe, growth registered that month was slightly higher than forecast, although this assessment changes when we consider exclusively tourism sales to individuals, which would seem to be the most adequate indicator, if, in addition to results from activity in this sector, we are interested in obtaining a signal on how such a significant component of household expenditure on durable goods performs. In any case, forecasting errors have not been substantial and, in the absence of any surprise factors, no significant changes have occurred in the forecast average for the year. The indicator trends would

TABLE 2 CONSUMER PRICE INDEX, SPAIN

November 2004	Change from latest observed information			
	Interannual rate of change		Intermonthly rate of change	
	Observed	Forecast	Observed	Forecast
Total	3.5	3.5	0.2	0.3
1. Goods	3.4	3.5	0.4	0.5
1.1. Food products	3.5	3.5	0.3	0.3
Unprocessed	*2.3*	*2.6*	*0.6*	*0.8*
Processed	*4.1*	*3.9*	*0.2*	*0.1*
1.2 Industrial	3.3	3.5	0.4	0.7
Non-energy	*1.2*	*1.4*	*1.0*	*1.2*
Energy	*9.9*	*10.4*	*-1.2*	*-0.8*
2. Services	3.8	3.6	0.0	-0.2
MEMORANDUM ITEMS:				
IPSEBENE	2.9	2.9	0.4	0.3

	Change in forecasts for 2004			
	Average projected growth, 2004 Date of forecast			Growth observed in
	September 2004	October 2004	November 2004	2003
Total	3.1	3.1	3.1	3.0
1. Goods	2.8	2.8	2.7	2.7
1.1. Food products	4.0	3.9	3.9	4.0
Unprocessed	*4.8*	*4.7*	*4.7*	*6.0*
Processed	*3.6*	*3.5*	*3.6*	*3.0*
1.2 Industrial	2.0	2.0	1.9	1.9
Non-energy	*0.9*	*0.9*	*0.9*	*2.0*
Energy	*5.3*	*5.3*	*4.9*	*1.4*
2. Services	3.7	3.7	3.7	3.7
MEMORANDUM ITEMS:				
IPSEBENE	2.7	2.7	2.7	2.9

FORECASTING ERROR, INTERMONTHLY RATE OF CHANGE



SOURCE: Banco de España.

therefore seem to be consistent with the performance forecast some time ago, without evident substantial changes in trends; the same can be inferred in analysing standard error in the latest observations.

There are other indicators for which assessment is somewhat more painstaking, as aggregate data trends must be fine-tuned, for correct interpretation, to reflect the values recorded for the key components. This is true, for example, of the CPI, that can be initially assessed with the data presented in Table 2. Comparison of the observed data – corresponding to November 2004 – and the forecast, in this case, through the interannual rate of the original series and the intermonthly rate shows clear redundancy. This is true only because, until the introduction of temporarily reduced product prices, monthly trends in the CPI were substantially stable, particularly if we were to exclude some of its more erratic components (such as energy and unprocessed food) to generate the index known as index of non-energy processed goods and services prices (IPSEBENE); and, accordingly, the interquarterly interest rate has been used from time to time as a reference to assess its performance. This is an exceptional case that rarely recurs. According to the table, the observed rate of the general index was somewhat lower than forecast. This theoretically positive assessment must be fine-tuned with an analysis of its basic components. We confirm that this result is basically explained by energy price trends and, to a much lesser extent, by the remaining industrial products; while in services, a fundamental component in defining the inflationary core, the result was less favourable. Once again, the standard error values reflect this performance.

When the indicator has been initially assessed and the new information has been incorporated into the series, the estimated models provide a set of updated forecasts. Table 3 presents this information in reference to one of the basic economic series: merchandise exports in real terms obtained by deflating the customs data with unit value indices prepared by the Office of the Secretary of State for Economy. The table includes all types of rates to provide the most complete assessment of this indicator.

First, we observe the extremely erratic nature of real export series, which in due course came to be known as "manic-depressive" in reference to the contradictory messages that could be derived in observing the data if not treated appropriately[10]. Movements in the interannual rate of the original series (the intermonthly rate was not included) are insignificant, as is also true for the rates calculated with the seasonally adjusted series. This approach therefore involves a substantially erratic variable and, accordingly, performance must be assessed based on trend-cycle series.

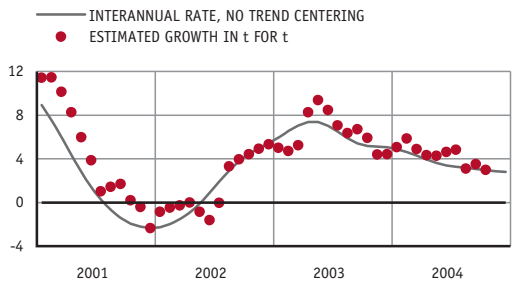
Analysis of interannual rates of trend-cycle series does provide accurate information on recent performance of exports. On this basis, we observe that exports gradually lost steam beginning in spring 2003. We also note that, if not centred, intermonthly rates are approximately six months ahead of interannual variations and, similarly, the interannual rate provides a delayed reflection of trends in the variable. A simple, but highly compelling way to reflect trends in the series is provided in the chart below, which shows interannual rates for the estimated trend after receiving the latest data (solid line); each point in turn indicates where the same series has passed at any given time. The sequence of points therefore reflects the change that has occurred in the estimated trend over time and, therefore, the

[10] See Maravall (1983).

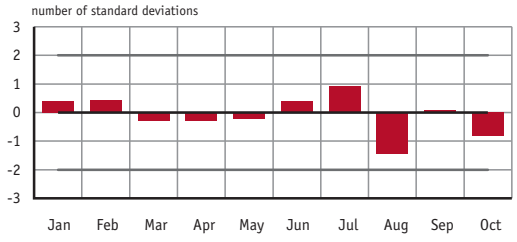
TABLE 3 TOTAL EXPORTS. IN REAL TERMS, MILLLIONS OF CONSTANT 1995 EURO

	Latest observation: October 2004					
	Original series	Interannual rate	Rates/trend		Rates/seasonally adjusted series	
			T1,1	Interannual	T1,1	Interannual
2002	115,875	1.4		1.4		1.5
2003	123,091	6.2		6.2		6.2
2004 p	128,989	4.8		3.6		4.8
2004						
I	31,958	7.3	1.1	4.6	2.8	6.9
II	33,264	2.2	0.7	3.7	0.2	2.0
III	30,374	6.9	0.4	3.2	4.0	6.7
IV p	33,392	3.3	0.7	2.9	-3.3	3.5
2003						
January	9,147	1.0	0.5	6.0	-1.4	1.0
February	9,816	3.5	0.6	6.5	0.2	3.6
March	10,831	13.1	0.6	7.0	3.2	7.9
April	10,927	9.0	0.5	7.4	4.8	13.9
May	10,980	11.8	0.4	7.4	-1.7	14.6
June	10,638	12.8	0.4	7.0	-2.8	10.2
July	10,217	3.4	0.3	6.5	-0.1	3.9
August	7,727	-2.1	0.2	5.9	2.5	1.0
September	10,469	11.5	0.3	5.4	0.9	8.4
October	11,740	4.4	0.3	5.2	-1.4	4.9
November	10,298	-2.1	0.4	5.1	-2.1	1.3
December	10,301	7.9	0.4	5.0	3.2	5.3
2004						
January	9,673	5.7	0.4	4.9	1.7	8.5
February	10,545	7.4	0.4	4.6	0.9	9.2
March	11,741	8.4	0.3	4.3	-2.7	3.0
April	10,823	-1.0	0.2	3.9	0.7	-1.0
May	10,897	-0.8	0.1	3.6	1.1	1.8
June	11,544	8.5	0.1	3.4	0.8	5.5
July	11,788	15.4	0.1	3.3	12.3	18.7
August	7,865	1.8	0.1	3.2	-13.9	-0.4
September	10,721	2.4	0.2	3.1	3.6	2.3
October	11,373	-3.1	0.2	3.0	-1.3	2.4
November	11,449	11.2	0.3	2.9	1.0	5.6
December p	10,570	2.6	0.3	2.8	0.3	2.6

RATES/TREND



STANDARD DEVIATIONS
January-October 2004



SOURCES: Ministry of Economy and Finance, and Banco de España.

points can be used to reflect performance of the variable. Accordingly, we observe the substantial recovery in exports during the latter months of 2002, reflected by systematic increases in their estimated trends; the greatest strength was observed in spring of that year (data in the table indicate that the intermonthly trend rate identified this point somewhat in advance); thereafter, activity begins to decline, stabilises during the early months of 2004 and rebounds with the latest data received when the analysis was conducted.

With this information, analysts await the new data (November 2004). If this exceeds the forecast figure, the trend estimate will be revised upward. While this result should in principle be favourable, we would expect the new data to confirm it. We must stress once again that assessment should be approached as an overall exercise that reflects all available information. For example, if the data for November were in line with the forecast – a real increase in exports of 11.2 percent – this might be indicative of a highly positive result, when in reality the slight deceleration perceived to that time would be confirmed.

4 Conclusions

This chapter has provided a number of thoughts on statistical information in Spain, reviewing the main available sources and their key features, gaps remaining to be filled, progress made in recent years owing to the National Statistics Plans and, most recently, the requirements imposed by key international organisations, Eurostat, or ECB. This ultimately involves incentives in connection with the establishment of the Economic and Monetary Union. The need for Spain's statistical system to adapt and integrate into a supranational pattern is possibly the most important characteristic at present, and is also Spain's medium term goal. An annex at the end of the book provides a more detailed analysis of 13 basic information sources to describe the Spanish economy.

In addition to this review of Spain's statistical system, the chapter addresses some of the basic problems faced by analysts who work with economic data. We note the progress than has been made in techniques applied to analysis of statistical series, with a discussion of how they can be used for optimal analysis of the continuous information flows that characterise modern economies, to facilitate decision making by economic agents. To that end, the approach used is presented with a series of real examples to illustrate the nature of the problems to be solved.

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5. Economic modelling and forecasting tools

Ángel Estrada and Javier Vallés

1 Introduction

Forecasting exercises based on statistical and econometric tools that include accuracy and discipline derived from correct application of statistical analysis and economic theory are essential in economic analysis. This chapter reviews the statistical techniques and econometric models used by the *Servicio de Estudios* of Banco de España in its forecasting exercises to extract the maximum information on past performance of the National Accounts aggregates and short-term economic indicators, and to project the behaviour of these macroeconomic variables in the future. The various tools available have comparative advantages in different aspects of analysis, and no single quantitative strategy is superior to the others in all relevant aspects. An eclectic approach that maximises the benefits of combining the tools for both their predictive and explanatory qualities is, therefore, appropriate.

Forecasting exercises provide future trends of the key macroeconomic aggregates (components of aggregate demand and deflators, value added and employment in the principal economic sectors, and wages and labour costs), as well as the disposable income and capital account of the main institutional sectors (corporations, households, public sector and external sector) under certain assumptions. Various labour market variables are also projected, such as the labour force, unemployment, etc., and the consumer price index (CPI) and its main components (in this case, with a somewhat shorter-term horizon). The principal frame of reference for the forecasts is the National Accounts aggregates, but they also cover broader aspects of the economic reality.

The availability of a set of technically and analytically justified forecasts for the relevant horizon is a key factor in assessing the economic situation in the short and medium term. The definition of a central forecasting scenario, accompanied by alternative scenarios, helps to determine the position in the economic cycle and to identify the medium-term economic outlook, as well as the most significant risks to be faced.

The *Servicio de Estudios* conducts quarterly forecasting exercises for the main aggregates of the Spanish economy over a two- to three-year horizon. The forecasts provide an up-to-date evaluation of the economic outlook, on which Banco de España can base its economic policy recommendations and decisions. Such forecasting exercises provide the basis for preparing the Quarterly Report on the Spanish Economy, that appears regularly in the *Economic Bulletin,* which includes the estimate for growth of the most significant macroeconomic aggregates in the most recent full quarter, in advance of the preview released by the National Statistics Institute (INE). Twice a year, forecasting exercises are coordinated with the rest of the Eurosystem National Central Banks (NCBs) and with the European Central Bank (ECB)[1]; these forecasts form an essential part of the ECB Governing Council's monetary policy decision-making process.

Producing the forecasts involves the use of both statistical tools and econometric models. Statistical tools are used to extract information from the various indicators and to interpret the most recent data on the economy. Econometric models, based on economic theory, relate the macroeconomic variables to each other and provide projections. They also allow studying the determinants of the main macro-magnitudes and help explain the channels through which various shocks are transmitted. Among those available models, a key position is held by the quarterly macroeconomic model, which provides an overall framework for analysing the Spanish economy as a whole; besides, other models of more limited scope are also used, known as "satellite models", which analyse specific aspects of the economy in greater depth. Both the statistical evaluation tools and the models use the national accounts as their frame of reference, enabling their results to be combined. These models provide varying degrees of value added according to the forecasting horizon considered and the level of detail with which they approach the economic event to be explained.

Statistical and econometric tools help to underpin the forecasts for the operating mechanisms and characteristics of the economy that emerge from the historical performance in the variables. Despite this, they are subject to a certain degree of uncertainty that changes over time. All the models are simplifications of reality, and it is thus difficult to cover all the aspects relevant to the formulation of forecasts. The analyst's judgement must supplement the information provided by the models, drawing on assumptions derived from knowledge of the economy. While such assumptions cannot be expressed as mathematical relationships, they must be consistent with the analytical framework and with the set of available information.

The next section describes the context in which the forecasting exercises are carried out and its impact on the choice of models used. Section three sets out the method used to perform short-term forecasts based on the indicators of demand, activity, costs and prices. Sec-

[1] Summarised in the ECB's Monthly Bulletin, June and December, under the title *"Eurosystem staff macroeconomic projections for the Euro Area".*

tion four describes the quarterly macroeconometric model and further models referring to specific economic issues that round out the overall picture of the quarterly model. A description of how all these tools are combined and adjusted to reflect the analyst's judgement to obtain final forecasts is provided in Section five. Finally, Section six summarises the chapter's main conclusions.

2 Description of forecasting exercises

2.1 Assumptions

Forecasting exercises start off by establishing paths for the variables that are considered exogenous (but not necessarily constant) within the forecast horizon, which is normally two to three years. The exercises are performed quarterly in harmony with national accounts. Both the quarterly macroeconomic model and the various satellite models treat the exogenous variables as given, some referring to the external environment, and others related to fiscal and monetary policy. Possible deviations from the underlying assumptions that are considered significant are evaluated using risk analysis.

When establishing the external assumptions, the fact that Spain is a member of the European Economic and Monetary Union (EMU) and that it participates in the common monetary policy mean that the euro area needs to be distinguished from the rest of the world[2]. The most significant assumptions for the rest of the world are the forecast for growth in world economic activity and expected trends in imports from the various geographical areas, which, in part, determine Spain's external demand growth. These assumptions are generally established based on the most recent forecasts by the main international bodies as references. Further variables relating to the external context are the oil prices other raw materials – usually based on their futures prices – ; exchange rates – normally established using the random walk hypothesis – ; and the prices at which the rest of the world trades, which help to determine evolution in the prices with which Spanish exports compete on global markets and in import prices. In the case of the euro area, a forecast is made for growth in GDP, the components of domestic and external demand, and inflation. These assumptions complete the information on the growth in export markets for Spain and the prices with which Spanish products compete.

For the assumptions on monetary and financial variables, short-term interest rates are held constant over the forecast period, so that the projections are conditional on monetary policy remaining unchanged[3]. The path of long-term interest rates is obtained from market expectations, adjusted to be consistent with the assumption of constant short-term rates; the forecast for the value of stock market assets is estimated using the previously established long-term interest rate path as the discount factor. In addition, the assumptions for domestic fiscal variables combine the most up-to-date fiscal information with fiscal policy measures – both those included and those approved, but not yet incorporated, in the current State

[2] See Chapter 10 of this book for a detailed description of the external context.

[3] See Chapter 6 of this book for a description of the assumptions in connection with the financial environment.

Budget and the Stability Program documents[4]. With the sole exception of social security benefits, the various items of public expenditure are considered to be exogenous. In the case of public revenues, however, each of the tax items moves in line with effective tax rates (which are exogenous) and with its elasticity to the variable of scale which sets up the closest approximation to the tax base[5]. Finally, it is worth mentioning that some fiscal variables, such as the replacement ratio and the tax wedge, together with competitiveness, provide the basis for establishing the long-term unemployment rate or non-accelerating inflation rate of unemployment (NAIRU)[6].

When the prediction is performed as part of the exercises coordinated by the Eurosystem, common assumptions are adopted (except for those relating to fiscal variables) and the projections for member countries and the euro area are discussed with other Eurosystem National Central Banks (NCBs) and with the ECB. There is a structure of working groups and committees that develops the common assumptions and discusses the results. Within the exercise particular relevance is attached to consistency checks on the trading block (i.e. that imports and import prices within the euro area are consistent with the area exports and export prices), on the financial environment (that the financial resources and uses are compatible) and on inflation. The ECB publishes a summary of the forecasts in its *Monthly Bulletin.*

2.2 Central scenario, uncertainty and risk in the forecasts

The central scenario of the forecasts is obtained from the various statistical tools and models available, subject to the assumptions described above. It is necessary, however, to recognise that the resulting estimates are subject to a certain degree of uncertainty. Estimating the confidence intervals is not a simple task when the forecasts are derived from the interaction of various analytical instruments, although a simple way to approximate them (that the ECB uses in its publications) is to start from the historical forecasting errors of the relevant variables.

Additionally, it is possible that the probability distributions around the exogenous variables' paths are not symmetrical, making it possible to conduct a risk analysis. In this analysis, probabilities other than 50 percent are assigned to the event that future trends in prices or output may lie above or below the central scenario. In any case, it bears repeating that quantification of these risks is a complicated task, as the risks to the various exogenous variables are not usually independent. An alternative way to conduct this analysis is to assess other paths (albeit less probable ones) for the exogenous variables and the corresponding deviations from the central scenario, thereby determining the uncertainty related to it[7].

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4 See Chapter 8 of this book for a description of the assumptions related to fiscal policy.

5 Similar modelling techniques are used for both unemployment and retirement benefits.

6 Various ways to estimate NAIRU are detailed in later sections of this chapter.

7 One of these exercises is described in Section 4.1.3 of this chapter.

3 Forecasting with indicators

In Chapter 4, which focuses on statistical information, the most significant criteria for assessing the economic indicators are set out in general terms. This section deals, specifically, with the methods used to obtain short-term projections for the main macroeconomic aggregates based on these indicators. Broadly speaking, there are two different approaches available to making forecasts of economic activity and prices with indicators. The first consists in blending a sufficiently broad and heterogeneous set of indicators into one indicator, (or a few indicators), to provide direct forecasts of GDP in real terms[8]. The second, which is the one used by the *Servicio de Estudios* consists in using one or more indicators to project the various components of real GDP and its deflator (using what are known as "bridge models") and to obtain by aggregation a projection of activity and prices. The common characteristic of the two approaches is that they use information exclusively from indicators and statistical techniques, without any reference to the economic theory. Consequently, these procedures are suitable for obtaining short-term forecasts and estimates, over two to three quarters.

The main reason to favour the second approach is that it provides integrated and consistent forecasts of GDP, its components and other macroeconomic variables, thereby considerably expanding the possibilities for analysis and diagnosis of the current economic situation. In addition, this disaggregated approach is the one used by the Spanish National Statistics Institute (INE) to obtain the Quarterly National Accounts (CNTR) estimates. The disadvantage of this approach is that, given that each of the indicators is lagging at the time the projections are made, not all GDP aggregates incorporate a set of information that is equally up to date. Further, given that real GDP and its deflator can be obtained as an aggregate of their components from the point of view of expenditure and from the sectors of economic activity, there are initially two possible projections of these variables, and so it is necessary to implement additional statistical procedures that allow to reach a single projection.

There are four phases in the process for projecting with indicators. These phases are sequential and each one provides results with its own value added. First, the economic indicator signals are extracted and their short-term prediction is obtained; second, the National Account component concerned is projected; in the last two phases two consistency exercises – cross-sectional and temporal – are performed on the projections.

Each of the economic indicators used in the short-term prediction exercises has its own specified autoregressive integrated moving average (ARIMA) model. These ARIMA models fulfil two purposes: to provide predictions of the indicators and to allow them to be broken down into three basic signals: the trend-cycle signal, the seasonal signal (and calendar effect) and the irregular component[9]. By definition, the latter element is unpredictable, while the seasonal component reflects regular periodic behaviour patterns that the indicator produces at a frequency of a year or less. The trend-cycle component reflects the steadiest signal of the indicator, that is, its performance in the medium term. Given that the set of

[8] Statistical techniques (such as main components) or structural weightings (from input-output tables, etc.) can be used to blend the information provided by a variety of different indicators.

[9] The TRAMO-SEATS signal extraction procedure is used [Gómez and Maravall (1996)]. These programmes have been maintained and developed since 2000 by G. Caporello and A. Maravall, Banco de España.

TABLE 1 TRANSFER FUNCTION, CAPITAL INVESTMENT (a)

Dependent variable: **Capital investment (ieq)**
Indicator: **Capital goods apparent consumption (dispeq)**

Equation:

$$\Delta ieq = \underset{(9.64)}{0.77}\,\Delta dispeq + Artificial\ variables + AR(1)$$

a. Variables in lower case expressed in logarithms; t-statistics in parentheses. Sampling period: 1992:I-2002:IV.

macroeconomic forecasts is specified in terms of CNTR series adjusted to reflect seasonal and calendar effects, the signal of the indicator used in the short-term projections is the one that results from aggregating the trend-cycle and irregular components, i.e. eliminating seasonality from the original series.

In the second phase, the aggregates concerned are projected using transference functions. Tables 1 and 2 show two representative examples of these functions. On the expenditure side, the basic indicator for capital goods investment is that of apparent consumption. This indicator is obtained as a weighted average of the index of industrial production, exports and imports of this type of goods[10]. While this is not the only indicator used to evaluate the short-term situation of the capital goods investment cycle, it is the one that shows a closer relationship to it. As Table 1 confirms, the relationship with capital goods investment is contemporaneous, in logarithmic first differences, and its stochastic component is well characterised as a first-order autoregressive process. Theil's U-statistic shows a clear increase in predictive power compared with a random walk model.

For economic activity, the indicator selected for value added in the industry and energy sector is the industrial production index (IPI). As can be seen in Table 2, in this case as well the model is specified in logarithmic first differences of the variables, and the relationship is contemporaneous, with a residual that follows a moving average process. The gain in predictive power compared with a random walk approach is found to be considerable.

The extension of the real aggregates series and their deflators through this system for predicting the CNTR leads to two different projections for GDP and the deflator: on the one hand, the projection obtained as an aggregate of the components of expenditure; and on the other hand, the projection obtained by aggregation of the value added of the various economic sectors (agriculture, industry, construction and services, plus net taxes on products). These two estimates must be combined to produce one single projection of GDP (and its deflator). To this end, they are weighted with factors reflecting their respective historical forecasting errors, which is a measure of the confidence that can be given to them.

[10] The weights of each component are obtained from the input-output table.

TABLE 2 TRANSFER FUNCTION, INDUSTRY AND ENERGY SECTORS VALUE ADDED (a)

Dependent variable: **Industry and energy sectors value added (vaie)**
Indicator: **Industrial production index (ipi)**

Equation:

$$\Delta vaie = \underset{(6.30)}{0.363}\,\Delta ipi + Artificial\ variables + MA(1)$$

a. Variables in lower case expressed in logarithms; t-statistics in parentheses. Sampling period: 1992:I-2002:IV.

GDP projection alone does not coincide with either of the two preliminary estimates, which means that the components must be adjusted to satisfy the accounting identities from both standpoints. To achieve cross-sectional consistency, the discrepancies are distributed according to the weight of each aggregate in GDP and to the fit of the aggregate to its indicator. The first weigh attempts to avoid smaller items absorbing the bulk of the adjustment, resulting in major distortions. The second attempts to have the adjustment fall to a greater extent on the components that can be predicted with a lower confidence level.

Finally, the short-term projections (two to three quarters ahead) obtained with indicators must be subjected to temporal consistency checks by incorporation in a set of forecasts with a wider time horizon and with a more solid foundation in the annual data. In fact, in this phase the aim is to fit the quarterly projections to various predetermined annual estimates, which are normally obtained using econometric modelling techniques.

4 Forecasting with models

4.1 The macroeconometric model

The objective of this section is to summarise the content of the quarterly econometric model estimated at the Banco de España. This tool is used both to obtain medium-term forecasts of the Spanish economy (2-3 years) and to verify the results provided by the rest of the forecasting tools in a wider framework. To aid comprehension of the model, a very simplified theoretical version of its steady-state[11] is presented that reflects its main macroeconomic foundations and illustrates its long-term properties. Later chapters of this book present the majority of the behavioural equations that make up the estimated model.

[11] In this simplified version, which includes 13 equations, neither the existence of technical progress nor changes in the population are taken into account. See Estrada, Fernández, Moral, and Regil (2004) for a full version of the model.

4.1.1 Theoretical foundations

The theoretical structure of the model is designed for a small open economy that forms part of a monetary area. This assumes, on the one hand, that while various channels through which the rest of the world influences the economy are modelled, the economy is not large enough to alter what happens outside it. On the other hand, both the short-term interest rate and the exchange rate are treated as given and do not react to changes in the domestic or external variables. The economy produces one single good, which is an imperfect substitute for the good produced in the rest of the world. In the long term, the production of this good is given by the technology available to the representative firm and by its factors of production (capital and labour), while, in the short term, production is determined by demand, implying that its convergence to the supply assumes a gradual adjustment of prices and quantities.

Aggregate demand is made up of the basic National Account identity that relates domestic output *(Y)* to private consumption *(C),* public consumption *(G)* (which, in this simplified version of the model is the only component of public sector demand), gross fixed capital formation *(I),* exports *(X)* and imports *(M)*[12]:

$$Y \equiv C + G + I + X - M \qquad [1]$$

Leaving aside public consumption, which is an exogenous variable, the rest of the components of this identity are determined in the household block (private consumption) and the external block (exports and imports). Meanwhile, *gross investment (I)* is defined as the sum of net investment and capital depreciation[13]:

$$I \equiv \Delta K + \delta K_{-1} \qquad [2]$$

where Δ is the difference operator, K the capital stock and δ the depreciation rate. In the steady-state it holds that $I = \delta K$[14].

The *household block* of the simplified model (which does not include the housing market) consists of a behavioural equation and two accounting identities. According to the private consumption equation, in the long term, consumption is dependent on permanent household income, in other words, on its spending power and the real interest rate *(RR),* which determines the degree to which agents postpone or bring forward their spending decisions in response to changes in the return on savings. Assuming that the spending power of individuals can be approximated by a weighted average of their disposable income (Y^d) and their wealth *(W), consumption (C)* can be expressed as:

[12] To simplify the analysis, it will be assumed that there are no changes in inventories.

[13] The capital accumulation equation.

[14] In the estimated version of the model, private productive investment is distinguished from residential investment, while the latter is determined in the household block. The residential investment deflator is obtained from matching the supply to the demand for housing, whereby supply is considered as predetermined and equal to the existing residential stock in the preceding period.

$$C = \left(Y^d\right)^{\omega} W^{1-\omega} e^{-\xi\, RR} \qquad [3]$$

where ω is the elasticity of consumption in relation to disposable income, and ξ the semielasticity with respect to the real interest rate.

Household disposable income (Y^d) *is* also defined in this block. Assuming that domestic corporations are owned by the households, a direct relationship can be established between the aggregate income of the economy and the income of households:

$$Y^d = \left(1-\tau_d\right) \left[\frac{PY}{\left(P^m\right)^{\eta}\left(P\right)^{1-\eta}} - \delta K + RR\, FA\right] \qquad [4]$$

where τ_d is the income tax (IRPF) rate, P is the GDP deflator, P^m is import prices (which are assumed to be equal to world prices) and *FA* are net financial assets of the domestic private sector. This equation shows that household disposable income in real terms will be the after tax value of real net domestic income, in terms of household purchasing power[15], and of the returns on capital provided by all the assets owned by the private sector.

The second definition of the household block determines *household wealth (W)* in real terms. Given that domestic corporations are owned by the households, their wealth coincides with that of the private sector, which consists of physical assets and net financial assets, which in turn are the sum of public debt *(B)* and net assets with the rest of the world *(F)*.

$$W = K + FA = K + \frac{B+F}{\left(P^m\right)^{\eta}\left(P\right)^{1-\eta}} \qquad [5]$$

Continuing with the demand side, in this simplified version the *external block* is made up of two equations and one definition[16]. The first equation relates *exports* (*X)* to world demand (*WD)* and competitiveness *(P/CP^x)*[17], with an elasticity of η_x:

$$X = WD\left(\frac{P}{CP^x}\right)^{-\eta_x} \qquad [6]$$

This equation shows that the greater the demand of the rest of the world and the lower domestic prices in relation to foreign prices *(CP^x),* the greater will be external sales. The second equation assumes that *imports (M)* depend on GDP and on competitiveness, with an elasticity of η_m:

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[15] Notice that the nominal income is deflated by a weighted average of import prices and domestic prices, to reflect the fact that goods consumed by households are not only produced domestically, but are also imported. Thus, *m* would be the weight of imported consumption in total consumption.

[16] In the empirical version of the model, trade with the euro area is distinguished from trade with the rest of the world, and trade in goods is distinguished from trade in services.

[17] In this case, the simplifying assumption introduced is that export prices *(P^x)* are equal to domestic prices *(P)*.

$$M = Y\left(\frac{P}{P^m}\right)^{\eta_m} \qquad [7]$$

Consequently, purchases from the rest of the world will be the greater, the higher the level of domestic demand and the higher domestic prices are in relation to those of the rest of the world.

In addition, in the external block the evolution of *net foreign assets (F)* is established. These will increase when a surplus is generated in the trade balance *(P X – P^m M);* given the interest income produced by the assets held in the previous period *(R F_{-1})*[18].

$$\Delta F = \left(PX - P^m M\right) + R\ F_{-1} \qquad [8]$$

To conclude the demand side, the *public sector block* is composed of a single identity, which reflects the way that public spending is financed through tax revenue[19] and public debt issues *(B).* Debt will increase in direct proportion with the public deficit *((G – τ_d Y) P);* taking into account the interests that this sector have to pay for the debt from the previous period *(R B_{-1}):*

$$\Delta B = \left(G - \tau_d Y\right)P + R\ B_{-1} \qquad [9]$$

The specification of *aggregate supply* is based on the existence of firms that operate in a regime of imperfect competition and maximise their profits on the sale of goods and services. Cobb-Douglas technology is considered with constant returns to scale on two productive factors: capital *(K)* and labour *(L).* In addition, a trade union negotiates workers' wages with firms to maximise the welfare of their members; the firm subsequently decides on the level of employment.

From the first-order conditions of profit optimisation, the corresponding expressions can be obtained for the demand of production factors and for the prices set by the corporations, given a certain functional form for the demand for their products. The demand for *capital (K)* will be a function of employment and of the relative costs of production *(W^p/UC)*[20]:

$$K = L\left(\frac{\beta}{1-\beta}\right)\left(\frac{W^p}{UC}\right) \qquad [10]$$

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[18] The nominal interest rate *(R)* is defined as the sum of the real interest rate and expected inflation.

[19] Although only direct taxes levied on household income are reflected in this simplified theoretical model, the empirical model includes direct taxes on labour, on corporate profits and indirect taxes on spending.

[20] *UC* is known as "user cost of capital" and is expressed as follows: $UC = (P)^{1-\eta}\,(P^m)^{\eta}\,(RR + \delta - \Delta l_n\,(P)^{1-\eta}\,(P^m)^{\eta})$; whereas in the case of private consumption, the investment deflator is a weighted average of domestic prices and import prices, as investment goods can be produced domestically or imported.

where (1 – β) represents the elasticity of output in relation to employment in the production function. Demand for *labour (L)* is obtained from the inverse of the production function. If *A* is the level of technology:

$$L = A^{\frac{1}{1-\beta}} Y^{\frac{1}{1-\beta}} K^{\frac{\beta}{1-\beta}} \qquad [11]$$

Domestic prices (P) are obtained from the first-order condition of profit optimisation with respect to employment, which implies that they will be the result of adding a mark-up to the marginal costs of production, which, in this context, are the unit labour costs ($W^p L/Y$). Since the economy analysed is small and open to international competition, the mark-up is dependent on competitiveness with an elasticity of *s:*

$$P = \frac{1}{1-\beta}\left(\frac{P}{CP^x}\right)^{-s} \frac{W^p L}{Y} \qquad [12]$$

Consequently, domestic output prices are a weighted average of unit labour costs and of the prices of the rest of the world.

To complete the aggregate supply of the economy, it suffices to specify the rule of *wage (W^p)* determination. In a context of bargaining as described above, the wages received by workers can be expressed as follows:

$$W^p = (1-\beta)\frac{PY}{L}\left(\frac{L}{N_f}\right)^{\lambda_U} \mathrm{H} \qquad [13]$$

where N_f is the labour force, λ_U is the elasticity of real wages to the rate of employment and *H* is a set of variables that reflect the labour market structure. This equation implies that real wages will move with productivity and with the rate of employment, that is, the inverse of the unemployment rate, which captures the probability of remaining out of work.

The system of equations [1]-[13] can be summarised in two equations that express the aggregate demand and supply of the economy according to a set of exogenous variables *(A*, τ_d, *G*, *RR*, *WD*, N_f, *FA*, *H)*[21] and to relative prices *(P/CP^x)*[22]:

[21] To simplify the presentation of the model, wealth was considered an exogenous variable, although in the empirical model it is endogenous.

[22] Rest-of-world prices are taken as given. A full derivation of these expressions can be found in the working paper by A. Willman and Á. Estrada (2002).

$$\frac{Y}{N_f} = \frac{C+G+I+X-M}{N_f} = D\left(A, \tau_d, G, RR, WD, N_f, FA, \frac{P}{CP^x}\right) \quad [14]$$

$$\frac{Y}{N_f} = S\left(A, RR, \frac{P}{CP^x}, H\right) \quad [15]$$

Aggregate demand (per capita) depends positively on the level of technology (real wealth effect), public expenditure, world demand (through exports) and net assets (financial wealth effect), while it is negatively influenced by tax rates (disposable income effect), the real interest rate (substitution, income and wealth effects on consumption) and population (as public spending is not indexed to the population). However, the effect of relative prices (that is, of the real effective exchange rate) on aggregate demand is ambiguous, as on the one hand, higher relative prices (greater real appreciation) cause a substitution effect of domestic output with external output; but, on the other hand, they produce an opposite effect through the impact of the terms of trade on household purchasing power[23]. Aggregate supply (per capita) depends positively on the level of technology (productivity effect) and on relative prices (a real appreciation reduces the cost of use of capital and margins) and negatively on the real interest rate (cost of use effect on capital stock); furthermore, it depends on certain structural labour market variables.

In this way, the condition whereby demand equals supply allows equilibrium relative prices and output to be determined. It is worth noting that this is the long-term solution of the model, in other words, the solution that establishes the potential output of the economy. Similarly, NAIRU is determined with equations [12] and [13] according to relative prices and various structural labour market variables (see Section 4.2.3). This model guarantees that in the presence of any shock (whether temporary or permanent), the variables of the model reach a new equilibrium that satisfies all the conditions noted previously.

4.1.2 Main results of the estimates

At the Banco de España an expanded version of this model has been estimated for the Spanish economy, using the cointegration methodology, therefore, the majority of the behavioural equations are error correction mechanisms. Although there are more efficient methods of error correction mechanisms estimation, it was decided to estimate the equations in two stages: obtaining the long-term parameters in the first stage, and the short-term parameters in the second. The first stage of the estimation guarantees that the long-term constraints of the model are met, and for this it is necessary to estimate jointly various equations; whereas, in the second stage, the specifications are purely empirical and the equations are thus estimated individually. In any case, the objective of this section is not to

[23] It is important to notice that the empirical results guarantee that the demand curve is negatively sloped.

present the final estimated equations in detailed form, which will be covered in other chapters of this book, but to comment on the estimated values for the main long-term parameters introduced in the previous section, and to evaluate some of their implications in characterising the steady-state of this model.

Starting with *investment,* the first component of aggregate demand considered in the previous section, the empirical model breaks it down into three categories, two of which are endogenous (private productive investment and residential investment, which is determined in the household block), and the other exogenous (public investment). The main component is private productive investment, which represents about 60 percent of the total, followed by residential investment (27 percent) and public investment (13 percent). Private productive investment is determined through the adjustment of the observed capital stock to the desired level (obtained, in turn, in the supply block), taking into account existing capital depreciation. The annual depreciation rate (δ), measured from data from firm balance sheets, is 8.5 percent (see Table 3)[24].

In the empirical version of the model, the *household block* consists of three behavioural equations that are jointly estimated: private consumption, residential investment and its deflator. As we observe in Table 3, with regard to private consumption, income elasticity (w) is estimated at 0.96; therefore, wealth elasticity[25] must equal 0.04, as the two add up to unity. The semi-elasticity to the real interest rate (ξ) is 0.06[26]. Furthermore, the determinants of residential investment are the same as those for private consumption plus an user cost[27], which has a negative impact with an elasticity of 0.03. This user cost captures the return on housing relative to alternative assets.

In the case of the *external sector,* the empirical model is also broader than the one presented in the simplified version. Both exports and imports and their deflators are divided into three categories: trade in goods with the euro area, trade in goods with the rest of the world and trade in services. Exports of goods to the euro area represent about 42 percent of the total, exports to the rest of the world 28 percent and services (including tourism) 30 percent. The elasticities with regard to world demand[28] are constrained to equal unity, as in the theoretical model, and deterministic trends must therefore be included to reflect market gains achieved by Spanish products in the most recent decades; in the case of the exports of goods, the trend goes up to 1998. The elasticities in relation to competitiveness (η_x) are fairly similar for each category (0.86, 1.08 and 0.91, respectively; Table 3 shows their average elasticity).

With regard to imports, purchases of goods from the euro area represent some 49 percent of the total, those from the rest of the world 35 percent and those of services 16 percent. The greater weight of the rest of the world, in comparison with exports, derives from

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[24] Residential investment and public investment deprecation rates are 2% and 5%, respectively.

[25] In this case, wealth includes residential capital, unlike the theoretical model.

[26] The parameters of the consumption equation imply that, in the steady-state, the model tends to a savings rate of 11% if the real interest rate is 3% and the ratio of wealth to income is maintained at the levels observed in recent years.

[27] This user cost is defined as: $P^{ir}\,(r + \delta - \Delta \ln P^{ir})$, where P^{ir} is the residential investment deflator.

[28] The world demand variable is specific to each component of exports, as it is constructed as a weighted average of the imports of the countries that belong to each area.

TABLE 3 KEY PARAMETERS, MACROECONOMETRIC MODEL

Depreciation rate, private productive capital	δ	0.085
Consumption-income elasticity	ω	0.96
Consumption-interest rate semi-elasticity	ξ	0.06
Export-competitiveness elasticity (average)	η_x	0.95
Import-competitiveness elasticity (average)	η_m	0.55
Elasticity of output to employment	$1-\beta$	0.64
Price-competitiveness elasticity	s	0.12
Wage-unemployment semi-elasticity	λ_U	-0.42
Elasticity consumer prices-domestic prices	m	0.94
Elasticity investment prices-domestic prices	m	0.69

the fact that a considerable share of raw materials (above all energy inputs) come from that geographic area; in addition, expenditure on tourism by residents is lower than that in Spain by non-residents. In this case too, elasticities of imports to final demand[29] are constrained to equal unity, which means that linear trends must be introduced, which go up to 2000 in the case of goods. Elasticities with respect to competitiveness (η_m) are similar (0.52, 0.48 and 0.65, respectively; their average is shown in Table 3).

Unlike the simplified theoretical model, in the empirical model only the economy's private sector *supply* is modelled, as public sector output[30] is determined exogenously from the government's fiscal policy. In the *supply block,* therefore, the long term for four equations referring to the private sector has been estimated jointly: the desired (private productive) capital stock, the employment, the value-added deflator and wages. The parameters of these equations are the elasticity of output with respect to emploment ($1 - \beta$), which is calibrated as the average labour income shares (0.64); the average growth of total factor productivity, which is estimated at 0.8 percent annually; the effect of competitiveness on the mark-up of the value added deflator *(s),* which is estimated at 0.12; and the sensitivity of real wages to the rate of unemployment (λ_U), which is –0.42[31].

Finally, the empirical model includes equations for demand component deflators. Starting with imports, which were assumed in the simplified model to equal world prices, the estimations confirm that this assumption is correct in the case of goods, and that domestic economic conditions have no influence on these prices. Specifically, the prices of goods

[29] This variable is also specific to each category of imports, as it is constructed as a weighted average of the components of final demand, where the weights are the imported content of each component.

[30] Public sector wages and employment are also considered exogenous variables.

[31] These parameters imply that, if the population grows at a rate of 0.8% and the participation rate of women increases at a similar rate to that of recent years, the steady-state unemployment rate would be about 11% and the growth in potential output (compatible with this level of unemployment) would average slightly below 2%.

imported from the euro area depend exclusively on the export prices of the countries of the area, and those of the goods purchased in the rest of the world, on the export prices of those countries, on oil prices, and on the prices of non-oil raw materials, with estimated weightings of 0.52, 0.23 and 0.25, respectively. By contrast, the services imports deflator depends on the export prices of Spain's trading partners (0.55), but also on domestic prices (0.45). In all cases export prices depend on a weighted average of world prices and domestic prices, reflecting, on the one hand, competition effects and, on the other hand, export costs of production. In the case of goods exported to the euro area, the weightings are 0.73 and 0.27, to the rest of the world, 0.61 and 0.39 and for the exports of services, 0.33 and 0.67.

The private consumption and private productive investment deflators are modelled in the same way as in the theoretical model, as a weighted average of domestic prices and of the import deflators, to reflect the fact that they are composed partly of goods produced domestically and partly of imported goods. The weightings are 0.94 and 0.06, respectively, for the private consumption deflator, and 0.69 and 0.31 for the private productive investment deflator. As could be expected, the effect of import prices is much greater in the case of capital goods, as a higher percentage of them are purchased abroad.

4.1.3 Base line and alternative scenarios: simulation exercises

As discussed in Section two, the forecasting exercises start out from various assumptions on developments in the exogenous variables in the projection horizon, so that the forecasts are conditioned to these pre-established trends. Nevertheless, the profiles of these variables, obtained from specific models or from information derived from other sources or institutions, are subject to uncertainty. Accordingly, while the path adopted for the base line may be the most probable, other paths are possible. The consequences arising from these alternative paths are evaluated through simulation exercises with the quarterly model, enabling the uncertainty surrounding the base line to be delimited.

The essential difference between forecasting and simulation exercises stems from the fact that the former produce the paths of the variables concerned from the complete set of the most likely paths for the exogenous variables, while in the latter exercises only a subset of them (or simply one of them) is changed, without altering the rest of the base line.

In the rest of this section, two examples of simulation exercises carried out with the quarterly model are presented. The first simulates a demand shock that produces a permanent increase of 1 percent in world demand for Spanish exports. The second simulates a supply shock reflected in a permanent increase of 5 percent in the total factor productivity of the Spanish economy.

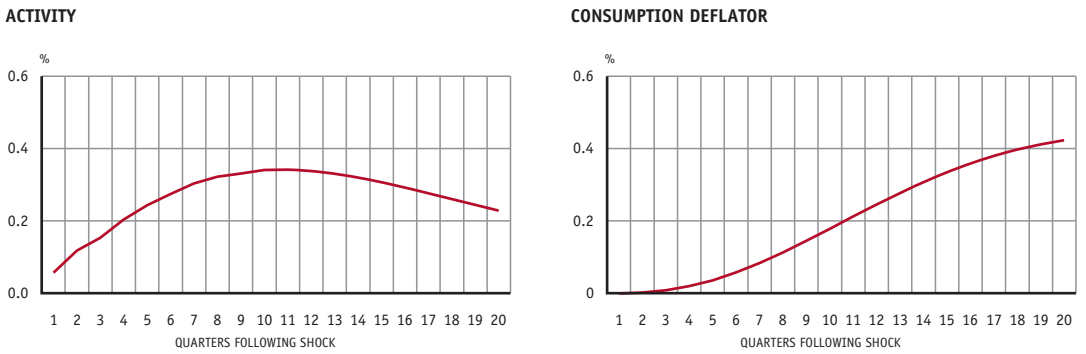
The theoretical model is fairly conclusive with regard to the foreseeable effects of a major increase in *world demand:* in accordance with expression [14], the aggregate demand curve shifts to the right, and the aggregate supply curve remains unchanged, in agreement with expression [15]. This implies that both economic activity and prices should rise.

As we observe in Table 4, an increase in world demand is translated into an immediate increase in exports, which in the second year is already of the same magnitude as the initial shock. To satisfy this increase in demand, corporations increase production, employing more workers and investing more in capital. This, in turn, leads to an increase in house-

TABLE 4 INCREASE OF 1% IN WORLD DEMAND. RESULTS OF SIMULATION

	Year 1	Year 2	Year 3	Year 4	Year 5
Prices	*Levels, percentage deviations from base line*				
HICP	0.00	0.06	0.19	0.32	0.40
Consumption deflator	0.01	0.07	0.20	0.32	0.40
GDP deflator	0.00	0.06	0.19	0.30	0.38
Unit labour cost	-0.03	0.04	0.21	0.35	0.44
Compensation per employee	0.01	0.09	0.22	0.33	0.39
Productivity	0.04	0.05	0.01	-0.02	-0.05
Export deflator	0.00	0.02	0.07	0.13	0.17
Import deflator	0.00	0.00	0.01	0.03	0.03
GDP and components	*Levels, percentage deviations from base line*				
GDP	0.13	0.29	0.34	0.31	0.25
Consumption	0.04	0.14	0.22	0.24	0.18
Investment	0.07	0.23	0.32	0.35	0.33
Public consumption	0.00	0.00	0.00	0.00	0.00
Exports	0.73	1.03	1.08	0.99	0.87
Imports	0.51	0.60	0.66	0.68	0.63
Contribution to shock	*Percentage of GDP, absolute deviations from base line*				
Domestic demand	0.04	0.14	0.21	0.23	0.19
Change in inventories	0.03	0.03	0.01	0.00	-0.01
Net external demand	0.06	0.12	0.11	0.08	0.07
Labour market	*Unemployment: pp, absolute deviations from base line*				
Employment	0.09	0.24	0.33	0.34	0.30
Unemployment rate	-0.07	-0.21	-0.29	-0.30	-0.26
Household accounts	*Saving: pp, absolute deviations from base line*				
Disposable income	0.08	0.19	0.23	0.20	0.14
Saving rate	0.04	0.05	0.00	-0.04	-0.04
Public sector accounts	*Percentage of GDP, absolute deviations from base line*				
Revenues	-0.01	-0.02	-0.01	-0.01	-0.01
Expenditures	-0.06	-0.14	-0.19	-0.21	-0.21
Balance	0.05	0.12	0.18	0.20	0.20
Public debt	-0.05	-0.23	-0.45	-0.68	-0.88
Financial variables	*Levels, pp, absolute deviations from base line*				
Short-term interest rate	0.00	0.00	0.00	0.00	0.00
Long-term interest rate	0.00	0.00	0.00	0.00	0.00
External demand	*Levels, percentage deviations from base line*				
World demand	1.00	1.00	1.00	1.00	1.00
Foreign prices	*Levels, percentage deviations from base line*				
Effective exchange rate	0.00	0.00	0.00	0.00	0.00
Exchange rate, euro/$	0.00	0.00	0.00	0.00	0.00
Foreign prices (euro)	0.00	0.00	0.00	0.00	0.00
Oil prices (euro)	0.00	0.00	0.00	0.00	0.00

CHART 1 INCREASE OF 1% IN WORLD DEMAND. RESULTS OF SIMULATION



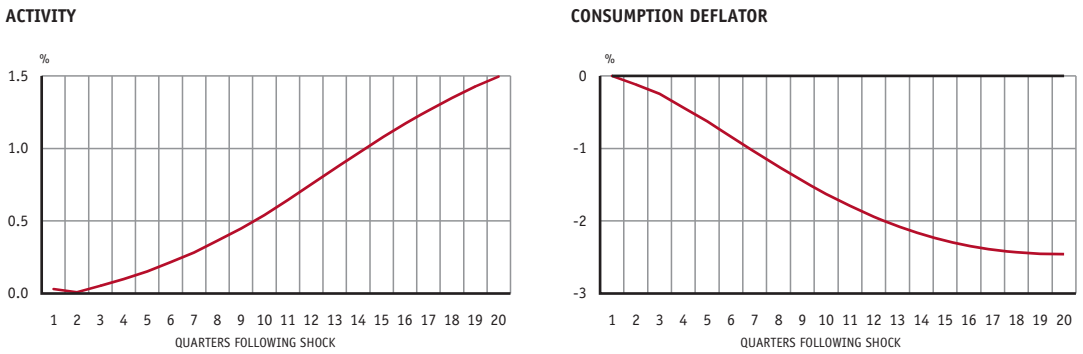
hold income, meaning that household spending decisions are adjusted upwards, thus, buoying up all components of final demand. In any case, a proportion of the increase in final demand filters abroad and the rise in imports offsets part of the substantial improvement in the trade balance. Pressure from demand on the domestic productive system generates wage tensions, which raise the costs borne by firms. The latter translate part of their higher costs into their basic prices, thereby leading to a rise in inflation and a loss of competitiveness. The public sector balance improves, due to the working of automatic stabilisers. As confirmed in Chart 1, the maximum effect on the level of GDP is achieved about three years after the initial shock is observed, and the effect on prices tends to stabilise at about five years.

The effects of a permanent improvement in *productivity* are more complex, as, in accordance with expressions [14] and [15], both the aggregate demand and the aggregate supply curves shift to the right, although can be shown that the structure of the model generate an increase in economic activity and a reduction in the level of prices.

The increase in total factor productivity implies that, at the levels of utilisation of the productive factors and of demand prior to the shock, excess supply is generated, which drives basic prices down (Table 5). This reduction in basic prices raises the purchasing power of households, which increase their demand. Furthermore, the improvement in competitiveness associated with the fall in domestic prices also stimulates net external demand, not only through the increase in exports, but also through the substitution of imported production with domestic production. In a model with forward-looking elements in household behaviour, permanent income would rise, thereby giving an additional stimulus to domestic demand. In any case as the model includes a certain level of price rigidity, the initial reduction in prices is not sufficient to cause demand to meet the level of supply and, therefore, at the beginning of the simulation horizon the demand for factors of production drops and during the first year both employment and investment fall[32]. The initial reduction in employment leads to an increase in the rate of unemployment and a

[32] This effect is similar to that found by Galí (1999) for the U.S. economy.

CHART 2 INCREASE OF 1% IN PRODUCTIVITY. RESULTS OF SIMULATION



deterioration in public accounts, which are later corrected. Chart 2 shows that this shock is quite persistent, as its effects on both activity and prices last beyond the five year horizon showed.

4.2 Satellite models

A second set of models used at the Banco de España is known in generic terms as "satellite models". These supplementary models are preferably oriented towards providing more in-depth information on partial aspects of the economy, such as the labour market or financial flows, which are aspects on which the quarterly model provides insufficient depth. The results of these models generally enable the aggregate model projections to be refined with more information, giving rise to modifications to the base line or providing support to the risk analysis and alternative scenarios.

This section describes four examples of satellite models: the first refers to household spending decisions; the second investigates the determinants of household credit demand; the third estimates alternative measures of the natural rate of unemployment and, finally, the Bayesian vector autoregression (BVAR)[33] model provides an alternative aggregate prediction.

4.2.1 Breakdown of household spending decisions

Household spending decisions are an area of special importance in macroeconomic analysis owing, among other things, to the substantial percentage that they represent in aggregate demand. Specifically, households are responsible for the evolution of private consumption and for part of gross fixed capital formation (housing investment), i.e. more than 60 percent

[33] This section summarises the results of the work of Sastre and Fernández (2005), Martínez-Carrascal and del Río (2004), Estrada et al. (2002) and Ballabriga et al. (1998).

TABLE 5 INCREASE OF 1% IN PRODUCTIVITY. RESULTS OF SIMULATION

	Year 1	Year 2	Year 3	Year 4	Year 5
Prices	*Levels, percentage deviations from base line*				
HICP	-0.21	-0.99	-1.77	-2.27	-2.47
Consumption deflator	-0.20	-0.94	-1.70	-2.22	-2.43
GDP deflator	-0.23	-0.98	-1.69	-2.15	-2.33
Unit labour cost	-0.16	-0.82	-1.51	-1.95	-2.06
Compensation per employee	-0.10	-0.60	-1.17	-1.52	-1.61
Productivity	0.06	0.22	0.35	0.43	0.45
Export deflator	-0.04	-0.26	-0.61	-0.92	-1.11
Import deflator	0.00	-0.06	-0.14	-0.19	-0.21
GDP and components	*Levels, percentage deviations from base line*				
GDP	0.05	0.25	0.60	1.02	1.38
Consumption	0.02	0.15	0.47	0.92	1.38
Investment	-0.01	0.01	0.13	0.37	0.63
Public consumption	0.00	0.00	0.00	0.00	0.00
Exports	0.01	0.13	0.43	0.78	1.07
Imports	-0.11	-0.35	-0.35	-0.17	0.03
Contribution to shock	*Percentage of GDP, absolute deviations from base line*				
Domestic demand	0.01	0.09	0.31	0.64	0.97
Change in inventories	0.00	0.01	0.04	0.07	0.07
Net external demand	0.04	0.15	0.24	0.31	0.34
Labour market	*Unemployment: pp, absolute deviations from base line*				
Employment	-0.01	0.03	0.25	0.59	0.94
Unemployment rate	0.01	-0.02	-0.21	-0.51	-0.81
Household accounts	*Saving: pp, absolute deviations from base line*				
Disposable income	0.05	0.31	0.69	1.12	1.48
Saving rate	0.03	0.15	0.21	0.19	0.09
Public sector accounts	*Percentage of GDP, absolute deviations from base line*				
Revenues	0.01	0.00	-0.02	-0.05	-0.07
Expenditures	0.03	0.08	0.04	-0.08	-0.22
Balance	-0.03	-0.08	-0.06	0.03	0.15
Public debt	0.04	0.30	0.55	0.61	0.44
Financial variables	*Levels, pp, absolute deviations from base line*				
Short-term interest rate	0.00	0.00	0.00	0.00	0.00
Long-term interest rate	0.00	0.00	0.00	0.00	0.00
External demand	*Levels, percentage deviations from base line*				
World demand	0.00	0.00	0.00	0.00	0.00
Foreign prices	*Levels, percentage deviations from base line*				
Effective exchange rate	0.00	0.00	0.00	0.00	0.00
Exchange rate, euro/$	0.00	0.00	0.00	0.00	0.00
Foreign prices (euro)	0.00	0.00	0.00	0.00	0.00
Oil prices (euro)	0.00	0.00	0.00	0.00	0.00

of GDP. This justifies the need for a sufficiently disaggregated, self-contained empirical model to analyse the determinants of household spending in Spain.

The model presented here, in particular, investigates household spending behaviour broken down into three components: consumption of non-durable goods and services, consumption of durable goods and residential investment. Private consumption is thus broken down into two categories: durable and non-durable; at the empirical level this is justified by the greater cyclical variability of durable consumption and its greater sensitivity to the cost of external financing. The variables used to estimate purchasing power of households are labour income, financial wealth and non-financial wealth. In the latter two cases, there are significant differences from the variables considered in the macroeconometric model: here, the financial component of wealth only includes the part that is directly owned by households, and debt with the financial sector thus appears explicitly; in the non-financial component, housing prices also take the value of land into account.

The econometric methodology selected to carry out this analysis is the vectoral error correction model (VECM). This methodology, which can be rationalised as the generalisation of the traditional uniequational treatment of the error correction mechanisms to a multivariate context, has the advantage that all variables in the system can be treated as endogenous and that the different error correction mechanisms may appear in one or more equations, thereby enhancing the adjustment mechanisms of the model.

Given a set of potentially endogenous variables, a vector autoregression model (VAR) is first estimated and the number of cointegration vectors is determined, that is, the linear combinations between the endogenous variables that are stationary. In the case of the household spending model, three cointegration vectors were estimated in the VAR:

$$c^{nd} = 0.50\ y^{l} + 0.23\ w - 0.83\ RR^{h} \qquad [16]$$

$$c^{d} = 1.00\ y^{l} + 0.37\ w \qquad [17]$$

$$i^{r} = 1.00\ y^{l} + 0.13\ w + 1.35\ p^{v} - 8.99\ RR^{h} \qquad [18]$$

As we might expect, both non-durable consumption *(c^{nd})* and the durable component (c^{d}) depend positively on labour income (y^{l}) and on wealth (w). Furthermore, the coefficients are higher in the case of durable spending, owing to the greater volatility of this variable. Durable consumption does not depend directly on the real interest rate (RR^{h}), but rather indirectly through the effect that the two consumption error correction mechanisms (equations [16] and [17]) have on household labour income. In the short term, both mechanisms are significant in explaining developments in the two types of consumption, in addition to temporary changes in wealth, the interest rate and housing investment, reflecting the existence of consumption functions in their traditional format. Residential investment *(i^{r})* depends positively on household income, wealth and prices of housing (p^{v}), and negatively on the real interest rate. In this case, deviations from the long-term trend produce adjustments of an opposite sign, both on demand for housing and on its price.

This disaggregated model generates elasticities of consumption and investment to wealth and the interest rate that are greater than those estimated by the macroeconometric model. Estimations of the two consumption functions imply an elasticity of aggregate consumption to the real interest rate of –0.01, while in the macroeconometric model it is –0.006. In the case of residential investment the interest rate elasticity is –0.13, while it is –0.03 in the structural model. Similarly, elasticity to wealth is 0.25 for aggregate consumption and 0.13 for residential investment, while it was 0.04 in the structural model (although, in this case, the value of the coefficient was constrained to add up to unity with the disposable income coefficient). These alternative estimates can be used to measure the uncertainty associated with the level of the substitution and wealth effects in consumer spending decisions.

4.2.2 Household indebtedness and consumption equations

Given the relationship between indebtedness and spending decisions, and the absence of indebtedness variables in the consumption equation in the macroeconometric model, it is important to have an auxiliary tool to analyse the relationship between consumption and credit. Just as in the case of the disaggregation of consumption, a VECM was estimated in which the long-term determinants of consumption *(c)* and credit (*cr)* are jointly considered. In particular, labour income *(y^l),* housing wealth *(nfw)* and the nominal interest rate (R^{cr^h}) are considered as possible long-term determinants. The presence of the nominal rather than the real interest rate aims to approximate the influence of financial frictions on the cost of financing. The following long-term relationships were estimated:

$$c = 0.68\ y^l + 0.12\ cr \qquad [19]$$

$$cr = 0.84c + 0.39\ nfw - 4.1\,R^{cr^h} \qquad [20]$$

Consequently, in this system consumption is positively related to income and credit, while the influence of wealth is channelled through the latter variable. In the credit equation, greater wealth and greater consumption increase credit, while the nominal interest rate has a negative effect. The estimated short-term relationships indicate that increases in household credit above the level signalled by its long term determinants generate a downward adjustment both in credit and in consumption, while deviations of consumption from its determinants generate changes in the same direction in labour income. In terms of estimated elasticities, the model expressed in reduced form implies an elasticity of consumption to income of 0.75 and to housing wealth of 0.05, values that are not too far from those obtained with the structural model.

This satellite model not only shows the determinants of household credit, and enables them to be projected consistently with the projections of the real variables, but also quantifies the possible imbalances that may arise between the financial and real variables over the course of economic expansions and recessions.

4.2.3 Alternative estimations of NAIRU

The natural rate of unemployment is usually defined as the structural component of unemployment compatible with the stability of inflation (hence the acronym NAIRU – non-accelerating inflation rate of unemployment–). Consequently, the gap that exists between the observed rate of unemployment and its natural rate constitutes a fundamental element in analysing the cyclical position of the economy and the existence of possible inflationary pressures. However, NAIRU is not observable (nor is the output gap), and it is important to have alternative estimation mechanisms to determine its level with the least possible uncertainty.

The quarterly macroeconomic model, presented in Section 4.1, contains a calculation of NAIRU. The price and wage equations of the model ([12] and [13]) can be re-formulated into logarithms, so that the structural rate of unemployment depends on a set of exogenous variables. As we will recall, prices (p^p) are determined as a result of adding a mark-up to wages (w^p) corrected to reflect productivity $(y^p - l^p)$. To take into account the fact that Spain is a small open economy, the mark-up is made to depend on the real exchange rate $(cp^x - p^p)$:

$$p^p - w^p = -\left(y^p - l^p\right) + 0.12\left(cp^x - p^p\right) \qquad [21]$$

Real wages, resulting from bargaining between trade unions and employers, depend on productivity, on the rate of unemployment, (U), on taxes on the labour factor (tw) and on the replacement ratio (RU)[34]:

$$w^p - p^p = \left(y^p - l^p\right) - 0.41\left(U - 0.03\ RU\right) + tw \qquad [22]$$

In this two-equation system, NAIRU is defined as the rate of unemployment that equalises the share of earned income in both equations, that is:

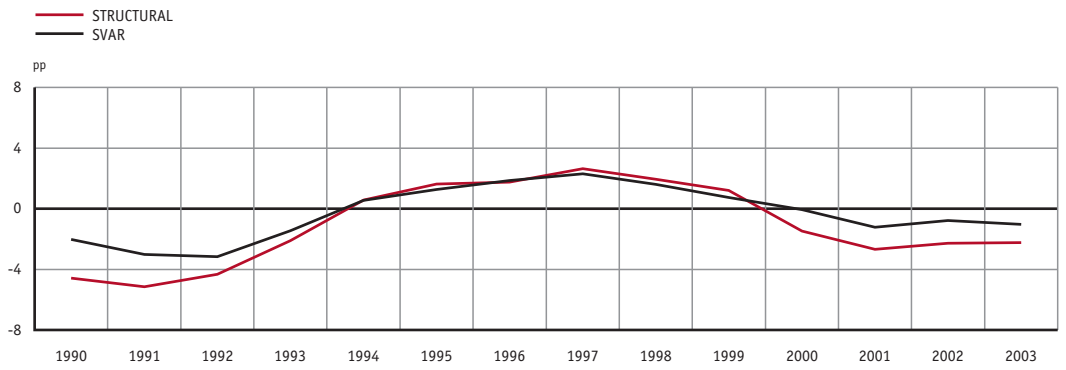
$$NAIRU = \frac{1}{0.41}\left[0.12\left(cp^x - p^p\right) - tw\right] + 0.03\,RU \qquad [23]$$

With this methodology, the movements of NAIRU result from changes both in demand for labour (determined by competitiveness) and in supply of labour (determined by the fiscal gap and the replacement ratio).

This approach has the advantage that movements in NAIRU are related to specific changes in the labour market institutions, which are usually considered to be determinants of the natural unemployment rate. Another way to reflect the evolution of structural unemployment is through the construction of a structural vector autoregression model (SVAR)

[34] The replacement ratio is defined as the ratio of unemployment benefits to wages.

CHART 3 NAIRU GAP (in pp)



based on the constraints that certain stylised models of the labour market entail over the joint dynamic of unemployment and other variables. A model of this type that provides effective results considers that trends in inflation, economic activity and unemployment are determined by three types of shock: nominal shocks, supply shocks and shocks in NAIRU. To identify these shocks, the Phillips curve must be vertical in the long term, productivity must not affect long-term unemployment and, finally, inflation and output must not be related over sufficiently long periods. In this context, NAIRU is defined as the prediction of unemployment provided by the model in the long term.

Chart 3 shows these two measures of NAIRU, in deviations from the observed unemployment rate, from 1990. As we observe, the qualitative information that they provide is quite similar, although they differ in scale (in some cases substantially). We note an initial increase up to 1994 and a subsequent decline that continued until 2001, the year in which NAIRU lay below its long-term equilibrium level; it subsequently stabilised. These estimations demonstrate the uncertainty associated with individual NAIRU measurements, and the need to be very cautious in their use in macroeconomic policy discussions.

4.2.4 Bayesian vector autoregression (BVAR) model

Within the category of satellite models, this section also presents an example of an alternative forecasting model, entailing a reduced scale econometric VAR model for the Spanish economy, estimated with Bayesian techniques, that has been in use for some time.

The model is based on a stylised representation of the economy, divided into four blocks: the external sector, the monetary sector, the public sector and the private sector. The external block variables are the main determinants of the trade balance. Accordingly, competitiveness and external markets are addressed through the exchange rate and the level of world economic activity. The monetary block is represented by the overnight interest rate and by the Spanish contribution to the euro area monetary aggregate M3. Public sector performance is

reflected through the public deficit. Finally, the private sector encompasses prices [proxied by the consumer price index (CPI)] , the level of output and employment, and the evolution of wages, in terms of compensation per employee. In summary, the economy is represented through nine that are used to obtain GDP and inflation predictions.

Intuitively, the construction of a BVAR model can be seen as the result of an iterative process in which the information in the sample data is blended with statistical and economic *a priori* assumptions. Each equation of the model makes the dependent variable dependent of all the lagging variables in the model. In BVAR models, *a priori* information is used to alleviate the problem derived from the existence of a large number of parameters, which lead to the estimations were excessively influenced by the short term variability of the sample (noise), in contrast to systematic relationships (signal)[35].

The BVAR model is a useful instrument for predicting inflation and economic activity, and determining the uncertainty that surrounds them. Nevertheless, the predictions it provides are aggregate in nature, with no breakdown by components, and it must therefore be used in jointly with other analytical tools.

5 Combining the various forecasting tools

The information provided by the satellite models and obtained from short-term forecasting with indicators is included in the set of macroeconomic forecasts through their interrelation with the macroeconometric model. The objective is to provide, at the end of this process, the most likely base line for the forecast horizon. The projections of the aggregate model correspond to the set of assumptions, both external and internal, that are used as the starting point of the exercise. Procedures must therefore be defined for incorporating into these projections the information and valuations provided by other analytical tools, so that they can reflect the characteristics of the macroeconometric model. These procedures are also used to consider a set of financial and fiscal variables that are not included in the macroeconomic model, but which are interrelated with the aggregates modelled in it, and which are evaluated using specific analytical tools.

In addition to the satellite model for credit and consumption, there are other specific estimations of financial variables (credit to non-financial firms and households, price of housing, or liquid assets) which help in forecasting and in checking the results derived from the macro model (see Chapter 14). For example, when there is a high level of recourse to external financing by consumers or firms, abrupt changes in these variables may also signal significant effects on activity and the general price level.

Furthermore, the study of the general government accounts provides very relevant information that interacts with the main nominal and real variables of the economy. This applies to forecasts made for the various components of tax revenue and expenditure, as well as for the net lending of general government (see Chapter 9), which are determined by the macr-

[35] In practical terms, the *a priori* distribution of all the model parameters is made to depend on a few parameters, known as “hyperparameters”. Subsequently, *a priori* information is combined with the sample information using the Bayes’s rule.

oeconomic scenario. Similarly relevant, in this context, are the assessment and quantification of the fiscal measures passed by the government, given their impact on decisions of other economic agents.

A practical way to integrate the results of these other approximations into the forecasts, that is consistent within each time horizon, is by introducing *add-factors* into the macroeconometric model equations. Inclusion of these factors presumes that in the forecast horizon, the quarterly model equation residuals can be positive or negative depending on the additional information derived from other analytical tools deemed relevant to include.

A process of this type is complex and is carried out by successive approximations in various phases. An initial version of the projections is first obtained from the aggregate model, into which the new assumptions, both external and internal, are incorporated, while the add-factors, or changes in the residuals of the equations, derived from the valuation carried out in the previous forecasting exercise, remain unchanged. This first estimation serves as a basis for integrating the results of the short-term forecast with indicators into the medium-term path of the model, and to incorporate all the additional relevant information that the analysts have been able to obtain from the satellite models or from the remaining instruments available. The integration is carried out through successive iterations expressed specifically in changes in the add-factors. The procedure results in a set of final projections, based on a different analytical system and subject to the economic and accounting coherence tests necessary to guarantee their consistency, into which the valuations derived from the various models and information available have been incorporated, duly ranked in order of importance by experts[36]. The forecasting exercise thus performed not only provides the most likely scenario and its determinants, but also enables the inherent risks to that scenario to be covered as well as the ways in which they could occur.

As we infer from the brief description of the forecasting process, the analyst's judgment carries a significant weight in completion of both the base line and the uncertainty around it. The models are stylised representations of a series of statistical regularities and of a set of behaviour theories. Generally speaking, they are of linear form that are constant in time, which cannot capture specific events. Thus, when there is indirect evidence of a possible structural change, when non-linear behaviours are sensed intuitively, or when the existence of some additional channel is known that has not been taken into account in any of the models and the relationship of which is difficult to quantify, modifications must be introduced, for the sake of the quality of the forecast, based on the analyst's judgement, potentially influencing the value of the parameters or the specific behavioural relationships. Such valuations must be supported by a sound knowledge of the economy, backed with well-founded theoretical arguments, and must be consistent with the overall forecasts.

6 Conclusions

This chapter has reviewed the main analytical tools available for doing the macroeconomic forecast, and thus to assess the short- and medium-term situation of the economy. Both the

[36] See Chapter 1 of this book.

way in which the forecasting exercises are carried out and the characteristics of the tools used are determined by the Spanish economy's participation in the European Monetary Union.

The macroeconometric model constitutes the central element for the preparation of the forecasts, given its global nature and the fact that is geared to the National Accounts frame of reference. This model, however, cannot cover all the relevant channels of economic transmission, nor take into account all the key variables; there is, thus, a set of analytical tools that supplement it. In particular, in the short-term forecast horizon the conjuntural indicators provide a generally more faithful reflection than econometric models. Consequently, to produce final forecasts that maximise the use of the available information, results derived from the various econometric models and instruments should be efficiently combined. In the decisions involved in this process, the sound judgment of the analyst is fundamental in defining the most likely forecast scenario and in determining the range of uncertainty around it, consistently with the information provided by the models.

The experience of the *Servicio de Estudios* in economic forecasting has been gained largely through the development of a variety of analytical approaches that have been brought together in a complementary way to produce a detailed overall picture of the Spanish economy and its environment, based on models with proven explanatory and predictive power and subject to permanent theoretical and empirical verification. To maintain and improve the quality of the economic forecasting and analysis, the tools employed must be expanded and fine-tuned. This is an essential requisite to perform accurate diagnoses of the economic situation and of its risks and challenges, and to support appropriate economic policy recommendations. It will also be necessary in this regard to focus, *inter alia,* on possible structural changes in behavioural relationships of economic agents, such as those that occurred when joining the EMU; as well as on the explicit treatment of expectations, reflecting progress in economic modelling and integration of the financial sector into the aggregate model of the economy.

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Macroeconomic policy framework

6. The monetary transmission mechanism

Ignacio Hernando and Jorge Martínez

1 Introduction

The monetary transmission mechanism is a complex, dynamic process through which the central bank's decisions (such as changes in reference rates) affect economic activity and prices in the economy. A good knowledge of this mechanism is therefore required not only to provide solid foundations to conduct monetary policy *per se,* but also to prepare regular economic forecasts, particularly when the institution preparing them is a central bank.

This requirement is two-dimensional in the current situation of membership in the Economic and Monetary Union (EMU). On the one hand, as a participant in decision-making processes in connection with the single monetary policy, Banco de España must understand how the transmission mechanism operates in the euro area as a whole. To that end, decisions are based on available macroeconomic models for the area and its member countries, and action is co-ordinated with the rest of the Eurosystem. Specifically, Banco de España contributes its knowledge on the transmission mechanism in the Spanish economy. On the other hand, this latter aspect is essential in formulating forecasts for the Spanish economy, since these are affected by the impact of the common monetary policy, and in diagnosing the national policies required to achieve an appropriate mix. As we have discussed on various occasions throughout this book, the common monetary policy may not be adapted to the requirements of the Spanish economy in specific circumstances, and this requires adjustments in other policies.

This chapter shall provide a general description of the transmission mechanism and present the available evidence on the overall expected impact of monetary policy deci-

sions on the Spanish economy[1]. Owing to its complexity, the available evidence on the transmission mechanism is incomplete. As a result, the empirical results are combined with theoretical arguments to qualify or supplement them. The current context, in which decisions taken in EMU affect not only Spain but also all the countries in the area, is also taken into account. Possible discrepancies between the transmission mechanism in Spain and EMU as a whole are therefore important factors to be considered. This subject is also addressed in this chapter.

The rest of the chapter is structured as follows: First, Section 2 individually analyses the various distribution channels involved in the monetary policy transmission mechanism in Spain. Section 3 provides a combined analysis of the overall process, based on Banco de España's quarterly model (MTBE). Section 4 compares evidence on monetary policy impulse transmission mechanisms in Spain and in EMU as a whole. Last, Section 5 reviews a number of signals of recent changes in the transmission mechanism; and Section 6 presents some brief final comments.

2 Analysis of the key transmission channels

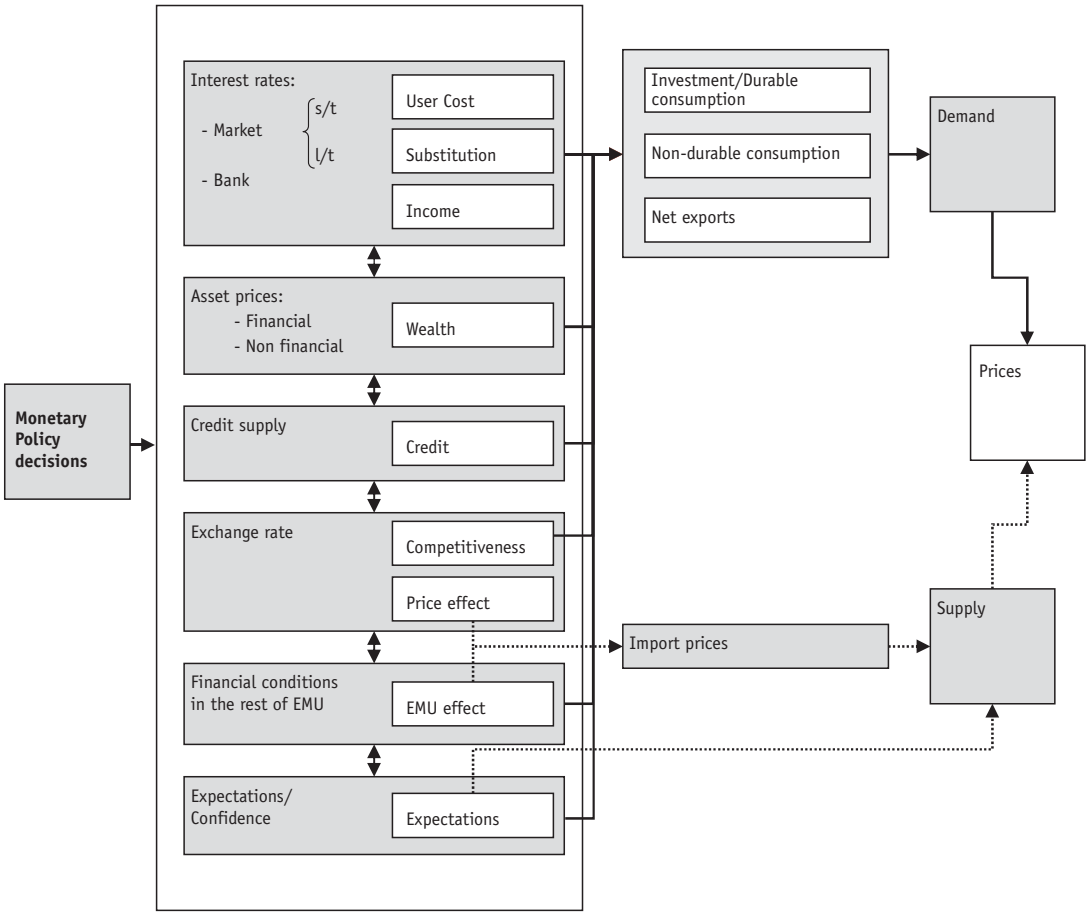
By way of reference, Chart 1 presents a diagram of the key channels through which monetary policy is transmitted, consistent with the idea that this policy does not affect real variables in the long term, only the general price level.

Initially, changes in the monetary authorities' basic decision-making variable – the minimum accepted bid rate on the Eurosystem's main refinancing operations – entail changes in monetary and financial conditions (interest rates, exchange rates and asset prices) in Spain and in EMU as a whole. As we shall analyse in greater detail in the next chapter, the impact on short-term money-market interest rates is immediate and direct, while effects on other variables are less predictable owing to the importance of expectations in determining prices negotiated in the financial markets. In general, standard simulations of the impact of contractionary monetary policy presume increases in interest rates on different instruments and terms, appreciation in the domestic currency and decreases in prices of the financial and non-financial assets comprising corporate and household portfolios; in particular, in the price of equities and houses. However, the actual response to a specific monetary policy shock will also depend on the specific circumstances prevailing at the time. Accordingly, there is some degree of uncertainty in this regard.

Through different channels, changes in monetary and financial conditions affect expenditure decisions by corporations and households and therefore the general level of demand for goods and services in the economy. Changes in the relative level of demand in respect of supply will in turn affect the inflation rate. Concurrently with this key effect through demand, exchange rate fluctuations directly affect import prices and, as a result, aggregate supply. In addition, changes induced in demand and supply in the rest of EMU also have an

[1] The following chapter will include a more comprehensive discussion of one aspect of this process, focusing in particular on the analysis of monetary and financial conditions and the way these are monitored by Banco de España.

CHART 1 SIMPLIFIED DIAGRAM OF THE MONETARY TRANSMISSION MECHANISM



effect on these same variables in Spain (something we shall refer to as the *EMU effect)*. Last, there is a further channel derived from the impact of monetary policy decisions on expectations about future trends in prices and economic activity. Although this channel is probably the most difficult to quantify, it is still important in determining agents' expenditure decisions and price formation in the economy.

This overall process has an important transitory component. Accordingly, although monetary policy can temporarily affect the economy's level of output, in the long term this is fundamentally determined by technical progress, capital accumulation, and the size and quality of the labour force. Induced changes in respect of production therefore will taper off over time, which will not occur in the case of price effects.

To quantify the effects of monetary policy, simulations are carried out with macroeconometric models that incorporate the main monetary transmission channels along with a more or less simplified representation of the overall economy. However, this aggregate analysis

inherently cannot include all relevant factors. For this reason, macro evidence must be supplemented with partial models and qualitative information, for a more in-depth analysis of the transmission mechanism.

In each of the following subsections, the various individual transmission channels identified will be analysed and presented, together with the available information on their quantitative importance in the Spanish economy.

2.1 Interest rate channel

The interest rate channel, which has traditionally been the cornerstone of the transmission mechanism in conventional macroeconometric models, refers to the direct influence of interest rate movements on expenditure decisions by households (durable consumption, non-durable consumption and residential investment) and by corporations (investment in fixed capital and inventories). This channel encompasses the substitution, user cost and income effects.

First, the interest rate is a measurement of the relative value of goods available in different periods. Accordingly, if an increase in nominal interest rates is not accompanied by an equal increase in the inflation rate, it will generate greater incentives to save, by increasing the amount of future consumption that can be achieved by forgoing a certain amount of present consumption. This is referred to as the *substitution effect* in the transmission of monetary impulses.

In addition, the interest rate is a component of the opportunity cost of investing in productive assets. This user cost basically depends on interest rates, the asset depreciation rate and trends in relative prices, though it can also be affected by tax variables such as the investment allowances provided for in tax regulations. Given a certain level of price rigidity, an increase in nominal interest rates entails at least a temporary increase in real interest rates, and therefore an increase in the user cost of capital. This effect, known as the *user cost effect,* therefore affects the basic investment components of domestic demand: durable consumption, residential investment, private productive investment and inventory investment.

Last, the *income effect* refers to the impact generated by monetary policy measures on disposable income of households and non-financial corporations through changes introduced in interest paid and received. These changes depend not only on the net financial position (debit or credit) that they maintain, but also on the composition of their balance sheets and, in particular, on the sensitivity of interest rates for different financial assets and liabilities to monetary policy measures.

The importance of the first two effects discussed above (substitution and user cost) within the transmission mechanism depends above all on the level of the estimated elasticities of expenditure decisions of households and corporations in respect of the interest rate, and on the relative weight of the various components in expenditure. Where the substitution effect is concerned, the sensitivity of consumption to changes in interest rates is also determined by households' capacity to transfer income between different periods of time and, specifically, by the relevance of credit restrictions to consumers. In the case of the Spanish economy,

TABLE 1 SIMULATION OF THE EFFECTS OF AN INCREASE OF ONE PERCENTAGE POINT IN THE NOMINAL INTEREST RATE DURING ONE YEAR

	Maximum effect		Quarter of occurrence		First year average effect		Second year average effect	
	MTBE (1)	HSM (2)	MTBE (1)	HSM (2)	MTBE (1)	HSM (2)	MTBE (1)	HSM (2)
Aggregate household expenditure	-0.51	-0.50	6th	5th	-0.22	-0.23	-0.38	-0.14
Private consumption	-0.53	-0.37	6th	4th	-0.19	-0.18	-0.41	-0.04
Non-durable consumption		*-0.45*		*4th*		*-0.17*		*-0.06*
Durable consumption		*-1.26*		*3rd*		*-0.28*		*0.05*
Domestic residential investment	-0.74	-2.48	3rd	5th	-0.51	-0.62	-0.14	-0.99
Private productive investment	-1.87		4th		-1.30		-1.46	

SOURCES: (1) Estrada et al. (2004); (2) Sastre and Fernández (2005).

the share of consumption in GDP is similar to that of the overall euro area, and the sensitivity of consumption to interest rates is moderate. According to the MTBE, the long-term semi-elasticity of consumption to the long term-interest rate is estimated to be –0.57.

As for domestic residential investment, the available estimates for the Spanish economy indicate that this not only accounts for a higher share of total demand as compared with other countries, but is also highly sensitive to changes in user cost. Thus, while in the MTBE, consumption responds to long-term interest rates, which are more stable and less sensitive to monetary shocks, residential investment responds to interest rates on mortgage loans, which are closely linked to short-term interest rates in Spain. The estimated long-run semi-elasticity of residential investment to mortgage rates is –0.84, while in the household satellite model [Sastre and Fernández (2005)] it is –8.99[2] (see Chapter 5).

As to the user cost effect on private productive investment, transmission of monetary impulses will depend on factors such as the size and financial structure of firms, the capacity to access alternative financing sources and the relative weight of capital-intensive sectors. For example, this effect will tend to be more important in countries where manufacturing industry and short-term financing carry more weight. In the case of the Spanish economy, the substantial investment/GDP ratio (25 percent in 2003) suggests that this channel may be of a high magnitude.

To assess the relative importance of the substitution and user cost effects on different components of private expenditure, Table 1 provides some results from the simulation of the effects on private consumption (durable and non-durable), domestic residential investment and private productive investment of a transitory (one-year) increase in nominal interest rates, based on estimated equations for the MTBE and for the household satellite model. In these simulations, other determinants of expenditure decisions are considered exogenous

[2] This highly pronounced difference is explained in part by the fact that the MTBE is estimated with a number of different restrictions among parameters derived from the equilibrium conditions of the model, and that the household satellite model was estimated using more recent information.

and, therefore, only the intertemporal substitution and user cost effects are considered. In the MTBE, the greatest effect comes from changes in the user cost of private productive investment, with a maximum impact of –1.87 percent during the fourth quarter following the shock. Domestic residential investment also responds somewhat more than consumption, but much less than private productive investment. The two components of household expenditure also have a very different profile. While the impact on residential investment is relatively rapid, reaching its maximum during the third quarter following the shock, in the case of private consumption, it does not occur until the sixth quarter. The household satellite model gives a similar response for household aggregate expenditure during the first year after the shock. Thereafter, however, the aggregate effect is lower. The main differences from the MTBE entail, on the one hand, the different time profile in the responses of the different components of household expenditure (residential investment and consumption) and, on the other, the greater estimated effect of changes in the user cost of residential investment. In the satellite model, then, household investment in housing reacts intensely to changes in interest rates, which can be explained, at least in part, by the use of a somewhat more recent sample in its estimation.

As regards the income effect, its importance depends on the net financial position and composition of financial assets and liabilities of households and corporations, as well as on the relative propensity of creditors and borrowers to spend. Specifically, the greater the proportion of short-term variable-rate assets and liabilities, the greater the income effect will be. In the Spanish economy, the household sector presents a decreasing net financial position, although still in a credit position. However, the volume of interest paid slightly exceeds interest received owing to the difference in remuneration between assets and liabilities. Accordingly, the sign of the income effect for consumers considered on an aggregate basis will depend on the relative trends in borrowing and lending interest rates. Where the corporate sector is concerned, owing to a net position that is clearly in the red, an increase in interest rates reduces its income and tends to restrict expenditure decisions, therefore strengthening the user cost effect. However, as discussed in greater detail in Section 5, changes in the financial position of households and generalisation of variable-rate agreements[3] are relatively recent factors that might not be sufficiently reflected in the current estimates and which, if considered, might imply a more contractionary nature for monetary policy in Spain through the income effect.

2.2 Wealth effect

In accordance with the life-cycle theory, changes in the value of wealth are reflected in variations in consumption and saving patterns throughout consumers' life, which influences expenditure on consumption of non-durable goods as well as purchases of durable goods and real property. Increases in interest rates theoretically tend to reduce demand for real and financial assets, and therefore to reduce the value of wealth at market prices. The im-

[3] Particularly pronounced for mortgage loans. At end-2002, 97.7 percent of outstanding mortgages granted for housing purchases corresponded to variable-rate loans.

portance of this channel depends on the financial mechanisms available to redistribute resources over time and, therefore, will be favoured by the process of liberalisation in the financial system. In addition, the size of the wealth effect is a function of the level and structure of household wealth. Thus, for example, the gradual generalisation of investment in variable-yield assets, whose prices are more sensitive to interest rate movements, clearly should have contributed to increasing its profile. The high volatility of stock prices, however, also involves a lower response of consumption to changes in value, when they can be largely perceived as transitory. Further, holdings of variable-return assets are more concentrated in high-income households whose expenditure is less sensitive to changes in available resources.

In Spain, approximately three-quarters of household wealth corresponds to housing, with a more homogeneous distribution among households than variable-yield assets (approximately 82 percent of them own their house) and lower volatility in prices, which offsets also lower levels of liquidity. Clearly, households can mobilise and monetise real property wealth by arranging a mortgage. However, unlike in other countries, there is still no evidence in Spain of significant mortgage equity withdrawal intended for consumption, although changes in the value of real property wealth can obviously affect household expenditure decisions by influencing their borrowing capacity and the level of savings maintained for precautionary motives. By contrast, as there are few holdings of assets and liabilities in foreign exchange, they are insignificant in the transmission mechanism.

Empirical evidence on wealth effects varies substantially according to the period analysed, the way wealth is measured and the econometric methodology applied. For example, in the MTBE, the estimated long-term elasticity of consumption and residential investment to wealth is quite low (0.04), which is substantially the result of the theoretical restrictions imposed. By contrast, the household satellite model estimates long-term elasticities at 0.23, for non-durable consumption, 0.37, for durable consumption and 0.13, for domestic residential investment, which are more consistent with other available estimates at the international level, although relatively high with reference to consumption. Last, without attempting to be comprehensive, Balmaseda and Tello (2002) obtain a long-term elasticity of total consumption between 0.06 and 0.15, depending on the type of assets considered. It is therefore possible that the quarterly model underestimates wealth effects to some extent, although there is substantial uncertainty in this respect, together with some evidence of changes over time. Further, both Balmaseda and Tello and the MTBE estimate a greater effect on expenditure for changes in real property wealth than financial wealth[4].

2.3 The credit channel

In the presence of perfect capital markets, changes in monetary conditions are automatically transmitted to the credit market. When there is asymmetric information between creditors and borrowers, however, a series of incentive problems arise that means this might not

[4] The household satellite model is uninformative in this respect since it does not distinguish between different types of assets.

be the case. For example, in a highly uncertain situation, expansionary measures by the monetary authorities reflected in lower market interest rates might be offset by hesitancy on the part of creditors to grant new loans. Furthermore, as a result of these information problems, some agents may be exclusively dependent on bank credit and will not have recourse to alternative financing sources should this avenue be unavailable for any reason. Thus, the credit channel makes it possible for financial intermediaries to play more than a neutral role in the transmission mechanism. The credit channel captures this possible impact of monetary policy on the economy via credit supply.

There are three ways in which monetary policy can affect credit supply: the balance-sheet channel, the bank-lending channel and the bank-capital channel. In the first case, an increase in the monetary policy reference rate reduces demand for assets and therefore their value, particularly for shares and real assets. The subsequent deterioration in borrowers' net wealth position increases creditor risk and leads to a reduced supply of credit and an increase in required risk premiums, which strengthens the damping impact of the higher general level of interest rates on spending. This situation might explain why monetary policy has a significant, persistent impact on investment decisions despite its relatively modest effect on medium- and long-term interest rates. In the original bank-lending channel, contractionary monetary policy reduces demand for core deposits, raising the cost of bank financing and, hence, reducing their capacity to grant new loans. Last, where the bank capital channel is concerned, an increase in interest rates reduces the value of bank assets, adversely affecting their solvency position and accordingly also limiting their capacity to extend credit.

However, it is an extremely complicated matter, in practice, to obtain evidence on the scope, and even on the existence, of these linkages between monetary policy and credit supply, owing to the interrelations with the rest of the traditional channels. The potential impact of monetary policy on credit supply overlaps with the demand effect derived from the lower level of expenditure induced by an increase in interest rates. There are, however, some indications that cash flows generated and the net wealth position of corporations are relevant in determining their level of investment, which would indicate that this depends not only on returns and costs, but also on the supply of external finance[5]. Since there is also evidence that a restrictive monetary policy not only increases finance costs for corporations, but also reduces the value of their assets, there exists at least some support for the existence of the first of the three channels mentioned above, i.e. the balance-sheet or financial accelerator channel.

The other two mechanisms discussed above operate exclusively through bank balance sheets and are more questionable. There is no question regarding the idea that a cut in bank credit supply, e.g. in the case of a massive withdrawal of bank deposits, has negative effects on expenditure by those who cannot fully replace this credit with other financing sources. It is less clear, however, whether monetary policy decisions alone can systematically change banks' capacity to lend. While this could occur in specific episodes or for certain isolated institutions, it does not seem to occur on a more widespread basis. The available evidence for Spain corroborates this assertion [see Hernando and Martínez Pagés (2003)].

[5] See, for example, Chatelain et al. (2003) and Hernando and Martínez-Carrascal (2003).

The Spanish economy is characterised by the sizable weight accounted for by its small, unlisted corporations. These firms tend to face greater problems in terms of information asymmetry and dependency on bank credit and, accordingly, the effects through the credit channel can be expected to be substantial in Spain. However, the favourable net wealth position of Spanish banks, which are highly capitalised and profitable and, since the beginning of EMU, have greater facilities to meet their financing needs in the European interbank market, might tend to offset these effects.

The MTBE does not directly incorporate a credit channel, although it does so indirectly through the effects of cash flows and the value of assets on expenditure decisions by corporations and households. Martínez-Carrascal and del Río (2004) find a positive direct effect of credit on total household consumption with a long-term elasticity of 0.12. This coefficient, however, reflects not only the effects of a potential credit channel, but also, in part, the traditional interest rate and wealth effects. In any case, Banco de España's regular analyses pay attention to trends in the financial position of corporations, households and financial intermediaries – particularly banks – to supplement the results of the macroeconomic models (see Chapters 7 and 14 of this book).

2.4 Exchange rate channel

The impact of monetary policy measures on economic activity and prices via movements in the exchange rate is an important component in the overall transmission mechanism, particularly in open economies and in an increasingly globalised environment. However, it should be pointed out that the importance of this channel has been reduced by Spain's participation in EMU.

This channel includes the following three components: the pass-through of exchange rate movements to import, export and, finally, consumption prices; the adjustment of exports and imports to relative price changes (demand channel); and the effects of changes in import prices on production costs (supply channel)[6].

(a) First, the long-term pass-through of changes in the exchange rate to import and export prices depends on the relative importance of the country experiencing the exchange rate variation, the level of substitutability between imported goods and those produced in the country and, in general, the structure of the import and export markets. The smaller the country's economy, the lower its influence on external prices and, therefore, the greater the pass-through. On the other hand, the greater the product differentiation and market segmentation, the greater the capacity of corporations to discriminate in prices across markets and, as a result, the lower the pass-through. In the short term, other factors such as exchange rate volatility or standard duration of trade contracts may also limit the pass-through effect.

The available evidence on the effect of changes in the exchange rate on import prices in the Spanish economy suggests that this tends to be complete and rapid relative to other developed countries. Campa and González Mínguez (2004) found that pass-through rates to

[6] A more detailed presentation of the role of exchange rates in the transmission mechanism can be found in Gordo and Sánchez Carretero (1997).

import prices in the Spanish economy, in the short (0.81) and long (1.04) terms, are relatively high.

As regards the direct impact on consumer prices, two main factors contribute to determining this: the country's openness to imports from outside the euro area and the composition of imports. Campa and González Mínguez (2005), using information for the period 1989-2001, calculate, for EMU countries, the direct impact on consumer prices of a depreciation of 10 percent, with the assumption that the change applies only to import prices from countries outside the area. They conclude that the differences observed are dependent more on the level of openness in the countries than on the composition of their imports. The effect on the overall area is small (below 0.5 percent for a depreciation of 10 percent) and is slightly lower in Spain. There is evidence of a certain reduction in the pass-through to consumer prices since the 1990s, possibly explained by lower inflation rates and the shift to products less sensitive to exchange rate movements inside the import basket[7].

(b) Second, changes in the exchange rate induce at least transitory changes in relative prices of domestic and external goods and services and therefore affect the volume of imports and exports in the economy. An appreciation in the exchange rate will reduce the competitiveness of exporters and producers of goods in sectors where there is a substantial level of import penetration, and will have a contractionary effect on activity in some service sectors such as tourism. In general, consumption will shift from domestically-produced consumer goods and services to those produced abroad. The intensity of this demand channel will therefore depend on the proportion of trade with countries outside the euro area and elasticities of exports and imports to the exchange rate.

The level of openness in the Spanish economy, measured by the ratio of foreign trade with countries outside the area, is moderate (18.7 percent of GDP in 2003). In any case, it is important to point out that, as occurs in the rest of the EMU countries, although a substantial percentage of Spanish foreign trade is with the euro area, the importance of the exchange rate channel is still substantial. In this connection, the fact that Spain's exchange rate with its principal trading partners is permanently set does not mean that Spain's competitiveness will not be affected by relative price trends, which vary in accordance with inflation differentials. In addition, exchange rate fluctuations in the euro affect the competitiveness of Spanish products in the area, as they change the relative attractiveness in these markets of products offered by other countries outside the area.

The available evidence suggests that Spanish imports and, above all, exports, are highly sensitive to exchange rate fluctuations. Accordingly, the estimated long-term elasticity of exports of goods with respect to relative prices is always near unity (in absolute value)[8]. In particular, the MTBE includes different equations for exports of goods to the euro area, to the rest of the world and total exports of services, and the respective estimated elasticities to changes in relative prices are –0.86, –1.08 and –0.91. These results are corroborated by studies in which a comparative analysis of exports in the countries in Spain's environment is conducted [Buisán and Caballero (2003) and Buisán et al. (2004)]. Where imports are

[7] See, *inter alia,* Campa and Goldberg (2002), Gagnon and Ihrig (2001) and Choudhri and Hakura (2001).

[8] See, for example, Mauleón and Sastre (1994), Doménech and Taguas (1996), Buisán and Gordo (1997) and García and Gordo (1998).

concerned, elasticities with respect to relative prices are around –0.4, although when the analysis is centred on non-energy imports, higher elasticities in absolute value are obtained. In the MTBE, estimated elasticities with respect to relative prices for imports of goods from the euro area, of goods from the rest of the world and of services are –0.52, –0.48 and –0.65, respectively.

Still within the demand channel, changes in the exchange rate affect agents' financial wealth by changing the value in euro of financial assets and liabilities denominated in other currencies. In addition to this wealth effect mentioned earlier in section 2.2, there is an income effect derived from changes in interest paid and received from assets denominated in foreign currency. In this respect, although the recourse by non-financial corporations to external debt in recent years has increased, the income effect might continue to be moderate, as overall external debt on firms' balance sheet is still just under 10 percent and is mostly denominated in euro.

(c) Third, fluctuations in the exchange rate affect costs of production (by affecting prices of imported intermediate inputs and wages) and business margins. On the one hand, the effect induced through costs of imported intermediate goods will depend basically on the use of this type of input in the economy and the elasticity of substitution between different productive factors[9]. The effect of exchange rate fluctuations on wages is more indirect: a proportion of changes in import prices is reflected on consumer prices and thus affects workers' real wages. with implications for wage bargaining. The scope of this effect will depend on the wage determination mechanisms (duration of contracts, wage revision clauses, etc.).

As with the pass-through from exchange rate movements to consumer prices, the impact on intermediate input costs depends primarily on the proportion of inputs imported from outside the euro area and the composition of these imports. Campa and González Mínguez (2005) estimate that the pass-through to intermediate consumer prices in Spain is small and slightly below the level estimated for the overall area. On the other hand, the highly indirect nature of the impact of changes in the exchange rate on wages implies that its quantification is subject to a high level of uncertainty. Nonetheless, the widespread use in Spain of wage indexation to past inflation would suggest that this impact may not be insignificant.

2.5 Effects derived from the existence of a single monetary policy in EMU

In addition to the channels described above, a further channel, specific to economies integrated into a monetary union and that therefore share a common monetary policy, should be mentioned. Prior to EMU, monetary policy changes in Spain generally involved no changes in the monetary conditions in the rest of the euro area. In the current framework, however, monetary policy decisions jointly affect all countries in the area and will, therefore, also have an impact on economic activity and inflation in the rest of the countries in

[9] It is worth noting that this effect is not reflected in the MTBE, as in this model the production function is expressed in terms of value added.

the area. This new effect will be transmitted to the Spanish economy through the usual trade channels, generating an impact in addition to that which would occur if there were a specific Spanish monetary policy. Thus this effect, which we shall refer to as the EMU or spillover effect, means that a monetary contraction will lead to an economic slowdown in the overall area with the consequent decline in demand for Spanish exports. The importance of this effect will depend on the impact of the monetary impulse on activity in the rest of the countries in the euro area and on the sensitivity of Spanish exports to changes in the demand for goods and services in these countries.

Moreover, the decline in overall prices in the euro area countries induced by the higher interest rates, in addition to a direct impact on Spanish consumer prices, will affect the competitiveness of Spanish exports and of other products that compete with imports from the euro area. The importance of this effect on the Spanish economy will depend on the extent to which prices in the area react to the monetary impulse and on those factors that would influence the scope of the exchange rate channel in general.

A priori, the relative importance of these effects on the Spanish economy is potentially substantial. This is what the high level of exports to countries in the area, which represent just over 60 percent of total exports, and the high income-elasticity of exports seem to suggest. Thus, for example, in the equations for the demand for manufactures exports in EMU countries, estimated by Buisán and Caballero (2003), the highest value of the elasticity of export demand with respect to export markets' activity is obtained in Spain (0.77 in the short term and 1.42 in the long term)[10]. Also high values for the elasticity of exports to world trade are recurrently found in different studies of the Spanish economy, both for total exports and non-energy exports, and using different approaches for the measurement of the world trade variable[11].

A more accurate approach to assessing the relevance of this channel is used in van Els et al. (2003) and Berben et al. (2004). These studies entail a simulation of the effects of a transitory and simultaneous increase in interest rates in the different countries of the euro area. The initial impact obtained in each country separately is reintroduced into the national models to produce an estimate of the EMU effect. The impact of this effect on the level of economic activity is relatively important in most cases, particularly in countries such as Belgium and the Netherlands, where the share of exports within the area in GDP is quite high. In Spain's case, the magnitude of this channel is similar to the average level observed for the overall area.

2.6 The transmission to prices

The last step in the transmission mechanism is the transmission of the various effects discussed to prices. With the exception of the direct impact on the imported component of prices, induced through the exchange rate channel and the EMU effect, the analysis con-

[10] These results are corroborated in Buisán et al. (2004), in which a two-equation (supply and demand) model analysis of exports of manufactured goods is conducted.

[11] See, for example, Buisán and Gordo (1997), Doménech and Taguas (1996) and García and Gordo (1998).

ducted in earlier sections has focused on the incidence of monetary impulses on consumption, investment and net exports. In addition to this effect on aggregate demand, the different channels also have an indirect impact on the domestic component of inflation, as a result of the ensuing change in the existing gap between the economy's potential output and the level of aggregate demand.

Starting from a situation of equilibrium between aggregate demand and potential output, an increase in interest rates will lead to a contraction of aggregate demand in the economy below the potential output level. This excess supply situation will be reflected by reduced inflationary pressures. In turn, the decline in demand can be expected to generate a reduction in demand for labour that will entail a reduction in wage pressures. This relationship between the inflation rate and the gap between production and potential output is known in the economic literature as the Phillips Curve. The slope of this curve, i.e. the intensity of the response of prices and wages to the contraction in demand, will determine the impact on prices of a given change in aggregate demand induced by monetary policy. This slope will, in turn, depend on the flexibility of the product and labour markets. In general, the cost in terms of the contraction in the level of economic activity necessary to achieve a given reduction in the inflation rate (the sacrifice ratio) will increase the greater the rigidities in the processes of wage and price formation.

In this connection, available evidence suggests that the level of rigidities – obstacles to the establishment of corporations, barriers to free competition, managed prices, etc. – in product markets in the Spanish economy is similar to the situation existing in other economies in the euro area, but higher than in other developed economies, particularly in most Anglo-Saxon countries [see Nicoletti et al. (1999)]. These results are corroborated by recent studies that found that the frequency of price adjustments and, therefore, their level of flexibility, is similar in different countries in the area [see Dhyne et al. (2004) and Fabiani et al. (2004)]. Where labour market flexibility is concerned, there is certain evidence that some features of the Spanish market (in terms of the collective bargaining system, replacement rate, job protection, etc.) may make it somewhat more difficult to adapt wage trends to demand conditions. Available indicators on rigidities in the labour market, however, do not register significant differences between Spain and other euro area countries [see Nicoletti et al. (1999) and Morgan et al. (2001)].

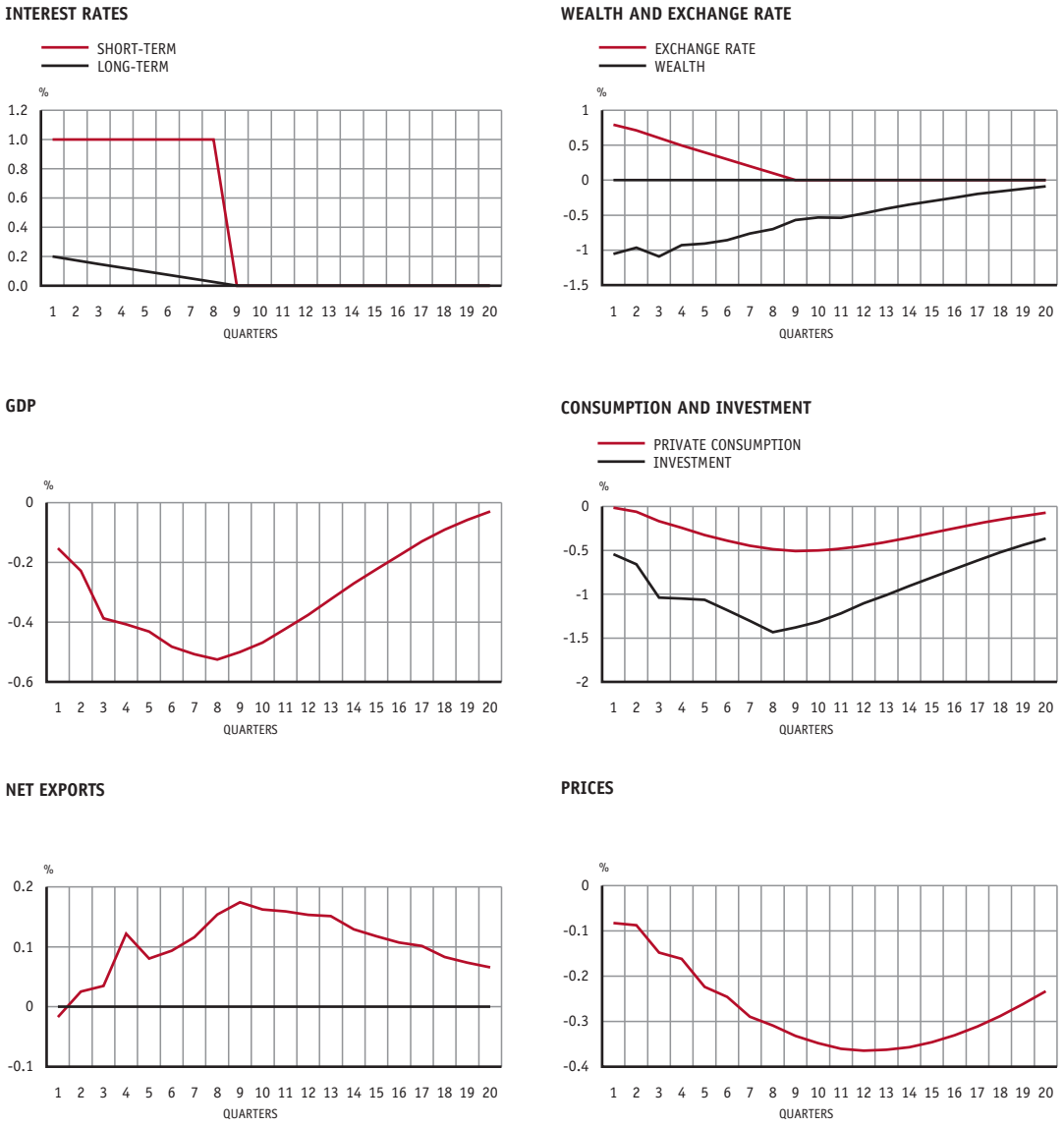
3 Quantitative assessment of the impact of monetary policy on production and prices

Estimated macroeconometric models can be used to quantify the overall impact of all of the channels described above and that comprise the transmission mechanism, providing an overview of the impact of monetary policy. In this section, we shall present the results obtained with the MTBE, in which the total effect can further be broken down into the different contributions of each particular transmission mechanism channel (see Chapter 5).

In any case, the results should be interpreted with care, as the estimate of the reaction of an economy to a monetary shock entails substantial difficulties related to the need to isolate its effects from those of other shocks simultaneously affecting the economy, to the exist-

CHART 2 SIMULATION OF THE IMPACT OF A MONETARY POLICY SHOCK IN SPAIN

PERCENTAGE DEVIATIONS FROM THE BASELINE SCENARIO (a)



a. Simulations prepared with the Banco de España quarterly macroeconometric model (MTBE), incorporating the effects induced by the simultaneous change of monetary conditions in the rest of the euro area countries (EMU effect).

TABLE 2 BREAKDOWN OF THE MONETARY POLICY IMPACT IN SPAIN BY CHANNEL (a)

PERCENTAGE DEVIATIONS FROM THE BASELINE SCENARIO

	First year	Second year	Third year	Fourth year	Fifth year
Impact on private consumption deflator					
User cost channel	-0.02	-0.05	-0.08	-0.08	-0.05
Substitution effect	0.00	0.00	-0.01	-0.01	-0.01
Income/cash-flow effect	0.00	-0.01	-0.02	-0.03	-0.03
Wealth effect	0.00	-0.01	-0.02	-0.02	-0.01
Exchange rate channel	-0.09	-0.14	-0.12	-0.08	-0.04
TOTAL WITHOUT EMU EFFECT	-0.10	-0.21	-0.24	-0.22	-0.14
EMU effect	-0.01	-0.06	-0.11	-0.13	-0.13
TOTAL	-0.12	-0.27	-0.35	-0.35	-0.27
Impact on GDP					
User cost channel	-0.11	-0.16	-0.18	-0.15	-0.12
Substitution effect	0.00	-0.02	-0.01	0.00	0.00
Income/cash-flow effect	-0.01	-0.03	-0.03	-0.01	0.00
Wealth effect	-0.01	-0.04	-0.03	0.00	0.02
Exchange rate channel	-0.11	-0.14	-0.07	0.00	0.04
TOTAL WITHOUT EMU EFFECT	-0.25	-0.38	-0.32	-0.16	-0.06
EMU effect	-0.05	-0.11	-0.12	-0.08	-0.02
TOTAL	-0.29	-0.49	-0.44	-0.25	-0.08

SOURCE: Estrada et al. (2004).

a. Response to an increase of one percentage point in the short-term interest rate during eight quarters, calculated with the Banco de España quarterly model.

ence of variable responses to the same monetary change in different contexts and with different agents' expectations, and to the possibility of structural changes over time in the actual workings of the economy. Estimated statistical models in some way reflect the average response observed during the historical period corresponding to the data used in the estimation. Further, different methodologies impose different restrictions on the data and may generate heterogeneous responses.

Chart 2 shows the effects on different variables of an increase of one percentage point, over a period of two years, in the short-term interest rate. It is assumed that the shock is fully anticipated by agents, so that the long-term (10-year) interest rate increases immediately and proportionally, the effective exchange rate appreciates and wealth (financial and non-financial) declines. As time passes, these effects will taper off to zero, in the case of interest and exchange rates at the very moment in which the monetary shock disappears, and later in the case of the wealth effect.

As a result of these changes, production will decline immediately by approximately 0.15 percent, owing primarily to the sensitivity of investment to interest rates. Consump-

tion responds only slightly in the beginning, and the decline in exports derived from appreciation in the currency is offset largely with reduced demand for imports induced by lower output. The initial impact is amplified over time by the delayed effects of some transmission channels and by second-round effects, i.e. the effects of the initial decline in output and, consequently, in income, on aggregate demand. Accordingly, during the eighth quarter after the beginning of the shock, the maximum point of decline in GDP (0.52 percent) is reached, after which the impact tails off. Both investment and consumption fall substantially, the former to a greater extent. Net exports (exports less imports), however, respond opposite to expectations, by increasing, rather than decreasing, owing to the high level of elasticity of import demand to output. The decline in aggregate demand is passed through with some delay to consumer prices, which register a maximum decline of 0.36 percent, which is sustained in the long term despite some degree of subsequent correction.

Table 2 illustrates the relative importance, for prices as well as for GDP, of the different channels operating in the MTBE[12]. Where output is concerned and centred in the second year in which the maximum effects are registered, the most important channels are user cost, exchange rate and EMU effect. With respect to prices, as a result of a direct exchange rate impact through import prices, this channel is most important during the first three years of the simulation, after which it is surpassed by the EMU effect and later by the user cost channel, which is found to be more persistent.

4 Differences with EMU

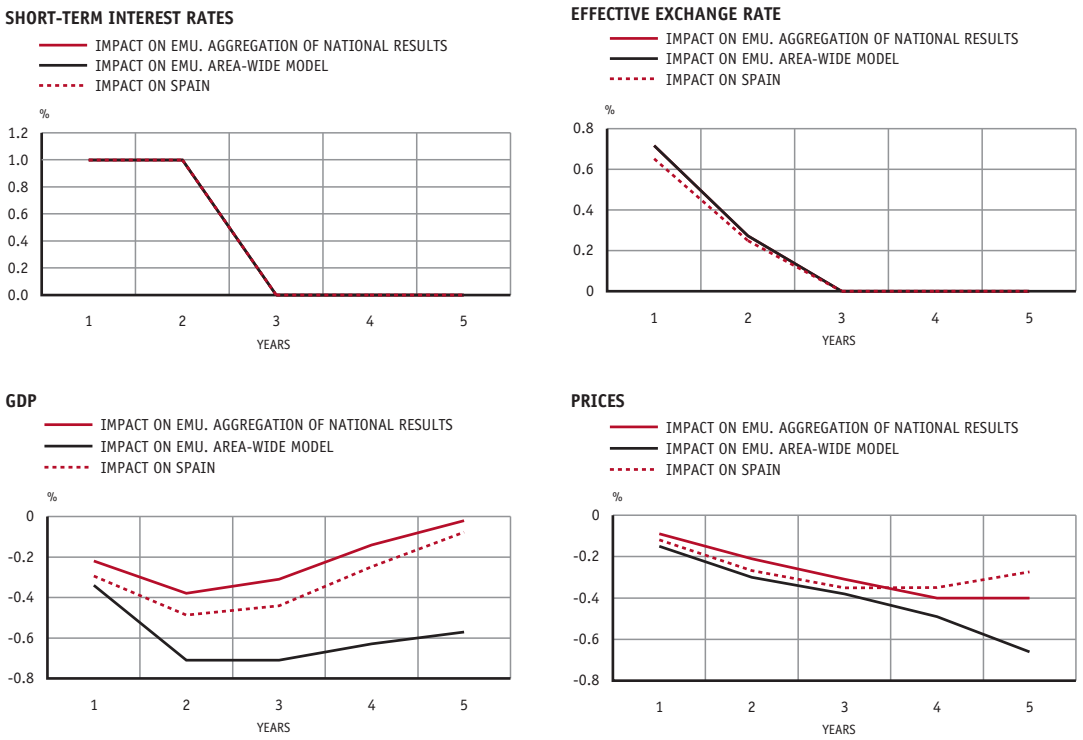
The effects of the single monetary policy may differ across countries as a result of divergences in national economic and financial structures that may affect how different economies respond to the same monetary impulses. Analysis of the possible existence of asymmetries between the transmission mechanism in the Spanish economy and in EMU as a whole is therefore significant.

Chart 3 shows the results, in Spain (calculated with the MTBE) and in EMU, of a transitory increase in interest rates in the area. As we observe, the results for EMU differ substantially, depending on whether the aggregated results of national models or those from the area-wide model are used, while the effects in Spain would not seem to be significantly different from those found in the aggregation of national responses. These findings are consistent with the available empirical studies [see, for example, the various studies compiled in Angeloni et al. (2003)], in which a high level of uncertainty surrounding estimates of the

[12] The exercise is carried out permitting changes in each case only in the financial variables related to the corresponding channel, i.e. interest rates in equations on private productive investment, residential and inventory investment (user cost channel), interest rate in the consumption equation (substitution effect), interest rate on assets and liabilities of households and non-financial companies (income/cash-flow effect), interest rates that influence the price of assets (wealth effect) and exchange rates. The EMU effect is estimated through *ex post* addition of the effects derived from changes in economic activity and prices in the rest of the EMU countries.

CHART 3 IMPACT OF THE COMMON MONETARY POLICY ON SPAIN AND EMU

PERCENTAGE DESVIATIONS FROM THE BASELINE SCENARIO LEVEL



impact of monetary policy within each country is observed. As a result, when we compare a number of different countries or monetary areas, either we do not detect statistically significant differences, or they are not robust to changes in the methodology or time frame considered.

As further evidence, Table 3 provides a comparison of Spain with EMU as a whole for some of the potentially relevant variables in respect of the transmission mechanism. There are some elements that suggest a greater effect of monetary policy in Spain than in EMU, such as Spain's greater weight in construction investment, the substantial percentage of owner-occupied housing and the predominance of variable interest-rate household debt. On the whole, as a result of these factors, changes in interest rates are transferred more quickly to household financial costs and disposable income, limiting household demand for consumption and, above all, for residential investment, which in turn reduces the value of their real estate assets, leading to further contraction in demand. The substantial weight of construction in total output strengthens the prominence of this effect in the Spanish economy. By contrast, the lower weight of manufacturing (interest-rate sensitive) and trade with countries outside EMU (exchange-rate sensitive) can be expected to work in the opposite direction.

TABLE 3 SPAIN-EMU COMPARISON OF SELECTED VARIABLES RELEVANT FOR THE MONETARY POLICY TRANSMISSION MECHANISM (a)

	SPAIN	EMU	DIFF. SPAIN-EMU
Output composition (% of GDP)			
Private consumption	58.1	56.3	
Investment	25.1	21.0	+
Trade with countries outside EMU	18.6	30.1	- -
Trade with other EMU countries	24.7	30.4	-
Construction	8.3	5.1	+ + +
Manufacturing	17.9	19.8	-
Capital-output ratio	2.9	3.2	-
Worker protection measures			
Employment protection	2.6	2.6	
Union coverage (%)	78.0	85.4	-
Replacement rate (%)	32.0	28.0	+
Average rate of unemployment (1991-2000) (%)	19.6	10.4	+ + +
Indicator of product market rigidities	1.6	1.8	-
Households			
Net interest received/Gross disposable income (%)	-0.2	0.3	- -
Debt/Gross disposable income (%)	76.3	80.7	
% of loans with interest rate renewable in one year	75.1	51.2	+ +
Housing purchase loans/GDP (%)	29.6	29.6	
Financial wealth/GDP (%)	180.5	201.7	-
Variable-return assets/Total financial assets (%)	27.0	18.8	+ +
Pension fund assets/Total financial assets (%)	15.8	26.3	- -
Stock exchange capitalisation/GDP (%)	80.9	71.7	+
Housing ownership rate (%)	82.0	61.0	+ +
Average annual real long-term growth rate, housing prices (%)	3.5	1.1	+ + +
Non-financial corporations			
Net interest paid/Gross operating surplus (%)	19.2	13.3	+ +
Debt/Gross operating surplus (%)	384.2	378.1	
% of loans with interest rate renewable in one year	82.4	83.7	
% employment in corportations with <50 workers	66.0	52.0	+ +
Borrowing from banks/Borrowing from banks + securities (%)	95.1	88.7	+
Credit institutions			
Market share of top five banks (%)	53.0	40.0	+
Net profit (loss)/Capital and reserves (%)	13.3	10.1	+ +
Solvency ratio (%)	12.3	10.9	+

SOURCES: Angeloni et al. (2003), Berben et al. (2004), Maza and Sanchis (2003), Eurostat, ECB and Banco de España.

a. Data from 2001 or nearest available date.

On the corporate side, the comparison of some factors would also indicate a greater response in Spain. In particular, corporate interest payments account for a greater proportion of the gross operating surplus, and the average firm is smaller and more dependent on credit from the banking sector. All of these factors can be expected to make firms more sensitive to changes in financing conditions. On the contrary, the favourable position of the financial system should contribute to the stability of financing flows to the investing sector.

On the whole, while the empirical results do not reflect significant differences with EMU, a somewhat greater response of the level of activity to monetary policy in Spain than in the area as a whole cannot be rejected. Further indicators, such as the high levels of structural unemployment in Spain, would point to the existence of greater rigidities in the Spanish factor markets. These rigidities may translate into a more inertial behaviour of prices, raising the sacrifice ratio so that the same price correction would require a greater real adjustment.

5 Recent changes in the transmission mechanism

The preceding sections have reviewed the evidence on the monetary transmission mechanism in the Spanish economy based primarily on the available models estimated with historical data. Beginning in the 1990s, however, the Spanish economy has experienced profound changes geared toward liberalisation, which have been particularly intense in the financial system. At the same time, it has benefited from the consolidation of an environment of macroeconomic stability, particularly since the inception of EMU in 1999. As explained in detail in Malo de Molina and Restoy (2004), the configuration of this new scenario has helped modify the institutional framework in which economic agents take decisions, substantially altering the size and structure of their balance sheets. It has also possibly changed the transmission of monetary impulses.

First, economic development has promoted an appreciable increase in households´ and non-financial corporations´ wealth, leading to unprecedented growth in financial asset holdings. Second, this growth in wealth, along with opportunities derived from the process of financial innovation and consolidation of an environment of macroeconomic stability, has promoted an appreciable increase in the income leverage of households and corporations. Last, growth in the private-sector balance sheet has been accompanied by an increased international focus and a reduced level of intermediation. Both processes have been more pronounced on the asset side.

These changes in the balance sheet structure of private agents potentially have substantial effects on the transmission of monetary impulses yet to be reflected in the models, as they are relatively recent. The increase in the borrowing capacity of households and non-financial companies has made their expenditure decisions less dependent on current income and, by contrast, more sensitive to the optimal time for execution, which is determined by changes in interest rates. In other words, substitution effects on consumption and user cost effects on investment have been enhanced. On the other hand, the increasing importance of variable-rate financing promotes greater sensitivity of household income and corporate profits to changes in financing cost (income effect). Where households are concerned, we

can expect this effect to be offset in part by the loss in the share of fixed-return instruments in total assets. By contrast, the greater weight of variable-return instruments and, above all, the growing importance of real estate wealth, have substantially increased the sector's sensitivity to changes in asset prices (wealth effect). In the case of corporations, in addition to this intensification of the user cost and income effects, the increase in external assets on the balance sheet may have induced a moderate accentuation in the exchange rate channel. Accordingly, we can conclude that the impact of movements in the Eurosystem reference rate on the Spanish economy might have increased significantly during the first few years of the new century[13].

6 Final comments

The recent transformations undergone by the Spanish economy tend to increase the uncertainty surrounding the analysis of the monetary transmission mechanism addressed in this chapter. This uncertainty itself is substantial, owing to the multidimensional nature of the process and, especially, to the important role of expectations. The foregoing discussion supports new analytical efforts designed to enhance our quantitative knowledge of the various monetary transmission mechanisms, particularly for a central bank, and in the as yet largely unexplored field of a monetary union comprising numerous and varied national economies.

In any case, the available evidence indicates that monetary impulses generate a transitory effect on GDP, that reaches its maximum intensity during the second year after the impulse occurs, and has a more delayed, albeit permanent, effect on the price level. These results are consistent with the evidence found for other economies in the euro area, making it generally not possible to identify significant asymmetries between the monetary transmission mechanisms in the various countries. Regarding the relative importance of different transmission channels, the existing evidence suggests that the impact of monetary policy on economic activity and price levels in the Spanish economy primarily flows through the user cost, EMU and exchange rate channels, that in total represent approximately 90 percent of the overall impact, both on GDP and on price levels.

As for the future, a better assessment of the impact of monetary policy measures requires the incorporation of those recent changes described above into the macroeconometric models now used. There seems to be a clear need for a better understanding and quantification of the interactions between financial and real variables and, specifically, for advances in the analysis of microeconomic information that can be used to model the nonlinear impact of financial conditions on private expenditure.

[13] With all the necessary caveats, as few observations are available in each case, Malo de Molina and Restoy (2004) find that the same monetary policy shock (an increase of two percentage points in short- and long-term interest rates for three years) has a negative impact on GDP, after three years, of approximately 50 percent more when the MTBE parameters estimated with a more recent (1991-2002) subsample are used, than with estimates from an earlier (1980-1990) subsample.

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7. Monetary and financial conditions

Roberto Blanco and Alberto Cabrero

1 Introduction

As we have observed in Chapter 6, the set of financial variables potentially influencing aggregate demand is quite broad and includes interest rates, asset prices, exchange rates and the composition of corporate and household balance sheets. Monetary policy has a notable influence on all of these variables, in determining short-term interest rates and, through this channel, affecting expectations on future trends and therefore longer-term yields. To the extent that they affect interest rates negotiated on the markets as a result of a complex interaction with agent's expectations, monetary policy decisions will also affect the financial variables relevant to aggregate demand, such as returns on savings, financing costs, exchange rates and the value of financial and real assets.

Although the single monetary policy has been applied to EMU as a whole since 1999, uniform monetary and financial conditions do not necessarily prevail in different countries of the area. This is true for a number of reasons. On the one hand, differences in the transmission mechanism and in risk premiums mean that nominal interest rates important in expenditure decisions will not be identical throughout the area. On the other hand, real interest rates, that theoretically are the ones that influence consumption and investment, will differ to reflect variations in inflation rates. Last, conditions of credit supply and the financial position of the private sector may also be heterogeneous within EMU. These reasons justify the monitoring of specific monetary and financial indicators for Spain, the assessment of which provides information on the level of

tightness of financial conditions, in absolute terms and in comparison with trends in EMU as a whole.

Owing to the potential importance of monetary and financial conditions on household and corporate expenditure decisions, analysis of these conditions is an important factor in assessing the short- and medium-term macroeconomic outlook. The Banco de España quarterly model incorporates some of the relevant channels discussed above. Accordingly, the consumption and investment function includes the interest rate, in order to reflect its effect on the opportunity cost of both types of expenditure decisions; financial and real property wealth are included in the determinants of consumption; and cash flow generated by corporations is an explanatory variable of private productive investment. There are, however, different factors that would suggest that the conventional macroeconomic models estimated using historical data can only aspire to partially reflect the effects of monetary and financial conditions.

It is reasonable to consider that some of these effects, and particularly those related to financial pressure, are non-linear in nature. For example, in light of a given negative shock, we should expect the impact on future expenditure to be greater the more fragile the situation of the economic agent affected. In this connection, the macroeconomic effects associated with a given aggregate financial position will depend on its statistical distribution. This suggests the suitability of the use of microeconomic data to analyse such questions.

Further, different recent changes in the size and structure of company and household balance sheets suggest that the expenditure response to changes in interest rates and asset prices is now greater than in the past[1]. Given that these changes have occurred in recent years, their effects may be difficult to reflect in the macroeconomic models (see Chapter 6).

These limits underscore the importance of a specific assessment of monetary and financial conditions in the private sector to supplement the information provided by the customary macroeconomic prediction tools in the design of forecasting scenarios.

The rest of this chapter is structured in five sections. Section 1 describes the process of transmission from official interest rates to prices and returns important in expenditure decisions, and discusses the key indicators used to assess the monetary policy stance; Section 2 presents the variables used to assess returns on savings and financing conditions; Section 3 will examine wealth indicators; Section 4 discusses the importance of the concept of financial pressure and reviews the analytical framework and statistics to monitor it; and the last section will provide some final comments.

2 Monetary policy and monetary and financial conditions

As indicated in the introduction, monetary policy exerts a substantial influence on monetary and financial conditions. In this section, we shall briefly describe this transmission process and the key indicators used to assess the monetary policy stance.

[1] See Malo de Molina and Restoy (2004).

2.1 Monetary policy and interest rates

The operating framework for monetary policy in the Eurosystem consists of a series of instruments[2] used to influence determination of interest rates important in expenditure decisions. The most prominent instrument includes main refinancing operations, which are weekly fund auctions in which the participant counterpart institutions – that are recognised for that purpose by the Eurosystem – obtain most of the liquidity they require. Since March 2004, the maturity of these operations has been weekly and, since June 2000, auctions have been carried out at variable interest rates, with the minimum bid rate established by the Governing Council of the European Central Bank (ECB)[3]. This is the main reference for the overnight money market interest rate.

On the other hand, *standing facilities* constitute a further important instrument in signalling the monetary policy stance. Such facilities enable institutions to obtain overnight financing against assets provided as collateral *(marginal lending facility)* and to make overnight deposits *(deposit facility)*. In both cases, the interest rate is pre-determined.

Decisions to change interest rates on the instruments described above are made during the first of the two monthly meetings held by the Governing Council of the ECB; generally on the first Thursday of the month. Changes in the minimum rate on main refinancing operations are generally implemented from the first auction following that meeting, which, since March 2004, has coincided with the beginning of a new reserve maintenance period. By contrast, interest rates on marginal facilities become effective the following day.

In normal circumstances, interest rates on credit and deposit facilities respectively constitute an upper and lower limit on the overnight money market interest rate. The first panel of Chart 1 shows that the Euro Overnight Index Average (EONIA[4]) fluctuates around the main refinancing operations rate and moves within the band applicable to standing facilities.

EONIA is the interest rate anchor for the remaining terms on the interbank market, as rates are determined according to expected trends in EONIA within the time frame of the transactions involved. As shown in the second panel of Chart 1, money market interest rates tend to register similar trends for different terms. These rates serve as reference rates to determine the prices of many borrowing and lending operations for the private non-financial sector and therefore are relevant in their expenditure decisions. In the public debt markets, yields also reflect expected trends in short-term interest rates and possible term premiums.

Yields on private debt are generally determined by adding a risk premium to the interest rate on government securities and, accordingly, movements in public debt returns generally are fully transferred to private securities. In addition, the risk premium might also respond to changes in monetary policy decisions, to the extent that it affects corporate credit risk. Accordingly, a decline in interest rates will tend to reduce financial burden for indebted companies, which will be reflected in a lower credit risk premium.

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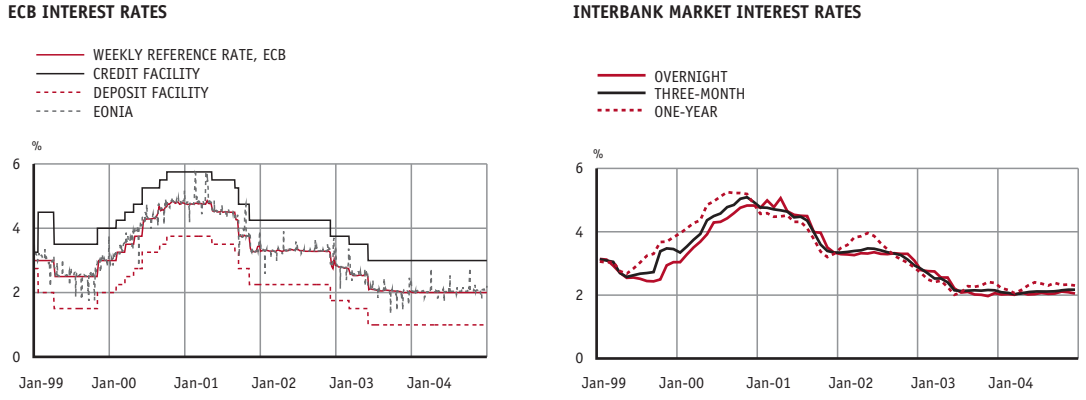
[2] See ECB (2004) for a detailed description of Eurosystem monetary policy instruments and procedures.

[3] Before June 2000, the Eurosystem carried out main refinancing operations through fixed-rate auctions.

[4] This index is calculated as a weighted average of effective interest rates on overnight unsecured deposits, denominated in euro, according to the information reported by a panel of banks.

CHART 1 INTEREST RATES IN THE EURO AREA



SOURCES: ECB and Banco de España.

2.2 Monetary policy and its influence on exchange rates and asset prices

Further variables normally affected by interest rate movements are exchange rates and asset prices. Accordingly, the exchange rate is related to the relative return on investments in domestic currency, in comparison with returns generated in other currencies, so that an increase in interest rates for the euro will be reflected in principle in an appreciation of that currency. In practice, however, the final effect is less obvious, as it will depend on other factors such as expectations on future interest rates in EMU and in other important areas.

In the case of shares, there are two channels through which monetary policy decisions can affect the price and that acts in the same direction. On the one hand, there is a discount effect, through which a higher interest rate implies a lower current value of future income and therefore a decline in market price. On the other hand, higher interest rates are reflected by a higher financial burden, which might negatively affect the expected flow of future dividends.

Last, in the case of real assets, such as housing, there is also a discount effect through which higher interest rates will tend to depress prices. There is, however, an additional effect derived from the importance of financing in the purchase of this type of asset, to the extent that an increase in nominal interest rates presumes a higher initial financial burden, and this will normally reduce the available credit volume and in so doing will negatively affect demand and ultimately prices.

2.3 Assessment of the monetary policy stance

Real interest rates constitute an important indicator in assessing the level of tightness of monetary conditions. This concept may be assessed on an *ex ante* or *ex post* basis. Through

ex ante interest rates, the aim is to assess the expected return or real cost during the time frame of the borrowing or lending operation, while *ex post* rates refer to the real cost or return finally observed when the operations have matured. From the standpoint of expenditure decisions, the *ex ante* rate is the important concept, although this rate is not generally observable and, accordingly, must be estimated. To that end, the most common approach consists in deducting from the nominal interest rate an expected inflation rate measurement for the time frame of the instrument that can be computed using a number of different procedures. The simplest method consists in calculating a moving average (centred or otherwise) of the rate of change in prices – an approach based on the implicit assumption that inflation will not change much over time. Alternatively, statistical or econometric methods can be used based on analysis of time series or multivariate behaviour relations. A last option is to use analysts' expectations, such as those published in *Consensus Economics*.

For short terms, the different approaches will generally tend to provide similar results as long as inflation is relatively stable. For longer terms, by contrast, we can expect greater uncertainty in determining the level of and trends in real interest rates. In this case, another alternative indicator that is sometimes used is yields on inflation-indexed bonds. In the euro area, since 1999, an increasing number of sovereign issuers have used these instruments to obtain financing. Bonds indexed to Spanish inflation levels, however, do not exist, which rules out the use of this procedure to calculate real long-term interest rates for the Spanish economy. In any case, this indicator does entail a number of problems. The possible existence of an illiquidity premium, as these instruments are less liquid, could introduce an upward bias in real interest rate levels. Further, asymmetrical compensation of inflation in these instruments will tend to introduce a downward bias[5].

Chart 2 provides estimated *ex ante* three-month and 10-year real interest rates for the overall EMU and for Spain. In both cases, expected inflation is assessed as the three-year moving average for the harmonised consumer price index (HICP). First, we observe that, although the series profile is fairly similar in the two areas, the real interest rate level in Spain is lower than in EMU as a whole, which logically reflects Spain's higher inflation rate. This indicator therefore suggests relatively looser monetary conditions in Spain since the beginning of EMU.

The above indicators are therefore useful in assessing the level of tightness of monetary policy in Spain, in absolute and relative terms for the overall euro area. However, they do not reflect some important channels such as the exchange rate channel or wealth effect. As a result, other indicators such as real effective exchange rates[6], domestic and international stock exchange indices, and housing prices must be monitored[7].

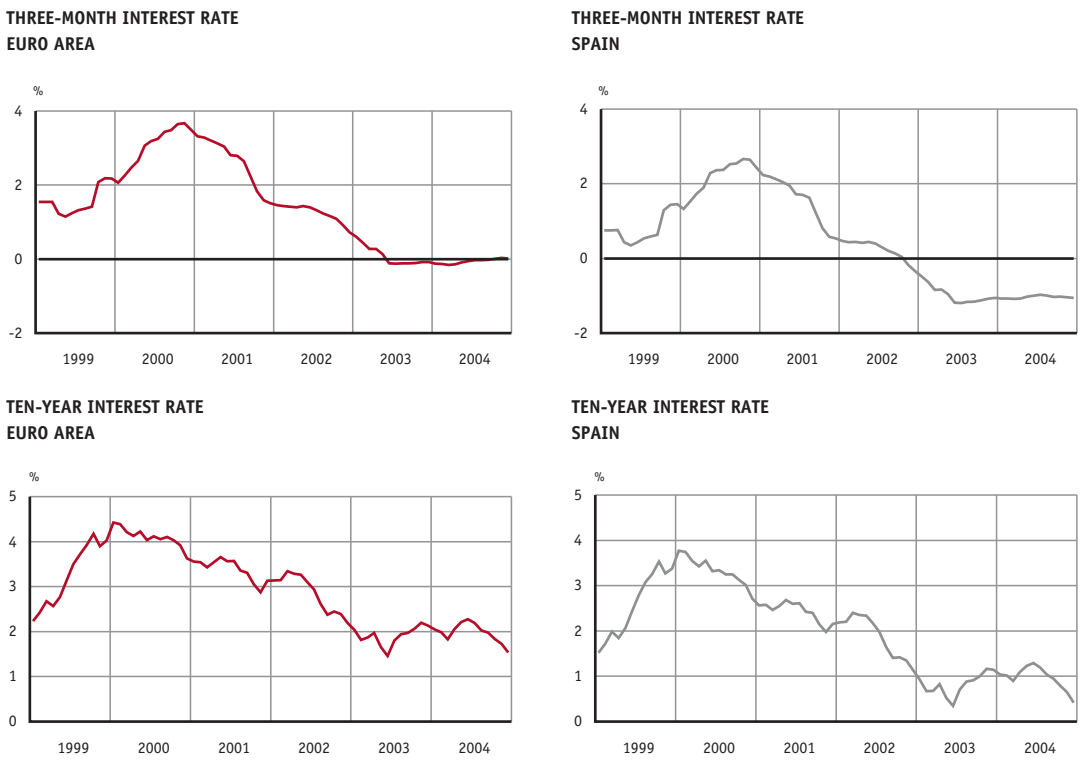
In some cases, the different indicators may provide contradictory signals, which makes it a more difficult matter to assess the general monetary policy stance. For example, in 2003,

[5] Holders of indexed bonds are compensated if the inflation rate registers positive levels. They are not penalised, however, in the event that negative inflation rates should occur. This asymmetry is a feature that benefits holders and therefore is reflected in a lower interest rate than would exist in the event of symmetrical compensation for inflation. For further details on this and other biases, see Breedon and Chadha (1997) and Alonso et al. (2001).

[6] See Chapter 17 for a description of real effective exchange rates.

[7] Section 4 describes the key wealth indicators.

CHART 2 REAL INTEREST RATES (a)



SOURCES: ECB and Banco de España.

a. Real interest rates are obtained as nominal interest rates less the interannual rate of change in prices calculated on a three-year moving average of the HICP.

the expansive effect of the decline in real interest rates coincided with an appreciation of the euro that acted in the opposite direction. In these cases, indices of monetary and financial conditions are useful, as they make it possible to summarise these conditions in one indicator. The concept of using this type of synthetic index by central banks and analysts, in general, initially emerged from the need for alternative measures to assess the monetary policy stance in light of the traditional quantity variables such as monetary aggregates, which have been found to register substantial limits, particularly in the short term[8].

Two types of indices have been proposed in the literature. Monetary Conditions Indices (MCIs) are constructed on the basis of changes in effective exchange rates and interest rates, in real terms in both cases, therefore reflecting the channels related to these two vari-

[8] The use and interpretation of these indices, in any case, are not exempt from a high level of controversy related to both theoretical and empirical factors [see Caballero et al. (1997)].

ables. This type of index plays a fairly important role in some countries such as Canada or New Zealand, where they are even included as an operating target for monetary policy. Other central banks such as those in Sweden or Norway use the MCI as an additional indicator in the decision-making process.

By contrast, Financial Conditions Indices (FCIs) reflect interest and exchange rates and prices of financial assets, such as returns on public debt or stock exchange indices. Accordingly these indices reflect the wealth effects as well as the interest and exchange rate channels[9].

It is therefore interesting to compare trends in these indices in the euro area and in Spain. In the *Servicio de Estudios* of Banco de España, two MCIs are calculated: one for the euro area and one for Spain. The MCI for the euro area is defined based on the following expression:

$$ICM_t = w_1\left(r_t - r_0\right) + w_2\left(e_t - e_0\right)$$

where r is the real short-term interest rate calculated as the difference between the three-month Euribor and inflation observed during the last 12 months in the area, and e is the logarithm of the real effective exchange rate for the euro. The MCI for Spain is calculated using an equivalent method, although the real interest rate is obtained by subtracting Spanish inflation, and the exchange rate factor reflects Spain's competitiveness vis-à-vis countries outside EMU as well as vis-à-vis EMU. The latter reflects the effect of Spain's inflation differential with the euro area[10].

The index coefficients reflect the effects on GDP of changes in the interest rate and exchange rate, based on elasticities estimated with macroeconometric models.[11] Specifically, for the overall euro area, they were obtained by aggregating the implicit figures in the structural models available from the respective national central banks, which are used in preparing macroeconomic forecasts for the Eurosystem. Where Spain is concerned, elasticities are derived from the Banco de España quarterly model (MTBE) presented in Chapter 5[12]. The advantage of using these elasticities is that they are re-estimated periodically. In addition, they guarantee greater homogeneity among the different countries and the euro area as a whole. It must be borne in mind, however, that this selection is not without its limits. First, these elasticities reflect the impact in association with fluctuations in interest rates and exchange rates, in nominal rather than in real terms, which is what the aim is to meas-

[9] Mayes and Viren (2001) or Lack (2002) proposed an index of financial conditions that includes the price of housing, underscoring the importance of this channel, in contrast with the insignificance of wealth effects related to stock prices.

[10] For operational purposes, this implies that the exchange rate factor is divided into two components: one reflecting the effects of changes in the effective exchange rate for the euro and the other capturing the impact on competitiveness of changes in the inflation differentials, similar to the approach adopted by Martínez and Ortega (2000).

[11] Where interest rates are concerned, the parameter used in the indices reflects not only the direct impact associated with an increase in the short-term interest rate, but also the effect of an increase in the same quantity in long-term interest rates, which is equivalent to assuming that a complete transmission occurs throughout the yield curve.

[12] The coefficient associated with changes in Spain's competitiveness vis-à-vis the euro area is derived from estimates based on the NIGEM model.

ure. In a context, however, in which inflation varies little in the short term, we might expect that the inflation effect will be unimportant, so that elasticities estimated in nominal terms will probably be similar to the real ones. The second limit is that elasticities do not reflect spillover effects[13]. We can presume, however, that these effects are relatively small in scope.

In line with MCIs in other countries, the interest rate coefficient is higher than the exchange rate coefficient, in Spain and in EMU. In the latter case, the proportion between the two coefficients is also similar to the level found in other large, relatively closed economies such as the U.S. and Japan. The comparison between the MCI for Spain and the euro area also shows that the interest rate parameter is similar in both areas (and somewhat higher for Spain), while the parameter associated with the real effective exchange rate for the euro is appreciably higher in Spain's case, reflecting the Spanish economy's greater estimated sensitivity to changes in that variable.

Where interpretation of MCIs is concerned, we should bear in mind that they only reflect changes in, and not the level of, tightness of monetary conditions. As we have observed, variables used in such calculations are expressed in the form of differences in respect of a base period. As a result, the level of the indicators reflects changes in the level of restriction in monetary conditions, in respect of this date. Specifically, a positive (negative) sign is interpreted as tighter (looser) monetary conditions with relation to the base period.

Chart 3 presents trends in MCIs for Spain and EMU using as a base period November 1998, shortly before EMU began. We observe how monetary conditions estimated with this indicator were more expansive throughout the period analysed than those existing at the beginning of EMU, presenting Spain looser financial conditions than the EMU up to 2003. Since 2002, despite the decline in interest rates, the gradual appreciation in the euro has tended to increase the level of tightness in both areas, especially in Spain, as a result of the Spanish economy's greater sensitivity to changes in exchange rates.

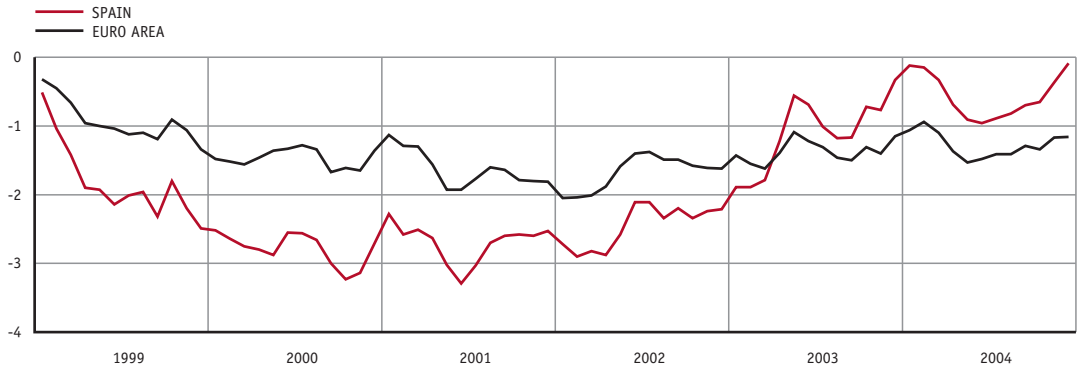
One tool that makes it possible to analyse the level of, and not only trends in, monetary restriction is known as Taylor's Rule, proposed by Professor Taylor in 1993. This rule aims to estimate the function of a central bank's reaction in determining the level of its official rates. Specifically, the rule is expressed as follows:

$$i_t = r^* + \pi^* + a_1\left(y - y^*\right)_{t-1} + a_2\left(\pi - \pi^*\right)_{t-1}$$

where i represents the official reference rates in real terms, r^* is the natural interest rate, $\pi - \pi^*$ is the deviation of inflation from its end target and, last, $y - y^*$ is the differential between observed and potential GDP, or the output gap.

[13] The spillover effect is the impact that occurs through trade vis-à-vis the rest of the euro area owing to the fact that a change in exchange rates and interest rates not only affects Spain, but also the rest of the euro area. See Chapter 6 for further details on this effect.

CHART 3 MONETARY CONDITIONS INDEX (a)



SOURCES: ECB and Banco de España.

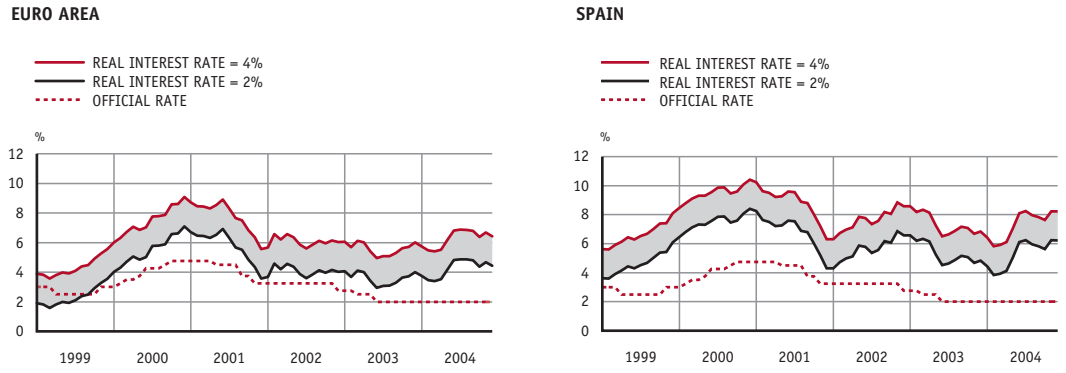
a. Increases (decreases) in the index mean more restrictive (relaxed) monetary conditions. In the indices, the short term interest rate is weighted approximately 82 percent for Spain and approximately 89 percent for EMU. The exchange rate weighting is approximately 18% and approximately 11%, respectively. November 1998 = 0.

Taylor's rule may be derived from an optimisation problem, in which the central bank has a loss function that reflects deviations in contemporaneous inflation and the output gap. The values of parameters proposed in Taylor's initial work, calibrated based on data for the U.S. economy, were: an equilibrium level of real rates *(r*)* of 2.5 percent, inflation target level (π*) of 2 percent and a weighting of the output gap (a_1) and inflation deviation (a_2) of 0.5 and 1.5, respectively.

Although a central bank's monetary policy decision-making process is much more complex than this specification might suggest, the simplicity of this rule and its capacity to replicate the decisions of the monetary authority in some cases have contributed to its popularity. It should be borne in mind, however, that the simplicity of Taylor's Rule does not exempt it from certain problems in practical application. For example, the same values are normally used for the parameters calibrated by Taylor, even though they are applied to other economies. This is important as the results are substantially sensitive to the exact specification selected. In this connection, Galí (2001) points out the difficulty in replicating decisions of the Eurosystem based on this type of rule.

Despite these limits, the comparison between interest rates determined using Taylor's Rule and those observed constitutes a useful tool in assessing the level of tightness of monetary conditions. For example, Chart 4 shows, for EMU and Spain, an interest rate band estimated with Taylor's Rule obtained using two alternative levels for the natural rate (2 percent and 4 percent) and the originally proposed weightings for that rule, along with the observed official rates. Both in Spain and EMU, official rates have tended to be situated below the values suggested by the rule. We observe that the distance between the two was substantially greater throughout the period in Spain, suggesting that monetary conditions in Spain may be looser than in EMU as a whole.

CHART 4 TAYLOR'S RULE (a)



SOURCES: ECB and Banco de España.

a. Calculated using the HICP. The bands correspond to application of Taylor's original equation. The weights of the deviation of inflation and output gap are 1.5 and 0.5, respectively. The inflation target is 2%.

3 Indicators of returns on savings and of financing conditions

The indicators for assessing the monetary policy stance presented in the preceding section offer an initial assessment to monetary and financial conditions. However, interest rates used in Taylor's Rules or in MCIs are from the interbank market, and are not those relevant in most expenditure decisions. Although the latter will generally maintain a relationship with the former, the existence of idiosyncratic factors suggests the advisability of monitoring more specific indicators. In addition, variables other than interest rates, such as availability of credit, influence financing conditions. Last, we should bear in mind further relevant channels such as wealth or financial position of households and companies. To that end, monitoring of monetary and financial conditions considers a broader set of indicators that aim to reflect all of the foregoing factors. This analysis is carried out separately for the two most relevant sectors: households and non-financial corporations.

In this section, we shall describe the specific indicators related to returns on savings and financing conditions. In Section 4, we shall present wealth indicators; while Section 5 will present financial position indicators.

3.1 Indicators of returns on savings in the private sector

Interest rates on deposits and other bank liabilities and public debt yields are two relevant indicators to assess the returns the private sector earns on its financial investments. In fact, the corporate sector and, above all, households, keep a portion of their portfolio in this type

of instrument or in other related vehicles, such as debt securities issued by the private sector, either directly or through investment funds.

Where bank deposits are concerned, monitoring is based on the exploitation of the new statistics on interest rates applied by monetary financial institutions (MFI), available since January 2003 with monthly frequency and prepared for all EMU countries. More specifically, these statistics contain detailed information by instrument and by sector on returns and the cost of financing for different borrowing and lending operations of credit institutions with the private sector. In addition, the distinction is made between interest rates on new operations and average balance sheet rates. The latter, in particular, are important in assessing income effects[14].

Where returns on public debt are concerned, the analysis focuses on monitoring benchmark interest rates for the most representative terms (12 months, 3 years and 10 years), that can be carried out with daily information, since these instruments trade on the secondary markets, with a high degree of liquidity.

3.2 Indicators of household financing conditions

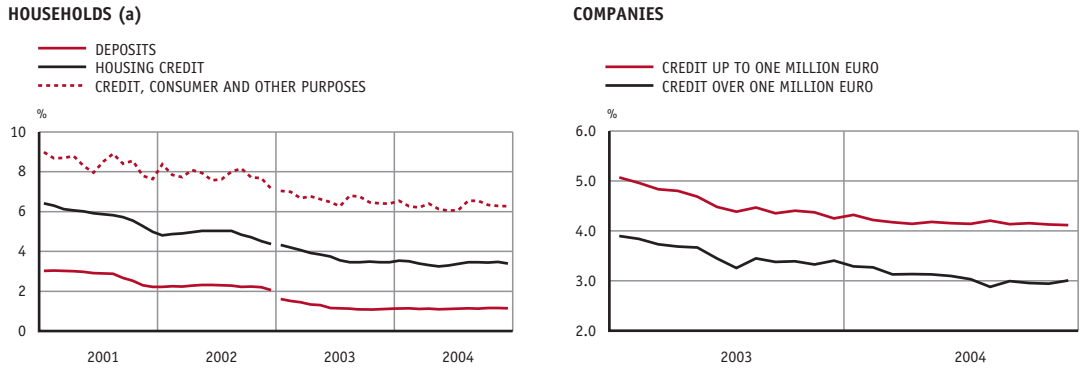
Most financing obtained by households comes from credit institutions. Accordingly, financing conditions in this sector are basically determined by credit conditions. To characterise the latter, interest rates on bank loans are monitored. It should be pointed out, however, that, in the credit markets where asymmetrical information between creditors and borrowers leads to rationing situations, this variable is insufficient to analyse credit supply conditions. In this connection, the criteria applied for the approval of new transactions or required guarantees constitutes further relevant information.

Analysis of interest rates applied in the credit system to households is based on the banking rates described above. In particular, to study financing conditions, information on new credit operations with this sector is used, that makes the distinction between account overdrafts and loans for three different purposes: housing, consumption and other purposes. Each of these categories is broken down according to interest rate renewal periods. The left panel in Chart 5 shows recent price trends in bank financing for housing, consumption and other purposes, as well as remuneration on bank deposits. We observe how all of these interest rates have registered a downturn during the period considered. Further, we observe that the cost of financing for purchase of housing is situated below the cost of credit for all other purposes, which reflects the existence real guarantees with the first loan category.

To assess credit supply conditions, the Bank Lending Survey launched by the Eurosystem in 2003 is used. This survey is conducted quarterly based on a representative sample of credit institutions in the euro area. The questionnaire includes a set of qualitative questions on changes in credit supply and demand conditions during the immediately preceding quarter ended, on the outlook for the current quarter and on factors that explain the changes that have occurred. The distinction is made between loans to corporations and

[14] For a description of the new banking statistics, see Departamento de Estadística y Central de Balances (2003) and, for an assessment, see Maza and Sanchis (2004).

CHART 5 BANK INTEREST RATES



SOURCE: Banco de España.

a. For bank rates, there was a discontinuity in the series for January 2003 as a result of changes in the statistical requirements for data compilation.

households and, in the latter case, credit for housing purchases and the rest of financing is also specified[15].

3.3 Indicators on financing conditions for companies

Unlike households, companies have a broader set of financing instruments available to them. In addition to bank credit, they can issue fixed-income securities and shares. The indicators used to describe financing conditions for companies therefore include more variables. Specifically, indicators are available on financing conditions for each of the three main financing mechanisms.

To assess bank financing conditions, indicators similar to those described for household are used (interest-rate and bank-lending surveys). The right panel in Chart 5 shows recent trends in the cost of bank loans for companies, making the distinction between transactions greater than or less than one million euro. We observe that the interest rate is lower in the first case, probably reflecting the fact that it mainly captures operations with larger corporations that would normally present better credit ratings and greater guarantees, and would tend to have more negotiating power.

To assess the financing conditions on the fixed-income market, the traditional indicator is the cost of issues on the primary and secondary markets. This cost is normally assessed as a differential in respect of the return on public debt or swap curve in the same currency (credit spread). Monitoring of these spreads, however, is not a simple matter based on the

[15] For further details on this survey, see Martínez and Maza (2003).

available information. For example, in practice, there is normally more than one reference for the same issuer and for similar terms, even with different returns. In these conditions, the most representative reference is not always immediately identified. A number of different investment banks, however, prepare some indicators on average spreads for specific groups, depending on the credit rating, issue currency and economic activity sector. This information, however, is not available for all Spanish corporations. Another alternative to estimate the credit spread is to use information on instruments traded on the credit derivative markets, such as credit default swaps (CDS), that are currently the most traded. These instruments make it possible to transfer credit risk associated with a loan or bond issued by a given corporation. In normal circumstances, the price of these agreements is close to the credit spread on bonds calculated based on swap rates[16]. For these reasons, CDS premiums are a useful tool in characterising financing conditions for Spanish corporations.

Last, two indicators are used in analysis of financing conditions for equity markets: stock exchange prices and implicit volatilities negotiated on the options markets. Under specific assumptions, the former proxies trends in finance costs. Financing conditions on the equity markets will tend to improve the higher the traded price. Implicit volatilities can easily be derived from the price of options negotiated and a standard valuation formula for the instruments, such as the Black-Scholes formula. This variable reflects the uncertainty the market assigns to projected trends in negotiated share prices. In particular, the greater the value of this indicator, the greater the difficulties corporations will have in obtaining financing on the stock markets. Both indicators are monitored for representative indices of the Spanish market (the Madrid general stock exchange index – *Índice General de la Bolsa de Madrid* – and the *Ibex 35)* and for the main sectors.

4 Wealth indicators

As indicated in the introduction, household wealth is one of the key financial variables potentially influencing expenditure decisions in this sector. Available evidence, however, suggests that these effects have become increasingly important during recent years[17]. In this connection, it is of great interest to monitor net wealth in the sector.

Household net wealth is comprised of financial and real wealth (primarily real property assets). *Financial net wealth* is defined as the difference between financial assets and liabilities valuated at market prices according to quarterly estimates included in the financial accounts of the Spanish economy. Instruments are valued based on the prices observed, provided that assets are traded on the secondary markets, or at theoretical prices estimated in other cases[18]. In addition, available information can be used to separate changes in wealth attributable to fluctuations in prices of assets from those resulting from financial operations.

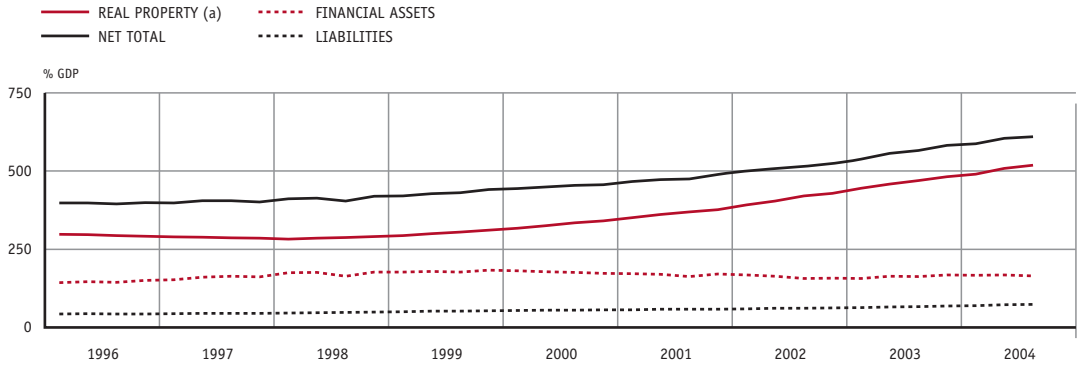
Real household wealth is estimated as household *real property wealth,* as this type of asset constitutes the bulk of household real investments, and there is no information on other

[16] Blanco et al. (2005) provide evidence on the properties of CDS premiums with relation to credit spreads.

[17] See Malo de Molina and Restoy (2004).

[18] See Banco de España (2004) for further details.

CHART 6 WEALTH, HOUSEHOLDS AND NPISHs



SOURCE: Banco de España.

a. Estimate based on estimated trends in housing stock, average area and price per square metre.

types of real assets. Despite the importance of household real property wealth, there are no official estimates in this connection, comparable to those existing for financial wealth. For this reason, Banco de España uses its own estimates, based on information covering the housing stock, average size and prices[19].

Owing to the importance of real property wealth within household net wealth – in which it accounts for approximately three fourths – (see Chart 6), housing market outlook analysis is of great interest. To that end, we have a broad set of indicators, that includes prices and costs as well as variables to proxy supply and demand conditions[20]. Where prices are concerned, the main indicator is published by the Ministry of Housing with quarterly frequency, and is used to estimate real property wealth. This indicator is available with a breakdown by age: new housing (less than one year old) and used housing (more than one year old). It also reflects different sizes of municipalities. As these indicators are published with some degree of delay, the provisional data provided by the appraisal companies are also used.

5 Financial pressure indicators

In frictionless economies, changes in the financial position of agents are only important in their expenditure decisions to the extent that they are associated with changes in future income flows. However, as underscored in the literature on the "financial accelerator"[21] in the

[19] See Chapter 11 for a detailed description of these estimates.

[20] In the table of housing market indicators, in the summary of indicators (www.bde.es), these data can be consulted and series downloaded. The methodological note describes the calculation method and sources used.

[21] See Bernanke et al. (1999) or Gerter et al. (2003), for example.

presence of restrictions to credit supply, changes in private sector balance sheets may affect access to financing, thereby influencing consumption and investment patterns.

These considerations emphasise the importance of analysing the financial position of households and corporations. Monitoring in this area relies on a broad battery of indicators that assess the level of financial pressure to which the private sector is subject. As discussed in the introduction to this chapter, in this type of analysis, the availability of microeconomic information is particularly relevant for assessing the future expenditure outlook in the sector, as the implications of the same aggregate position may be quite different depending on its statistical distribution. Private sector financial position is therefore monitored with macroeconomic and microeconomic indicators, although in the latter case, information is generally less available and frequent.

5.1 Household financial pressure indicators

Most household financial pressure indicators are based on macroeconomic information, owing to the limits of microeconomic data (they are less frequent and detailed). These indicators provide quarterly information on the following concepts: level of indebtedness, debt burden associated with debt, savings and problems making debt payments. Of course, the level of financial pressure will tend to be greater the higher the level of variables used to measure these concepts.

With reference to the level of *indebtedness*, three indicators are monitored that relate to the level of debt in the sector – estimated as the sum of resident bank credit, including debt that has been securitised, and foreign loans – with gross disposable income and two definitions of financial assets: total assets and a sub-aggregate comprised of the less volatile instruments calculated by subtracting shares and participations in securities investment funds (FIMs) from the total. The former measures the time required by the sector to repay the debt, in light of gross current disposable income, while the latter two reflect the point to which sector wealth covers its debts.

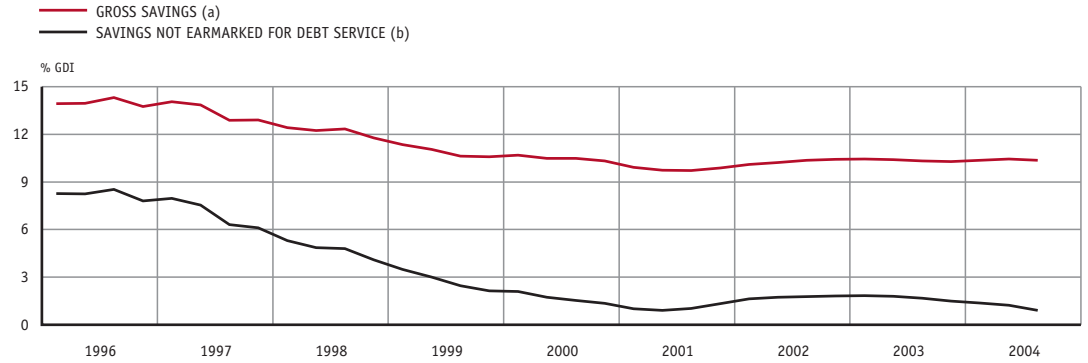
The debt burden is defined as the proportion of gross disposable income of the sector earmarked to meet obligations derived from debts assumed, for interest payments (interest burden), as well as amortisation of principal (total debt burden). Interest payments are basically calculated from the profit and loss account of deposit-taking banks, while amortisation is assessed based on information in respect of residual terms to debt maturity, interest rates and outstanding debt balances[22].

To assess the buffer available to households to absorb adverse revenue shocks, it is used an indicator of *savings not earmarked for debt service*, obtained as gross savings in national accounts less estimated payments for debt amortisation[23]. As we observe in Chart 7, in terms of profile, the informative content of the two savings definitions is quite similar. The sign and level of the indicator, however, are also important in its assessment. In this con-

[22] For further details on the procedure for assessing the debt burden, see Maza and del Río (2002).

[23] Gross savings is obtained as the difference between gross disposable income, less interest payments and consumption.

CHART 7 SAVINGS, HOUSEHOLDS AND NPISHs



SOURCE: Banco de España.

a. Balance, use of disposable income account.
b. Gross savings less estimated amortisation payments.

nection, the broadening of the gap between the two definitions since the mid-1990s, that is logically related to the increase in debt, is significant, can be observed.

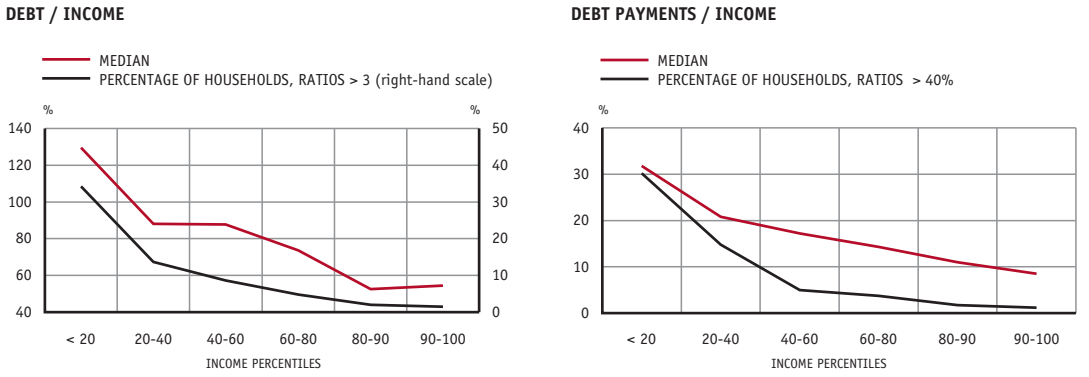
To proxy the problems in the sector in covering the debts undertaken, we monitor the bank delinquency ratio, which is defined as the volume of doubtful assets over credit.

All of these aggregate indicators are supplemented with microeconomic information from surveys. The main available sources for that purpose are the Survey of Household Finances *[Encuesta Financiera de las Familias],* recently implemented by Banco de España, planned for biennial frequency, and the Household Expenditure Survey *[Encuesta Continua de Presupuestos Familiares],* with quarterly frequency.

The Survey of Household Finances contains information, *inter alia,* on variables related to the household financial position. This dataset enables the statistical distribution of many aggregate indicators as defined above, such as indebtedness and debt burden ratios, to be analysed. In addition, these variables can be mapped with different features of household units, such as age of head of household, income and wealth. The absence of a temporary profile in this survey, however, still limits its use. For that purpose, the European Community Household Panel, that provides information, albeit more limited, on some of these factors is also used.

An important result obtained in analysing this information is that the financial pressure indicators are distributed quite disparately among the population. For example, under the Survey of Household Finances, more than half of households in 2002 had no pending debt. For households that did have pending debt, both the debt burden associated with loans and the debt-to-income ratio declined with the level of income (see Chart 8). Specifically, the median household situated below the 20th percentiles earmarked almost one third of its revenue to payment of interest and repayment of loans arranged, while the median household above the 90th income percentile earmarked only 8.5 percent. These results highlight the advisability of using disaggregated information in financial position analysis.

CHART 8 DEBT AND DEBT BURDEN, HOUSEHOLDS WITH PENDING DEBT



SOURCE: Survey of Household Finances (EFF).

The household expenditure survey contains information on households that can save and on the level of difficulty in meeting all monthly expenses. The main value added of this survey is its quarterly periodicity.

5.2 Financial pressure indicators for companies

A variety of recent publications provide evidence in the microeconomic area on the relationship between different financial variables and corporate employment and investment decisions. Hernando and Martínez-Carrascal (2003), with the annual data from the Central Balance Sheet Data Office, Banco de España, find that different variables used to measure the level of indebtedness, profitability and debt burden associated with debt of corporations are significant in explaining the behaviour of investment and employment demand, when controlled to reflect the effects of other relevant real variables. As we observe in Table 1, in the case of the investment equation, the estimated coefficients for this type of indicator are all significant and bear the expected signs. Specifically, increases in indebtedness and debt burden are associated with decreases in investment, while profitability is directly related to gross capital formation. In addition, these effects appear if we introduce each of these variables separately as well as when we consider the three simultaneously, which suggests that each presents an additional informative content.

Another noteworthy feature of these results is that the effect of some indicators, and particularly the debt burden, is non-linear. To reflect these effects, the estimated coefficient can have different values depending on the level of financial pressure. The third column of Table 1 provides evidence in this connection for the debt burden. We observe how this concept is only relevant in explaining investment expenditure when it exceeds the threshold corresponding to the 90th distribution profile. Column 4 of the table shows that these effects are maintained when the other two financial variables are added.

TABLE 1 IMPACT OF FINANCIAL VARIABLES ON INVESTMENT AND EMPLOYMENT

ESTIMATED COEFFICIENTS

	Investment				Employment			
Indebtedness	-0.091**	—	—	-0.052*	ns	—	—	ns
Profitability	—	0.201**	—	0.165**	—	0.127**	—	0.085**
Debt burden (<p90) (a)	—	—	ns	ns	—	—	ns	ns
Debt burden (≥p90) (b)	—	—	-0.004**	-0.002*	—	—	-0.004**	-0.003**

* Significant to 90%.

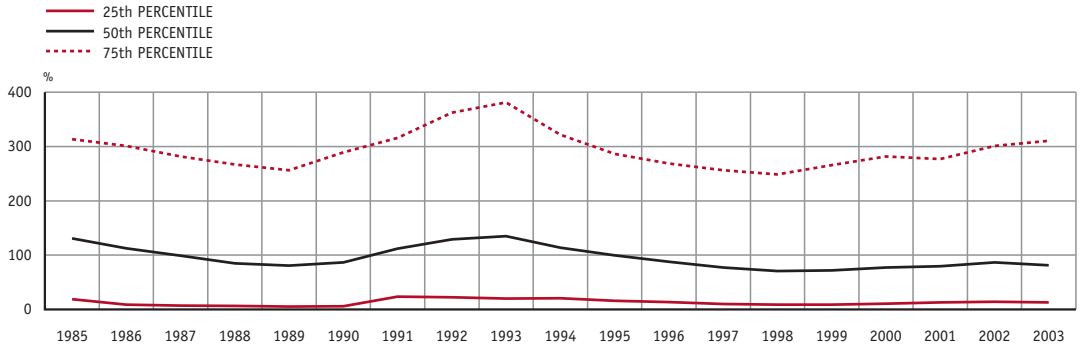
** Significant to 95%.

a. Debt burden when situated below the 90th percentile of distribution.

b. Debt burden when situated above the 90th percentile of distribution.

CHART 9 DEBT BURDEN, COMPANIES

Short-term debt and interest payments over gross operating profit plus financial revenue



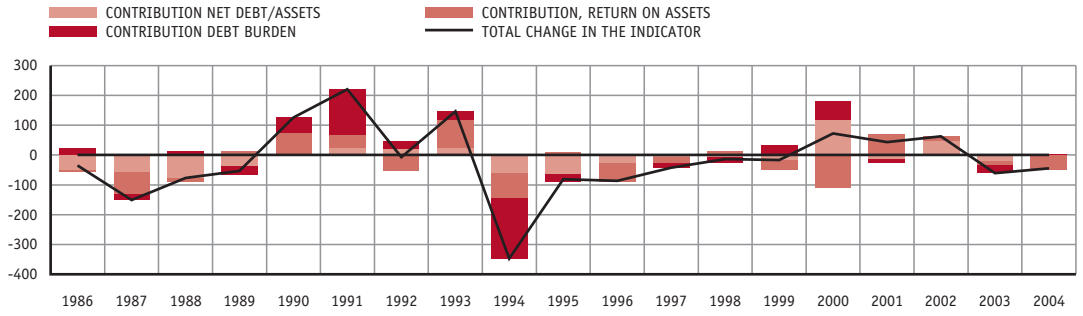
SOURCE: Banco de España.

In the employment equation, the results are the same, although the level of indebtedness does not appear to play any role, whether introduced separately or when considered jointly with other variables. The evidence supporting existence of non-linearities is quite similar to that described in the case of the investment equation (see Columns 7 and 8 in Table 1)[24].

As is true for households, another relevant characteristic for individual corporate data is the high degree of heterogeneity where some financial pressure indicators are concerned, as observed in the debt burden indicator shown in Chart 9. This property, along with the existence of non-linearities in the same variable, justify the relevance of using disaggregated data to characterise the financial position of the business sector.

[24] See Hernando and Martínez-Carrascal (2003) for further details.

CHART 10 CHANGE IN THE SYNTHETIC INDICATOR OF FINANCIAL PRESSURE ON INVESTMENT AND CONTRIBUTION OF ITS COMPONENTS



SOURCE: Banco de España.

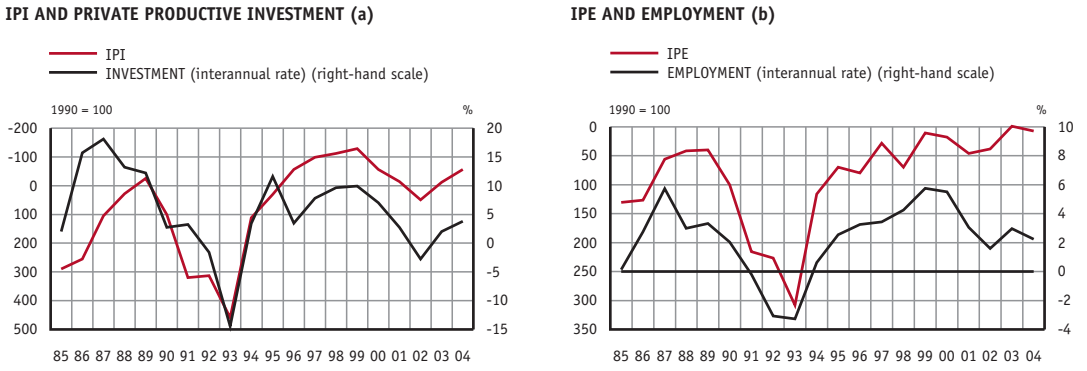
In keeping with the foregoing evidence, financial position analysis of non-financial companies is based on indicators reflecting information on the concepts discussed above: indebtedness, debt burden and returns on investment, along with the level of liquidity, which, although there is no evidence on its relevance in explaining companies' real decisions, is considered to potentially contain useful information.

These ratios are supplemented with two *synthetic indicators of financial pressure on investment and employment* that summarise information contained in the preceding items. For each corporation, these indicators are constructed as a weighted average of variables found to be significant in the investment and employment equation, respectively[25]. These statistics will subsequently be aggregated to generate indicators for the non-financial corporations´ sector. We observe that, as a result of the non-linear nature considered in their definition, these indicators cannot be calculated directly based on aggregate ratios. These statistics are presented as indices that reflect a value of 100 during a specific reference period. Accordingly, levels above 100 indicate a less favourable situation for investment or employment with relation to the reference period.

The main advantage of synthetic indicators is that they summarise the overall impact of the most important financial variables on investment and employment, which is particularly interesting in situations where the individual ratios provide contradictory results. Chart 10 presents changes in the synthetic indicator of financial pressure on investment for all corporations reporting to the Central Balance Sheet Data Office, and their contributions between 1986 and 2004. The chart clearly illustrates the relevance of this indicator. For example, in 2000, two of the three ratios (indebtedness and debt burden) indicated an increase in financial pressure on investment, while corporate profitability performance implied the contrary. The synthetic indicator shows a combined effect of a deterioration in the situation of corporations.

[25] The weightings used are taken from Columns 4 and 8 in Table 1.

CHART 11 CHANGES IN INDICATORS OF FINANCIAL PRESSURE VS INVESTMENT AND EMPLOYMENT



SOURCE: Banco de España.

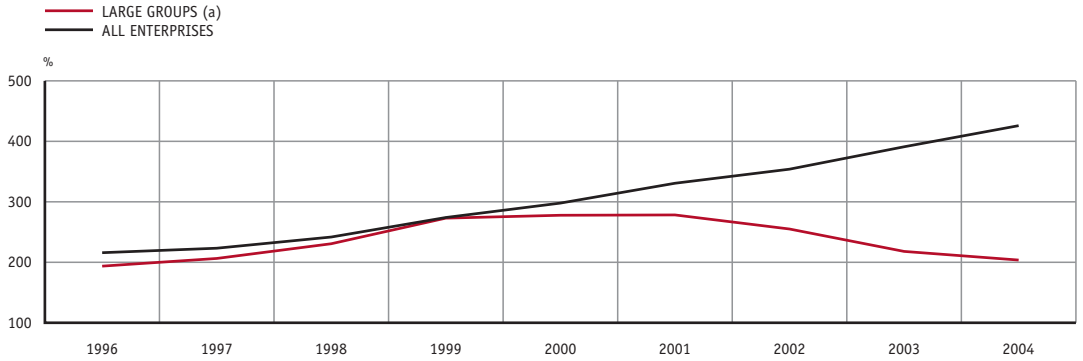
a. IPI: Indicator of financial pressure on investment.
b. IPE: Indicator of financial pressure on employment.

Chart 11 shows how a substantial correlation exists between synthetic indicators of financial pressure on investment and employment (inverted scale) for corporations reporting to the Central Balance Sheet Data Office, and the corresponding real variables for all Spanish non-financial companies. This illustrates the relevance of these indicators in explaining real decisions of non-financial companies, although their calculation only reflects information from a subgroup of corporations.

The foregoing financial pressure indicators are calculated for different aggregations generated based on information reported by individual corporations to the Central Balance Sheet Data Office. Specifically, the statistical distribution, various groups by size and sector, and the most indebted group are monitored[26]. These statistics are also calculated for all Spanish corporations, provided that information is available on the relevant concepts. This is true for the debt-to-earnings ratio and the interest debt burden. The sources used for aggregate indicators are national accounts and the financial accounts.

[26] Information from the Central Balance Sheet Data Office includes two different databases, one with annual frequency (CBA) and another with quarterly periodicity (CBT). The indicators based on the Central Balance Sheet Data Office are calculated, provided that responses are available for a significant number of corporations, based on the CBA, as its coverage is better the more companies involved and the more detailed the information. This information, however, is normally not available for short-term economic analysis, owing to the lags with which it is received. In these cases, the indicators are estimated by projecting on the last observed level of the CBA the changes in the ratio for all companies participating in the CBT. This procedure is preferable to simple substitution of CBA indicators with CBT indicators, as the level of the ratios in both databases is in most cases substantially different. Of course, the advisability of adjusting the projections will depend on the extent to which changes in the CBT ratios are similar to those of the CBA. Studies conducted to assess the validity of the procedure suggest that, in general, it is reasonable.

CHART 12 DEBT/GROSS OPERATING PROFIT PLUS FINANCIAL REVENUE



SOURCE: Banco de España.

a. Data for Endesa, Iberdrola, Unión Fenosa, Repsol YPF and Telefónica.

This approach, based on analysis of different levels of aggregation, makes it possible to identify differential performance potentially relevant in assessing the financial position of the corporate sector. For example, between 2001 and 2004, the increase in the debt-to-earnings ratio for all Spanish corporations was compatible with a reduction in this indicator for larger corporations, that resorted more quickly to borrowing in the immediately preceding years (see Chart 12). The balance sheet restructuring of these corporations between 2001 and 2004, which was not identified based on aggregate ratios, was an important factor in explaining the deceleration in investment during part of that period, illustrating the importance of using different types of breakdowns.

The foregoing financial pressure indicators are supplemented with a set of statistics to assess the *level of fragility* of the corporate sector. Specifically, four types of variables are used: *bank delinquency ratios*, *credit ratings* prepared by risk rating agencies, *CDS premiums* and a *synthetic fragility indicator* built with micro- and macroeconomic information[27]. These indicators are to some degree complementary, as their informational content can be different. More specifically, delinquency ratios reflect defaults that have effectively occurred, while the others theoretically anticipate credit problems that may occur in the future as a result of the current situation in the sector.

6 Final comments

In this chapter, we have analysed the relevance of monitoring monetary and financial conditions to assess the macroeconomic outlook, and have reviewed the main indicators used for that purpose. First, we presented a group of variables that basically make it possible to

[27] For further details on this variable, see Chapter 19 and Benito et al. (2004).

compare the level of tightness of monetary conditions in Spain in relation to EMU as a whole. As discussed, however, these variables are incomplete, as they do not reflect information on some relevant factors such as those related to the wealth effects or the financial position of corporations and households. Also, financing and investment conditions are only partially captured with those indicators. The rest of the chapter was therefore dedicated to describing the other indicators used to approach all of these factors.

We hope that, in the future, analytical work carried out in connection with the Survey of Household Finances will contribute to a better understanding of the impact of the household financial position on expenditure decisions in this sector, which will enrich the analysis of monetary and financial conditions.

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8. Fiscal policy: stabilisation, sustainability and growth

José Manuel González-Páramo

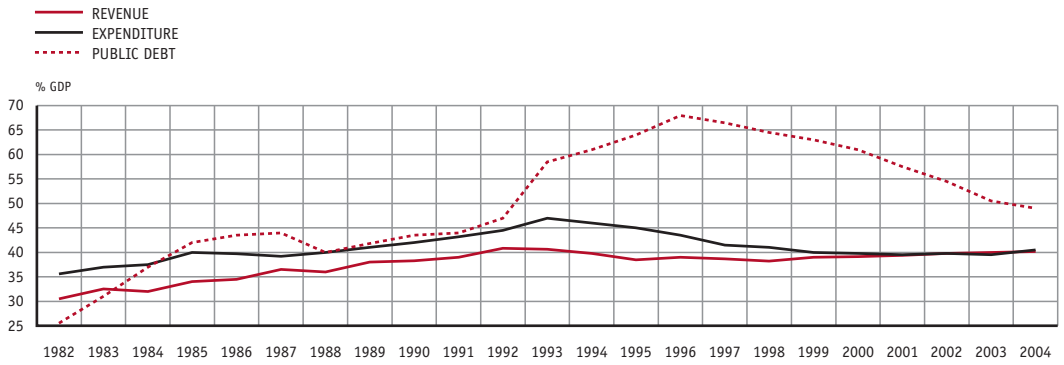
1 Introduction

One of the cornerstones of the consensus that engendered the Economic and Monetary Union (EMU) is the affirmation of the vital importance of rational, simple rules of fiscal acknowledgement discipline to guarantee sound, sustainable public finances, in support of macroeconomic stability. This consensus on the general features of the rules, rather than on the specific details, was forged against an historical backdrop of two decades of lax fiscal policy and macroeconomic instability. Indeed, throughout the 1970s and 1980s the monetary and fiscal policy mix was not generally conducive to stability. High levels of real interest rates, substantial and variable rates of inflation, foreign exchange tensions, wide public deficits, tax pressure and growing public debt gradually narrowed the authorities' margin for action, thus leading to smaller and more volatile growth rates than in earlier times [Lane (2003)].

The lessons learned during this period explain the widespread change in fiscal policy orientation that occurred in Europe during the early 1990s and offered the key motivation for the Maastricht Treaty, the process of nominal convergence to EMU and the Stability and Growth Pact (SGP).

Spain participated actively in this fiscal policy shift, as shown in Charts 1 and 2. Fiscal policy carried out during the period 1996-2004 made it possible to reduce the structural deficit to historically low levels (a deficit of 0.3 percent of GDP in 2004, with an improvement of 5.6 points since 1996), and to reverse the growing public debt trend (48.9 percent of GDP in 2004, a reduction of 19.2 percent as against 1996). This was clearly related to the reductions registered in inflation expectations and interest rates, which helped to create an environment of nominal stability required for higher and more sustained growth levels.

CHART 1 PUBLIC FINANCE TRENDS IN SPAIN, 1982-2004



SOURCE: INE (National Statistics Institute).

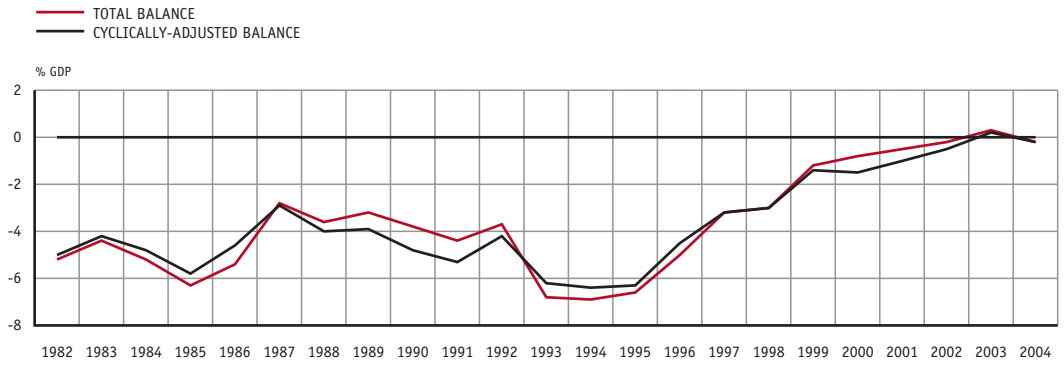
In recent years, however, the signs that the impulse associated with Maastricht has been losing steam have been quite visible, in Spain and, above all, in some EMU Member States. Are the current problems rooted in the fiscal rules we established for ourselves to ensure budget stability? And, in particular, are there costs associated with discipline, in the form of reduced stabilising capacity of fiscal policy and a smaller contribution to growth? If the answer to this question is a more or less qualified "no", can we expect the recent streamlining or *rejuvenation* of the rules to contribute positively to stability and growth? This chapter will address these three questions, after a review of the economic rationale of rule-based budget discipline.

2 Why budget discipline rules?

One of the most important economic policy lessons from the experience of the latter decades of the past century is that the quality of results of measures adopted by a government cannot be explained exclusively in terms of the economic policy instruments used; the institutions are equally, if not more important. For this reason, rules-based economic policy has become more widespread, for monetary policy (independence of central banks and constitutional or legal price stability targets) as well as for fiscal policy. The fiscal rules of the Maastricht Treaty and subsequent development in the Stability and Growth Pact constitute one of the pillars of EMU.

The main justification of the rules is derived from political economy. Economic policy is designed and executed by the authorities, within the framework of the political institutions: the constitution, electoral legislation, budget legislation, rules of government and territorial organisation of the state. The democratic institutions within themselves contain a bias that tends to be at odds with fiscal discipline and responsibility. Although the costs in terms of growth derived from high public deficits and substantial public debt would seem

CHART 2 TOTAL PUBLIC BALANCE AND CYCLICALLY-ADJUSTED BALANCE, SPAIN, 1982-2004



SOURCES: INE and Banco de España.

to have been generally acknowledged, there is little incentive for the political authorities to reduce budget imbalances.

The basic explanation of this bias is simple: expenditure is targeted at specific social groups – and the government has the power to block potential cuts, and will in any case bear the political brunt for attempting to reduce the benefits they enjoy – while revenue comes from a *common pool,* i.e. total tax revenue. The political authorities, who have their own agenda, try to gain popularity by financing specific programmes using the fund. In other words, they promote benefits for a few financed with taxes applied to everyone. And so the political authorities tend to underestimate the social cost of taxes and offer excessive expenditure programmes [Persson and Tabellini (2002)]. If we add to this the short-term horizon in which political authorities take decisions – determined by the electoral calendars and by uncertainty as to the long-term effects of their decisions – and the fact that future taxpayers do not vote, the incentive to finance expenditure with debt is easily understood.

If the constitution or the laws do not limit this bias, the deficit and expenditure will tend to grow above their socially desirable limits, and certain political institutions may promote fiscal laxness. This occurs, for example, when the electoral legislation is proportional and promotes minority or coalition governments, as more interests are represented in government; or when legislatures are excessively short-lived; when cabinets are too numerous (in terms of portfolios) or fragmented (into political groups); or when the political decision-making of the state is decentralised, if the subcentral governments have insufficient revenue capacity of their own. For example, Kontopoulos and Perotti (1999), and Hallerberg and Von Hagen (1999a and 1999b) provide convincing empirical evidence on the effects of these political variables and the propensity to run deficits.

Accordingly, political institutions can generate shocks and instability. When citizens have heterogeneous, changing preferences, there is uncertainty surrounding effective fiscal policy results. Political representatives are elected periodically in light of varied characteristics. Governments may behave opportunistically and pursue their own political agenda

– to maximise electoral support – in a political market dominated by "fiscal illusion." The existence of electorally-driven budget cycles is the most notable example of this type of activity. The rules can aim to curtail such cycles, although not always with guaranteed success [Buti and Van der Noord (2003)].

Widespread belief among the political authorities that excessive expenditure and budget disequilibria adversely affect economic growth and the standard of living of the citizens in the medium and long terms is not a sufficient condition to eliminate these incentives. The political system is difficult to reform, except in situations of profound economic or political crisis, as these changes affect the national political balance and may not be valued equally by the parties, also depending on their presence or absence of government; or they may be blocked by powerful interest groups.

There are, however, two types of reforms that can substitute for political reforms without affecting the basic political institutions: reform of the economic institutions and policy rules. First, delegation of economic policy decisions to independent institutions can strengthen the credibility of macroeconomic policy. A second type of reform that can be used in the short and medium terms to meet fiscal responsibility objectives targets budget institutions, including, *inter alia,* rules on the deficit, expenditure, or debt. These rules – whether quantitative targets or rules of procedure – determine the level of fragmentation in the budget process, its credibility and the quality of its results. Accordingly, budget reforms may qualify as substitutes for political reforms (Reviglio, 2001). This approach entails imperfect substitutability, in any case, as the dynamics of public revenues and expenditures are essentially rooted in policy and economics.

Having established the central political economy argument , it should be pointed out that fiscal rules have further advantages. They facilitate budget co-ordination when applied at the subcentral level in decentralised countries. They also contribute to medium- and long-term sustainability of public debt and, in broadening the margin for action in light of macroeconomic shocks, they can improve the anti-cyclical response capacity of national fiscal policies [Von Hagen and Harden (1994)].

While rules may be recommended in the national context, for the reasons discussed above, where a monetary union without a federal budget is concerned, they become necessary, for three main reasons. First, the states do not retain control of their monetary and exchange policies to address economic shocks affecting them. Fiscal policies might cushion this type of shocks if the starting situation is sound. Second, member countries of a monetary union may be more prone to run deficits, since countries that apply more relaxed fiscal policies basically enjoy the short-term political benefits of a deficit, while the negative consequences on interest rate levels spread out onto all members of the union. This is particularly clear when monetary policy is forced to react to protect its ultimate objective: price stability. Indeed, the rules help offset "fiscal externalities" and can facilitate budget co-ordination within the union [Marín (2002); Detken et al. (2004); ECB (2004)]. And last, the rules can help limit the drift towards excessive indebtedness encouraged by the limited penalisation that any particular economy pays in the form of higher cost of debt. The elimination of the exchange rate risk in a monetary union, in fact, reduces the sanctioning role of the financial markets, reflected in the public debt yield differentials. The reaction of some increasingly globalised markets, in light of unsustainable fiscal policy in a single country

that belongs to a monetary union will probably be slow and reflected only partially, in the short term, in the public debt yield differentials, even if the governments – as occurs in EMU – are unable to rely on financial assistance from others to address their fiscal difficulties. In this context, therefore, the signals of the financial markets might constitute an inefficient deterrent factor to encourage governments to fully consider their long-term budget restrictions [Afonso and Strauch (2004); Balassone et al. (2004)].

In the case of EMU, this logic adds to the need to support the stabilising role of common monetary policy. In addition to legal independence, in fact, the European Central Bank must guarantee its functional independence through rules to ensure fiscal solvency. Canzoneri, Cumby and Diba (2002) show how the rules of the Maastricht Treaty and SGP, if effective and credible, should assure that control of the objective of price stability remains essentially in the hands of common monetary policy. Section 5 will return to the justifications of fiscal rules, with special emphasis on political economy considerations.

Clearly, the common rules within EMU are not substitutes for the necessary national legislation reforms in those countries with less stringent fiscal traditions during the years prior to the formation of the union. In this connection, Spain's case offers an interesting example. As an EU Member State, Spain is subject to all rules of the Maastricht Treaty and the SGP. However, the fiscal stability law *[Ley de Estabilidad Presupuestaria* – LEP], in effect since 2002, introduced greater stringency into the limits on expenditure and balance or surplus targets. What does this mean? Although, in the next few years, the risk of incurring an excessive deficit is lower than in other cases within EMU, in a longer term, maintenance of fiscal discipline will require greater domestic efforts, for three basic reasons: consolidation fatigue, fiscal policy in neighbouring countries and persistence of structural problems reflected in public expenditure, that introduce a bias contrary to medium-term sustainability.

Consolidation fatigue has been visible since 1999. This tapering off of the consolidation impetus is quite evident in all EMU member countries. According to the Commission's estimates from spring 2005, the structural deficit in the area has remained unchanged at approximately 2.4 percent of GDP, a figure similar to or slightly higher than the figure registered in 1997; and the primary structural balance worsened by 1.1 points of GDP during the period 1999-2004. The situation was clearly better in Spain: the structural and primary structural balances improved by 1.6 and 0.6 points, respectively. However, these reductions are small as compared with those registered in previous years, as shown by the figures in Table 1, which also suggests difficulty in maintaining a rigorous fiscal policy orientation when an equilibrium or surplus position has been attained.

Further, the fiscal policy stance in the neighbouring countries, and particularly in those belonging to the euro area, did not help maintain these efforts. Von Hagen et al. (2001) underscore the importance of a restrictive fiscal policy stance followed by the other countries for continuity in consolidation of the domestic environment. The *contagion effect* of laxness on the part of surrounding countries may be offset, at least temporarily, with stricter rules.

Maintaining fiscal discipline in Spain may therefore require a greater effort from within, to anchor the achievements of consolidation. This effort, however, can only be beneficial in the long term if the authorities focus on trying to stop the underlying growth tendency in structural deficits. Among the factors leading to such increases, we should first point out the ageing of the population that directly influences expenditure on pensions, health assist-

TABLE 1 FISCAL POLICY INDICATORS: SPAIN, 1995-2004

% GDP

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	1995-2004
General government balance sheet	-6.6	-4.9	-3.2	-3.0	-1.2	-0.9	-0.4	-0.1	+0.4	-0.3	
Change (in % of GDP)											
Observed deficit		-1.7	-1.8	-0.1	-1.9	-0.3	-0.4	-0.2	-0.6	+0.6	-6.4
Cyclical component		+0.1	-0.3	-0.5	-0.4	-0.3	+0.1	+0.3	+0.1	+0.2	-0.6
Cyclically-adjusted deficit		-1.8	-1.3	+0.3	-1.5	+0.1	-0.5	-0.5	-0.8	+0.4	-5.6
Interest expenditure		+0.1	-0.5	-0.5	-0.7	-0.2	-0.2	-0.3	-0.3	-0.3	-3.0
Cyclically-adjusted primary deficit (a)		-2.0	-0.8	+0.8	-0.7	+0.3	-0.3	-0.2	-0.4	+0.8	-2.7
Total revenue		-0.5	+0.2	+0.3	-0.7	0	-0.2	-0.6	-0.2	-0.1	-1.8
Total expenditure		-1.2	-2.0	-0.4	-1.2	-0.3	-0.4	+0.4	-0.3	+0.8	-4.6
Collective consumption+current transfers		-0.3	-0.8	-0.2	-0.3	+0.2	-0.4	+0.5	+0.1	+0.1	-1.2
Investment		-0.6	0	+0.1	+0.1	-0.3	+0.2	+0.2	0	+0.2	-0.1

SOURCES: INE and Banco de España.

a. A negative sign denotes a restrictive fiscal policy stance, and a positive sign an expansionary stance.

ance and care for dependent persons. Another element that requires reforms is public expenditure management criteria, a topic that will be addressed in Section 4. In many countries, the dynamics of public expenditure continue to reflect an excessive influence of inertia and growth marked by the *committed expenditure philosophy* and by the absence of target-based management. To all of this we should add, in Spain's particular case, the effects to be expected in the medium term from a projected decline in community funds received from 2007 onwards, earmarked predominately to investment. This reduction in funding, along with other consequences of EU expansion, should be addressed essentially on a national basis. We shall return to this topic in Section 4. First, however, we shall address a central issue in the debate on reform of fiscal rules. Is there a trade-off between medium- and long-term sustainability and short-term stabilising capacity?

3 Stabilising capacity and rules of fiscal discipline

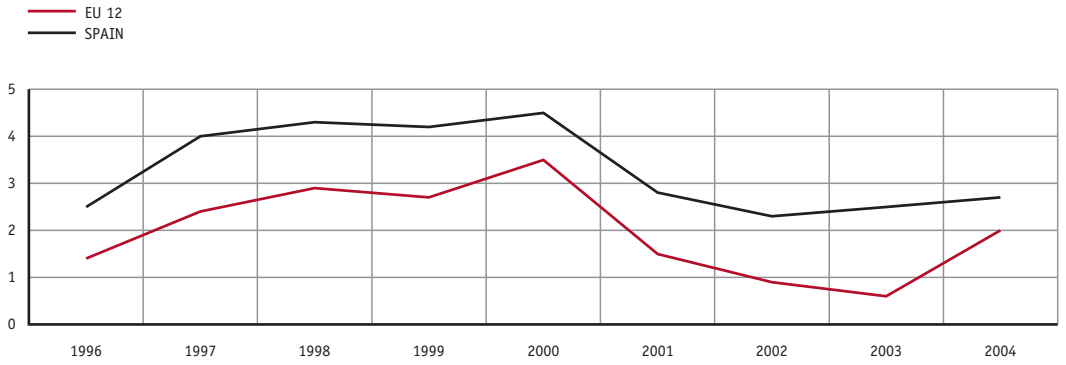
It is difficult not to agree with the assessment that budget discipline has been a source of substantial benefits for all countries of the euro area. Increased national savings, reduced medium- and long-term interest rates and the contribution to credibility of anti-inflation objectives, among others, stand out [González-Páramo (2001); Lima, Serres and Kennedy (2003)]. Throughout Stage 2 of EMU, however, it was argued that consolidation could also have costs in terms of growth and employment, and many economists maintain that sustaining fiscal discipline may entail future costs by impeding the stabilising function of fiscal policy.

The costs of consolidation that unfortunately had to be expected would derive from budget adjustment programmes that countries intending to accede to EMU in 1999 were required to apply. However, the experience of countries such as Spain, as illustrated in Charts 1-4, or Ireland, among others, suggests that the traditional Keynesian contractionary effect of demand was offset with non-Keynesian effects. The most recent literature explains the occurrence of non-Keynesian fiscal policy effects in some countries during certain periods of time, with a combination of the following elements: agents' expectations, intertemporal nature of adjustments (front loading), non-linear impact of fiscal policy affected by initial public debt and deficit levels, and composition of adjustment packages. Considering only agents' expectations on the future tends to reduce the value of fiscal multipliers and may explain the appearance of non-Keynesian effects (contractionary budget expansions and consolidations with positive short-term impacts on aggregate demand) in situations of rapid growth of debt.

There is no lack of evidence, based on the analysis of the key fiscal consolidations carried out in the OECD during the past 30 years, that supports – under specific conditions – the absence of short-term costs of budget adjustments [for example, OECD (1996); Perotti (1996); Alesina and Perotti (1995); Giavazzi and Pagano (1996); Fatás et al. (2003); and European Commission (2003)]. Improvements achieved in inflation and deficit reduction in many countries generally and systematically did not entail substantial costs in terms of output and employment. There are two factors that help offset the short-term contractionary effect on demand: a mix of adjustments – revenue and expenditure categories – tailored to the requirements of economic growth; and mechanisms having a number of features – structure, scope and permanency – to enhance expectations of solvency and public debt sustainability and to support aggregate supply. Consolidations of an appreciable scope, sustained over time, concentrating on current expenditure (public consumption and transfers), can promote substantial reductions in long-term interest rates and defuse the risk of future tax increases in countries subject to budget stress. In this framework, lower costs of credit, maintenance of public investment, favourable wealth effects on consumption and expectations of greater macroeconomic stability should largely offset the initial contractionary effect. The experiences of Ireland and Denmark during the early 1990s, Italy during the middle of the same decade and Spain during the latter half of the 1990s would seem to fit well into this pattern. Charts 1-4 and Table 1 support some of these characteristics in the Spanish case. Fiscal adjustment was concentrated during the period 1996-1999; half of the primary deficit reduction was attributable to cuts in net interest expenditure and three fourths of the latter was accounted for by reductions in collective consumption and transfers.

Can we accept this general explanation to justify the fact that the post-Maastricht consolidation lacked contractionary effects in the case of the EU as a whole? Considering that France and Germany, the two leading members of EMU, registered a relatively sound fiscal situation during the early 1990s, the question cannot be settled with the examples cited. Von Hagen, Hughes Hallett and Strauch (2001) analyse this matter by estimating a dynamic tri-equational system to explain the real GDP growth rate, the change in the primary structural surplus and an index of monetary conditions (real interest and real exchange rate type function). The estimation was initially carried out on a sample of 20 OECD countries for the period 1973-1998. The results show a significant negative effect of fiscal policy on out-

CHART 3 COMPARATIVE GDP TRENDS IN SPAIN AND THE EU (a)



SOURCES: INE and EC.

a. Annual GDP growth rates.

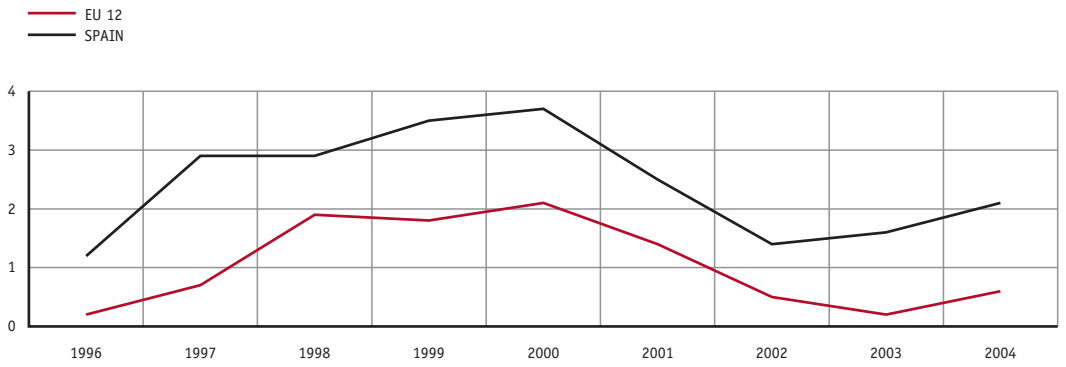
put: One year after an increase of approximately 1 percent in the structural deficit, the real growth rate declined by 0.12 points. The monetary policy reaction function aggravates this effect as it tends to set in, in response to fiscal consolidation, leading to 0.05 points of further deterioration in the growth rate. If we re-estimate the system for a sample of only EU countries during the period 1990-1998, the direct fiscal policy effect vanishes and the monetary policy effect stops responding to fiscal policy. These findings have one important implication. During the 1990s there seems to have been a structural change reflected by a significant reduction of costs in output of budget adjustments, which cancelled themselves out. These findings suggest that the non-Keynesian effects of fiscal policy in some countries have offset their traditional Keynesian effects in others.

To the non-conventional effects based on phenomena of expectations that can be anticipated to cease to operate once the fiscal situation is corrected, we must add the non-Keynesian supply effects. As shown by Alesina et al. (2002), fiscal policy may continue to exert non-Keynesian effects even outside contexts of fiscal stress. This channel relates to the labour market, profits and investment. A cut in public expenditure, particularly focused on wages and salaries, tends to reduce the equilibrium wage, in competitive economies as well as in highly unionised ones. Lower wages entail greater present and future profits and, as a result, higher levels of investment.

Moving to present and future policy issues, are there arguments and evidence that the European fiscal rules substantially limit the stabilising capacity of fiscal policy throughout the economic cycle? This is a very important question, particularly in the case of countries that have adopted more demanding rules on equilibrium and surpluses, such as Sweden, Denmark and Spain.

In this connection, we should distinguish automatic stabilisation from discretionary fiscal policy activities. Clearly, if an economy maintains a deficit of around the limit of 3 percent, when it grows at or above the potential rate, as has been the case in some euro area countries later subject to the excessive deficit procedure, a cyclical deceleration will im-

CHART 4 COMPARATIVE EMPLOYMENT TRENDS IN SPAIN AND THE EU (a)



SOURCES: INE and EC.

a. Annual employment growth rates.

pede the free operation of automatic stabilisers if the rules of the old SGP must be followed and this limit is not to be exceeded. In this line of thought, the European Commission (2002) decided to calculate a number of cyclically-adjusted deficit ceilings, or minimum benchmarks, whose observance theoretically would make it possible to fully exploit the automatic stabilisers without risk of exceeding the 3 percent deficit limit.

Corroborating this argument, Leeftink (2000) demonstrates empirically that some countries with lower structural deficit levels and public debt ratios tend to benefit from a greater automatic stabilising capacity. In this connection, Galí and Perotti (2003) and Andrés and Doménech (2005) conclude that the response of automatic stabilisers has increased substantially in EMU countries following introduction of the Maastricht fiscal framework in 1994. There is no evidence that would lead us to expect the discipline incorporated into the Stability and Growth Pact and the Spanish Fiscal Stability Law would reduce the stabilising capacity of the budget.

This is encouraging, as margin for fiscal policy action has been particularly necessary since 1999, in light of the priority assigned to price stability, in the mandate of the European Central Bank for its monetary policy orientation, that should serve as a reference for general conditions in the euro area. In fact, simulations by Taylor (2000) conclude that the adequate response of automatic stabilisers to changes in the output gap should increase when monetary policy lacks an explicit objective for stabilising the level of real economic activity. This is precisely what the above-mentioned evidence suggests that has occurred over the last decade: fiscal rules do not appear to have limited the automatic response capacity of the budget to cyclical fluctuations; the contrary is rather the case.

However, if we would consider the automatic deficit response to be insufficient, budget activism should be discussed. However, in this connection discretionary fiscal policy is increasingly deemed insufficient and ineffective. Fiscal activism has tended to be procyclical in the U.S. and EU countries. This evidence is corroborated by Canzoneri et al. (2002) and

TABLE 2 FISCAL POLICY AND CYCLE BEFORE AND AFTER THE "MAASTRICHT YEARS"

	1995	1996	Excluding "Maastricht years"	
			1997	1998
Correlation —*output gap*— change in cycle adjusted balance (%)	-3	-37	-32	+1
Procyclicality index (%)	54	60	63	43
Procyclical expansions (%)	50	100	75	100
Procyclical contractions(%)	60	50	50	20

The procyclicality index is the percentage of years during which the cyclically-adjusted balance change and the output gap register a different sign.

by the European Commission (2001): of the 45 significant episodes of fiscal activism that occurred in the EU during the period 1970-1997, 37 were procyclical, a particularly recurrent result in the expansions. The evidence for Spain in the past two decades points in the same direction. As shown in Table 2, the procyclical stance has dominated. These results, attributable essentially to the known delays in acknowledgement, design and impact of fiscal policy, along with the irreversibility of many discretionary measures and the lack of symmetry that the political institutions tend to introduce into adjustments [Corsetti et al. (2002)], cast scepticism on any realistic analysis of discretionary fiscal policy as an anticyclical tool.

Without excluding the possibility that the authorities may need to resort to discretionary measures in certain exceptional circumstances, experience does not permit us to conclude that the limits that the Stability and Growth Pact and Fiscal Stability Law have placed on discretionary adjustments can be considered a cost, for two basic reasons. First, perhaps counterintuitively, the literature provides no sound evidence that the SGP rules have made fiscal policy more procyclical in recent years [see Fatás et al. (2003), Galí and Perotti (2003) and European Commission (2004)]. Once again, the Spanish case is illustrative in this connection, as we learn from the data in Table 1. And second, as procyclical activism has its costs in terms of uncertainty and permanence of measures, the fiscal rules of Maastricht, the SGP and, therefore, complementary national legislation may be a source of additional benefits in the future, if properly implemented. This is confirmed by the results of Fatás and Mihov (2003) for a broad sample of countries: the benefits of limiting discretionality – that is, higher rates of growth derived from lower levels of fiscal policy volatility – exceed the possible costs.

The recent fiscal events in Europe illustrate the consequences of procyclical, asymmetrical activism. In 2004, one third of the EMU members registered a deficit of 3 percent or more, and half of the cases exceeded 2.5 percent [European Commission, (2005a)]. In all cases, the source of these problems has been a neutral or expansionary fiscal policy stance during the best years of recovery in the late 1990s and the early part of the present decade, specifically when consolidation would have been required to meet the objective of moving toward equilibrium in the structural balance. Accordingly, the task of maintaining or reduc-

ing the structural deficit throughout the cycle is requiring, and will require – if the fiscal rules must be strictly observed – a restrictive procyclical policy during a low growth period. The greater variability that these changes introduce in the course of activity is not contributing to recovery. It is not, after all, easy to escape the observance that the present difficulties are not rooted in the rules of the SGP. They can basically be attributed to policy errors that led to a failure to capitalise on the economic boom years to progress towards medium-term fiscal targets. This does not mean that improvements to SGP implementation should be overlooked to make it a more symmetrical, faster-acting mechanism throughout the cycle.

In light of the foregoing discussion, we can draw two conclusions in respect of fiscal policy. First, international and Spanish experience lead to some degree of scepticism around the possibilities that discretionary policy tends to help offset cyclical fluctuations. Second, it is clear that a strict budget balance rule limits the potential to adopt significant discretionary measures, although this margin would broaden when the structural deficit (surplus) at the outset is greater (smaller). It can be concluded in this connection that perhaps the limits to discretionary policy are not as serious or concerning as one might expect; they could even be a source of benefits in the form of higher growth levels. More than a trade-off between budget sustainability based on stabilising capacity and rules, the arguments developed identify a substantial level of complementarity.

4 Fiscal rules and economic growth

Fiscal rules are also criticised frequently for their alleged inhibiting effects on growth. This might in fact be the case if they were inevitably associated with decisions such as cuts in public investment or limits in other areas related to long-term growth. As indicated above, however, there are a number of different channels through which the fiscal rules benefit growth. First, in strengthening fiscal sustainability, an element of uncertainty is eliminated regarding the possibility of cuts in social benefits or tax increases in the future. Second, some of the rules that limit shocks derived from volatility of discretionary short-term fiscal policies tend to increase growth rates significantly. Third, to the extent that the rules place *hard* budget restrictions on governments, the latter will have more incentives to design less costly expenditure programmes and to manage funds more efficiently – breaking the inertial patterns of increase – and to collect taxes more effectively. Through these three channels, the aim is to reduce the propensity to deficit-spend and increase growth, thereby improving medium- and long-term fiscal sustainability.

Having presented these general conclusions on the relationship between fiscal rules and growth, we should focus some attention on the controversial relationship between fiscal rules of discipline and public investment. Of course, public investment expenditure is a natural candidate for budget cuts, for reasons of political visibility, and because they involve a less rigid type of expenditure [De Haan et al. (1996)]. There is abundant international evidence on this association between deficit reduction and reduction in public investment. In OECD countries, fiscal consolidation efforts have generally been accompanied by reductions in public investment in four out of every five cases during the last three decades [Roubini and Sachs (1989); De Haan et al. (1996); Balassone and Franco (2000)]. It would

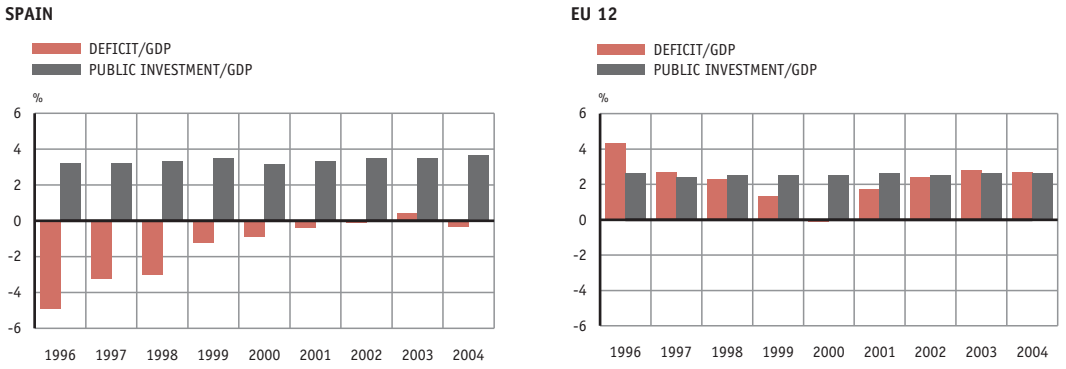
seem, at first glance, that Spain is no exception. If we econometrically relate the change in weight of public investment in GDP with the changes in the ratio of the primary structural deficit to GDP since the mid-1960s, each percentage point of reduction in the primary structural deficit is associated with a short-term decline in public investment of just under 0.2 points [González-Páramo (2001)]. This is a figure disproportionate to the weight of investment in the expenditure budget (less than 10 percent), or with its participation on overall revenue and expenditure, as the latter can also be used to reduce the deficit.

Given the positive effects of public investment on productivity in the private sector and the objectives of competitiveness under the Lisbon Agenda, as well as the relative lag of some European countries in the area of infrastructure, up to what point can the SGP and LEP place economic performance at risk? There are compelling reasons that prevent us from being excessively pessimistic. In analysing the Spanish case, we observe that there is no long-term relationship between levels of public investment and the deficit, nor do we detect any statistical causality between the two variables in any direction. In other words, the association between changes in the deficit and investment is only visible in the short term, while public investment is independent of the deficit in the medium and long terms. During the period 1995-2004, the total deficit improved by 6.3 points of GDP and the primary structural balance by 2.5 points. As shown in Chart 5, however, investment expenditure, following a substantial cut in 1996, in 2002 reached a level similar to the figure registered in 1995, a year before the beginning of budget consolidation during the latter half of the 1990s, maintaining a favourable differential of just over 1 percent of GDP in respect of the average for the euro area. Chart 5 also illustrates the lack of relationship between public investment and the deficit in the framework of the euro area. Neither the consolidation of the period 1996-2000 discernibly affected public investment, nor did the later expansion in the deficit seem to have any relationship with that variable.

These conclusions should be viewed with caution, as they are based on important, albeit descriptive, information. In reality, throughout the last decade, we observe a slight decline in the weight of public investment in GDP in EMU countries. The analysis by Galí and Perotti (2003) concludes, however, that it is difficult to attribute this trend to the Maastricht Treaty or to the SGP. In fact, other industrialised countries not subject to European fiscal rules experienced even greater declines and, within the euro area, the decline in public investment was even more pronounced prior to Maastricht. This rejection of the assumption that establishment of EMU had negative consequences on public investment is corroborated by the econometric analysis of the determinants of public investment developed by the European Commission (2003) for all members of the EU during the period 1970-2002. According to this analysis, processes of debt and structural deficit reduction tend to exert pressure on public investment. This relationship, however, would seem to have varied since 1993. From that time, the structural deficit changed sign, combining a smaller deficit and greater public investment. Accordingly, establishment of EMU would seem to have a direct, positive impact on investment, regardless of the deficit and debt situation. This might be explained by the reduction of the interest burden and expectations of streamlined public finances in the framework of EMU fiscal rules.

Some academic and political criticisms of the European fiscal rules, particularly in respect of the Spanish LEP, have focused on failure to comply with the *golden rule* of public

CHART 5 COMPARATIVE PUBLIC INVESTMENT TRENDS IN SPAIN AND THE EU



SOURCES: INE and EC.

investment. According to this rule, a deficit generated by public investment expenditure would be justified as efficient and equitable, as the future returns on this investment would offer a tax assessment base from which to collect revenue – to be paid for by the beneficiaries of the investment – to cover interest payments and repayments of principal.

The logic of the *golden rule* faces practical problems that cast doubt on its desirability, particularly as a criterion of intergenerational equity, for a number of reasons. First, because it creates incentives to classify current expenditure as capital expenditure. In addition, it introduces a favourable bias to physical capital investments – contrary to expenditure on human capital formation, classified largely as current expenditure (substantially education and health) – that have little justification in terms of social returns and distributive considerations [Buiter (1998)]. Further, it overlooks the current expenditure required for the investment to yield returns. And last, it does not discriminate between productive investments and those that only meet criteria involving political returns. In summary, as it is desirable in catching-up countries to keep public investment expenditure above the EU average to reduce the infrastructure gap between them, and as it is also desirable for the EU as a whole to strengthen investment to enhance economic performance throughout Europe, the thesis that this objective is threatened by the Maastricht rules, or by national fiscal rules such as the Financial Stability Law, is much more controversial. Neither the necessity to maintain the level of public investment justifies a deficit, nor should the objective of reducing the deficit appreciably affect public investment.

Referring to this rule as a criterion of intergenerational justice has an implication that may prove surprising for its supporters. If it is fair for future generations to pay with their taxes for the benefits of investments made today, it should also be fair for the current generations to pay for benefits they will enjoy in the future, and particularly in the areas of pensions and health. This implies that some countries should maintain substantial surpluses for a number of decades [Buti (2000)]. The unqualified defence of the weak golden rule, that of the deficit with any justification, can only be understood as if one fails to consider

alternative forms to finance public investment, as well as the need to enhance public finance efficiency. This necessity has become inevitable in countries such as Spain, in light of the formidable challenge of EU expansion.

Enlargement will produce quite complex effects in the Spanish economy, with contrasting signs, and both temporary and permanent effects. The scope of all of these shocks has been estimated by Martín et al. (2002) in a reduction of GDP – in respect of the baseline without expansion – of 0.4 percent in the short term, in 2004, to a maximum of 1.8 percent in 2008, tapering off to 1 percent in 2014. Against this backdrop, we can inquire what is the best fiscal policy response.

Using as a benchmark the elasticities of the deficit in respect of the output gap [European Commission (2002)], the deficit can be expected to register an automatic increase of 0.7 percent of GDP in 2004-2008, as a maximum, and this figure should decline to 0.4 percent in 2013. This involves an apparently small, acceptable impact. We could also, however, even consider that the size of the shock would justify a transient expansionary discretionary reaction from the budget authorities.

It can be argued, however, that neither discretionary expansion, nor, in all likelihood, automatic deficit slippage is justified. The strongest short-term impact will derive from the commercial adjustment associated with a decline in output in the marketable sector, that can be expected to be transient with a downward adjustment of prices and wages, required to recover markets initially lost to foreign competition. In light of the depreciation in the real exchange rate achieved in this connection, an expansionary discretionary policy might delay the required adjustment in the external sector [Alesina et al. (2001)] and generate further problems if the normal lags in adopting fiscal measures and their tendency to be permanent in the long term do not receive proper attention.

As the remaining shocks are predominantly supply oriented, they are durable with a net negative sign. Although liberalisation and expansion of markets will entail progress in productivity and reductions in prices and costs, this process will be relatively slow and quantitatively more modest in scope than reductions in the rate of increase in productivity derived from the possible initial reduction in direct investment flows received, as well as later cuts in assistance for structural activities from the EU budget.

The appropriate reaction to a permanent negative supply shock is a reduction (increase) in the structural budget deficit (surplus) that offsets the effects of automatic stabilisers. The automatic response of the budget balance to permanent changes in aggregate supply tends to be destabilising, as it delays structural adjustment and prolongs inflationary tensions [Artis and Buti (2000); Buti et al. (2001); Corsetti et al. (2002)].

The required adjustment in the structural budget balance might be avoided, however, provided that steps are taken to restructure public revenue and expenditure, with a view to enhanced budget efficiency, within a package of reforms intended to promote growth and increase the resilience of supply. Among these measures, we can highlight support for public investment, reduction of taxes on labour, reform of the tax system to eliminate obstacles to productive investment, mobility and, in general, flexibility of supply. These initiatives should be viewed in a broader context of structural reforms that should include the liberalisation of the labour and product markets, the promotion of investments in physical and human capital and public sector reforms leading to more efficient management of public services.

5 Reforming the rules of discipline

The application of fiscal policies in the euro area has been problematic in recent years. Although fiscal disequilibria did not reach the levels of the preceding recession during the latest economic slowdown, and the growth trend in the public debt ratio was held – to the credit of the original SGP as an instrument to prevent major budget policy errors [Briotti (2004)] – the fiscal situation has clearly deteriorated in some euro area countries. As discussed above, half of these countries in 2004 registered deficits near or exceeding the limit of 3 percent. At the same time, SGP procedures established to prevent and correct excessive deficits have not always been observed adequately.

This lack of strict compliance has cast doubt on the need for an effectiveness of the EMU fiscal rules, which has generated an intense debate among the academic world, the informed public and economic policy authorities. In this context, the European Council decided on 23 March of the past year to approve some changes in the SGP. The changes affect both the preventive and the corrective arms of the Pact.

Essentially, although the fundamental elements of the SGP are nominally maintained in their quantitative references, the excessive deficit procedure – the *corrective arm* of the Pact – becomes less stringent in the definition of *exceptional circumstances* that could avoid triggering the procedure, and introduces a long list of *other relevant factors* that should be considered when the decision has been adopted to initiate the procedure, after the deficit has been exceeded on a *transitory basis while remaining close to the reference value,* i.e. the limit of 3 percent. Accordingly, the SGP gains sophistication and adaptability, what it loses in terms of transparency and clarity, increasing the risk that pressure for a rapid reduction in deficits will soften and the principle of equal treatment under the Treaty will not materialise in a strict sense. In this connection, the changes introduced are cause for concern that can only be relieved through implementation of the new SGP rules. From this point on, all efforts should aim to prevent changes to the *corrective* arm of the SGP from undermining confidence in the EU budget framework and fiscal sustainability of euro area Member States.

At the same time, SGP reform has changed its *preventive* arm by introducing the obligation to strengthen progress toward medium-term objectives during boom cycles and adapting these objectives and the path of adjustment to national circumstances (potential growth, level of debt and structural reforms). These changes, unlike those discussed earlier, are consistent with the potential strengthening of the SGP, although at the risk of also opening the door to more discretionality, as their application will rest upon quantification methods (potential growth rates, effect of exceptional measures and budget impact of structural reforms, among other factors), on procedures yet to be defined, and on enhanced governance under the Pact – based on adaptation of national legislation to complement the SGP, strengthening the quality and integrity of statistics and enhanced reliability of macroeconomic projections, in essence – that should move from intentions to specific decisions for each country.

This assessment of the reform, which is necessarily succinct and provisional, should review some of the arguments highlighted in Section 2 on the economic and political rationale of fiscal rules. We should begin this assessment by recalling a basic conclusion: in a

monetary union without a federal budget, existence of fiscal rules is essential. Rules not only serve to avoid or correct the government deficit bias, but they also provide a tool to protect against fiscal externalities between countries. In fact, the economic foundation used as a basis for budget discipline is the need for government finance to be sound and sustainable, as a prerequisite for macroeconomic stability. Along with monetary policy aimed at price stability, fiscal discipline makes it possible for economic agents to maintain low inflation expectations and to enjoy favourable financing conditions that in due course facilitate planning decisions and promote long-term investment. As we have observed in Section 3, healthy public finances also improve the stabilising role of fiscal policy, despite frequent arguments to the contrary.

Substantially, these are the reasons that EMU incorporates a number of fiscal stability rules along with the European Central Bank's mandate to maintain price stability. We should bear in mind that, without these rules voluntarily accepted by the EU decision-making bodies and ratified by the Member States, the countries that are now members of the euro area would not have agreed to the establishment of a common currency.

Having established the need for a number of fiscal rules in a monetary union, and owing to the lack of strict compliance with the old rules, we can legitimately wonder whether they were inadequate.

To try to answer this question, we should bear in mind first of all that the SGP is not a rule applicable to only one country, but a scheme of fiscal discipline for 25 countries and, in particular, for the 12 countries of the euro area. The design of a fiscal rule in a multinational context is, of course, much more complex than it would be for one country. On the one hand, what is important to a given country might not be to the rest; however, different rules cannot be established for each country as equal treatment for all must be guaranteed. On the other hand, the international nature of the rules weakens incentives for compliance.

In fact, the ECOFIN Council is the body responsible for overseeing observance of the rules and imposing penalties. Owing to its political nature, it is not an impartial, independent body, but is a partisan body with the presence of those who comply and those who do not. Furthermore, there is no coercive mechanism that can require sovereign governments to adopt corrective measures. Once within the Union, the incentives to comply are reduced, as expulsion is not possible and the potential effects of fiscal irresponsibility are assessed with the traditional short-sightedness prevalent in the functioning of the political market. In this context, a government's reputation for discipline, or the existence of national fiscal rules can be more effective than the *soft law* that defines the community fiscal framework. This type of law is not equivalent to the absence of rules [Abbott and Snydal (2000)], as it helps prevent major policy errors and can facilitate reciprocal pressure, although it offers no incentives to comply, and when it lacks strictness, it runs the risk of deteriorating.

In the real world, when decisions are made on design of the fiscal rules, there is a set of equilibria that must be maintained. On the one hand, the rules should have some degree of economic rationality. On the other hand, they must be sufficiently simple and transparent to permit adequate control by the institutions officially responsible for that control and by the markets and public at large. Preparation of contingent fiscal rules can be quite intellectually attractive for economists, but how useful would such rules be if the criteria and measures on which they are based could not be calculated with a reasonable level of certainty? How

useful would the rules be if they were so complex that it would be almost impossible to determine whether or not they have been observed?

This discussion suggests that there is an optimum level of complexity in the rules [Schnuknecht (2004)], that can be expected to vary depending on the circumstances in which they are applied. In the case of the rules under the SGP, this desirable level of complexity results from the need to reflect the national specificities and types of shocks and, on the other hand, incentives to encourage compliance. These can come theoretically from the public who pay the financial and economic consequences for lack of discipline; from the markets, that must valuate the risks included in the transaction prices; and judges responsible for formal application of the rules. With *hard laws* and independent judges, manageable complexity is potentially quite substantial. In the opposite case – that is, *soft laws* and political judges – the incentives for compliance depend to a much greater extent on the level of control exercised by the public and by the markets. In the *soft law* context, the added complexity of reforms to the SGP, despite all the economic rationality added, still means higher transaction costs on the political market [Horn (1995)]. Simplicity is essential to induce compliance that must rely on monitoring by the public and the markets.

At the normative level, therefore, the rules should be as simple as possible to be understandable and to facilitate control by private agents, while being sufficiently strict to inspire fiscal discipline. However, the rules must also incorporate some degree of flexibility, to reflect the possibility of unexpected or unusual events. A fiscal rule essentially establishes a scheme of risk sharing. Who should bear the risks of a failure of the rules? If the aim is to firmly establish expectations of compliance, only extraordinary events beyond direct control of the governments, such as sudden, abnormal declines in economic growth or disasters, should be covered with escape clauses, such as waivers of measures or allowance of special periods of time to return to a situation of compliance. This approach limits the moral hazard that might be induced by an extended list of exceptions for factors related to actions and efforts (or omissions thereof) by the national governments [Inman (1997)]. In this connection, we cannot affirm that the central elements of the original SGP, such as the terms in the excessive deficit procedure or full implementation of automatic stabilisers departing from situations close to equilibrium in the structural budget balance, reflect an inappropriate balance in the distribution of risks. The anchoring of expectations of discipline after the March 2005 reform should, more than on the precise wording of the SGP, depend on the strictness with which Member States, the Commission and the Council decide to act in the future.

All of these questions were debated when the SGP was initially proposed. The results of this debate were a prudent compromise: a reflection of the need to combine economic rationality with simplicity and transparency, rules and discretion. This, of course, does not mean that alternative rules would not have been possible. However, in general terms, we can affirm that the rules were appropriate. This might also prove to be the case with the new ones if the potential improvements in the preventive arm of the Pact and its governance were accompanied with the political commitment required for strict implementation of the excessive deficit procedure.

We should also emphasise an observation that is essential in this debate: the fiscal rules under the old SGP were not the cause of the fiscal problems experienced in some countries.

The problems are instead a result of the failure to appropriately apply these rules when addressing problems. In particular, we found that it was extremely difficult to avoid the authorities failing to dedicate budget margins arising during upward phases in the cycle to increase public expenditure. In other words, the EU fiscal rules were not adequately applied during good times. As a result of this non-compliance, in some cases, the margins available for the automatic stabilisers to operate during decelerating phases were insufficient to prevent excessive deficits from appearing. This lack of strict compliance, as well as the natural interest of politicians in the design of complex rules – as they offer margins for interpretation and discretionality – might have played a substantial role in motivation of reform, without prejudice to a genuine concern for better economic rationality and governance in connection with the SGP.

It follows from this discussion that the greatest challenge to the credibility of the new SGP is to cover the distance that has existed in recent years between commitments and actions. More reflection and decisive action are required on the decision-making structure and the mechanisms of incentives to comply with the rules, at both the European and national levels, to achieve substantial improvements in the application of the Pact. The governance structures should provide adequate incentives for the authorities and institutions concerned, at the national and European levels, to interact in order to ensure fiscal discipline. The definition of responsibilities and accountability should be clear. Above all, there should be a firm political commitment to comply with rules and to apply procedures in a strict and timely manner. Only then will fiscal policy in the euro area be adequately co-ordinated, coherently with monetary and structural reform policy, to become a further driving force to improve the levels of well-being and employment in Europe.

6 Conclusions

The need for rational, simple rules of fiscal discipline, in support of healthy, sustainable public finances that will contribute to macroeconomic stability is part of the consensus that led to the creation of EMU. This consensus was forged in a context of macroeconomic instability during the 1970s and 1980s. The lessons from that period underscore the merits of fiscal discipline in terms of stability and its contribution to medium- and long-term sustainability and international co-ordination, which explains why the Maastricht fiscal rules continue to be one of the pillars of the economic constitution of EMU.

In recent years, however, there have been signs that the impulse associated with Maastricht has been losing steam in Spain and, above all, in some of the other larger EMU Member States. To what extent are the current problems rooted in the fiscal rules we set out for ourselves to ensure budget stability? And in particular, are there costs associated with discipline, in terms of reduced stabilising capacity of fiscal policy and a smaller contribution to growth? The arguments and evidence analysed tend to reject the existence of these costs, while identifying important benefits. The fiscal adjustments prior to establishment of the euro do not seem to have had negative effects on growth and employment for all countries in the area and, in some of them such as Spain, they have been accompanied with substantial dynamism. Further, the Maastricht years seem to have coincided with an increase in the

automatic stabilising capacity of the budget, contrary to the procyclical nature of fiscal policy based on discretionary measures. As a result, fiscal policy has a greater automatic response capacity in the short term. This is a desirable result, when monetary policy does not respond to national interests, and there is less variability in discretionary policies owing to rules intended to reduce uncertainty, helping support medium-term growth. Recent fiscal events in Europe are consistent with this analysis. In fact, it is not an easy matter to escape the finding that the problems registered are not caused by the SGP rules themselves. They are fundamentally attributable to political errors in failing to take advantage of the economic boom years during the late 1990s and the first few years of this decade to redress the deficits, notwithstanding the advisability of improvements in SGP implementation.

The contribution of fiscal discipline to potential growth is strengthened by other favourable consequences of the rules. In fact, the "hardening" of the government budget constraint that accompanied it introduces increased incentives to design less costly expenditure programmes, manage resources on hand more efficiently and collect taxes more effectively. Efficiency and quality of public expenditure would be much lower if capital expenditure would have had to undergo cuts as a result of the rules. Fortunately, there is no evidence that this has been the case, in Spain or in the EU as a whole. On the contrary, establishment of EMU would seem to have helped stop the downturn in public investment observed in all industrial countries since the 1970s.

Lack of strict compliance with the EMU fiscal rules has cast doubt on their need and effectiveness, which has led to an intense debate involving the academic world, the informed public and economic policy authorities. In this context, the European Council decided on March 23, 2005 to approve some changes in the SGP. The changes affect both the preventive and the corrective arms of the Pact. Although some of these changes may strengthen the economic rationality of the SGP, the new rules are clearly more complex and more subject to interpretation. This is a result derived from the political intention to adapt the rules to national conditions, which will not facilitate monitoring by economic agents, equal treatment in application, or assessment of compliance incumbent on the community institutions. In the case of EMU, the need for simplicity and transparency in the rules is of utmost importance, as without these factors the public and the markets cannot adequately assess the extent to which the judges – members of the ECOFIN Council – are strict in the application of the rules under the Pact.

The greatest challenge for the credibility of the new SGP lies in covering the distance that has existed in recent years between commitments and actions. If the application of the Pact stands to be significantly improved, the governance structures should provide adequate incentives for the authorities and institutions concerned, at the national and European levels, to interact in order to ensure fiscal discipline. The definition of responsibilities and accountability should be clear. Above all, there should be a firm political commitment to comply with the rules and to apply procedures in a strict and timely manner. Only then can fiscal policy for the euro area be co-ordinated adequately and become a further engine to improve the levels of well-being and employment in Europe.

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9. Fiscal policy analysis

Pablo Hérnandez de Cos and Eloísa Ortega

1 Introduction

Fiscal policy is defined as the intervention of public authorities, fundamentally through public revenue and expenditure management, influencing many aspects of the economy, such as cyclical developments, income distribution and economic efficiency. The study of fiscal policy and activity in the public sector is therefore essential to the understanding of the Spanish economy functioning and plays a prominent role in the analysis carried out by the *Servicio de Estudios*.

As indicated in the introductory chapter of this book, a very important part of the analytical and empirical work of the *Servicio de Estudios* entails obtaining short- and medium-term macroeconomic forecasts. Given that fiscal variables affect economic activity, macroeconomic forecasts should include estimates of the accounts of the general government sector. This in turn calls for a broad range of forecasting and estimation techniques to clarify how the influence of fiscal policy is transmitted to the key macro-magnitudes.

Further, sound public finance is considered essential to achieving macroeconomic stability and accordingly to establishing the conditions needed to promote sustained, balanced economic growth. This approach requires ongoing assessment of the fiscal situation, as far as it is relevant in terms of budget stability. This analysis, however, poses a number of difficulties. In particular, it is not an easy task to assess the fiscal situation simply by looking at the general government account balance, as the latter is influenced by the cyclical position of the economy, which in turn affects certain budget items. In order to isolate those effects, analytical tools have been developed to estimate the effects economic fluctuations may have on public accounts and to estimate what is called the cyclically-adjusted balance

or structural balance. The importance of these estimates has gained increased recognition and the analytical tools for that purpose have been further developed (see Chapter 2 for a detailed presentation), to facilitate assessment of the situation and of the medium-term fiscal strategies of Member States, in accordance with the commitment on fiscal discipline and coordination of economic policies in EMU.

Analysis of the contribution of fiscal policy to macroeconomic stabilisation has consistently received preferential attention in the work of the *Servicio de Estudios.* Prior to Spain joining the EMU, the authorities required a precise diagnosis of the fiscal policy stance, since this was a fundamental component of monetary policy decision-making. After single monetary policy was adopted, considerations relative to the policy mix continued to be important in a context where monetary conditions are determined jointly for the euro area. Knowledge of the stabilising impact of fiscal policy requires an estimation of discretionary measures designed for that purpose, but also of the functioning of automatic stabilisers (in other words, an estimation of the response of certain budget items to changes in the economic situation). Having access to effective estimates of these two factors is therefore vital in preparing a good diagnosis of the cyclical orientation of fiscal policy and its contribution to macroeconomic stabilisation.

Analysis of public debt and its dynamics also constitutes an important aspect of fiscal policy analysis. This approach makes it possible to study general government action from a different standpoint – given that trends in debt constitute the financial reflection of revenue and expenditure – which is useful when comparing the results obtained from the analysis of non-financial operations. Further, public debt can be more informative on the real fiscal situation, as its trends are less subject to problems of "creative accounting," which can distort the significance of observed deficits. This is particularly important in the case of the financing of regional goverments. As a result of decentralisation of certain public services, regional governments channel a substantial volume of public resources, although their budgetary information is still only obtained with a substantial time lag.

From a macroeconomic point of view, the diagnosis of fiscal sustainability and debt stabilisation issues are also an essential factor in the analysis of fiscal policy. In fact, the Maastricht Treaty established that the ratio of debt to GDP together with the observed deficit should serve as a basic reference for identifying excessive deficits. Similarly, increasing concern with the problem of an ageing population faced by most countries in the near future and its implications for future public expenditure (primarily on health and pensions) have led to an increasing concern about the assessment of long-term fiscal sustainability.

A final aspect related to the public sector and fiscal policy that has begun to attract growing interest in the European context is the need for compatibility between mantainig sound public finance and a public sector which provides incentives for economic growth. A number of studies has been launched to try to incorporate the analysis of the quality of public finances into EU multilateral coordination and supervision processes. The concept of quality of public finances covers many factors, ranging from the level of efficiency in providing public services, the composition of public expenditure reflecting its contribution to economic efficiency and productivity gains, to issues such as the effects of social benefits and taxation systems on labour supply and demand. Although the *Servicio de Estudios* has addressed some of these matters in different research activities, their incorporation into regular fiscal policy analysis is at a less advanced stage.

The main features of the fiscal policy analysis of the *Servicio de Estudios* are described below, according to the following structure. First, effects of fiscal policy and its impact on economic activity are analysed. This topic will be addressed covering three aspects: forecasting of the general government account, estimation of cyclically-adjusted public balances and transmission channels from public sector activities to the rest of the economy. Section 5 discusses the instruments used to analyse public debt and its dynamics; and Section 6 addresses fiscal quality indicators.

2 Forecasting the general government account

Fiscal policy has an impact on economic activity, either directly (through public investment and consumption) or indirectly (through disposable income of households and corporations) through taxes, subsidies and transfers. Macroeconomic forecasting therefore requires having general government sector account estimates. In turn, economic activity also affects activity in that sector. As a result, fiscal projection should be developed in co-ordination with the other aspects of macroeconomic forecasting.

General government account predictions requires, first of all, looking at the accounting and institutional framework in which activities take place. In accordance with the current European System of Accounts (ESA 95)[1], the institutional sector of general government in Spain is made up of four subsectors: central government (state and units of the central government), regional (autonomous) governments *[Comunidades Autónomas],* local corporations and social security administrations. The non-financial operations account of the general government is a useful means to reflect public sector activity in summary form (see Table 1). As indicated in Table 1, as far as the expenditure component is concerned it is useful to distinguish between current expenditureand capital uses. The former are included in final consumption (compensation of employees and intermediate consumption), social benefits in kind (mainly pensions and unemployment benefits), interest payments derived from public debt, current subsidies to corporations and other current transfers (international co-operation activities, for example). Capital expenditure is made up of gross public capital formation and other capital expenditure (capital transfers). Total revenue can also be broken down into current and capital revenue. Current revenue can be classified as direct taxes (tax on income and net wealth), indirect taxes (taxes on production and imports), social security contributions and other current revenue (Banco de España profits, for example).

In this context, fiscal forecasts are prepared with a relatively disaggregated level of public revenue and expenditure, and for general government as a whole. This is the means by which the balance of the general government non-financial operations and public debt are obtained. The balance estimated for the overall sector is later distributed among its four constituent subsectors.

[1] ESA 95 defines the general government sector as all institutional units whose main function is to produce non-market services for individual or collective consumption and/or to redistribute income and wealth, operating primarily with resources from obligatory payments made by units belonging to other sectors.

TABLE 1 GENERAL GOVERNMENT. TABLE OF NON-FINANCIAL OPERATIONS (a)

	Percentages of GDP		Structure %	
	2003	2004	2003	2004
1. Total resources	40.4	40.5	100.0	100.0
1.1. Current resources	39.6	39.8	97.9	98.1
Taxes on production and imports	*12.0*	*12.4*	*29.6*	*30.5*
Current taxes on income, wealth, etc.	*10.6*	*10.7*	*26.2*	*26.4*
Social contributions	*13.7*	*13.6*	*33.8*	*33.6*
Other current revenue (b)	*3.4*	*3.1*	*8.3*	*7.6*
1.2. Capital resources	0.8	0.8	2.1	1.9
Of which: Capital taxes	*0.4*	*0.4*	*1.0*	*1.1*
2. Total uses	40.1	40.8	100.0	100.0
2.1. Current uses	35.2	35.2	87.9	86.3
Final consumption	*18.0*	*18.3*	*45.0*	*44.8*
Of which: Compensation of employees	10.4	10.4	26.0	25.4
Social benefits other than social transfers in kind	*12.2*	*12.2*	*30.4*	*30.0*
Effective interest paid (EDP)	*2.5*	*2.2*	*6.3*	*5.3*
Subsidies	1.1	1.0	2.8	2.6
Other current transfers	*1.4*	*1.5*	*3.5*	*3.6*
2.2. Capital uses	4.9	5.6	12.1	13.7
Gross capital formation (c)	*3.7*	*3.7*	*9.1*	*9.1*
Other capital uses	*1.2*	*1.9*	*3.0*	*4.5*
3. Net lending (+) or net borrowing (–)	0.3	-0.3		
MEMORANDUM ITEMS				
Gross debt	51.4	48.9		
Primary balance	2.8	1.9		
Total fiscal revenue (without EU)	36.6	37.1		
Balances by subsector				
Central government	*-0.3*	*-1.3*		
Social security funds	*1.0*	*1.0*		
Regional (autonomous) governments	*-0.3*	*0.0*		
Local governments	*-0.1*	*0.0*		

SOURCES: INE (National Statistics Institute), IGAE (National Audit Office) and Banco de España.

a. Balance according to the Excessive Deficit Protocol (EDP). Presentation by source/use categories does not correspond to ESA 95.

b. Includes fixed capital consumption (equal to gross operating surplus).

c. Includes net purchase of non-financial non-produced assets.

Roughly speaking, two types of variables can be distinguished in the preparation of fiscal forecasts. On the one hand, we have those determined exogenously by the pubic authorities, as the result only of fiscal policy activities. This is the case for most primary expenditure components (public investment, for example) and non-tax revenue, as occurs in transfers received from the European Union. By contrast, the others are endogenous in nature. In addition to depending on the discretionary activities of governments, they are also affected by macroeconomic trends. The latter include tax revenue, unemployment benefits and interest charges on public debt.

Exogenous variables as well as the component of endogenous variables that can be affected by discretionary activities are estimated using information provided by official documents which describes the authorities' intentions on fiscal policy: mainly budgets at various levels of administration and the Stability Programme (Box 1 provides a chronological summary of the availability of these documents throughout the year), and any other rule affecting public revenue and expenditure. Final preparation of fiscal forecasts also includes accounting adjustments, expertise judgment on deviations of certain variables from the official forecast and own estimates on the impact of specific discretionary measures.

In this connection, it should be borne in mind that most available official information uses the public accounting framework, while fiscal forecasting is done in accordance with the national accounts system, ensuring consistency with the forecasts for the rest of the sectors of the economy. There are substantial differences between the two accounting systems, however, requiring a series of adjustments[2]. Further, some expenditure items may register systematic deviations in their execution as compared with the projected figures (for example, purchases of goods and services). These deviations are reflected in the forecasts according to historical performance. Last, the impact of certain reforms on fiscal variables is also estimated independently when sufficient information is available.[3]

Variables identified as endogenous maintain a relatively stable relationship with different macroeconomic variables used to assess the corresponding tax base, or, if applicable, the expenditure determinant. Forecasting therefore requires availability of estimates of an initial macroeconomic forecast and, in particular, of the relevant variables for each revenue and expenditure item. In this case, the methodology applied to forecasting can be summarised in the following expression:

$$E[I_{it}] = \varepsilon_i E[BI_{it}] + IF_{it} + \mu_{it} \qquad [1]$$

where E refers to forecasting and t to time, I_i to the component of tax or expenditure i, BI_i is the macroeconomic variable that presents a relatively stable relationship with this component i, ε_i is the estimated elasticity of tax or expenditure i on the macroeconomic variable,

[2] For a review of these adjustments, see Argimón, Gómez, Hernández de Cos and Martí (1999).

[3] For example, the *ex ante* impact on revenue in the 2003 IRPF reform was estimated using information from nearly 10,000 Spanish households, provided by the *Encuesta Continua de Presupuestos Familiares.* This information made it possible to compare the results obtained by applying the new IRPF legislation with the figures that would result from the case of this law being unchanged, and therefore inferring effective tax rate changes caused by the reform. See García Vaquero and Hernández de Cos (2003) for further details.

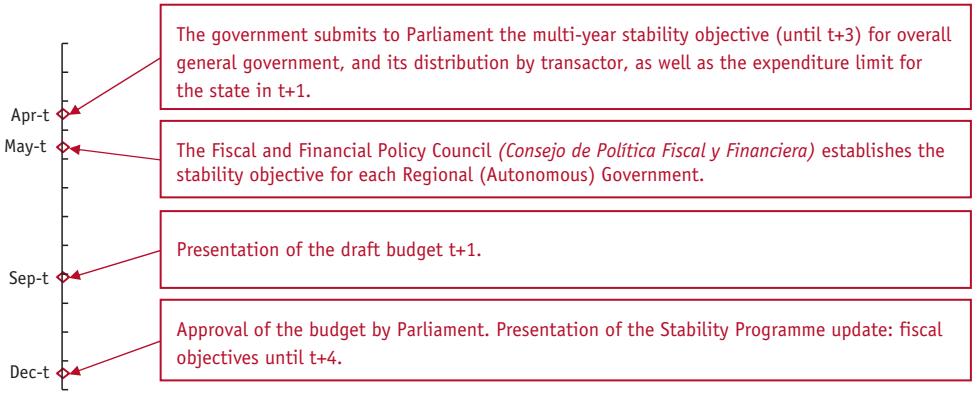
BOX 1 DEFINITION OF MEDIUM TERM FISCAL STRATEGY AND BUDGET OBJETIVES

The general central government budgets *(Presupuestos Generales del Estado)* have traditionally played a central role in preparation of fiscal forecasts. Based on a predetermined macroeconomic scenario, they provide comprehensive information on projected central government revenue and expenditure, and estimated fiscal policy actions, yielding an initial complete, well-founded forecast of the general government account for the year following its presentation. In recent years, however, the transfer of substantial expenditure powers to the regional governments and changes in their financing arrangements have substantially reduced the informative content of the central goverment budgets. This gap has yet to be filled with equally detailed information on the activities of regional governments.

Since the Budget Stability Law entered into force, preparation of the general state budgets fits into the framework of a pluriennial (three-year) strategy, the main features of which are summarised in the chart below. Preparation begins during the first four-month period of the year, when the government set the budget stability target for the General goverment sector (that includes the central government, social security, regional goverments and local corporations) for the next three fiscal years, which fits into an equally pluriennial macroeconomic framework. At this time, the maximum expenditure limit for the central government budget is determined for the subsequent year. All of this information is remitted to Parliament for approval. In the case of regional goverments, the budget stability objective is established for each of them within the Fiscal and Financial Policy Council *(Consejo de Política Fiscal y Financiera)*, also during the first four-month period of each year. The preparation phase of the draft central government budget should be concluded by 1 October, the deadline for government approval and submission to Parliament of the draft, which must be approved by 1 January.

This information is supplemented with the information presented in the Stability Programme, a report that should be submitted by the government to the European Commission

TIME SEQUENCE FOR BUDGET PROGRAMMING FOLLOWING ENACTMENT OF THE BUDGET STABILITY LAW



between 15 October and 1 December of each year, in the framework of multilateral fiscal supervision exercises of the European Union. This document assesses the fiscal results for the year in progress, with relation to the initially-established targets, and presents a forecast of the medium-term (until t+4) fiscal policy stance. Similarly, the government must submit fiscal information to Eurostat twice a year (in March and September), for the year in progress and the subsequent year, in the context of the Excessive Debt Protocol.

The *Servicio de Estudios* carefully analyses this documentation, which provides valuable information for macroeconomic forecasting. In the case of general state budgets, the aim is to assess the macroeconomic scenario underlying the fiscal projections and to assess the fiscal policy stance deriving from the announced measures. In the analysis of the Stability Programme, the central focus shifts to assessment of medium-term fiscal strategies. To that end, the plausibility of the proposed medium-term objectives is analysed along with the proposed path, taking into account the macroeconomic assumptions underlying the fiscal projections and measures as announced, as well as the consistency of these objectives with maintaining a fiscal position in structural terms close to balance or in surplus.

IF_i is the discretionary tax impulse on tax or expenditure *i* (for example, a tax reform)[4], and μ_i *estimates* any other factor that affects tax collection or developments in expenditure *i,* not reflected in the value of its elasticity or in the fiscal impulse (a change in the accounting criteria, for example).

As indicated above, the main components of revenue and expenditure as analysed using this procedure are tax revenue (personal income tax – IRPF –, tax on corporations, indirect taxation and social security contributions) and unemployment benefits. The macroeconomic variables that maintain a relatively stable relationship with these items are household income, gross operating surplus of corporations, consumption, compensation of employees and unemployment, respectively. The elasticities are estimated econometrically or on the basis of current legislation. Table 2 presents the estimated values of these elasticities for Spain and for the rest of the countries in the European Union (EU 15). Where direct taxation is concerned, elasticities of taxes on households take on values of more than unity in all countries as a result of the progressive taxation system, while taxes on corporations vary substantially from country to country. The rest of the items (indirect taxes, social security contributions and unemployment expenditure) are found to have elasticities of around unity.

There are further budget items that also depend, to a greater or lesser extent, on the macroeconomic scenario or other factors not directly under the authorities' control, such as demographic determinants. Projection of pension expenditure, for example, should be coherent with projected inflation, to the extent that the government should, by law, compensate pensioners when inflation fails to follow the initial forecasts. In addition, an estimation of

[4] In some cases, the adopted discretionary measures may determine not only changes in revenue and expenditure, but also a change in the elasticity or relationship between the macroeconomic variable and the public expenditure or revenue component. This occurs, for example, in the case of IRPF reforms affecting its progressive nature, as this itself is a measure of the elasticity of the tax.

TABLE 2 ELASTICITIES OF PUBLIC EXPENDITURE AND INCOME IN EU COUNTRIES

Budget item	Base	BE	DE	GR	ES	FR	IE	IT	LU	NL	AT	PT	FI	EMU	DK	SE	UK	EU
Direct taxes on households																		
Tax on labor income (private sector)	Employment, private sector	1.0	1.0	1.0	**1.0**	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Tax on labor income (private sector)	Compensation per employee, private sector	1.4	1.9	1.5	**1.5**	1.2	1.5	1.6	1.7	2.6	1.3	1.7	1.3	1.6	1.2	1.4	1.2	1.5
Direct taxes on corporations																		
Tax on corporate profits	Proxy for corporate profits	0.7	1.3	1.0	**1.2**	1.5	0.8	1.0	0.7	1.0	1.1	1.0	1.0	1.2	1.4	1.0	1.0	1.2
Indirect taxes																		
Net of payments to EU and VAT paid by general government	Private consumption	1.0	1.0	1.0	**1.0**	1.0	1.0	1.0	0.7	1.0	0.9	1.1	1.1	1.0	1.0	1.2	0.9	1.0
Social security contributions																		
Paid by private employees	Compensation of employees, private sector	1.0	1.0	1.0	**0.9**	1.0	0.9	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Unemployment expenditure																		
Unemployment expenditure	Number of unemployed persons	0.9	0.6	0.2	**1.0**	1.0	0.9	1.0	1.0	1.0	0.9	1.0	1.1	0.8	1.0	1.0	1.0	0.9

SOURCE: Bouthevillain et al. (2001).

the growth in the number of pensioners is necessary, which is determined by demographic factors, and on what is known as the substitution effect motivated by the replacement of the more longstanding pensions by the new higher pensions.

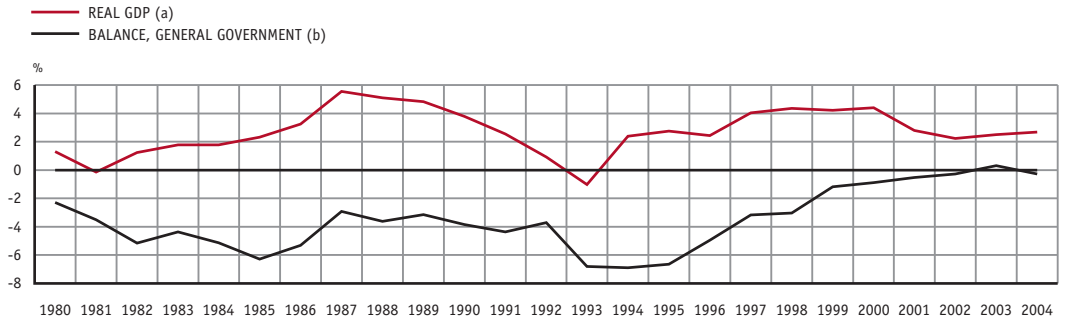
The forecast for the general government account is completed by the projection of interest charge on public debt. For that purpose, only interests linked to new debt issues must be estimated as information on accrued interest from previous years is available. To this end an estimation of face value of securities to be issued is needed on the basis of the forecast of debt requirements (which in turn includes an estimated cash deficit and the net change in financial assets).

The estimation of public revenue and expenditure together can be used to prepare an initial forecast of the general government balance. In a second step, his figure is incorporated into the general macroeconomic forecasting framework of the Spanish economy. This is the beginning of an iterative estimation process, deemed to adapt fiscal forecasts to new estimates of GDP and of the rest of the macroeconomic variables, until a definitive estimate for general government is produced. Finally, the forecast of the public debt-to-GDP ratio is prepared based on its various components, according to the debt dynamics equation: initial debt level, general government balance, and differential between interest and economic growth rates.

This set of forecasts will be revised and updated during the year, in an attempt to reflect changes in the intentions of different government authorities, or in response to information on budget execution during the year, which is quite scarce where regional governments and

CHART 1 PUBLIC DEFICIT AND ECONOMIC GROWTH

TRENDS IN OUTPUT AND EMPLOYMENT (a)



SOURCE: Ministry of Economy and Finance.

a. Year-on-year rate of change.
b. Percentage of GDP.

local corporations are concerned. The quarterly information prepared by INE for all of general government, substantially in reference to pubic consumption and indirect taxes is also taken into account. Fiscal forecasts are also updated to reflect revisions in the macroeconomic scenario, new measures approved or announced by the government, or simply changes in the historical data used as a basis for forecasts.

3 Impact of economic activity on the public accounts: cyclically-adjusted budget balance indicators

The diagnoss on the level of fiscal consolidation is conditioned by the fact that, as indicated, many budget items are affected by the macroeconomic situation (see Chart 1). Accordingly, trends in observed budget balances are not fully reliable as indicators of the fiscal effort. An adequate fiscal policy assessment therefore requires the use of analytical instruments to determine the component of the changes in the general government balance which are attributable either to the cyclical position or to structural factors (or from discretionary actions of governments).

To that end, different synthetic indicators, generally developed by other institutions, are used[5]. The increasing use of the cyclically-adjusted balance in European multilateral fiscal supervision exercises[6] has increased the relevancy assigned to these estimated cy-

[5] OECD, IMF, European Commission or the European System of Central Banks (ESCB).

[6] For example, the clause in the Stability and Growth Pact that requires public balances to be maintained close to balance or in surplus has been interpreted as a position in which the structural balance cannot exceed a deficit of 0.5 percent of GDP.

clical and structural components of the budget balance that are subject to ongoing scrutiny.

The various methodologies available to estimate cyclically-adjusted balances use a similar approach that consists in subtracting the component attributable to cyclical factors from the observed public balance. In this connection, the structural balance is obtained as a residual and, accordingly, its capacity to adequately estimate changes in deficits resulting from discretionary actions by the government are dependent on the quality of the cyclical balance estimates. The method used to estimate the cyclical component is also similar in the different methodologies. In general, it entails applying total deficit elasticities or elasticities of different public expenditure and revenue components to the deviation between observed GDP and a trend or potential GDP measurement (known as the output gap), by means of which analysts attempt to estimate the cyclical position of the economy[7]. Even so, the methodology for calculating the cyclically-adjusted balance can be used for a synthetic quantification of the sensitivity of the public balance to the economic cycle, defined as the change in the public balance (as a percentage of GDP) derived from a 1 percent change in real GDP. In the case of the Spanish economy, the sensitivity obtained using this procedure is around 0.4, and this value is consistent in the different methodologies[8].

Within this general philosophy, there are discrepancies between the different methods of estimating the cyclical position and the revenue and expenditure elasticities on GDP. Such discrepancies can, from time to time, produce different estimates for the structural and cyclical components, and therefore different assessments of the fiscal policy situation or the scope of the fiscal adjustment are made (see Box 2). In this connection, cyclically-adjusted balance indicators that attempt to summarise all fiscal policy measures in one figure should be interpreted with caution and, in any case, should be supplemented with the analysis of the budget measures applied and their effective results.

It is interesting to apply this methodology to the analysis of the fiscal policy stance in Spain since 1999, and to assess the level of compliance with the requirements established under the Stability and Growth Pact. We can attempt to assess the fiscal consolidation effort during the period 1999-2004 by breaking down the cumulative reduction in observed deficits into their cyclical and structural components. In the latter case this would indicate which proportion of the reduction in observed deficits is attributable to the adoption of discretionary fiscal policy measures. It should be borne in mind, however, that the structural component thus defined includes changes in interest payments that are difficult to attribute to a discretionary fiscal policy decision. Accordingly, it is preferable to assess the fiscal ef-

[7] In the ESCB method the cyclical position is not defined exclusively in terms of GDP. Instead, five macroeconomic variables are selected to reflect the fact that the different macroeconomic bases of public revenue and expenditure can be in different cyclical positions, or exhibit different levels of fluctuation. A detailed description of this method can be found in Hernández de Cos (2001).

[8] This sensitivity is obtained, for example, by simulating a shock on all GDP components of the private sector, so that the total GDP shock amounts to approximately 1 percent, based on the Banco de España quarterly model, or using the elasticities provided in Table 2.

BOX 2 ESTIMATION OF CYCLICALLY-ADJUSTED BALANCES

A variety of indicators are now available to correct public balances for the effects of cyclical fluctuations. They all follow a two-step procedure. First, the cyclical position of the economy, or output gap, is estimated as the difference between observed output and potential or trend output. Second, the impact of the cyclical position on the public balance is calculated on the basis of estimated elasticities of public revenue and public expenditure. The cyclically-adjusted balances are obtained as the difference between the observed public balance and the cyclical component of the public balance as previously estimated.

Despite the usefulness of these indicators, their definition and calculation are subject to a series of theoretical and empirical limits[1]. In this connection, there is some debate surrounding the best way to estimate the economic cycle, whether using potential output based on the estimation of a production function (PF), or alternatively, trend output, by applying a statistical procedure (known as the Hodrick-Prescott (H-P) filter). It might be conceptually better to use potential output, as the cycle estimated using this procedure is underpinned by a solid theoretical framework and it identifies the sources of potential growth. However, there are also substantial limits. To obtain potential output, a set of assumptions must be adopted (for example, on the specification of the production function to be estimated) and auxiliary estimates (on total factor productivity, the structural unemployment rate and capital stock of the economy), which complicate the analysis. Use of trend output has the advantage of being simpler, while, for estimation of the cyclically-adjusted balance, considerations involving economic growth determinants are less important. This estimation, however, still does entail its own problems; among others, the absence of an economic theory that supports this trend output approach or the selection of the smoothing value.

The second methodological problem arises from estimation of public revenue and expenditure elasticities. The calculation is normally based on a standard econometric estimation that consists in regressing the annual information on observed fiscal variables (revenue and expenditure components) with the macroeconomic base. In addition, the regressors include other variables that can reflect, for example, application of discretionary measures that have affected the fiscal variables during the estimation period. Econometric estimations of public revenue and expenditure elasticities, however, face a number of different problems. On the one hand, it is difficult to find stable relations between fiscal variables and their macroeconomic bases, since the estimation periods have entailed substantial legislative changes, control of which would require a knowledge of their budget impact, which is not always available. On the other hand, fiscal policy affects economic activity, and therefore problems of endogeneity occur. Given the foregoing limitations, we can also choose to calculate elasticities taking also into account current fiscal legislation. This second method is increasingly valid the

[1] A detailed discussion on different methodologies available for the estimation of cyclically-adjusted balances can be found in Hernández de Cos (1999).

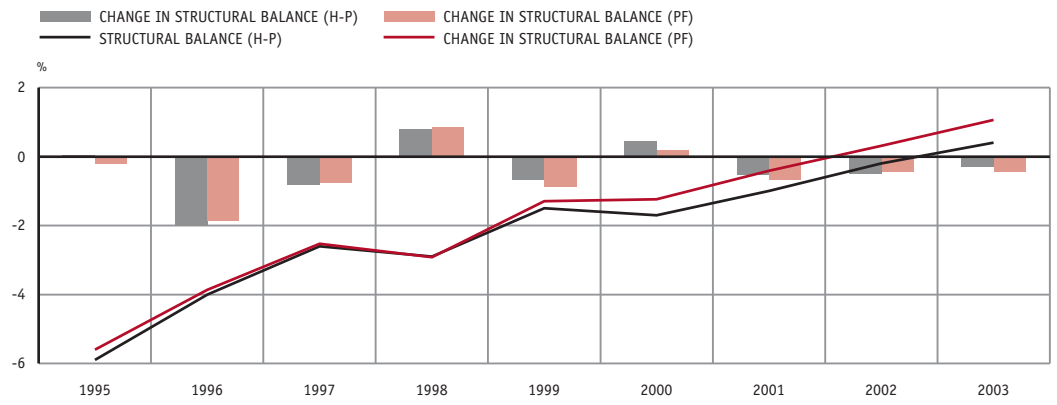
closer the macroeconomic variable is to the tax base. This is a relatively simple system when tax legislation consists basically of a single tariff, as is true for social security payments and indirect taxes payments in many countries. However, when the tax is based on a progressive tariff system, such as income tax, estimation of elasticity requires detailed information on fiscal revenue by income bracket.

The importance of these questions increases as the different methods for estimating the output gap lead to different cyclically-adjusted balances. We observe, for example, that the sensitivity of the cyclically-adjusted deficit calculation for Spain using these methods is quite high, having greater effects on the levels of estimates than on their growth rates, which must be taken into account when assessing fiscal policy using this indicator (see chart below).

In addition to these methodological problems that affect estimation of the cyclical component, there are others that arise from the construction itself of the indicator or the residual nature of the structural component. First of all, we should mention the sensitivity of cyclically-adjusted balances to revision of GDP figures, which is attributable to the fact that potential (or trend) GDP estimates are carried out from the observed GDP data and from forecasts into the future[2]. Second, with relation to the residual nature of the structural balance, there is a risk that changes in public expenditure or revenue not explained by the economic cycle may be erroneously imputed to discretionary actions, although they in fact are not the result of the government's fiscal policy activities, or represent measures that have only transitory effects on the public deficit.

[2] This problem and its possible solutions are discussed in González Minguez, Hernández de Cos y del Río (2003).

CYCLICALLY-ADJUSTED BALANCES USING DIFFERENT METHODOLOGIES (a)



a. Percentages of GDP.

TABLE 3 BREAKDOWN OF THE GENERAL GOVERNMENT BALANCE. EUROPEAN SYSTEM OF CENTRAL BANKS METHODOLOGY

% GDP

	1998	1999	2000	2001	2002	2003	2004	1998-2004
CHANGE IN DEFICIT	-0.1	-1.9	-0.3	-0.4	-0.2	-0.6	0.6	-2.7
As a result of:								
Primary structural balance (a)	0.8	-0.7	0.3	-0.3	-0.2	-0.4	0.8	-0.7
Of which:								
Structural revenue	*0.7*	*-0.4*	*0.2*	*-0.2*	*-0.8*	*-0.1*	*-0.2*	*-1.5*
Primary structural expenditure	*0.1*	*-0.4*	*0.1*	*-0.1*	*0.6*	*-0.3*	*1.0*	*0.8*
Interest payments	-0.5	-0.7	-0.2	-0.2	-0.3	-0.3	-0.3	-2.1
Cyclical effects	-0.5	-0.4	-0.3	0.1	0.3	0.1	0.2	0.0
GEN. GOVERNMENT BALANCE	-3.0	-1.2	-0.9	-0.5	-0.3	0.3	-0.3	
Cyclical balance	-0.1	0.3	0.6	0.5	0.2	0.0	-0.1	
Structural balance	-3.0	-1.5	-1.5	-1.0	-0.5	0.3	-0.2	
Primary structural balance	1.3	2.1	1.8	2.1	2.4	2.8	2.0	
MEMORANDUM ITEMS								
Primary balance	1.2	2.4	2.4	2.6	2.6	2.8	1.9	
Interest payments	4.3	3.5	3.3	3.2	2.9	2.5	2.2	
Real GDP growth	4.3	4.2	4.4	2.8	2.2	2.5	2.7	
Output gap (b)	-0.2	0.6	1.7	1.3	0.5	0.1	0.1	

SOURCE: Banco de España.

a. A positive sign denotes an expansive fiscal policy stance and a deterioration in the primary structural balance.
b. Output gap = (GDP – trend GDP) / Trend GDP (%) in real terms, using a Hodrick-Prescott filter with lambda = 30.

fort based on changes in primary structural balances, obtained by subtracting the financial burden from the cyclically-adjusted balance.

As we observe in Table 3, the cumulative decline in observed deficits during the period 1998-2004 (2.7 pp of GDP) is explained primarily by the decline in the financial burden and the change in primary structural balances, indicating a structural improvement in government finance. The structural improvement in government finance is clearer when the effect (0.7 pp of GDP) attributable to the assumption of Spanish National Railroad (RENFE) debt is subtracted (owing to its one-off nature), from the figure in the structural balance for 2004. A disaggregated analysis of the contribution of revenue and expenditure to this result indicates a similar quantitative contribution of both components. Changes in the cyclical position, that according to the estimated output gap, went through an initial phase of expansion and subsequently of contraction, made a neutral contribution to the correction of public deficits during the overall period.

Accordingly, throughout this period, there has been an improvement in structural balances, up to a slight General Government deficitin 2004 (or structural surplus if we discount the RENFE effect). According to the operational criteria established by the European Commission (and the Eurosystem) to assess compliance with the rule of "close to balance or in surplus" under the Stability ad Growth Pact (structural balances with a maximum deficit of 0.5 percent of GDP), Spanish public finances have complied with this criterion since 2002.

Given the potential for errors in estimating the cyclical and structural components, it became necessary to supplement the foregoing analysis with the analysis of the budget measures adopted during this period and their results. The main fiscal policy measures during this period were, on the revenue side, the two IRPF reforms of 1999 and 2003 – which, through reduced tax pressure, should generate a structural loss of revenue – the freezes on excise duties in 2000, 2001 and 2003 – designed to act in the same direction – and the absence of adjustment for inflation in tariffs and personnel and family deductions under the IRPF, which should have a positive effect on revenue. From the expenditure side, the scarce measures adopted during this period, after the substantial cut in primary current expenditure which took place during the years of transition to EMU, were primarily expansionary (for example, minimum pensions and widows' benefits were revised upward).

In light of this information, it is difficult to reconcile the fiscal policy sign that emerges from the foregoing measures (in general, expansive in nature) with the results obtained from the cyclical balance indicators shown, without taking into account other types of considerations. Lower levels of IRPF revenue were offset with a substantial increase in revenue from indirect taxation and social security contributions (more than would be expected from the rate of growth of the respective bases). However, the assumptions offered to explain this increase in revenue – such as emergence of activities previously in the informal economy – are difficult to contrast. The method for estimating cyclically-adjusted balances reflects this increase in indirect taxation as further growth in revenue not explained by the economic cycle and therefore as the result of discretionary activities. In this case, the cyclically-adjusted balance indicators might be overvaluating the fiscal adjustment carried out.

4 Economic impact of fiscal policy

Macroeconomic stabilisation is one of the arguments traditionally used to justify intervention of the public sector in the economy. In a monetary union, this argument is strengthened, as fiscal policy becomes the only stabilisation instrument available to the national authorities. Knowledge of the cyclical stance of fiscal policy and its contribution to stabilisation is particularly important from a central bank's perspective. Prior to Spain's participation in EMU, the analysis of the fiscal policy stance was a fundamental element in monetary policy decision making. This analysis now continues to be important in assessing macroeconomic developments, as it can be used to derive implications on management of fiscal policy and other economic policies by the national authorities.

Despite the general acknowledgement of the importance of fiscal policy in reaching the goal of macroeconomic stabilisation, there is still no theoretical or empirical consen-

sus on its effectiveness in achieving that objective [Perotti (2001)][9]. This lack of consensus coincides with the existing methodological difficulties when the impact of fiscal policy on economic activity is measured. In this context, two types of approaches are normally used: calculation of synthetic indicators and use of simulations through macroeconometric models.

In the first case, there are different indicators in the literature that can be used to assess the impact of fiscal policy on economic activity. For example, the *fiscal impulse,* developed by the International Monetary Fund (IMF) [Heller, Haas and Mansur (1986)] is calculated by comparing the budget balance in a given year with the one that would have resulted if the ratio of revenue to current GDP and the ratio of public expenditure to potential GDP had remained constant in relation to a base year:

$$IF = (g - t) - ((g_0 Y / Y^{pot}) - t_0) \qquad [2]$$

where g and t refer to public revenue over GDP, respectively; Y is nominal GDP and Y^{pot} is potential GDP. A positive fiscal impulse is therefore interpreted as a situation where discretionary fiscal policy has been relatively more expansionary than during the preceding year. By contrast, if it is negative, discretionary fiscal policy is considered contractionary[10]. In the same line of thought, changes in cyclically-adjusted public (primary) balances are often used as an indicator of the cyclical stance of discretionary fiscal policy. A positive change, then, in the cyclically-adjusted primary balance in a situation in which the output gap is negative (that is, observed output is below potential output) is considered to entail procyclical fiscal policy[11].

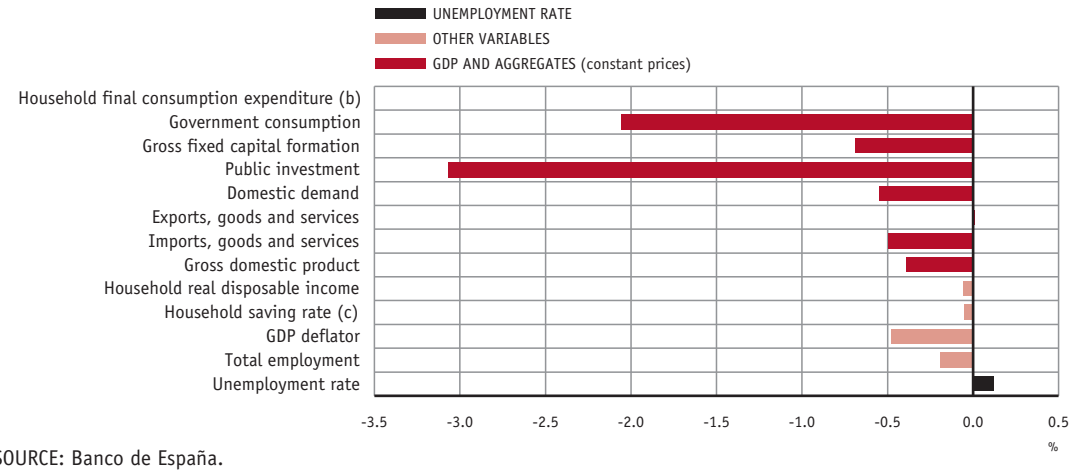
The main problem with the foregoing measures is that, although they reflect the initial fiscal policy impact on economic activity, they do not include the subsequent reloading elements that occur through automatic stabilisers. They also assume that all components of the

[9] A number of different research papers prepared in the *Servicio de Estudios* have contributed to this debate on the effectiveness of fiscal policy, at the theoretical and empirical levels. See, for example: Argimón (1996); Argimón, González-Páramo and Roldán (1994 and 1997); Argimón, González-Páramo, Martín and Roldán (1993); Marín (1997); De Castro, González-Páramo and Hernández de Cos (2001), De Castro (2003); Andrés and Doménech (2003) and Galí, López-Salido and Vallés (2003).

[10] We should bear in mind that the IMF fiscal impulse uses the assumption of unitary elasticities for expenditure and revenue in terms of potential and observed nominal output, respectively, including, within the discretionary component, the effect of automatic stabilisers arising from differences between unity and the revenue and expenditure elasticities with respect to GDP. Therefore, the effect that progressivity has on revenue is attributed to discretionary fiscal policy action. If the fiscal system is progressive, in an expansionary economic cycle, revenue will grow more than GDP, and the fiscal impulse will include the increased revenue associated with this progressivity as a discretionary element, although it is in fact an automatic effect.

[11] In addition to this indicator, others have been proposed in the literature, such as the one defined by Blanchard (1990), based on a consumption function that depends on wealth (including public debt) and the present and future value of disposable income (that includes taxes net of transfers other than interest charges). Based on this consumption function, and adding public direct expenditure on goods and services, a fiscal policy impact indicator depends positively on direct public expenditure and public debt and negatively on the expected future revenue flow.

CHART 2 MACROECONOMIC EFFECTS OF FISCAL POLICY (a). 2003



SOURCE: Banco de España.

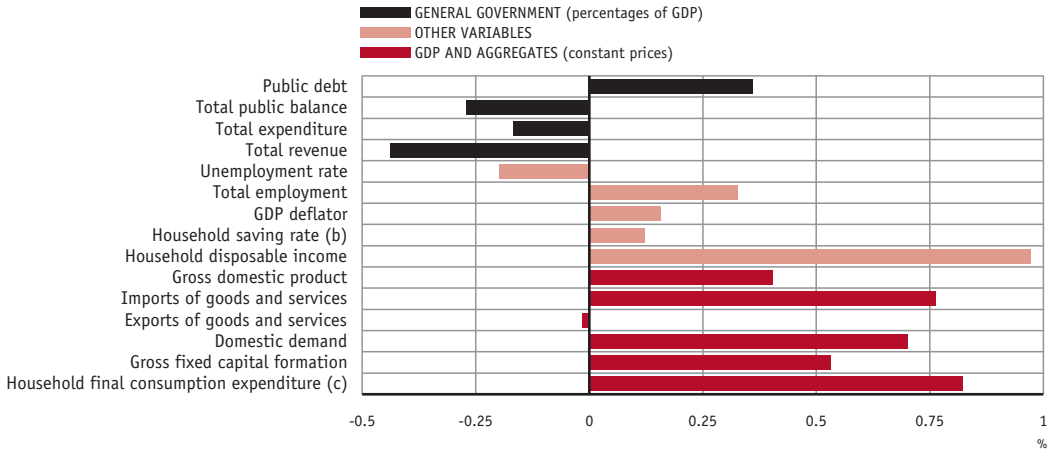
a. National Accounting ESA 95. Percentage deviations from the baseline scenario.
b. Includes non-profit institutions.
c. Percentage of disposable income.

public balance have the same effect on economic activity[12]. The foregoing indicators therefore make it possible to conduct an initial assessment of the fiscal policy stance, although not to quantify its impact. To correct these problems, we can use simulations with macroeconometric models, a methodology that makes it possible to reflect interactions between macroeconomic variables and budget items over time. It also makes it possible to measure the effects of fiscal actions on a broader set of macroeconomic variables, such as inflation, for example. Last, it makes it possible to conduct an isolated analysis of the effects of reforms on a specific component of revenue or expenditure.

The use of a macroeconometric model to measure the effects of a given fiscal policy on economic activity requires a comparison of the observed (or forecast) results with the results of a counterfactual simulation in which the alternative scenario would be implementation of neutral fiscal policy. The latter can be defined, for example, as a simulation in which, for the year analysed, on the revenue side, implicit tax rates must remain constant with relation to the preceding year; and on the expenditure side, the different budget items must remain constant as a share of GDP. Chart 2 presents the results of an exercise having these features for the Spanish economy in 2003, using the Banco de España quarterly model (MTBE). During that year, real GDP growth was 2.4 percent, while public investment and consumption, also in real terms, grew at higher rates, of 5.7 percent and 4.6 percent,

[12] To avoid this problem, some authors (see, for example, Ceriani and Di Mauro (1986)) calculate the impact on demand by aggregating changes in the different public revenue and expenditure components, in real terms, weighted by their respective elasticities to GDP.

CHART 3 MACROECONOMIC EFFECTS OF THE 2003 IRPF REFORM (a). CUMULATIVE EFFECT UNTIL 2004



SOURCE: Banco de España.

a. National Accounts, ESA 95. Percentage deviations accumulated between 2003 and 2004 as compared to the baseline scenario.

b. Percentages of disposable income.

c. Includes non-profit institutions.

respectively, and, therefore, would have been expected to exert an expansionary effect on economic activity. On the revenue side, substantial growth in implicit rates of indirect taxation and social security contributions occurred while direct taxation rates declined as a result of the IRPF reform. This simulation exercise shows that the contribution of fiscal policy to economic activity was approximately four tenths. This result contrasts with the result that would have been obtained from the application of the fiscal impulse indicator, that shows a reduction (restrictive stance) of approximately five tenths, or the observation of the total public balance, which improved by three tenths of GDP during that year.

Similarly, as indicated above, this methodology can be used to assess the impact of a specific discretionary measure on economic activity. For example, Chart 3 shows the results of the simulation of the effect of the IRPF reform that went into effect in 2003. This reform produced an estimated reduction in the *ex ante* effective rate of approximately 1.5 percentage points. It is also estimated that it entailed an increase in household real gross disposable income of one percentage point, which led to an increase in final household consumption expenditure in real terms of 0.8 percentage points. When we take into account the total effect on GDP, in addition to this effect on consumption, the increase in gross capital formation and imports as a result of the increase in final demand is estimated at approximately four tenths of GDP, while the estimated impact on employment would be approximately three tenths. The increase in demand generated only slight pressure on prices, meas-

ured with the consumption deflator, in light of the cyclical position of the economy, which, at that time registered a decelerating path.

The results of these simulation exercises should, in any case, be considered with care. While the simulation based on a macroeconomic model makes it possible to reflect the main interrelations between economic variables, their necessarily aggregate, simplified approach cannot reflect some effects that may be particularly important. For example, the tax reform simulated above introduced changes in fiscal treatment of financial instruments and modified tax progressiveness, which probably affected factors such as composition of savings or supply of labour, factors whose impact cannot be reflected in the simulations. The structure of the model only makes it possible to simulate the decline in the average aggregate annual tax rate and fundamentally reflects the impact on aggregate economic demand. The results can also depend on the assumptions used in constructing the model. Consideration, or not, of forward-looking individuals, for example, can have substantial effects on the results[13].

5 Analysis of public debt

Public debt analysis was quite important during the period of transition to Stage Three of EMU, when this variable registered a growing trend, and very precise monitoring of the fiscal consolidation process was required[14]. Following a strong fiscal adjustment carried out in recent years, the interest in the public indebtedness path has shifted, to some extent, to considerations of long-term sustainability, in light of the ageing of Spain's population, undoubtedly a priority problem[15]. Analysis of debt dynamics continues to be a central topic when stability programmes are assessed. It also proves quite useful in fine-tuning the diagnosis of the fiscal situation. As indicated in the introduction, public debt can also prove highly informative about the true fiscal situation, as its trends are less subject to problems of "creative accounting" that can distort the significance of observed deficits. In the Spanish case, debt statistics are, last of all, one of the few indicators available to analysts throughout the year to analyse fiscal trends in the regional governments.

There are a number of different ways to approach the analysis of public debt dynamics, depending on the nature of the problem to be solved. The simplest approach entails analysis of the ratio of debt to GDP based on its determinant factors, as synthesised by the debt dynamics equation:

$$\Delta b = b - b_{-1} = -s + \left(\frac{r-g}{1+g}\right) b_{-1} + af \qquad [3]$$

[13] See, for example, Henry, Hernández de Cos and Momigliano (2004).

[14] See, for example, Gómez and Roldán (1995).

[15] See Hernández de Cos and Ortega (2002) for a review of the potential effects of ageing on the economy.

TABLE 4 CHANGES IN PUBLIC DEBT (PERCENTAGES OF GDP)

	1999	2000	2001	2002	2003	2004
PUBLIC DEBT	63.1	61.1	57.8	55.0	51.4	48.9
Change in public debt (I + II + III)	-1.5	-2.0	-3.2	-2.9	-3.6	-2.5
Contributions from:						
I. Stock-flow adjustment	1.6	1.7	0.3	0.6	0.1	0.7
II. Primary balance	-2.4	-2.4	-2.6	-2.6	-2.8	-1.9
III. GDP growth rate-interest rate differential	-0.7	-1.3	-0.9	-0.9	-0.9	-1.3
	1992	**1993**	**1994**	**1995**	**1996**	
PUBLIC DEBT	47.2	59.0	61.3	64.0	68.2	
Change in public debt (I + II + III)	2.7	11.9	2.2	2.8	4.2	
Contributions from:						
I. Stock-flow adjustment	2.1	6.6	-1.1	0.6	2.9	
II. Primary balance	-0.5	2.3	1.5	1.4	-0.4	
III. GDP growth rate-interest rate differential	1.0	2.9	1.9	0.8	1.7	

According to this equation, an increase in the ratio of public debt to GDP *(b)* in a given year *(t)* will be determined by the primary surplus over GDP *(s)* for the period, the impact of the differential between the interest rate *(r)* and the economic growth rate *(g)* on the public debt ratio from the previous year, and the stock-flow adjustment *(af)*[16]. This equation shows that the evolution of public debt over GDP depend on factors within control of the authorities (basically public revenue and expenditure programmes) as well as factors not directly under their control (such as interest rates and economic growth rates).

Table 4 provides the figures for public debt and its determinants in Spain during two different time periods trends. During the first period (1999-2004) the ratio of public debt to GDP registered a substantial reduction (14.2 percentage points of GDP), supported, above all, by a primary surplus throughout the period and, to a lesser extent, by a positive differential between the rate of growth in GDP and interest rates, while the stock-flow adjustment made a positive contribution to the increase in debt during the same period, primarily as a result of investments made in financial assets. The second period studied (1992-1996) is characterised, however, by intense growth in the debt ratio, to which the three components contributed, although the latter two were particularly important. The existence of a negative

[16] The stock-flow adjustment includes financial transactions and valuation adjustments between the deficit and public debt, that either should be added to gross debt or to the value of existing liabilities (revaluation of public debt denominated in foreign exchange); alternatively, changes in financial assets of the public sector balance sheet can affect public debt financing (loans from government to other sectors, privatisations, changes in stock of liquid assets, other financial assets, etc.).

differential between GDP growth and interest rates and, above all, a high growth in financial assets, explain more than 80 percent of the increase in the debt ratio for that period.

By contrast, there is a second group of indicators used to determine whether, in light of current fiscal policy, an adjustment will be required in the future and, if so, the magnitude of the adjustment. The aim is therefore to assess the sustainability of existing fiscal policy at a given time. This is generally defined as the situation in which compliance with the intertemporal budget constraint is ensured for the public sector This issue can be analysed in different ways.

A first type of indicator is known as the *sustainability gap (s*) or primary gap,* and is defined as the difference between the constant primary surplus required to stabilise the ratio of public debt to GDP at its initial value (b_0) and the current primary surplus *(s)*:

$$s^* = b_0 \frac{(r-g)}{(1+g)} \qquad [4]$$

According to this expression, the constant primary deficit required to achieve fiscal sustainability is equal to the product of the initial debt-to-GDP ratio by the discount rate, and the latter is computed as the difference between the interest rate and GDP growth rate. Table 5 presents an application of this indicator to countries of the Monetary Union. A positive/negative value for this gap indicates that the current fiscal policy does not stabilise/stabilises the debt ratio at the present levels. In accordance with these calculations, EMU countries can be divided into three groups: those that guarantee debt stabilisation with the current fiscal policy (Ireland, Spain, Finland, Belgium, Greece and Italy); those that do not (the Netherlands, France and Germany); and those whose debt is stable at the current levels, but with little margin (Austria, Luxembourg and Portugal).

The foregoing sustainability criterion is not, however, excessively satisfactory, permitting countries that began with higher debt to GDP ratios to maintain these levels, that in some cases are quite high and far from the ratios required by the EU framework of fiscal discipline. In other words, this indicator minimises the importance of past fiscal policy trends (public debt) and maximises present fiscal policy (primary balance). In any case, the intertemporal budget constraint makes it possible to calculate the constant primary surplus required to achieve a given predetermined level of debt *(b*)* at a given moment *T,* based on the following expression[17]:

$$s^* = b_0(\alpha - 1) + \frac{(b_0 - b^*)(\alpha - 1)}{(\alpha^T - 1)}, \text{where } \alpha = \frac{1+r}{1+g} \qquad [5]$$

Application of this criterion to the debt of a country such as Italy indicates that, if the aim is to reduce the initial level of debt of slightly over 100 percent to 60 percent in a period of X years, the constant primary surplus should be situated at Y percent above its current primary surplus of 2.9 percent.

[17] See González-Páramo, Roldán and Sebastián (1992) for further details.

TABLE 5 FISCAL SUSTAINABILITY INDICATORS IN EMU COUNTRIES 2003 (a)

	Observed primary balance	Debt	Average 1998-2003 (%)		Required primary balance	Fiscal gap
			Real effective interest rate	Real GDP growth rate		
	(1)	(2)	(3)	(4)	(5) = (2)*[(3) −(4)] / 100	(6) = (5) − (1)
Ireland	1.6	32.8	-0.1	7.4	-2.5	-4.1
Spain	**2.9**	**50.8**	**1.7**	**3.3**	**-0.8**	**-3.7**
Finland	4.1	45.3	4.0	3.1	0.4	-3.7
Belgium	5.8	100.7	4.2	1.9	2.3	-3.5
Greece	2.5	103.0	3.0	3.9	-0.9	-3.4
Italy	2.9	106.2	3.2	1.5	1.8	-1.1
Austria	1.9	65.4	4.2	2.2	1.3	-0.6
Luxembourg	0.1	4.9	2.5	4.8	-0.1	-0.2
Portugal	0.1	59.9	2.0	2.1	-0.1	-0.2
The Netherlands	-0.3	54.8	3.1	2.1	0.5	0.8
France	-1.1	63.7	4.0	2.3	1.0	2.1
Germany	-0.7	64.2	4.6	1.3	2.1	2.8

SOURCES: European Commission, ECB and Banco de España.

a. Percentages of GDP, unless otherwise indicated.

A second type of sustainability indicator is obtained by relaxing the assumption that future public revenue and expenditure will be constant. In this case, the sustainability assessment attempts to consider future trends in specific components of public revenue and expenditure. A very interesting application of this type of indicator is carried out in multilateral supervision exercises of the public finances of European countries, as the European Commission has begun to compute long-term sustainability indicators based on foreseeable trends in public expenditure, taking population ageing into account.

The point of departure is long-term projections of demographic and macroeconomic variables (in most cases until 2050). The impact of these projections on public pensions and health expenditure is then estimated, as these are the main budget items that will be affected by population ageing. The long-term impact is simulated with the assumption of constant current fiscal policy, i.e. under the same eligibility and benefit calculation criteria as the existing during the initial year for pension expenditure, or with a constant expenditure structure by age in the case of health expenditure. These projections can be used to construct a variety of sustainability indicators providing complementary information.

In this regard, we should first mention estimates of deficit and public expenditure to GDP in the long-term. The deficit is estimated by assuming constant ratios of public reve-

TABLE 6 FISCAL SUSTAINABILITY INDICATORS (a). EPC PENSION EXPENDITURE SCENARIO

	2003	2010	2020	2030	2040	2050
PROJECTIONS						
Total public revenue	40.0	40.0	40.0	40.0	40.0	40.0
Total public expenditure	39.6	39.5	39.5	41.1	44.4	47.4
Primary exp. not associated with ageing	*16.4*	*17.4*	*17.4*	*17.4*	*17.4*	*17.4*
Primary expend. associated with ageing	*20.6*	*20.2*	*20.9*	*22.7*	*25.2*	*26.3*
Interest burden	*2.6*	*2.0*	*1.2*	*0.9*	*1.8*	*3.8*
Total public balance	0.5	0.5	0.5	-1.0	-4.3	-7.4
Primary balance	3.1	2.5	1.7	-0.1	-2.6	-3.6
Public debt	51.8	37.8	22.8	19.5	39.1	81.5
SUSTAINABILITY INDICATORS						
Sustainability gap:						
T1	-1.0					
T2	-2.5					

a. Percentage of GDP.

nue to GDP and primary public expenditure not related to ageing over GDP, while the interest burden is adjusted to reflect changes in public debt, and the implicit interest rate on public debt remains constant at the last observed level. The ratio of public debt to GDP varies according to the primary balance and the difference between the interest rate and GDP growth rate, that are assumed to be constant at a given level.

The sustainability analysis is completed with the calculation of sustainability gaps defined as follows. On the one hand, the sustainability gap is defined as the difference between the ratio of public revenue to GDP for the base year and the ratio of revenue to GDP that, if maintained constant throughout the projection period, would make it possible to reach a public debt level in 2050 equal to that reached by maintaining a balanced public budget every year, in line with the Stability and Growth Pact requirements (indicator T1). On the other hand, the gap is defined as the difference between the ratio of public revenue to GDP for the base year and the ratio of revenue that, if held constant, would guarantee the fulfilment of the government's intertemporal budget constraint for an infinite horizon (indicator T2)[18]. Last, in addition to the base scenario, the foregoing indicators are calculated for different projections that incorporate various sensitivity exercises.

[18] For its calculation, it is assumed that the primary expenditure and revenue ratios, both as a percentage of GDP, remain constant from 2050 onwards.

Table 6 presents an application of these indicators to the Spanish case. According to the estimates of the Economic Policy Committee of the European Union[19], public expenditure on pensions and health will increase in Spain by 5.7 percentage points between 2003 and 2050. According to the foregoing assumptions, the impact of this increase on the public balance and debt will be around 8 and 30 percentage points of GDP, respectively, which would place these two variables at approximately (–7.4) percent and 81.5 percent of GDP in 2050. Indicators T1 and T2 should be around (–1) percent and (–2.5) percent of GDP, respectively, which is indicative that the current level of public revenue is insufficient to ensure long-term fiscal sustainability.

6 Analysis of quality of public finance

As indicated in the introduction, public sector activity also has an impact on economic efficiency and therefore on long-term growth. Low employment and productivity growth in the EU in recent years has in fact led to underscore the role of public policies as producing positive effects or, on the contrary, distortionary effects on potential economic growth. The analysis of the quality of public finances refers precisely to the study of these effects of fiscal policy on efficiency, and includes analysis of factors such as the impact of different public expenditure components on productivity, measurement of efficiency in the provision of public services, or the incidence of tax and social security systems on the functioning of the labour market.

The *Servicio de Estudios* has conducted different studies connected with these questions. As regards the composition of public expenditure, studies have been conducted to determine the impact of public investment on long-term productivity and economic growth. A comparison of this variable in Spain with respect to the EU was also done in order to identify areas of improvement.

Where the first question is concerned, the work of the *Servicio de Estudios* indicates that public investment in physical capital has a positive impact on productivity and economic growth, in particular infrastructure investment, although this impact presents decreasing returns[20]. Spain's relative position in terms of this variable can be measured through per-capita public capital stock, that, in 2004, was 88.6 percent of the EU average level (Table 7), although the convergence effort during the past 15 years has been noteworthy, with growth rates in public investment systematically exceeding the EU average. This effort has made it possible to narrow the public capital gap by somewhat more than 25 percentage points since the beginning of the 1990s.

In matters concerning other public expenditure components, that, according to the available empirical evidence, generate positive effects on economic productivity, human capital stock (calculated according to estimates by the *Servicio de Estudios*) was situated at 87.4 percent in 2003 as against the average level for the EU. Progress in education in recent decades has been significant, as shown by the fact that individuals with secondary or higher

[19] See European Commission (2000) for further details.

[20] See Argimón, González-Páramo, Martín and Roldán (1993).

TABLE 7 INDICATORS OF THE QUALITY OF PUBLIC FINANCES IN SPAIN COMPARED TO THE EUROPEAN UNION

	Levels Spain/EU 15						Average differential growth rates Spain/EU 15	
PHYSICAL CAPITAL INDICATORS	1990	1995	2000	2002	2003	2004	2000/1990	2004/2000
Public capital stock per capita (a)	57.4	72.8	81.1	84.6	86.5	88.6	3.5	2.2
Infrastructure capital stock per capita (a) (b)	72.3	80.6	86.1	88.3	89.8	91.1	1.8	1.4
Public investment (% GDP)	158.2	140.3	126.8	142.2	131.1	137.1	-2.2	2.0
Infrastructure investment (% GDP) (c)	147.0	158.5	156.9	169.9	169.1	173.8	0.7	2.6
TECHNOLOGICAL CAPITAL INDICATORS	1990	1995	2000	2002	2003	2004	2000/1990	2002/2000
R&D expenditure (% GDP)	42.9	44.9	49.9	52.5			1.5	2.6
Public R&D expenditure (% GDP)	54.1	51.4	58.0	64.0			0.7	5.1
Technological capital stock (% GDP)	32.5	41.4	43.7	45.2			3.0	1.6
HUMAN RESOURCE INDICATORS	1992	1995	2000	2002	2003	2004	2000/1992	2003 (2002)/2000
Adults (25-64) with secondary education or higher (%)	47.7	54.0	62.8	66.2	67.2		3.5	2.3
Adults (45-64) with secondary education or higher(%)	27.8	31.7	42.9	47.3	48.5		5.6	4.2
Adults (25-44) with secondary education or higher (%)	58.1	65.3	71.9	75.0	75.9		2.7	1.8
Public expenditure on education (% GDP)	93.9	90.9	88.2	87.3			-0.8	-0.5
Per capita public expenditure on education (d)	70.1	69.3	73.4	74.8			0.6	1.0
Human capital stock (e)	78.3	81.5	85.9	87.5	87.4		1.2	0.6

SOURCE: Banco de España.

a. Obtained from the series expressed in purchasing power parity (PPP) for the euro, 1995.
b. Assessed with non-residential physical capital.
c. Assessed with non-residential investment.
d. Obtained from the series expressed in purchasing power parity (PPP) for the euro, 1995, by working age person.
e. Obtained from the average years of education of the working age population, quality adjusted.

education in the population 45-64 years of age amounted to less than 30 percent in 2004, while this figure increased to 56 percent of the population 25-54 years of age. During the course of these decades, however, the relative position of public expenditure on education did not increase in Spain in respect of the EU. Last, the relative position in terms of technological stock in 2002 registered a larger gap, of 45.2 percent, although progress was made as against the early 1990s in terms of public technological capital stock.

The impact of the tax system on the labour market was analysed in the context of the assessment of successive tax reforms on employment, the estimated impact of the tax wedge (defined as the difference between real gross wages paid by producers and real net wages received by workers) on supply and demand decisions in the labour market, as described

with some degree of detail in Chapter 18, and the role of the unemployment benefits system on the re-employment rate of individuals [Bover, Arellano and Bentolila (1996)].

As regards the analysis of the efficiency in the provision of public services, the work of the *Servicio de Estudios* has focused, last, on analysing the role of public ownership on firm's efficiency, based on the individual data provided by the Central Balance Sheet Data Office. The results show lower performance of public corporations vis-à-vis private ones, in terms of productivity, in a relatively competitive sector such as the manufacturing sector, while insignificant differences between public and private firms were observed in a regulated environment such as the electricity sector[21].

7 Final considerations

The analysis of fiscal policy will require a more in-depth approach to some factors that are gaining increasing importance. At least two of these factors should be pointed out. On the one hand, the implications of population ageing on public expenditure entail a high level of risk to fiscal sustainability in the medium term and to the margin for action in fiscal policy as a stabilisation instrument. This matter therefore requires more thorough study. This includes fine-tuning of long-term projection techniques and simulation of the effects of different types of reform of pension systems, such as, for example, changing the parameters of the pay-as-you-go system, or gradual introduction of a combined system that includes a capitalisation component. Further, the increasingly high importance of the analysis of the quality of pubic finances will require further studies on the impact, among many other factors, of taxation and benefit systems on the labour market, and the construction of synthetic indicators of the quality of public finances.

[21] See Hernández de Cos (2004).

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Operation of the Spanish economy

10. The international environment and external demand

José María Bonilla and Ana Buisán

1 Introduction: economic analysis from the perspective of demand

This chapter introduces a section of the book presenting the techniques and procedures usually employed in analysing and forecasting the Spanish economy, in line with the methodology outlined in Chapter 1. The first two chapters – of the total of six – describe the methods for evaluating, estimating and projecting trends in the various components of demand, in real terms, to define the performance of several fundamental macroeconomic aggregates, namely domestic demand, net external demand and real gross domestic product of the economy.

The demand-side approach to the economy continues to be of pre-eminent importance in the analytical strategy of many institutions and, of course, of central banks, as well, despite the growing significance of supply factors. The great potential of the techniques and instruments and also, to a certain extent, of the information sources available for monitoring the economy from the expenditure perspective provides very useful results in the majority of industrialised economies, regardless of the theoretical foundation of the empirical models used. In Banco de España's case, this approach is even reflected in the structure of its reports, which follow a sequence from expenditure to output, employment and prices. This structure is also reflected in this part of the book, albeit obviously as a result of a simultaneous exercise, related to a general equilibrium dynamic.

It is well known that economic analysis basically depends on macroeconomic forecasting exercises, as these combine the evaluation of the current situation, the outlook for the future and the risks related to each diagnosis. The methodology used combines two time

horizons, differentiated both by the type of information and by the tools employed. In the medium and long term, it is the assumptions made on the behaviour of the exogenous variables and the relationships between the different variables – estimated by means of econometric models – that provide the main input for the forecasting process; indicators are available in the short term on the recent performance of the various aggregates which, duly selected, are incorporated into the forecasting exercises through statistical models that reflect the relationships of these indicators with the quarterly national accounts (CNTR) variables (transference functions). The integration of both types of projections through an iterative process, which can also include another type of knowledge that may not be incorporated in the models or indicators, for example, of an institutional nature, is an essential part of preparing macroeconomic forecasts.

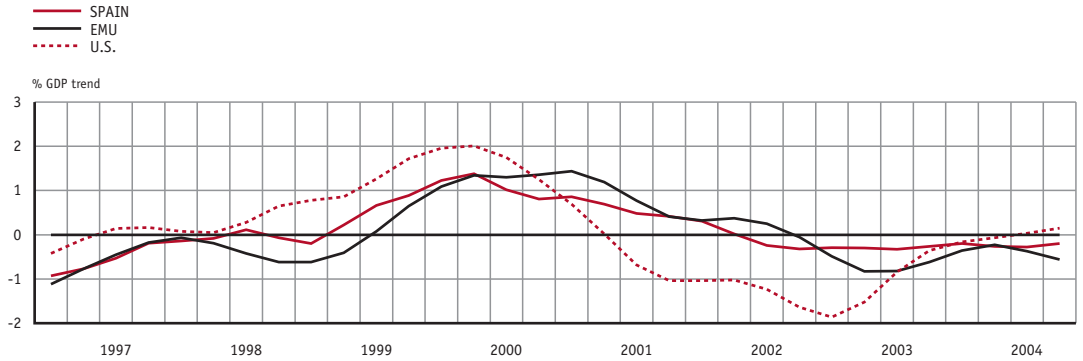
This chapter sets out to analyse expenditure by net external demand – covering the performance of exports and imports of goods and services – and the international environment that determines it. The reason why external demand is covered before domestic demand is that exports are largely conditioned by the external environment, which, for the purposes of the forecasting exercises, is exogenous in nature. It is true, however, that imports are predominantly endogenous, as they mainly depend on final demand of the economy. Despite this, the need for design and empirical treatment to be consistent with the analysis of exports justifies a common approach providing a picture of the net contribution of the external sector to growth in output and the competitive position of the economy.

This order of presentation provides the start of the analysis of the economy, and of its net external demand, by defining the characteristics of the international environment in which it is set and which determines the behaviour of various fundamental variables, such as external markets, import prices, etc., which respond to the decisions made by non-resident agents. Although this chapter adopts an approach that stresses the channelling of external relations through the trading of goods and services – and its determinant variables – it is not assumed, as seen in Chapter 2, that this is the only, or indeed at times, the most significant, path through which the influence of the international environment is transmitted, although it is logically the dominant one in macroeconomic forecasting exercises. It is clear that in the modern world, which is increasingly interrelated, and in an economy such as Spain's that is deeply involved in the integration processes taking place among the countries around it, it is essential to have a well-founded, independent knowledge of the characteristics and performance of the world economy, extending beyond the mere availability of a set of accurate and timely exogenous variables.

Spain's membership in the European Economic and Monetary Union (EMU) requires a particular effort in the analysis of the euro area, as that is where the monetary policy that applies to Spain is determined, and it has many implications on the performance of the economy and domestic economic policy. Furthermore, Banco de España's contribution, as part of the Eurosystem, to defining the common monetary policy relies on the quality of its own diagnosis on the euro area position, and this must be carried out without prejudice to the full analysis of the overall international context and of those countries with a major leadership role in the international economy.

Following this brief introduction, the chapter is structured as follows: the section below covers the analysis of the impact of the external context on the Spanish economy and the

CHART 1 GDP OUTPUT GAP



SOURCE: Banco de España.

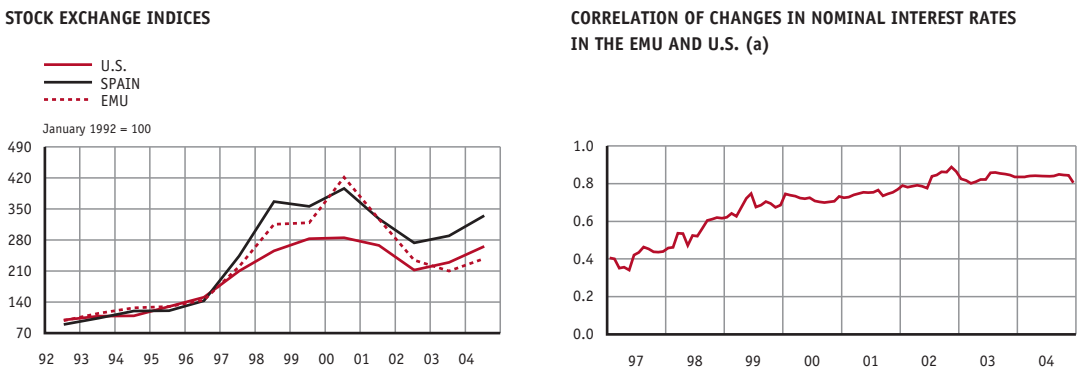
procedures and analytical techniques being developed to evaluate it, in particular with reference to the euro area. Next, the various components of external demand for goods and services will be analysed, and finally a few comments on the rest of the world account as an expression of Spain's financing capacity or requirement are presented.

2 The external context

As mentioned in Chapter 2, the increase in Spain's openness to trade, the growing internationalisation of Spanish corporate activity and the globalisation of financial activity have considerably expanded the channels through which the external environment influences the Spanish economy. Within the global context, Spain's high level of economic integration with the European Union (EU) stands out, indicated by the fact that almost two thirds of Spanish exports are made to this area, which, in turn, is the largest foreign investor in Spain and the main destination of Spanish direct investment flows since 2000. This is reflected in a high degree of harmonisation of Spain's economic cycle with the other European countries (see Chart 1), indicating the considerable influence exerted by the economic situation of Spain's closest neighbours on the trends in activity in Spain.

Furthermore, however, Spain's integration into the European Union and, particularly, into the European Economic and Monetary Union, has brought about the need to study this area in detail. Spain's membership of the European Union has led to the adoption of an overall framework of conduct and co-ordination of structural and fiscal policies, based on the needs of the European economy and in which Spain's domestic policies must be anchored. In addition, the fact that in the Economic and Monetary Union the common monetary policy is set by the Eurosystem, in accordance with the joint economic outlook and conditions of the euro area, justifies Banco de España's considerable strengthening of its capacity for analysing the economic outlook and trends of the euro area.

CHART 2 STOCK EXCHANGE AND LONG-TERM INTEREST RATE INDICES



SOURCES: OECD, ECB and Banco de España.

a. Correlation of three-year moving averages of the negotiated 10-year bond rate.

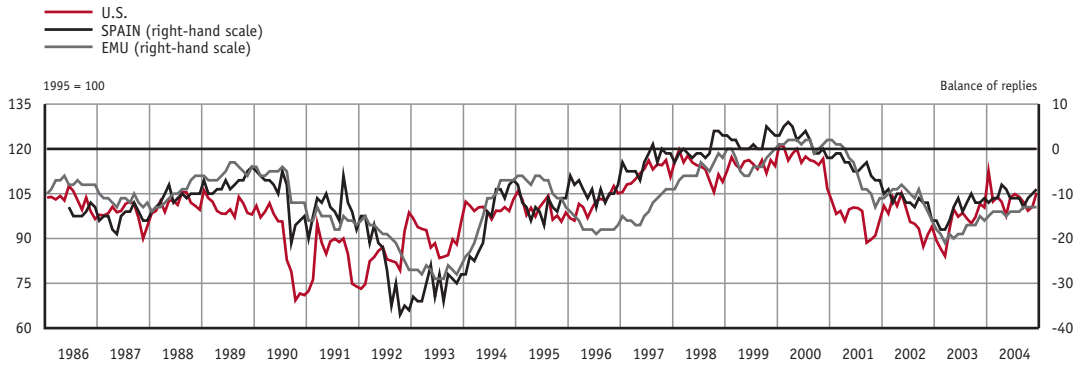
The following section describes the most direct channels of influence of the international environment on the Spanish economy, with particular emphasis on the different economic variables that represent the external economic situation in the forecasting exercises on the Spanish economy. The methodology used to evaluate and monitor the world economy – in particular as applied to the euro area – is summarised afterwards.

2.1 Influence of the international environment on the Spanish economy

As pointed out in the introduction, the international economic situation affects the Spanish economy through numerous channels, which are also themselves interrelated. Among these, the trade channel and the financial channel are the most analysed and best known with regard to the way in which shocks originating abroad are transmitted to the domestic environment. The trade channel refers to the effects of external demand and prices determined on world markets on domestic spending and on price formation in the Spanish economy. The financial channel arises from the relationships that exist between economies with regard to inflows and outflows of capital, and reflects the transmission of external shocks by way of their effects on direct or portfolio investment flows. Similarly, in recent years, the possible existence of an additional financial channel has arisen, resulting from international portfolio diversification and the spread of direct investment flows, which may be related to the transmission – or contagion – of shocks via the movements of interest rates and prices on different stock markets (see Chart 2). The empirical evidence supports the existence of this additional financial channel, although it does not appear that its effects have intensified in the recent period [Fratzscher (2001)].

Moreover, the cyclical synchronisation observed between the various western countries has also been reflected in an increased correlation between the confidence of economic

CHART 3 CONSUMER CONFIDENCE



SOURCES: European Commission and OECD.

agents in different countries, giving rise to the possibility that these variables act as transmitters of idiosyncratic shocks between different areas and not as simple mechanisms amplifying common shocks (see Chart 3). While it is difficult to determine the point to which the high level of correlation observed is due to the shocks in one market causing movements in another, or whether it is the result of common shocks, which affect all economies, the available evidence appears to favour the existence of a transmission channel through confidence, albeit not as strong as in the case of stock market prices [see Anderton et al. (2004)].

Of all the possible channels through which the international context affects an economy, the one that is usually introduced into macroeconomic models is the trade channel, which is of growing importance in the case of the Spanish economy, given the significant weight that exports and imports have been gaining in GDP, as will be seen in the next section. To evaluate the Spanish economic situation and outlook, we must identify the characteristics of the international context in which it is operating, as analysing this provides the information required on trends in several fundamental variables, such as foreign markets, export prices, etc., related to the decisions taken by non-resident agents that also affect very significant areas of the economy.

However, the need to have appropriate knowledge of the characteristics and performance of the world economy extends beyond the mere compilation of a set of exogenous variables required for forecasting exercises, and has particular relevance in an increasingly interrelated environment such as the present one, and in an economy such Spain's, which is immersed in some of the most significant integration processes currently under way. Given that the possible influence of external shocks, via the financial channel, of contagion between stock market prices, or of confidence, is hard to quantify, these elements must be included in the forecasts both as part of the judgment factors incorporated and as part of the risk analysis. It must be borne in mind that in this regard the uncertainty surrounding the macroeconomic forecasts is determined, to a great extent, by the evolution of the variables

that characterise the external environment and that affect the Spanish economy via the various channels outlined above.

The influence of the trade channel is reflected through the incorporation into the macroeconometric models of a set of external variables that fall into two groups depending on the degree of exogeneity. The first group is composed of the prices of various inputs determined on world markets and the exchange rate, which is the price of Spanish assets relative to foreign assets. The second group of variables is directly related to the spending capacity of and price setting by external economic agents, and the forecast path of the first group of variables must be available in advance in order to determine the second group.[1]

The variables of the first group affect the prices of domestic output relative to prices abroad and thus affect trade flows and resident agents' spending capacity. At the same time, these variables have a direct impact on domestic consumer prices in various ways.[2] Therefore, the inclusion of one assumption, or another, on the future evolution of variables such as the exchange rate, or the price of oil, has a very significant effect on the macroeconomic forecasts for the Spanish economy.

These variables are projected over the forecast horizon using simple techniques, due to the difficulties in modelling their performance statistically. In particular, the exchange rate is usually assumed to follow a random walk and the best forecast is assumed to be the most recent known value. The assumption that a random walk model of the exchange rate frequently produces better forecasts than structural exchange rate models has been corroborated empirically [Meese and Rogoff (1983) and Cheung et al. (2002)]. The most likely path of prices for oil and various other raw materials is determined from the information provided by their prices on the futures markets. Nevertheless, it must be borne in mind that the use of futures prices as a predictor of spot prices is subject to margins of error and biases that are not negligible.[3] For example, in the case of oil, the mean absolute error in the last five years is close to 15 percent for three-month futures prices and about 20 percent for six-month futures.

The second group of external environment variables is formed by import volumes and prices of exports from the world's main economic areas. As we shall observe in Section 3, the first variable, which assess spending by non-residents, is the scale variable in the export demand function. International export prices act as explanatory factors both of Spanish export prices and of domestic import prices. Moreover, the prices of exports from the rest of the world, through their effect on import prices, also affect the forecast of other final demand aggregates, such as private consumption and capital goods investment, as part of this demand is channelled towards imported goods. Unlike the more or less automatic forecast of the first set of external variables, the second group is obtained as part of a broad evaluation and monitoring exercise of the world economic situation, presented in the following section.

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[1] We must also introduce assumptions on interest rates and future trends in the public accounts.

[2] Chuliá (2000) presents the various phases by which the rising price of oil is transmitted to final prices, and Estrada and Torres (2004) analyse the impact of a change in the exchange rate on the Spanish economy.

[3] Kumar (1991) analyses the predictive power of other alternatives to using oil futures prices.

Finally, in the case of an economy such as Spain's, which belongs to a monetary union, the evolution of interest rates is a crucial external assumption. The path of this variable is normally set based on assumptions that interest rates will remain unchanged over the forecast horizon. Alternatively it may be assumed that they will vary in line with the forward rates quoted on the markets. In the first case, the forecasts can be interpreted as projections, provided the monetary policy stance is maintained. However, this procedure gives rise to a logical inconsistency, when it is assumed that short-term interest rates follow a path that, generally speaking, is not consistent with market expectations, as reflected in the prices of long-term fixed-return instruments. In the second case this problem is avoided, although the assumption on monetary policy underlying the forecasts is less transparent.

2.2 Methods for analysing and forecasting the external context

This section describes the methodological approach used at Banco de España to determine the external environment of the Spanish economy, that will serve as a basis for preparing the short- and long-term macroeconomic forecasts. Forecasting exercises are normally performed quarterly, so a set of up-to-date external variables must also be available quarterly so that the evaluation of the external environment can be incorporated in the forecasts.

In line with the increasing degree of openness of the Spanish economy, Banco de España has been developing a series of instruments in recent years to monitor and evaluate the international economic environment. The objective of this effort is obviously not to compete with the international organisations, which allocate significant resources to preparing global forecasts, but to be in a position to develop its own opinion on the most likely trends in and main risks faced by the largest economies – in particular, Europe – from analyses by other institutions and the available statistical information.

Accordingly, the starting point of the exercises evaluating the international context carried out by Banco de España is a complete up-to-date set of forecasts published by an international organisation. In the case of the euro area external environment, it usually starts from forecasts prepared by the International Monetary Fund (IMF), although they are checked against the information from the Organisation for Economic Co-operation and Development (OECD), the European Commission and the Eurosystem, which will be analysed afterwards. The IMF publishes the *World Economic Outlook* twice a year in the spring and autumn, which presents economic projections for the majority of the countries in the world for the current year and the two following years, which are incorporated into the estimation and forecast of a variety of economic variables. The IMF report accompanying the forecasts analyses the most significant factors that characterise these variables as well as the main risks faced by the world economy.

For the euro area, the starting point is the latest macroeconomic projections made within the Eurosystem, whether by the European Central Bank (ECB) alone, or by the ECB in conjunction with the euro area national central banks (NCBs). Nevertheless, these forecasts are always checked against and compared with those of the other international organisations, and particularly with those prepared every six months by the European Commission, given its special knowledge of the European Union economies.

Twice a year, in spring and autumn, the central banks belonging to the Eurosystem perform forecasting exercises in which they assess the short-and medium-term outlook of the euro area economy and each of the 12 member countries[4]; two further times a year, in winter and summer, the ECB conducts a similar exercise on its own. As a member of the Eurosystem, Banco de España participates in all the stages of the forecasting exercises that are carried out jointly. In these exercises, the Eurosystem NCBs and the ECB co-ordinate to determine the external assumptions to be used – the variables that characterise the economic evolution of the rest of the world, the exchange rate, oil prices, etc. – as well as the assumptions to be adopted for stock market prices and interest rates. These exercises are based at present on the assumption that short-term interest rates remain constant. The environment outside the euro area is discussed in detail and a baseline scenario is established by consensus among the Eurosystem members.

During the course of the Eurosystem forecasting exercise, each NCB provides projected trends for its country's economy, based on the previously agreed external assumptions, which are compared with the projections also prepared by the ECB in discussions in which the other NCBs actively participate. The projected evolution for the euro area economy in the short and medium term – resulting from aggregating the forecasts by country – and the risks faced in the proposed scenario are also submitted for discussion. The regular monitoring of the international economy, and of the euro area in particular, carried out by Banco de España enables it to participate actively in the discussions held alongside these exercises, to comment on the forecasts provided by the various NCBs and to contribute to the clarification of the trends and uncertainties surrounding the evolution of the euro area economy. Finally, in the forecasting exercises carried out in co-ordination with the Eurosystem, the international context is also estimated in conjunction with the other NCBs and the ECB[5].

When the quarterly forecasting exercises carried out by Banco de España do not coincide with the Eurosystem exercises, the evaluation of the external context is obviously performed on an autonomous basis. Given a starting point – which is, as mentioned above, a complete set of forecasts on the world economy prepared by the main international organisations – this set of forecasts is evaluated, fine-tuned and updated to reflect information on the current economic situation received subsequent to its publication. Similarly, it must be borne in mind that it is often the case that when the reports containing the international organisations' forecasts are published, the assumptions on the oil price, the exchange rate, interest rates, or world trade on which they are based are already out of date, given the sometimes lengthy time required for the approval processes and subsequent publication once the forecasts are made. To solve this problem, various methods have been developed to update the various fundamental external environment variables – GDP, imports, export prices and some other macroeconomic aggregates – on a consistent basis to adapt them both to the new information being received on economic indicators and to the changes registered by the exogenous variables mentioned.

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[4] A detailed explanation of the techniques and procedures employed by the Eurosystem in preparing its projections can be found in ECB (2001).

[5] As a result of the exercise, a report is compiled and submitted to the ECB Governing Council, in which the forecasts are analysed and the main risks associated with the central scenario are set out. ECB (2000) presents a discussion on the role of the projections within the monetary policy strategy of the ECB.

In this way, the information provided by the short-term economic indicators[6] makes it possible to revise the estimated growth in GDP and in imports by countries outside Spain for the quarter immediately following the most recent data released. In particular, for the euro area, a short-term GDP growth estimate is obtained from a transference function between various significant indicators and quarterly GDP. At the same time as this GDP estimate is made, based on economic activity indicators, the short-term estimates of its demand side components can be revised, also on the basis of the information provided by the published indicators. The new estimates are incorporated in the euro area macroeconomic framework, thereby providing an alternative estimate of the GDP rate of change from the aggregation of its components. The two estimates of GDP do not always coincide, and the analyst's judgment is a determining factor in setting the proposed growth rate. As a result of this process, new short-term estimates of GDP and imports are obtained, both for the euro area and for the main areas and countries outside the euro area, which normally differ from those provided by the IMF or the ECB. The quarterly revision is included in the available annual projection, thereby leading at times to an automatic change in the average annual rate.

For the subsequent quarters, the forecasts available from the international organisations are adapted to reflect the changes introduced in the assumptions on the exogenous variables – oil price, exchange rate, interest rates, stock market prices and world trade – applying adjusting elasticities and judgement factors. The elasticities used are derived, on the one hand, from the results published by various international organisations on the effects of changes to such variables on prices and activity in the leading world economies [see, for example, IMF (2000) or IEA (2004)]. On the other hand, for the euro area, the available forecasts are adapted to the new assumptions by applying the adjusting elasticities of the projections, which are used to perform similar fine-tuning in the final part of the forecasting exercises carried out by the Eurosystem.[7] As the elasticities are available both for GDP and for imports, their application provides the revised growth rates for both variables. In the case of export prices, the growth rates forecast by the international organisations are adapted to the new assumptions by applying the adjusting elasticities, in the case of the euro area, or are recalculated to reflect the most recent changes in the exchange rate, when referring to the non-euro area.

The results of the revision exercise for the external environment are expressed in the preparation of a document reflecting the new assumptions on exogenous variables (exchange rates, interest rates and raw material prices), as well as the new growth forecasts for GDP and imports for the main economic areas over the forecast horizon. Imports by countries that are a destination for Spanish products are weighted by the size of Spanish exports to each country, and the growth in Spain's export markets – a scale variable of the Spanish export function – is obtained in this way (see Table 1). As described above, the analysis of the Spanish economy's external environment and, specifically, the forecasts for export prices and markets, provide a fundamental ingredient for preparing projections of the Spanish

[6] Tables 1 and 2 of the annex present some of the main indicators of the euro area and of the countries outside the euro area that are usually analysed, as well as their correlation with GDP.

[7] An explanation of the method for calculating elasticities can be found in ECB (2001).

TABLE 1 GROWTH IN SPAIN'S EXPORT MARKETS (a)

	Annual rate of change in imports from each country or group								
	Weight	Proposed		ECB (Sept. 04)		IMF (Sept. 04)		OECD (Sept. 04)	
		2004	2005	2004	2005	2004	2005	2004	2005
EMU	60.1	6.6	7.1	6.3	6.5	5.7	5.8	5.9	6.5
Germany	12.0	6.9	6.7	6.9	6.7	6.5	6.1	6.4	4.9
France	19.2	8.3	7.9	8.3	7.9	8.3	8.8	7.7	7.7
Italy	9.7	4.7	6.0	4.7	6.0	3.3	1.9	4.3	7.5
Portugal	9.6	8.0	5.2	8.0	5.2			7.1	5.5
The Netherlands	3.4	5.1	5.5	5.1	5.5			5.3	6.4
Belgium	3.0	4.4	5.5	4.4	5.5			3.3	6.2
Finland	0.4	-1.1	3.0	-1.1	3.0			0.2	4.0
Ireland	0.6	3.9	5.6	3.9	5.6			6.0	8.6
Austria	0.9	6.2	7.5	6.2	7.5			7.1	8.1
Luxembourg	0.1	8.1	6.3	8.1	6.3			6.9	7.7
Greece	1.2	9.4	4.8	9.4	4.8			5.1	4.1
Non-EMU EU	14.3	7.2	6.4	7.1	7.6	4.9	5.3	7.7	8.3
United Kingdom	9.3	5.0	5.0	4.7	6.6	4.9	5.3	4.7	6.5
Sweden	1.0	7.0	6.0	7.6	8.3			6.9	9.3
Denmark	0.7	4.5	5.0	6.6	4.3			6.6	7.0
Other	3.3	12.0	9.3	11.4	9.9			13.6	11.4
U.S.	4.1	9.0	6.0	9.8	5.8	9.8	5.0	10.1	7.7
Japan	0.7	10.0	8.0	9.8	5.9	8.8	4.8	9.9	7.1
Rest of OECD (b)	3.6	8.8	7.0	8.8	7.0	8.2	5.3	8.7	7.7
Latin America	4.7	25.5	11.0	7.6	7.2	11.3	7.6	11.3	7.6
Argentina	0.3	70.0	15.0						
Brazil	0.6	30.0	15.0						
Mexico	1.6	12.5	8.7					10.5	9.1
Asia, excluding Japan	4.8	13.0	10.7	12.5	9.7	15.0	8.4	15.0	8.4
Newly ind. countries (NIC)	0.9	10.2	10.0			13.0	7.4	13.0	7.4
Rest of Asia	3.9	22.4	17.2			18.2	9.9	18.2	9.9
Eastern Europe	1.0	12.0	12.0	11.5	10.0	12.7	9.1	12.7	9.1
OPEC (c)	2.5	9.0	8.6	9.0	8.6	9.0	8.6	9.0	8.6
Rest of world	4.2	9.1	10.3	9.1	10.3	7.9	8.9	7.9	8.9
Export markets (rate of change)	100.0	8.3	7.5	7.3	7.1	6.8	6.1	7.4	7.2

a. Forecasts for "Growth in Spain´s export markets" were calculated as the weighted average of forecasts for the key areas for which weighting exists.

b. Forecasts for the "Advanced economies" group, IMF.

c. Forecasts for the "Petroleum exporters" group, IMF, repeated for OECD and ECB.

economy, as they are essential determinants of external demand, which is analysed in the next section.

3 External demand

The evaluation of external demand is central to macroeconomic forecasting and analysis exercises, as it is the means for establishing the link between domestic conditions and the international environment in which the Spanish economy operates. The significance of exports and imports of goods and services in domestic economic activity has increased considerably, progressing alongside the process of Spain's liberalisation and integration into the world economy (see Table 2). Net foreign demand in real terms currently occupies substantial weight in determining real GDP and the degree of openness of the Spanish economy is now equivalent to that of the main euro area economies. In addition to their quantitative significance, the diversity of factors, both external and domestic, that are combined to determine the various components of external demand means that the analysis of external demand provides relevant information on the economy's ability to maintain a process of continuous, balanced development, in which openness and participation in ever larger and more integrated areas is a stimulus, and not a hindrance, to potential growth.

The knowledge and evaluation of the external context, as established in the previous section, therefore provide the necessary information on a set of exogenous variables that affect the main external demand components. As mentioned above, the evaluation of the markets and the income of the rest of the world help to explain trends in exports of goods and services. The prices of goods and services produced abroad, compared with those produced domestically – once they have been expressed in the same currency – help to explain import penetration in the domestic market, in addition to being a key element in the process of cost and price formation. Also the comparison, finally, between prices of exports and prices applied by other competitors in international markets – also set on a comparable basis – determines the competitive position of Spanish goods and services and their ability to gain positions in these markets. The influence of domestic factors on external demand is channelled, in turn, through final demand – domestic demand plus exports – the pressure of which can be directed at the domestic market, or the external market, according to a number of factors, among which, as seen above, the ability of the economy to compete with goods and services from the rest of the world plays a predominant role.

The many factors affecting the various components of external demand does not end here, although those discussed above play a key role in macroeconomic forecasting and modelling processes. In any case, when the main variables determining the competitiveness of the Spanish economy are analysed in Chapter 17 it will be evident that other types of factors, such as the characteristics of the productive and trade structure or the degree of technological development and innovation, are also important in defining the conditions in which Spanish products access the international markets – which are increasingly competitive and contested.

This section will therefore refer to the procedures used to evaluate the main external demand components of the Spanish economy in real terms and the corresponding deflators. In

TABLE 2 WEIGHT OF TRADE FLOWS WITH THE REST OF THE WORLD IN GDP

	Percentage of real GDP		Percentages of current GDP	
	1985	2004	1985	2004
1. Exports of goods and services	16.3	31.0	21.6	27.0
1.1. Goods	9.8	22.6	14.6	18.7
1.2. Services	6.5	8.4	7.0	8.4
Other services	*1.6*	*3.9*	*2.2*	*3.7*
Tourism	*4.9*	*4.5*	*4.8*	*4.7*
2. Imports of goods and services	10.1	35.9	19.9	30.7
2.1. Goods	7.8	30.3	17.2	25.5
2.2. Services	2.3	5.6	2.7	5.3
Other services	*1.8*	*4.4*	*2.0*	*4.1*
Tourism	*0.5*	*1.2*	*0.6*	*1.1*
3. Level of openness	26.4	66.9	41.5	57.8
3.1. Goods	17.6	52.9	31.9	44.1
3.2. Services	8.8	14.0	9.6	13.6
Other services	*3.4*	*8.3*	*4.2*	*7.8*
Tourism	*5.4*	*5.8*	*5.4*	*5.8*
Memorandum items: Level of openness				
Euro area	44.7	77.7	63.9	71.2
Germany	48.1	74.1	63.1	71.5
France	32.3	56.5	46.8	50.5
Italy	34.3	56.9	45.4	52.5

SOURCES: INE (National Statistics Institute) and Eurostat.

each case, the first section describes the underlying analytical foundations in the econometric formulas used for the medium-term forecast. A subsequent section comments on the cyclical economic information available for analysing the short term, with emphasis on the methods for assessing the various indicators and ranking them in order of importance, and their suitability for short-term forecasting.

3.1 Analytical framework and modelling

The usual theoretical approaches to the analysis of exports and imports of goods and services are based on partial equilibrium models. In these models, the optimisation conditions for economic agents enable demand decisions to be expressed in terms of an income variable – world or domestic demand, according to whether it is a matter of the export or import function – and in terms of a relative price variable, which compares export prices or import prices with the corresponding international or domestic market prices, once they have both

been expressed in a common currency using the appropriate effective exchange rate.[8] The most common way to determine the conditions of supply is to assume that the price does not depend on the quantity exchanged – a reasonable assumption for a small economy – and that it is set as a variable mark-up over basic costs. As we shall observe below, these approaches are used in the external block of the quarterly macroeconometric model of the Spanish economy (MTBE)[9], which was presented in Chapter 5 of this book and which is the main tool for medium-term forecasting of the key components of external demand.

3.1.1 Exports of goods and services

The analysis of exports of goods and services – like the analysis of imports set out in the next section – can be approached with varying levels of disaggregation, according to the desired objectives and the available information. For medium-term macroeconomic forecasting, which is the topic of this section, the distinction is customarily made at least between exports of goods and of services, as it is thought that this breakdown provides sufficient elements to identify the specific determinants of each type of export. Owing to the complexity and significance assumed by trade in services over the past few years and the significant weight of the tourism sector in some economies, it might be advisable to address some of these items separately. However, the lack of specific information on the determinants of such heterogeneous activities as those included here often makes it a more difficult matter to perform a sufficiently disaggregated analysis of trade in services.

At Banco de España, the main instrument used in preparing the macroeconomic forecasts, the MTBE, employs an aggregate approach for modelling services exports, despite the well-known significance of the tourism sector in the case of the Spanish economy. According to the Tourism Satellite Account estimate, tourism activity accounted directly and indirectly for 10.7 percent of real GDP and 10 percent of employment in 2003, with foreign tourism representing 50 percent of these figures[10]. In these circumstances, a separate analysis of the performance of this sector would be fully justified to gain a better understanding of it and to enhance its forecasting in the medium term. The constraints that governed the production of the quarterly model, however, prevented this disaggregation being made within this framework. In any case, the approach of the equation for services exports that was finally estimated relates in effect to factors that fundamentally affect trends in tourism revenue. Work is under way on estimating an external sector satellite model, one of the objectives of which is specifically to increase the degree of disaggregation of services exports, while isolating tourism.

Within the area of exports of goods, the MTBE does distinguish between exports to the EMU and those to the rest of the world – a breakdown that is considered necessary, given that it could be expected that the effects of the exchange rate as an explanatory factor might vary in each case. The exercises to analyse and forecast exports of goods and services are

8 See Buisán and Gordo (1997) and Buisán, Caballero and Jiménez (2004).

9 Estrada et al. (2004).

10 For a detailed analysis of the significance and characteristics of this sector see Bravo Cabria (2004).

therefore performed for the time being with the three levels of disaggregation provided by the model: exports of goods to the EMU, exports of goods to the rest of the world and services exports. Table 3 shows the three demand equations, separating long-term relationships from short-term dynamic specifications. The same pattern and level of disaggregation are repeated in the price equations shown in Table 4.

As we observe in the tables, the demand equations reflect the theoretical approaches discussed above. Real exports of goods – to the euro area and to the rest of the world – depend in the long term on a variable that measures their demand and on their price competitiveness. Demand in each area is calculated, as we observed in the second section, as a weighted average of imports from the various countries involved, according to their relative weight in Spanish export trade. Competitiveness, in turn, is measured as the relationship between Spain's export prices (in each of the two areas considered) and competitors' prices, once they have been harmonised with the exchange rate, when this variable is relevant (trade originating from outside the euro area).

In the relative price variable of each equation, not only the countries belonging to the relevant area are considered as competitors, but additionally those belonging to the other area that also compete with their goods and services in the reference market. This method of introducing the competition of third countries is highly relevant to the Spanish economy, which is now facing the challenge of the enlargement of the European Community and the growing presence of the emerging economies in various increasingly globalised markets.

A particular feature of the export functions that have been estimated historically for the Spanish economy is their high income-elasticity. In the case of the quarterly model, in order to comply with the long-term stability conditions, a unitary elasticity was applied to the income variable. Consequently, and to capture the constant gain in market share of Spanish exports over the majority of the sample period (not explained by the competitiveness variable), a time trend was included in the equation up to 1998, the year from which gains in market share ceased to show a sustained trend. With regard to price elasticities, the coefficients have the correct sign and their absolute values fluctuate around unity.

The short-term relationships basically reflect the dynamics of the exogenous variables, as well as the impact of the error correction mechanism. As can be seen in Table 2, it is worth pointing out the contemporaneous sensitivity of exports to changes in world demand, while the effect of changes in relative prices is more spread out over time and less intense.

The estimated functions provide a reasonable picture of trends in exports of goods, and are therefore a sound set of instruments for medium-term forecasting. Charts 4 and 5 show the contributions of the main determinants to growth in exports to the euro area and to the rest of the world, respectively, and compare the results simulated by the equations with the data observed for the period 1991-2003. Although, as already mentioned above, the significance of external demand as an explanatory factor for exports is clear, the significance of competitiveness is not negligible. In this connection, it is worthwhile to observe the stimulus received by exports in both markets in the wake of the peseta exchange rate devaluations during the first half of the 1990s and the negative impact of competitiveness in the subsequent years, when the exchange rate ceased to act within its constraints as a corrective factor of price differentials following adoption of a common currency. The contribution of the trend imposed on the equations up to 1998 – reflected in the charts in the "other variables" component – evidences

TABLE 3 REAL EXPORT EQUATIONS (MTBE) (a)

Long-term:

1) $$\bar{x}_{be} = 8.52 - 0.08\ D84 + 0.01\,TRENXGER + (wd_{be})^r - 0.86\left(p^x_{be} - 0.64\left(cp^{xe}_{be}\right)^r - 0.36\left(cp^{xe}_{br}\right)^r\right)$$

2) $$\bar{x}_{br} = 8.57 + 0.32\ D86 + 0.00\,TRENXGNR + (wd_{br})^r - 1.08\left(p^x_{br} - 0.63\left(cp^{xr}_{br}\right)^r - 0.37\left(cp^{xr}_{be}\right)^r\right)$$

3) $$\bar{x}_{s} = 8.62 + 0.01\,TRENXSR1 + 0.03\,TRENXSR2 + (wd_{s})^r - 0.91\left(p^x_{s} - cp^x_{s}\right)$$

Dynamic specification:

1) $$\Delta x_{be} = \underset{(3.22)}{0.02} + \underset{(3.07)}{0.87}\,\Delta wd_{be} - \underset{(-1.73)}{0.24}\left(\Delta\left(p^x_{be} - cp^{xe}_{be}\right) + \left(p^x_{be} - cp^{xe}_{be}\right)_{-4}\right) - \underset{(-4.30)}{0.42}\left(x_{be} - \bar{x}_{be}\right)_{-1}$$

2) $$\Delta x_{br} = \underset{(1.40)}{0.01} + \underset{(1.59)}{0.64}\,\Delta wd_{br} - \underset{(-3.83)}{0.50}\,\Delta\left(p^x_{br} - cp^{xr}_{br}\right) - \underset{(-4.51)}{0.37}\left(x_{br} - \bar{x}_{br}\right)_{-1}$$

3) $$\Delta x_{s} = \underset{(0.78)}{0.00} + \underset{(18.42)}{0.80}\,\Delta x_{s_{-1}} + \underset{(1.31)}{0.24}\,\Delta wd_{s_{-1}} - \underset{(-4.22)}{0.09}\left(\Delta\left(p^x_{s} - cp^x_{s}\right) + \Delta\left(p_{s} - cp^x_{s}\right)_{-2}\right) - \underset{(-4.26)}{0.05}\left(x_{s} - \bar{x}_{s}\right)_{-1}$$

Where:

x_{be} = real goods exports to the euro area	x_{br} = real goods exports to the rest of the world
x_s = real services exports	wd_{be} = indicators of demand for goods exports to the euro area
wd_{br} = indicators of demand for goods exports to the rest of the world	wd_s = indicators of demand for services exports
p^x_{be} = deflator of euro area goods exports	p^x_{br} = deflator of goods exports from the rest of the world
p^x_s = deflator of services exports	cp^{xe}_{be} = competitor prices of euro area exports in the euro area
cp^{xe}_{br} = competitor prices of rest of the world exports in the euro area	cp^{xr}_{be} = competitor prices of euro area exports in the rest of the world
cp^{xr}_{br} = competitor prices of rest of the world exports in the rest of the world	cp^x_s = competitor prices for services exports
D84 = Step dummy from 1984	**D86** = Step dummy from 1986.II
TRENX (XGER, XGNR, XSR1, XSR2) = deterministic trend	

a. Variables in lowercase are expressed in logarithms. The superscript "r" indicates that the parameter is restricted in the estimation. Bar variables ($\bar{x}$) denote the long term. t-statistics are given in parentheses. Estimates were prepared with seasonally adjusted quarterly series for the period 1980.I-1998.IV. For further details, including checks for model adjustmet dependability, see Estrada et al. (2004).

TABLE 4 EXPORT DEFLATOR EQUATIONS (MTBE) (a)

Long-term:

1) $$\bar{p}^{x}_{be_n} = 0.12 - 0.10\,D93 + 0.73\left(0.64\left(cp^{xe}_{be}\right)^{r} + 0.36\left(cp^{xe}_{br}\right)^{r}\right) + 0.27\,p^{p}$$

2) $$\bar{p}^{x}_{br_n} = 0.20 - 0.16\,D93 + 0.61\left(0.63\left(cp^{xr}_{br}\right)^{r} + 0.37\left(cp^{xr}_{be}\right)^{r}\right) + 0.39\,p^{p}$$

3) $$\bar{p}^{x}_{s_n} = 0.06 - 0.02\,D93 + 0.33\,cp^{x}_{s} + 0.67\left(p^{p}\right)^{r}$$

Dynamic specification:

1) $$\Delta p^{x}_{be_n} = \underset{(1.66)}{0.00} + \underset{(-)}{0.28}\,\Delta\left(p^{x}_{be_{n-2}}\right)^{r} + \underset{(7.76)}{0.72}\,\Delta cp^{xe}_{be} - \underset{(-4.98)}{0.57}\,\Delta e^{x}_{be} - \underset{(-2.50)}{0.21}\,\Delta e^{x}_{be_{-2}} - \underset{(-4.70)}{0.34}\left(p^{x}_{be} - \bar{p}^{x}_{be}\right)_{-1}$$

2) $$\Delta p^{x}_{br_n} = \underset{(0.46)}{0.00} + \underset{(2.32)}{0.23}\,\Delta p^{x}_{br_{n-2}} + \underset{(3.51)}{0.44}\,\Delta cp^{xr}_{br} - \underset{(-2.03)}{0.25}\,\Delta e^{x}_{br} - \underset{(-3.25)}{0.27}\left(p^{x}_{br} - \bar{p}^{x}_{br}\right)_{-1}$$

3) $$\Delta p^{x}_{s_n} = \underset{(1.25)}{0.00} + \underset{(7.82)}{0.44}\,\Delta p^{x}_{s_{n-4}} + \underset{(4.25)}{0.10}\,\Delta cp^{x}_{s} + \underset{(6.82)}{0.33}\,\Delta p^{p} - \underset{(-1.92)}{0.09}\left(p^{x}_{s} - \bar{p}^{x}_{s}\right)_{-1}$$

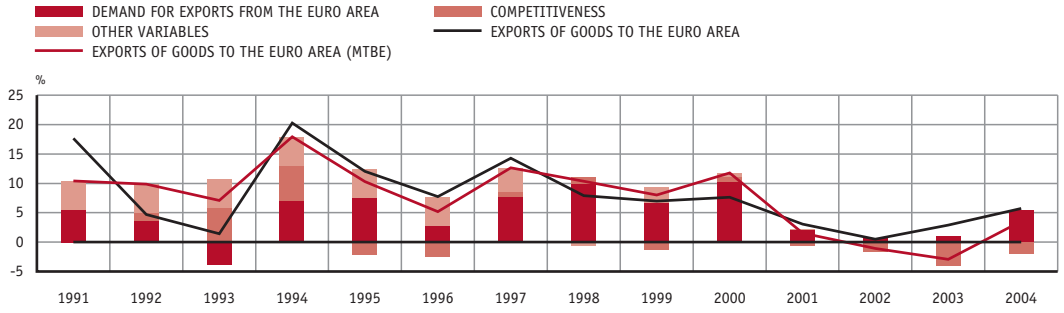
Where:

p^{x}_{be} = deflator of euro area goods exports	$p^{x}_{be_n}$ = deflator of euro area goods exports net of taxes
p^{x}_{br} = deflator of goods exports from the rest of the world	$p^{x}_{br_n}$ = deflactor of rest of the world goods exports net of taxes
p^{x}_{s} = deflator of services exports	$p^{x}_{s_n}$ = deflator of services export net of taxes
cp^{xe}_{be} = competitor prices of euro area exports in the euro area	cp^{xe}_{br} = competitor prices of rest of the world exports in the euro area
cp^{xr}_{br} = competitor prices of rest of the world exports in the rest of the world	cp^{xr}_{be} = competitor prices of euro area exports in the rest of the world
cp^{x}_{s} = competitor prices for services exports	p^{p} = private-sector value added deflator excluding taxes
e^{x}_{be} = nominal effective exchange rate on the side of euro area exports in the euro area	e^{x}_{br} = nominal effective exchange rate on the side of rest of the world exports to the rest of the world
D93 = Dummy to reflect 1993 peseta depreciation	

a. Variables in lowercase are expressed in logarithms. The superscript "r" indicates that the parameter is restricted in the estimation. Bar variables ($\bar{x}$) denote the long term. t-statistics are given in parentheses. Estimates were prepared with seasonally adjusted quarterly series for the period 1980.I-1998.IV. For further details, including checks for model adjustmet dependability, see Estrada et al. (2004).

CHART 4 REAL EXPORTS OF GOODS TO THE EURO AREA AND DETERMINANT FACTORS

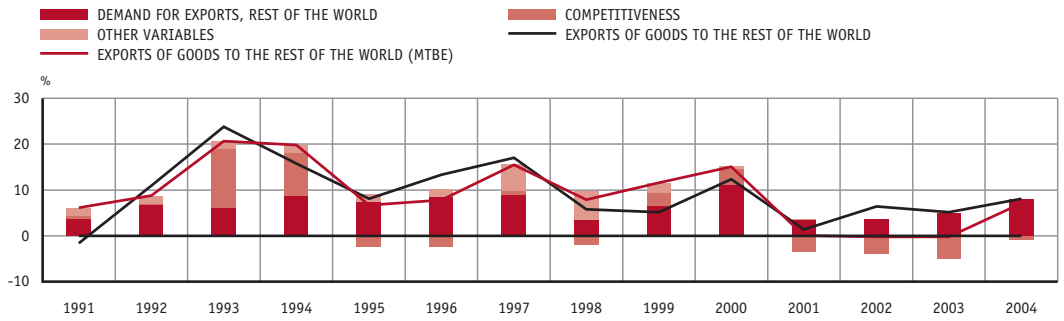
LOGARITHMIC RATES OF CHANGE AND CONTRIBUTIONS



SOURCE: Banco de España.

CHART 5 REAL EXPORTS OF GOODS TO THE REST OF THE WORLD AND DETERMINANT FACTORS

LOGARITHMIC RATES OF CHANGE AND CONTRIBUTIONS



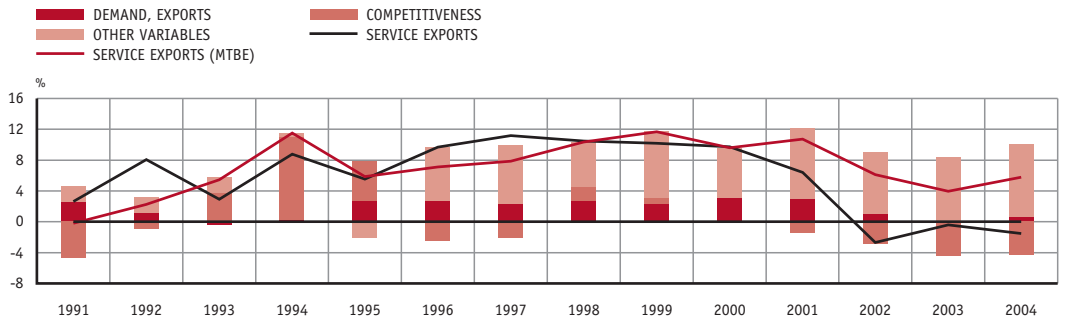
SOURCE: Banco de España.

the considerable gains in market share achieved in both markets – above all in the euro area – up to the creation of the monetary union and which could not be reflected through the demand variable when the value of its coefficient was constrained to equal unity. The fact that this trend was not necessary after that year demonstrates, in turn, the difficulties of the Spanish economy in continuing to increase its presence in foreign markets.

The approach used to model services exports follows the same analytical pattern. World demand has been approached through real GDP of the main countries using Spain's tourism services, with the relevant weightings. Relative prices have been calculated just as they were in the case of goods, so as to measure not only the direct competitive position of the Spanish market, but also the indirect competition of the markets of third countries. As we

CHART 6 REAL EXPORTS OF SERVICES AND DETERMINANT FACTORS

LOGARITHMIC RATES OF CHANGE AND CONTRIBUTIONS



SOURCE: Banco de España.

observe in Chart 6, competitiveness is the fundamental variable in explaining the trends in services exports in real terms, while once again bearing in mind the points when currency devaluations have contributed to improving the results of this aggregate and the problems building up in the years immediately after joining the EMU.

The conditions of supply of exports of goods and services are reflected in the three equations in Table 4. Spanish export prices, net of indirect taxes, have been modelled as a ratio of variable mark-up over domestic marginal costs, assessed using the value added deflator. The mark-up depends, in turn, on foreign competitors' prices and the estimated coefficient measures the changes in exporting companies' operating margins as a consequence of fluctuations in international prices. We note that, in the long term, prices of goods exports are determined not so much by domestic cost conditions, but by competitors' prices, which is indicative of Spain's position as a price-taking economy. This role of exporting companies' trading margins as an adjustment variable in the face of domestic price and cost pressures in relation to those of the main competitors is an appropriate reflection of the performance of the Spanish export sector in recent years.

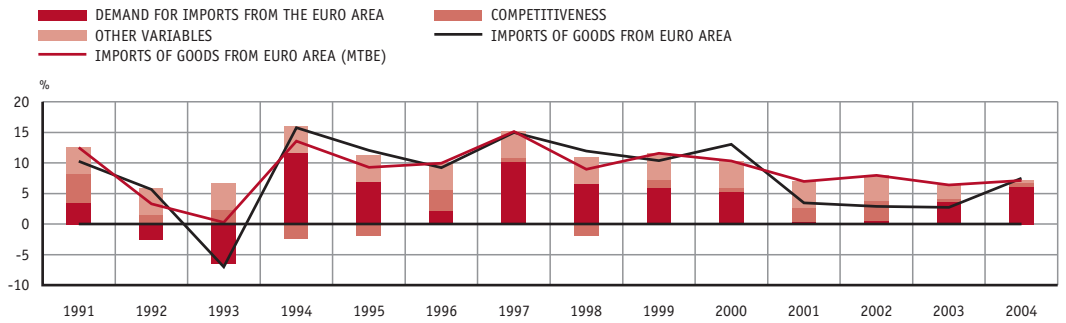
In the case of the equation for the price of services, other countries' competitiveness is reflected through the GDP deflator for OECD countries. The relatively smaller value estimated for this price coefficient is indicative of the greater market power of the Spanish economy in this market.

3.1.2 Imports of goods and services

The analytical approach underlying the equations for imports of goods and services is similar to that for exports, and the level of disaggregation is identical (see Table 5). Imports in real terms depend, in the long term, on a scale variable – measuring the evolution of demand of the Spanish economy – and on the competitiveness of imported products on the

CHART 7 REAL IMPORTS OF GOODS FROM THE EURO AREA AND DETERMINANT FACTORS

LOGARITHMIC RATES OF CHANGE AND CONTRIBUTIONS



SOURCE: Banco de España.

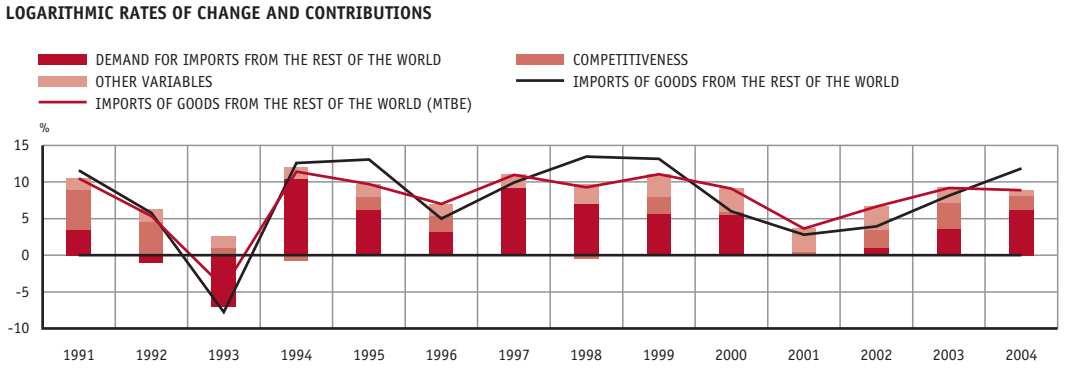
domestic market. The short-term relationships reflect the dynamics of the previous variables through various lag structures.

In the case of goods, the variable measuring demand in the Spanish economy was constructed by weighting each final demand component to reflect its import content, according to the input-output tables. Also in this case a unitary coefficient was imposed on this variable and a time trend was included that, unlike the case of exports, did not have to be terminated and was maintained throughout the estimation period. The variable measuring competitiveness was formed by the relationship between import prices and domestic prices, measured using the private gross value added deflator. In the case of the equation for imports of goods originating from the rest of the world, the import prices used covered non-energy prices. The price elasticities estimated show various values consistent with those normally used in this type of estimation, of approximately 0.5, in absolute values.

Charts 7 and 8 show the results of the estimated equations in terms of the contributions to growth of real imports of the main determinants considered. The values simulated with the equations are consistent with the observed data. The significance of the variable measuring demand in the Spanish economy as a determining factor in real import trends is of particular note. The substantial contribution of the time trend included in the set of other variables also confirms the high level of penetration of products originating outside the Spanish market throughout the sample period. This penetration has also been stimulated by sustained gains in competitiveness of imported products in most of the years under consideration.

Following the approach described earlier for export prices, the deflators of the three import components are functions of domestic prices and of prices of imported goods and services. The latter were compiled from the export prices of the various countries selling in the Spanish market, weighted to reflect the size of each of them in the structure of imports (Table 6). As we observe in the table, the variable that reflects domestic prices is not significant, except in the case of the services equation.

CHART 8 REAL IMPORTS OF GOODS FROM THE REST OF THE WORLD AND DETERMINANT FACTORS



SOURCE: Banco de España.

It can be concluded, therefore, that the econometric functions presented in this section are an adequate reflection of the main factors explaining trends in the flows of goods and services of the Spanish economy with the rest of the world and their respective deflators. This provides a highly useful set of instruments for the medium-term forecasting exercises carried out quarterly at Banco de España with sound, empirically and theoretically grounded support. As mentioned earlier, the preparation of a satellite model for foreign trade, currently under way, will enable these flows to be analysed with a somewhat higher degree of disaggregation and a greater level of precision in the set of determinants under consideration.

However, as has been mentioned several times, applied economic analysis also has a further time dimension, that of short-term evaluation and forecasting based on the knowledge and diagnosis of short-term economic indicators. This topic will be covered in the next section.

3.2 Short-term analysis

The information provided by the short-term economic indicators is quite valuable, as it anticipates, to a greater or lesser extent, the behaviour of the main macroeconomic aggregates and contributes to the formation of expectations and to decision-making by economic agents. Although, as we have just seen, the econometric models provide a fundamental basis to support the medium-term forecasting exercises, analysts must be able to assess the results of these exercises at any time and to replicate them with a more appropriate time dimension and, in most cases, with more incomplete, albeit more up-to-date, information. This is where short-term economic indicators play an essential role.

An annex included at the end of this chapter (Table 3) presents the main indicators available for the various components of external demand. They are all subject to detailed monitoring; their most distinctive features, both technical and institutional, are known; and there are statistical models that enable their performance to be evaluated and projected in the

TABLE 5 REAL IMPORT EQUATIONS (MTBE) (a)

Long-term:

1) $$\overline{m}_{be} = -0.85 - 0.35\,D86 + 0.01\,TRENMGER + \left(fd^{m}_{be}\right)^{r} - 0.52\left(p^{m}_{be} - p^{p}\right)$$

2) $$\overline{m}_{br} = -0.00 + 0.20\,D86 + 0.00\,TRENMGNR + \left(fd^{m}_{br}\right)^{r} - 0.48\left(\frac{p^{m}_{br} - 0.23\left(p^{o}\right)^{r}}{0.77} - p^{p}\right)$$

3) $$\overline{m}_{s} = -0.34 + 0.11\,D86 + 0.01\,TRENMSR + \left(fd^{m}_{s}\right)^{r} - 0.65\left(p^{m}_{s} - p^{p}\right)$$

Dynamic specification:

1) $$\Delta m_{be} = \underset{(-0.01)}{-0.00} + \underset{(5.11)}{1.71}\,\Delta fd^{m}_{be} + \underset{(2.10)}{0.68}\,\Delta fd^{m}_{be_{-1}} - \underset{(-5.80)}{0.74}\,\Delta\left(p^{m}_{be} - p^{p}\right) - \underset{(-4.95)}{0.33}\left(m_{be} - \overline{m}_{be}\right)_{-1}$$

2) $$\Delta m_{br} = \underset{(-0.93)}{-0.00} + \underset{(6.41)}{1.60}\,\Delta fd^{m}_{br} + \underset{(2.23)}{0.58}\,\Delta fd^{m}_{br_{-1}} - \underset{(-1.24)}{0.09}\,\Delta\left[\left(\frac{p^{m}_{br} - 0.23\left(p^{o}\right)^{r}}{0.77} - p^{p}\right) + \left(\frac{p^{m}_{br} - 0.23\left(p^{o}\right)^{r}}{0.77} - p^{p}\right)_{-1}\right] - \underset{(-2.55)}{0.23}\left(m_{br} - \overline{m}_{br}\right)_{-1}$$

3) $$\Delta m_{s} = \underset{(1.83)}{0.00} + \underset{(2.48)}{0.23}\,\Delta m_{s_{-2}} + \underset{(3.78)}{0.32}\,\Delta m_{s_{-3}} + \underset{(1.34)}{0.33}\,\Delta fd^{s}_{m_{-3}} - \underset{(-2.49)}{0.24}\,\Delta\left(p^{m}_{s} - p^{p}\right) - \underset{(-3.26)}{0.13}\left(m_{s} - \overline{m}_{s}\right)_{-1}$$

Where:

$\mathbf{m_{be}}$ = real goods imports from the euro area	$\mathbf{m_{br}}$ = real imports of goods from the rest of the world
$\mathbf{m_{s}}$ = real services exports	$\mathbf{fd^{m}_{be}}$ = indicators of demand for goods imports from the euro area
$\mathbf{fd^{m}_{br}}$ = indicators of demand for goods imports from the rest of the world	$\mathbf{fd^{m}_{s}}$ = indicators of demand for services imports
$\mathbf{p^{m}_{be}}$ = deflator of euro area goods imports	$\mathbf{p^{m}_{br}}$ = deflator of goods imports from the rest of the world
$\mathbf{p^{m}_{s}}$ = deflator of services imports	$\mathbf{p^{p}}$ = private-sector value added deflator excluding taxes
$\mathbf{p^{o}}$ = price of energy imports in euro	**D86** = Step dummy from 1986.II
TREN (MGER, MGNR, MSR) = deterministic trend	

a. Variables in lowercase are expressed in logarithms. The superscript "r" indicates that the parameter is restricted in the estimation. Bar variables ($\overline{x}$) denote the long term. t-statistics are given in parentheses. Estimates were prepared with seasonally adjusted quarterly series for the period 1980.I-1998.IV. For further details, including checks for model adjustmet dependability, see Estrada et al. (2004).

short term. The indicators considered most suitable according to their degree of correlation with the CNTR aggregates are used to estimate the transference functions applied in the preparation of short-term forecasts.

3.2.1 Trade-in-goods indicators

The foremost indicator of foreign trade in goods is the customs statistic prepared by the Spanish Customs Department *(Departamento de Aduanas de la Agencia Tributaria).* It is in fact atypical among short-term economic indicators, as the customs statistics for imports and exports, in nominal terms, rather than being indicators, are in effect the variables, by the same names, in the national accounts, subject certain minor, albeit complex, methodological adjustments.[11]

This statistic has undergone substantial vicissitudes over the years, as the economy became more deregulated and the customs tariff had to be adapted to the new requirements of the process. A crucial moment was the entry into force of the European Single Market on 1 January 1993. With the disappearance of borders for trade within the EU, customs control was limited exclusively to extra-community trade. To attempt to solve this problem, a system called Intrastat was set up, which in quite general terms requires all individuals and legal entities to declare their trade movements within the European Union, with certain limits (thresholds) according to the value of the transaction. This system – with all its limits – has enabled a key source of information for analysing short-term economic trends to be retained. Nevertheless its existence must be seen as a warning of the consequences of the formation of the European Union and of the need for the statistical system to adapt to the new circumstances and the supranational requirements imposed on the European statistics organisations.

Although customs statistics are prepared in nominal terms, data are also available on the volume of transactions, which enable foreign trade unit value indices (UVIs) to be constructed. UVIs are the customary approach to export and import prices. At present, the Spanish foreign trade UVIs are prepared at the General Directorate of Economic Policy, Department of Economy and Finance *(Dirección General de Política Económica de la Secretaría de Estado de Economía y Hacienda).* The methodology for preparing the UVIs has been adapted to the procedure applied for the national accounts deflators. Accordingly, until very recently, they were Paasche type indices with a fixed base, similar to the base year 1995 Spanish National Accounts (CNE 1995) deflators, which, with a few limits, reflected the changes that occurred in the structure of foreign trade. Analysts began to construct UVIs as chained Paasche indices to adjust to the change to 2000 for the base year of the Spanish National Accounts (CNE 2000).

The foreign trade data are usually categorised using various criteria and according to different classifications. The most common classification orders products according to their economic purpose: consumer goods, capital and intermediate goods; and differentiates the

[11] For a detailed analysis of the customs statistics and the changes that have taken place over time see Buisán and Gordo (1997).

TABLE 6 IMPORT DEFLATOR EQUATION (MTBE) (a)

Long-term:

1) $\bar{p}^{m}_{be} = 0.09 + 0.13\,D8085 - 0.11\,D93\left(cp^{m}_{be}\right)^{r}$

2) $\bar{p}^{m}_{br} = 0.20 - 0.20\,D93 + 0.52\left(cp^{m}_{br}\right)^{r} + 0.23\,p^{o} + 0.25\left(p^{rm}\right)^{r}$

3) $\bar{p}^{m}_{s} = -0.04 + 0.10\,D93 + 0.55\,cp^{m}_{s} + 0.45\left(p^{p}\right)^{r}$

Dynamic specification:

1) $\Delta p^{m}_{be} = \underset{(1.11)}{0.00} + \underset{(4.81)}{0.42}\,\Delta cp^{m}_{be} + \underset{(4.87)}{0.35}\,\Delta cp^{m}_{be_{-3}} - \underset{(-4.37)}{0.25}\left(p^{m}_{be} - \bar{p}^{m}_{be}\right)_{-1}$

2) $\Delta p^{m}_{br} = \underset{(-1.90)}{-0.00} + \underset{(7.69)}{0.35}\,\Delta cp^{m}_{br} + \underset{(3.40)}{0.15}\,\Delta cp^{m}_{br_{-2}} + \underset{(16.65)}{0.23}\,\Delta p^{o} - \underset{(-2.25)}{0.11}\left(p^{m}_{br} - \bar{p}^{m}_{br}\right)_{-1}$

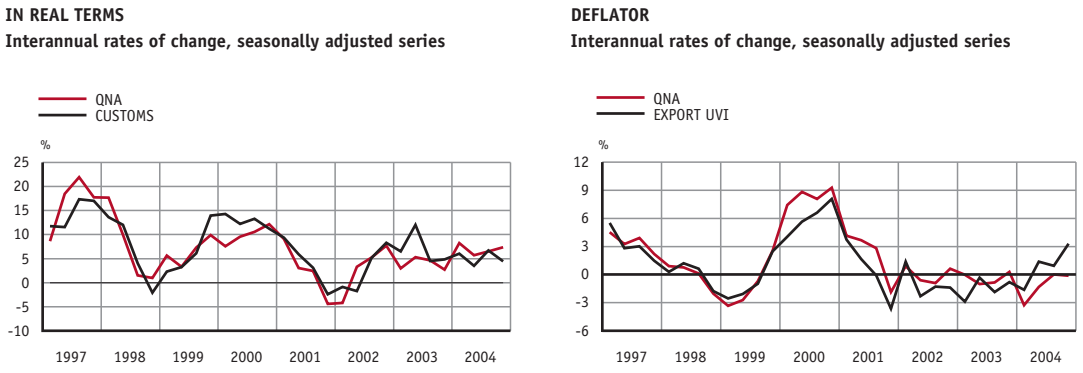
3) $\Delta p^{m}_{s} = \underset{(0.87)}{0.00} + \underset{(5.37)}{0.31}\,\Delta cp^{m}_{s_{-1}} + \underset{(8.04)}{0.31}\,\Delta cp^{m}_{s} + \underset{(2.98)}{0.17}\,\Delta p^{p} + \underset{(-)}{0.21}\,\Delta p^{p}_{-4} - \underset{(-3.77)}{0.14}\left(p^{m}_{s} - \bar{p}^{m}_{s}\right)_{-1}$

Where:

$\mathbf{p^{m}_{be}}$ = deflator of euro area goods imports	$\mathbf{p^{m}_{br}}$ = deflator of goods imports from the rest of the world
$\mathbf{p^{m}_{s}}$ = deflator of services imports	$\mathbf{cp^{m}_{be}}$ = Foreign prices of goods imports from the euro area
$\mathbf{cp^{m}_{br}}$ = Foreign prices of goods imports from the rest of the world	$\mathbf{cp^{m}_{s}}$ = Foreign prices of services imports
$\mathbf{p^{p}}$ = private-sector value added deflator excluding taxes	$\mathbf{p^{o}}$ = price of energy imports in euro
$\mathbf{p^{rm}}$ = price of nonenergy commodities in euro	**D8085** = Truncated step dummy from 1980 Q1 to 1985 Q2
D93 = Step dummy from 1993.II	

a. Variables in lowercase are expressed in logarithms. The superscript "r" indicates that the parameter is restricted in the estimation. Bar variables ($\bar{x}$) denote the long term. t-statistics are given in parentheses. Estimates were prepared with seasonally adjusted quarterly series for the period 1980.I-1998.IV. For further details, including checks for model adjustmet dependability, see Estrada et al. (2004).

CHART 9 EXPORTS OF GOODS QNA AND CUSTOMS INDICATORS



SOURCES: INE, Customs Department and Ministry of Economy.

various levels of disaggregation among the products. This classification is particularly well-suited to the analysis of imports, whose trends, as we know, are closely related to the components of domestic spending, and which present the advantage of being available both in nominal and in real terms (as UVIs are calculated for all components). For exports, it is more important to know the destination markets and to evaluate the possible gains or losses of market share in each case. From the geographical point of view, however, it must be borne in mind that UVIs are only prepared for the most representative economic areas: the EU, total extra-community trade and OECD; therefore market analyses sometimes have to be performed basically in nominal terms.[12]

As we observe in Table 7, the degree of correlation between the indicators derived from customs statistics – nominal imports and exports; UVIs and real series – and the annual and quarterly national accounts series is very high. Consequently, these are the indicators used for estimating the transference functions applied in the short-term projection of foreign demand. The close relationship between magnitude and indicator is also clear in Charts 9 and 10, showing the year-on-year rates of change of the seasonally-adjusted series.

3.2.2 Tourism indicators

The basic information source for analysing exports and imports of tourism services of the national accounts, in nominal terms, is the balance of payments prepared monthly by Banco de España. With some minor methodological adjustments and differences, these variables coincide with the equivalent items of the national accounts system, as is also the case with trade in goods and the customs statistic. Price indicators are in this case more numer-

[12] The geographical disaggregation of the UVIs has expanded somewhat with the new base 2000. In particular, UVIs are already available for the EMU and for the enlarged EU.

TABLE 7 KEY INDICATORS OF EXTERNAL DEMAND IN THE SPANISH ECONOMY: CORRELATION WITH NATIONAL ACCOUNTS VARIABLES (a)

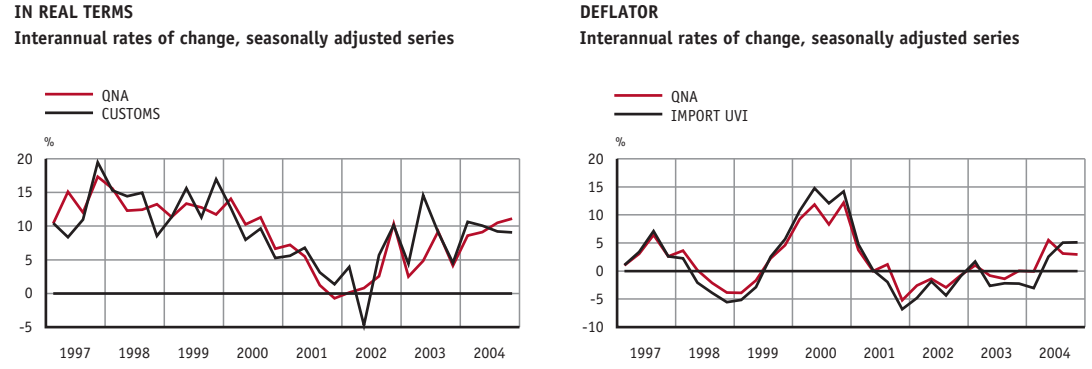
Indicator	Sample	Correlations					Variation coefficient	
		Annual series (b)	Quarterly series					
			4th order diff.		1st order diff.		4th order diff.	1st order diff.
		t	t	max. (c)	t	max. (c)		
Exports of goods								
NOMINAL: Customs	1992-2002	0.98	0.89	0.89 [t]	0.52	0.52 [t]	0.7	1.3
REAL: Customs/UVI FE	1992-2002	0.96	0.88	0.88 [t]	0.51	0.51 [t]	0.7	1.4
DEFLATOR: UVI FE	1992-2002	0.98	0.88	0.88 [t]	0.57	0.57 [t]	1.1	2.4
Imports of goods								
NOMINAL: Customs	1992-2002	0.99	0.95	0.95 [t]	0.64	0.64 [t]	0.9	1.3
REAL: Customs/UVI FE	1992-2002	0.98	0.93	0.93 [t]	0.61	0.61 [t]	0.9	1.6
DEFLATOR: UVI FE	1992-2002	0.99	0.98	0.98 [t]	0.88	0.88 [t]	2.2	4.2
Tourism exports								
NOMINAL: Revenue, BOP	1992-2002	1.00	0.93	0.93 [t]	0.68	0.68 [t]	0.5	1.1
REAL:								
Revenue/Hotel and rest. CPI	*1994-2002*	*0.99*	*0.96*	*0.96 [t]*	*0.71*	*0.71 [t]*	*1.1*	*2.0*
Overnight stays	*1992-2002*	*0.62*	*0.55*	*0.31 [t-2]*	*0.45*	*0.45 [t]*	*1.5*	*3.1*
DEFLATOR:								
Hotel and restaurant CPI	*1994-2002*	*0.83*	*0.77*	*0.77 [t]*	*0.74*	*0.74 [t]*	*0.2*	*0.2*
Hotel Price Index (HPI)	*2001-2002*	*1.00*	*0.69*	*0.85 [t+1]*	*0.69*	*0.69 [t]*	*0.3*	*0.5*
Tourism imports								
NOMINAL: Payments, BOP	1992-2002	0.99	0.91	0.91 [t]	0.72	0.72 [t]	1.2	3.3
REAL: Payments/CPI OECD	1992-2002	0.99	0.92	0.92 [t]	0.68	0.68 [t]	2.9	8.5
DEFLATOR: CPI OECD	1992-2002	0.95	0.93	0.93 [t]	0.84	0.84 [t]	1.1	1.7
Exports, other services								
NOMINAL: Revenue, BOP	1992-2002	0.60	0.44	0.44 [t]	0.36	0.36 [t]	0.4	1.2
REAL: Revenue/Services CPI	1993-2002	0.76	0.60	0.60 [t]	0.44	0.44 [t]	0.6	1.7
DEFLATOR: Services CPI	1993-2002	0.57	0.52	0.54 [t+1]	0.31	0.33 [t+1]	0.3	0.3
Imports, other services								
NOMINAL: Payments, BOP	1992-2002	0.91	0.60	0.61 [t-1]	0.27	0.27 [t]	0.6	1.3
REAL: CPI OECD	1992-2002	0.81	0.57	0.67 [t-2]	0.31	0.32 [t+1]	0.9	1.9
DEFLATOR: CPI OECD	1992-2002	0.40	0.37	0.39 [t-3]	0.62	0.62 [t]	1.1	1.7

a. Statistics calculated with seasonally adjusted series.

b. Annual rate of change.

c. Gap between the indicator and QNA variable for which the correlation is maximum.

CHART 10 IMPORTS OF GOODS QNA AND CUSTOMS INDICATORS



SOURCES: INE, Customs Department and Ministry of Economy.

ous and less specific, and so there are various alternatives to deflate the nominal data and to obtain the series in real terms. In addition, there are real direct indicators reflecting some tourism activities.

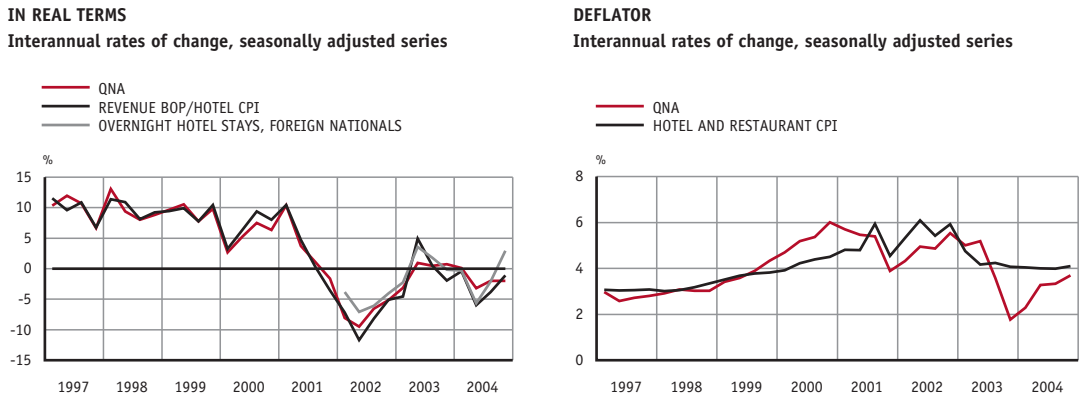
The problem of the information provided by the balance of payments is that, like the customs information, it has undergone the changes derived from the process of liberalisation of the Spanish economy. In the past, data on trading in foreign banknotes by Spanish credit institutions and the sale of banknotes to non-resident banks to meet tourism demand provided information, which, although incomplete, was a sound basis for evaluating tourism revenue in nominal terms. From 1 January 2002, the collection of information for compiling the balance of payments had to be redesigned following the replacement of national currencies with the euro.[13] In May 2002, in an effort to address this situation, the National Statistics Institute (INE), the Institute for Tourism Studies (IET) and Banco de España set a survey of tourism spending, EGATUR, in motion. This is a survey carried out at the borders, and provides monthly and quarterly information – more complete and with greater geographical coverage – on tourist spending in Spain (totals, per person, daily averages and by package tour) and on Spanish tourists travelling abroad.

Tourism revenue price indicators are, generally speaking, groupings of the CPI components related to the leisure and the hotel trade activities. In addition, since 2000, the INE has compiled an index of tourism prices, which has the advantage of including all the types of rates usually applied by hotels. In the case of tourism payments, the price indicator used is the CPI for all OECD countries.

The two basic indicators on real trends in tourism in Spain are the Hotel Occupancy Survey *(Encuesta de Ocupación Hotelera* – EOH), carried out by the INE, and the Border Tourism Movements Survey *(Encuesta de Movimientos Turísticos por Frontera* – FRONTUR)

[13] Detailed information on the problems and sources of compilation for these statistics is provided in the methodological introductions to the annually-published balance of payments.

CHART 11 TOURISM EXPORTS QNA AND OTHER INDICATORS



SOURCES: INE and Banco de España.

of the Department of Tourism *(Secretaría General de Turismo)*. The first provides information on travellers (both foreign and Spanish nationals) staying in Spanish hotels and the number of overnight stays they make, on a monthly basis. The second, also on a monthly basis, provides information on the travellers and tourists entering and leaving Spain.

All these indicators are evaluated, as discussed above, according to their statistical quality, availability and the degree of correlation with the magnitudes of the national accounts system, as presented in Table 7. The close relationship between some indicators selected and the national accounts variables can also be observed in Chart 11, which, due to tourism's greater relative importance in the Spanish economy, covers revenue from tourism in real terms and its deflator. The transference functions estimated for the short-term projection of the nominal variables use the balance of payments data. For real tourism revenue the solution is more complex, as the information on overnight stays and CPI, which is more advanced, is combined with the balance of payments data. As in the case of trade in goods, the deflators are obtained as a residual, although the results are compared with the available price indicators.

3.2.3 Indicators for trade in other services

Although trade in non-tourism services is of growing qualitative and quantitative significance as part of trade with the rest of the world, the lack of information and the great heterogeneity of the items it includes make a detailed analysis – which must be based primarily on the data provided by the balance of payments – a more difficult matter. In any case, Table 7 includes the correlations between the national accounts system and the indicators used for its short-term forecasting, applying the same approach as described for trade in goods and for tourism services.

4 The balance of the rest of the world account and the capital account of the economy

The approach used in this chapter to analyse foreign demand for goods and services of the Spanish economy has primarily involved evaluating and predicting the long- and short-term evolution of its main components, in real and in nominal terms, as well as of the corresponding implicit deflators. This section presents in summary form a different, though complementary, approach. Starting from the nominal balance of foreign demand for goods and services, it aggregates the balances of other external transactions – factor incomes and current and capital transfers – up to the point where the surplus or deficit of the rest of the world account, or, what amounts to the same thing, Spain's financing capacity or gap, is reached. This result coincides, except for minor formal differences, with the outcome of the balance of payments statistics that, as we have seen throughout this chapter, provide a basic source of information for analysing the external sector of the Spanish economy.

The analytical advantage offered by the national accounts is that, when they are part of a system integrated with the rest of the resident sectors, the balance of the rest of the world account, which is ultimately the expression of the result of Spain's savings and investment decisions, can be broken down into the various economic agents, both private and public, to obtain the contribution of each to the overall balance, as reflected in the (consolidated) capital account of the economy. These data, expressed as usual, in percentages of nominal GDP, are presented in Table 8. Comparing these figures with the information provided in the financial accounts presents a full overview of the financing flows of the country and of the resident institutional sectors, as well as each one's current position.[14]

However, trends in the nominal balances of the various aggregates that make up the rest of the world account also provide specific analytical content in line with the approaches described throughout this chapter. Ultimately, the overall balance of the relationships of the Spanish economy with other countries reflected by these nominal balances provides relevant information on the equilibrium (or lack thereof) in Spain's relationships with the rest of the world, thereby enabling some of the problems we might expect Spanish products, both goods and services, to face in foreign markets, to be anticipated. In the past, there were frequent occurrences when a significant external imbalance fuelled doubts surrounding Spain's medium-term sustainability and financing, triggering a series of speculative capital movements (and a loss of external reserves), which put pressure on the exchange rate and ultimately led to drastic adjustments to the exchange rate for the currency and substantial changes in the monetary policy stance, with the consequent impact on growth and job creation. This "external constraint" had a determining effect on the evolution of the Spanish economy for several decades.

Since Spain entered the monetary union, these adjustment mechanisms have ceased to operate, but the imbalances in the external accounts continue to reflect the imbalances in the functioning of the economy which are clearly visible in its relationships with the rest of the world.[15] For example, a substantial and persistent external deficit in trade in goods and

[14] See Chapters 9 (on general government) and 14 (on the private sector).

[15] See J. M. Peñalosa (2002).

TABLE 8 DOMESTIC FINANCING CAPACITY OR GAP

% NOMINAL GDP

	Average 1995-1998	1999	2000	2001	2002	2003	2004
1. Balance of trade in goods	-3.0	-5.1	-6.2	-5.7	-5.1	-5.2	-6.8
2. Balance of tourism	3.9	4.5	4.6	4.6	4.1	4.0	3.6
3. Services balance, not including tourism	-0.6	-0.7	-0.6	-0.5	-0.4	-0.4	-0.5
4. External trade balance, goods and services (1+2+3)	0.4	-1.3	-2.2	-1.6	-1.3	-1.6	-3.7
5. Net current transfers	0.6	0.5	0.3	0.2	0.4	0.0	0.0
6. Net factor revenue	-1.1	-1.4	-1.4	-1.7	-1.8	-1.7	-1.6
7. Net capital transfers (a)	1.1	1.1	0.9	0.9	1.1	1.2	1.1
8. Financing capacity (+) or gap (–) national (4+5+6+7)	1.0	-1.0	-2.5	-2.2	-1.6	-2.1	-4.2
8.1. General Government	-4.4	-1.2	-0.9	-0.4	-0.1	0.4	-0.3
Gross national savings	*-1.0*	*2.3*	*2.2*	*2.9*	*3.4*	*3.9*	*3.4*
Gross capital formation	*3.4*	*3.5*	*3.1*	*3.3*	*3.5*	*3.5*	*3.7*
8.2. Households	4.4	2.0	1.3	0.8	0.8	0.3	-0.1
Gross national savings	*9.8*	*8.0*	*8.0*	*7.5*	*7.7*	*7.6*	*7.7*
Gross capital formation	*5.4*	*6.0*	*6.7*	*6.7*	*6.9*	*7.3*	*7.8*
8.3. Corporations	0.9	-1.8	-2.9	-2.6	-2.3	-2.8	-3.9
Gross national savings	*14.6*	*13.3*	*12.9*	*13.0*	*12.8*	*12.4*	*12.5*
Gross capital formation	*13.7*	*15.1*	*15.8*	*15.6*	*15.0*	*15.1*	*16.4*

SOURCE: INE.

a. Includes net purchases of non-financial non-produced assets.

services could indicate accumulating losses of competitiveness. While this situation is unlikely to generate speculative movements and pressures against the common currency of the area, it will not call for immediate corrective action. Nonetheless, it will ultimately affect the medium-term economic growth capacity unless special appropriate measures are taken.

5 Conclusions

Each economy must be analysed within the external context in which it operates. This chapter has shown that it is correct to set out from an accurate evaluation of the international environment to provide the appropriate information on a set of fundamental external variables for macroeconomic forecasting exercises. In the current world, in which economic

agents' decision-making is increasingly related to events unfolding in a supranational context, it is clear that the influence of the external environment on the economy is ever more complex and that the areas of interest are therefore not limited to relationships established through what is known as the "trade channel". It is thus important to continue to develop a set of analytical instruments to supplement the information supplied by the various international organisations on the performance of the world economy, logically paying particular attention to knowledge of the euro area.

Such exogenous factors, together with the factors related to the conditions in the Spanish economy, are fundamentally tied in through the theoretical formulations established in the econometric models estimated for the main components of external demand, namely exports and imports of goods and services, with exports broken down into trade with the euro area and with the rest of the world. Further work is merited to improve the set of econometric instruments used in the forecasting exercises to provide a better understanding of the effects that joining the EMU may have had on the performance of the Spanish external sector, as well as to reflect the consequences of the changes taking place at the global level, in terms of ever greater integration and globalisation of trade relations.

Finally, the accurate evaluation and analysis of the rest of the world account, considered as the expression of the saving and investment decisions of resident economic agents, highlight the continuing significance of external imbalances in a monetary union, as an advanced indicator of the potential accumulation of competitiveness problems.

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Annex

TABLE 1 KEY INDICATORS FOR THE EURO AREA

Economic activity indicators								
Indicator	Units	Source	Publication lag	Sample and frequency	Correlations of the indicator with GDP (a)			
					4th order difference		1st order difference	
					t	maximum (b)	t	maximum (b)
Industrial production index	Index base 2000 = 100	Eurostat	2 months	[1991-2003] Monthly	0.98	0.98 [t]	0.89	0.89 [t]
Industrial confidence indicator	Net replies	European Commission DG Economic and Financial Affairs	None	[1991-2003] Monthly	0.78	0.83 [t-1]	0.70	0.70 [t]
Construction industrial production index	Index base 2000 = 100	Eurostat	2 months	[1991-2003] Monthly	0.83	0.83 [t]	0.83	0.83 [t]
Construction confidence indicator	Net replies	European Commission DG Economic and Financial Affairs	None	[1991-2003] Monthly	0.53	-0.63 [t+6]	0.28	0.30 [t-4]
Services confidence indicator	Net replies	European Commission DG Economic and Financial Affairs	None	[1995-2003] Monthly	0.41	-0.84 [t+7]	0.29	-0.58 [t+6]
Manufacturing PMI	Net replies	Reuters	None	[1997-2003] Monthly	0.59	0.78 [t-1]	0.69	0.69 [t]
Services PMI	Net replies	Reuters	None	[1998-2003] Monthly	0.21	0.75 [t-5]	0.05	0.34 [t-3]

a. Calculated with seasonally adjusted quarterly series.
b. Gap of the indicator in respect of GDP for which the correlation is maximum.

TABLE 1 KEY INDICATORS FOR THE EURO AREA (cont'd)

Demand indicators									
Indicator	Units	Source	Publication lag	Sample and frequency	Correlations of the indicator with designated QNA variable (a)				
					QNA variables	4th order difference		First order difference	
						t	maximum (b)	t	maximum (b)
Retail trade sales index	2000 = 100	Eurostat	2 months	[1995-2003] Monthly	Private consumption	0.87	0.87 [t]	0.65	0.65 [t]
Consumer confidence indicator	Net replies	EC, DG Economic and Financial Affairs	None	[1991-2003] Monthly	Private consumption	0.48	0.62 [t-2]	0.25	0.37 [t-2]
Retail trade confidence indicator	Net replies	EC, DG Economic and Financial Affairs	None	[1991-2003] Monthly	Private consumption	0.45	0.65 [t-2]	0.12	0.27 [t-2]
Use of productive capital	% installed capacity	EC, DG Economic and Financial Affairs	None	[1991-2003] Quarterly	GFCF	0.64	0.64 [t]	0.33	0.35 [t+2]
Exports of goods	2000 euro	Eurostat	3 months	[1991-2003] Monthly	Exports	0.83	0.83 [t]	0.78	0.78 [t]
Imports of goods	2000 euro	Eurostat	3 months	[1991-2003] Monthly	Imports	0.82	0.82 [t]	0.70	0.70 [t]
Export expectations indicator	Net replies	EC, DG Economic and Financial Affairs	None	[1991-2003] Quarterly	Exports	0.67	0.67 [t]	0.18	0.51 [t-2]

a. Calculated with seasonally adjusted quarterly series.

b. Gap between the indicator and the QNA variable for which the correlation is maximum.

TABLE 2 KEY INDICATORS OF THE EXTERNAL ENVIRONMENT OF THE EURO AREA

Economic activity indicators									
Country	Indicator	Units	Source	Publication lag	Sample and frequency	Correlations of the indicator with GDP (a)			
						4th order difference		1st order difference	
						t	maximum (b)	t	maximum (b)
UK	Industrial production index	Index base 2000 = 100	Office for National Statistics	2 months	[1980-2003] Monthly	1.00	1.00 [t]	1.00	1.00 [t]
	Industrial confidence indicator	Net replies	EC, DG Economic and Financial Affairs	None	[1985-2003] Monthly	0.49	0.58 [t-1]	0.32	0.36 [t-1]
	Construction confidence indicator	Net replies	EC, DG Economic and Financial Affairs	None	[1985-2003] Monthly	0.36	0.59 [t-4]	0.12	0.34 [t-1]
	Services confidence indicator	Net replies	EC, DG Economic and Financial Affairs	None	[1997-2003] Monthly	-0.05	0.43 [t-3]	-0.13	0.37 [t-1]
US	Industrial production index	Index base 1997 = 100	Federal Reserve Board	1 month	[1980-2003] Monthly	0.87	0.87 [t]	0.78	0.78 [t]
	Industrial Confidence Indicator (PMI)	Net replies	Institute for Supply Management	None	[1980-2003] Monthly	0.34	0.56 [t-1]	0.35	0.49 [t-1]
Japan	Industrial production index	Index base 2000 = 100	Ministry of Economy, Trade and Industry	1 month	[1980-2003] Monthly	0.72	0.73 [t-1]	0.45	0.45 [t]
	TANKAN Industrial confidence indicator	Net replies	Bank of Japan	1 month	[1980-2003] Quarterly	0.47	0.53 [t-1]	0.29	0.35 [t-1]

a. Calculated with seasonally adjusted quarterly series.

b. Gap of the indicator in respect of GDP for which the correlation is maximum.

TABLE 2 KEY INDICATORS OF THE EXTERNAL ENVIRONMENT OF THE EURO AREA (cont'd)

Demand indicators										
Country	Indicator	Units	Source	Publication lag	Sample and frequency	Correlations of the indicator with designated QNA variable (a)				
						Variable	4th order difference		First order difference	
							t	max. (b)	t	maximum (b)
UK	Retail sales index	2000 = 100	Office for National Statistics	1 month	[1980-2003] Monthly	Private cons.	0.79	0.79 [t]	0.40	0.40 [t]
	Consumer confidence indicator	Net replies	EC, DG Economic and Financial Affairs	None	[1985-2003] Monthly	Private cons.	0.08	0.51 [t-8]	0.08	0.31 [t-7]
	Retail trade confidence indicator	Net replies	EC, DG Economic and Financial Affairs	None	[1985-2003] Monthly	Private cons.	0.18	0.36 [t-3]	0.24	0.24 [t]
	Use of capacity productive	Percentage of installed capacity	EC, DG Economic and Financial Affairs	None	[1985-2003] Quarterly	GFCF	0.34	0.54 [t-3]	0.18	0.35 [t-3]
US	Retail sales index	US$ millions	Census Bureau, Commerce Department	1 month	[1980-2003] Monthly	Private cons.	0.82	0.82 [t]	0.68	0.68 [t]
	Consumer confidence indicator	1985 = 100	Conference Board	None	[1980-2003] Monthly	Private cons.	0.46	0.47 [t-1]	0.40	0.40 [t]
	Use or productive capacity	Percentage of installed capacity	Federal Reserve Board	1 month	[1990-2003] Monthly	GFCF	0.66	0.78 [t-2]	0.55	0.55 [t]
Japan	Retail sales index	Index base 2000 = 100	Ministry of Economy, Trade and Industry	1 month	[1995-2003] Monthly	Private cons.	0.82	0.82 [t]	0.65	0.65 [t]
	Consumer confidence indicator	Net replies	Econ & Social Research Inst., Cabinet of the Presidency of Govt.	1 month	[1982-2003] Quarterly	Private cons.	0.14	0.27 [t-1]	-0.16	0.23 [t-1]
	Use of productive capacity	Index base 2000 = 100	Ministry of Economy, Trade and Industry	1 month	[1980-2003] Monthly	GFCF	0.45	0.51 [t-2]	0.29	0.29 [t]

a. Calculated with seasonally adjusted quarterly series.
b. Gap between the indicator and the QNA variable for which the correlation is maximum.

TABLE 3 KEY INDICATORS OF EXTERNAL DEMAND IN THE SPANISH ECONOMY: FEATURES

Indicator	Units	Source	Frequency	Publication gap	Comments
Exports and imports of goods	2000 Current and constant euro	Customs Dept. and Ministry of Economy	Monthly	2 months (confidential: 1.5 months)	Provisional data (definitive data are available after mid year) broken down by economic purpose and geographic area.
Tourism revenue and payments	Current euro	Balance of Payments (BOP)	Monthly	2.5 months	The EGATUR tourism expenditure survey has been used in its preparation since the physical introduction of the euro in January 2002.
Foreign travellers and overnight stays by foreign nationals in hotels	Number	Hotel Occupancy Survey (EOH)	Monthly	24 days	Break in 1999 to incorporate one and two silver star hotels. Most foreign tourism is housed in this type of establishment, and this is where average tourism expenditure is greatest, representing a substantial proportion of total non-resident tourism consumption (approximately 70%).
Tourists entering at the borders	Number	FRONTUR (Tourism Statistics Institute-IET)	Monthly	20 days	Breakdown by typology (tourists or travelers), country of residence, mode of transportation used and reason for journey; additional information provided for tourism seasons (duration of stay, type of lodging, level of satisfaction, travel organisation method, etc.).
Journeys abroad by Spanish nationals	Number of journeys	FAMILITUR (IET)	Monthly	Substantial lags	The survey is conducted in three rounds throughout the year, in which questions are asked on travel during the four months prior to the month of the survey.
Other revenue and payments for non-tourism services	Current euro	BOP	Monthly	2.5 months	Availability of quarterly data by type of service: transportation, computer, corporate services, etc.
CPI, tourism and hotel industry	Index 2001 = 100	INE	Monthly	15 days	Includes prices of hotels, restaurants, and cafés (90.7%) and organised travel (9.3%).
CPI, hotels, cafés and restaurants	Index 2001 = 100	INE	Monthly	15 days	Includes prices of restaurants and cafés (94.3%) and hotels (5.7%)
HPI (hotel price index)	Index 2001 = 100	INE	Monthly	24 days	Began in 2000. Measures prices charged by hotels in application of different billing tariffs: regular, weekend, tour operator, corporate and group rates.
CPI, developed countries	Index 1999 Q1 = 100	BDE	Monthly	1.5 months	Weighted average (with weightings for Spanish foreign trade) of CPIs for developed countries corrected with the exchange rate for the euro to reflect the currency biases for these countries.

11. Demand decisions by households and firms

Pilar L´Hotellerie-Fallois and Teresa Sastre

1 Introduction

This chapter describes how the various components of private-sector demand in the Spanish economy are estimated, projected and analysed in real terms. Such components make up, together with public sector demand and external demand (which have already been analysed[1]) the main macroeconomic aggregates on the expenditure side: domestic demand, net external demand, final demand and GDP.

As already stated, approaches to real GDP growth from the expenditure side have the advantage, compared with estimates based on sectoral value added, that the range of analytical tools, and to some extent also the availability of information, is richer and more complete. Trends in the various components of expenditure can be analysed as the result of the decisions taken by different groups of agents that act, as a rule, in an optimising manner. Thus, for example, households determine their level of consumption by trying to maximise their utility within the limits established by the budget constraint to which they are subject. This gives rise to a relationship between consumption, wealth and disposable income that can be econometrically estimated. In fact, the estimated relationships between the different macroeconomic variables form the basis of many of the models that are used in preparing economic forecasts, as is the case with the Quarterly Model of Banco de España (MTBE).

Domestic demand, in addition to demand for consumption and investment by general government, is exercised by households (private consumption and residential domestic in-

[1] See Chapters 9 and 10.

vestment) and by firms (private productive investment and investment in inventories). In each case, econometric tools and additional information are available that enable their trends to be projected throughout the forecasting horizon, given a path for the main determinant factors. Models are also available for short-term monitoring of such aggregates. Both projections based on econometric models and short-term estimates relying on cyclical information require a knowledge of certain methodological aspects and procedures normally employed in conjunctural analysis. Reference to those methods and procedures that have been described in other chapters of this book will be made when needed[2].

This chapter is organised around the analysis and projection of expenditure decisions by households and firms. More specifically, Section 2 describes the breakdown of expenditure by sector used in the analysis, since it diverges in a number of points from that provided by National Accounts. Section 3 is devoted to household demand and explains the information and tools available for projecting private consumption and domestic residential investment. The same approach is applied below to business decisions to invest in fixed capital and in inventories. Last, a number of points are made concerning short-term analysis and a number of conclusions are presented.

2 Sectorisation and breakdown of domestic demand

Before embarking on the analysis of the various components of private domestic demand, a number of points need to be clarified concerning the breakdown with which this analysis will be approached. As we know, the GDP estimates at constant and current prices provided by Quarterly National Accounts (CNTR) present a breakdown of final domestic demand into two basic categories: consumption and gross fixed capital investment (in addition to changes in inventories). The first of these categories is divided, in turn, into private consumption and public consumption. The expenditure in each of the last two categories corresponds to a well-defined set of agents: households and NPISHs[3], in the case of private consumption, and general government, in the case of government consumption. Accordingly, changes in each of these components can be directly interpreted as the result of the decisions taken either by households or by general government.

Gross fixed capital investment combines all the (net) acquisition of fixed assets, i.e. all the expenditure on goods and services destined to increase or to replenish the economy's capital stock, whether such investment is made by firms, households or general government. In this case, the breakdown provided by the CNTR is made by type of product, since it distinguishes between investment in construction, capital goods and other products (which includes primarily investment in intangible assets and expenditure associated with the transfer of ownership of fixed assets)[4].

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[2] See Chapters 1 and 5.

[3] Non-profit institutions serving households.

[4] The Spanish National Accounts (CNE) provide, with a certain lag, annual estimates at constant and current prices of a further breakdown into six product categories. The CNE data also provide estimates of investment by households, NPISHs, companies and general government as part of the non-financial accounts of these sectors; these are annual estimates, at current prices, that are also published later than the Quarterly National Accounts.

DIAGRAM 1 RELATIONSHIP BETWEEN SECTORISATION AND EXPENDITURE IN DEMAND ANALYSIS

Sectors			Expenditure	
Resident Units	CNE (a)	MTBE (b)	MTBE (b)	QNA (c)
NPISHs	NPISHs	Households	Private consumption	Priv. consumption
Households	Households		Residential investment	Investment in: • Cap. goods • Construction • Other products
Sole proprietors		Firms	Private prod. investment	
Non-fin. corporations	Non-fin. corporations			
Financial institutions	Financial institutions			
General government	General government	Gen. govt.	Public investment	
			Gvt. consumption	Gvt. consumption

a. Sectorisation used in Spanish National Accounts.
b. Sectorisation and classification of expenditure used in the MTBE.
c. Expenditure classification used in Quarterly National Accounts (QNA).

Such categories of expenditure are not directly attributable to a uniform group of agents: both firms and general government invest in construction and in capital goods; even the household sector, which in National Accounts includes individual firms, accounts for a share of investment in capital goods, in addition to investment in housing.

In order to be able to analyse investment in terms of the expenditure decisions by uniform groups of agents, we use an alternative breakdown of investment, achieved by combining the CNTR and Spanish National Accounts (CNE) data with a number of additional indicators[5]. Specifically, investment is divided into the following categories: private productive investment, made by firms (including sole proprietorships) in order to increase or to replenish their stock of productive capital, whether this is in capital goods or in construction; residential investment made by households in order to increase or to replenish their stock of housing; and public investment, whether this is in capital goods or in construction, made by general government in order to increase or to replenish the stock of public capital. Accordingly, agents have to be sectorised somewhat differently than in the National Accounts, since the investment decisions of sole proprietorships are aggregated with those of companies. This modified sectorisation, which appears in Diagram 1, is also applied in the econometric models (and, in particular, in the MTBE) used in forecasting.

Table 1 includes the estimated growth, in terms of annual data, in expenditure on consumption and investment in fixed capital, broken down by agent, – or by institutional sector – and by type of product between 1998 and 2004, as well as information on the weight of expenditure under each of these headings. As may be observed, within investment, expenditure on capital goods and other comparable products is largely made by firms, while investment in construction and other products is divided between the three sectors considered. It is important that investment estimates broken down by sector and by product, as shown in this ta-

[5] See Estrada et al. (1997).

TABLE 1 CONSUMPTION AND GROSS FIXED CAPITAL FORMATION BY INSTITUTIONAL SECTOR (a)

	% GDP		Rates of change					
	1995	2004	1999	2000	2001	2002	2003	2004
HOUSEHOLDS AND NPISHs								
Final consumption expenditure (b)	59.8	60.3	4.7	4.1	2.8	2.9	2.9	3.5
Durable consumption	*5.7*	*7.3*	*12.9*	*0.8*	*1.9*	*-3.0*	*4.3*	*9.6*
Non-durable consumption	*54.1*	*53.0*	*3.6*	*4.6*	*2.9*	*3.6*	*2.7*	*2.7*
Domestic residential investm. (c)	5.7	7.2	8.6	8.6	1.2	7.3	6.1	6.0
COMPANIES								
Private productive investment (d)	12.6	14.3	9.9	7.0	2.8	-2.8	2.0	3.6
Capital goods & other products	*6.3*	*7.3*	*9.0*	*4.3*	*-1.2*	*-6.2*	*0.3*	*4.0*
Construction & other products	*6.3*	*7.0*	*11.2*	*10.7*	*7.7*	*1.2*	*3.8*	*3.2*
GENERAL GOVERNMENT								
Final consump. expenditure (b)	18.1	18.8	4.2	5.6	3.5	4.1	3.9	4.9
Gross fixed capital formation	3.7	3.6	4.8	-5.4	7.9	10.9	2.2	5.9
Capital goods & other products	*0.8*	*1.1*	*4.5*	*10.4*	*5.9*	*8.3*	*5.9*	*12.3*
Construction & other products	*2.9*	*2.6*	*5.0*	*-10.4*	*8.6*	*11.9*	*0.9*	*3.5*
MEMORANDUM ITEMS								
Gross fixed capital formation (b)	22.0	25.2	8.8	5.7	3.0	1.7	3.2	4.6
Capital goods (b)	*6.1*	*7.0*	*7.8*	*4.7*	*-1.2*	*-5.4*	*1.0*	*5.8*
Construction (b)	*12.6*	*14.2*	*9.0*	*6.2*	*5.3*	*5.2*	*4.3*	*4.4*
Other products (b)	*3.3*	*3.9*	*10.3*	*6.1*	*3.7*	*3.0*	*3.0*	*3.2*

SOURCES: INE (National Statistics Institute) and Banco de España.

a. Data in real terms.
b. This information is obtained directly from INE.
c. Excludes investment by sole proprietors.
d. Includes investment by sole proprietors.

ble, are consistent in order to ensure the consistency of the forecasts. It must be borne in mind that, unlike the analysis of investment within a medium-term horizon, the short-term diagnosis and estimation are based primarily on the breakdown of investment by type of product, since most of the conjunctural information available refers to the aggregates defined in this way. Therefore, the appropriate integration of both short- and medium-term forecasting horizons requires total consistency between both breakdowns of investment.

The remainder of this chapter will describe the information and tools available for analysing and forecasting the demand of households and firms[6].

[6] Models used to monitor demand for general government consumption and investment and preparing forecasts are addressed in Chapter 9.

3 Household demand

Demand exercised by households is the result of their decisions regarding expenditure on consumption and on investment in real assets, essentially in housing, and represents approximately 67 percent of GDP, 60 percent relating to private consumption and 7 percent to residential investment. Households therefore account for the majority of aggregate demand. This section describes the tools used in the conjunctural monitoring and analysis of expenditure by these agents.

Private consumption comprises expenditure on goods and services used to directly meet human needs, on an individual basis, by households and NPISHs. In the National Accounts, final consumption is considered to include both the expenditure on non-durable goods and services and the acquisition of durable goods. Housing is considered a capital good and therefore only services derived from the use of housing, and not expenditure made to purchase it (which is included in gross fixed capital formation), is included in private consumption.

Residential investment comprises expenditure by households to purchase homes, constituting the main component of gross fixed capital formation in this sector. It should be pointed out, however, that the estimates of this component of demand provided by the CNE correspond essentially to gross changes in the stock of residential capital, a qualification that must be taken into account.

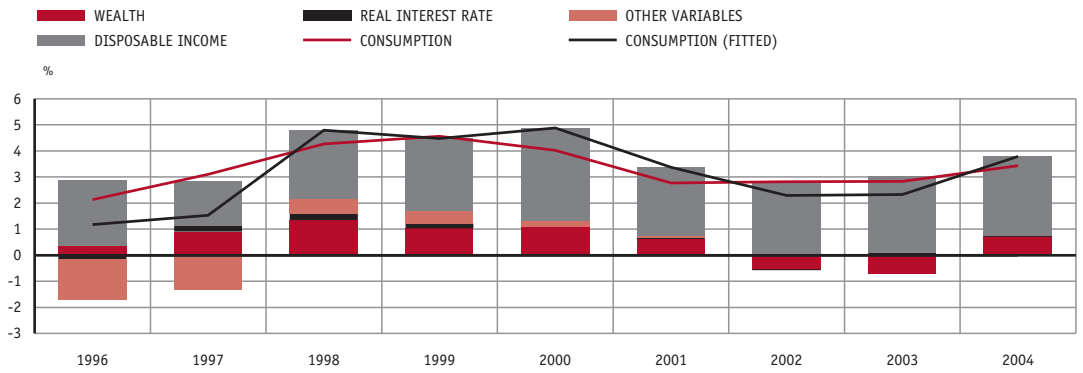
First, in accordance with the criteria applied by the Spanish National Statistics Institute (INE), there is no change in housing stock, leading to automatic matching of additions to residential stock with expenditure by economic agents. Second, the criterion of the National Accounts according to which construction is a non-tradeable good and therefore not subject to importing or exporting, means that only resident sectors can acquire housing on the domestic market. The latter criterion is inconsistent with the reality observed in Spain in recent years, where a significant proportion of homes have been acquired by foreign nationals[7]. Last, given that the existing information is indicative of the output of residential properties and that little information is available on when households acquire such output, the time allocation of expenditure on housing is based on assumptions regarding the course and execution of the works, and not assumptions regarding household expenditure patterns over time. All this means that residential investment, as estimated by the CNE, corresponds better to the volume of homes that has been produced in a specified period, namely the gross change in housing stock, than the purchasing patterns of these assets by households over time.

3.1 Household demand determinants and modelling

As indicated in the introduction and in other chapters of this book, the analysis of the components of aggregate demand, as well as one or two-year forecasts, are mainly based on the

[7] To take non-resident house buyers into account, the base 1995 CNE incorporates a number of notional resident units that receive financing from outside Spain. Use of this convention has, however, created certain drawbacks, which will be resolved in the new base 2000 CNE data series.

CHART 1 PRIVATE CONSUMPTION AND DETERMINANT FACTORS (a)



SOURCE: Banco de España.

a. Year-on-year logarithmic rate and contributions.

behaviour of their determinant factors and their relationship with the aggregate. This analysis will use both econometric models and expert assessments in relation to these determinants, possibly including some aspects not reflected in the models.

In accordance with consumer theories based on intertemporal choice (permanent income and life cycle), the main determinants of consumer demand and housing purchases are the expected value of real income[8], net wealth and the real interest rate, as well as the degree of uncertainty surrounding agents' decision-making processes. In the case of housing demand, as with demand for other capital goods, it is also essential to assess the user cost, which requires expected changes in the price of this good to be estimated and predicted. Similarly, possible changes in the tax system applicable to expenditure on housing should be considered as they also lead to changes in the user cost.

As we observe in Chart 1, real disposable income is the determinant that contributes most to growth in private consumption. Nonetheless, during the expansionary phase of the latter half of the 1990s, growth in consumption exceeded the contribution of real income, owing to the interest rate effect and, above all, the wealth effect (according to the estimates provided by the MTBE). Accordingly, the saving rate dropped to an historical low in 2001 as a result, initially, of the marked growth in net household financial wealth between 1996 and 1999. Subsequently, it was real property wealth that sustained the progress of total wealth and the reduction in the saving rate, helping to temper the loss of impetus in private consumption during the deceleration stage of this variable. The gradual reduction in the real interest rate from the mid-1990s similarly contributed to progress in consumption. Although the direct contribution of this factor was, on average, moderate, a significant part of the re-

[8] Since real income is assumed to constitute the result of movement in per-capita income and population growth, certain demographic factors are implicitly factored into calculations of housing demand.

valuation of wealth was due, in fact, to the reduction in interest rates, so that their contribution, including this more indirect route, was greater than that reflected in the chart.

An essential component in analysing household expenditure decisions is the estimation and projection of real household income, for which the income account at current prices of households and NPISHs is used[9]. The net balance of this account enables gross disposable income to be obtained in nominal terms. The most important component of revenue is compensation of employees, which represents approximately 75 percent of gross disposable income (see Table 2). The operating surplus of sole proprietors and mixed income constitute, for their part, slightly more than 30 percent, while net income from property and other income represent just under 5 percent. General government has a significant impact on household income, either by contributing resources through social security benefits, or subtracting them through direct taxes and social security contributions.

In order to estimate and to project the components of this account, it is essential to incorporate information on variables that are estimated and forecast simultaneously in the forecasting exercise *per se,* such as wages and employment (which are combined to project compensation of employees and the surplus of sole proprietors), contributions, social security benefits and taxes. Interest rate assumptions are also introduced which, together with forecasts of household bank credit and financial assets, provide a projection of net interest income. Disposable income so obtained and the consumption forecast can be used to project the saving rate within the forecasting horizon.

The analysis of *financial wealth* is based on the Quarterly Financial Accounts, which provide an estimate of the market value of the net financial assets of economic sectors, with an approximate lag of one quarter. Such information therefore incorporates stock market fluctuations, which affect variable-return assets. In the forecasting exercises, net financial wealth is projected by taking account of the fact that its changes are the result of the net financial saving and of the effect of the changes in asset prices (revaluation). The forecast change in the financing capacity of the household sector provides a projection of the net financial saving, while for the change in the price of financial assets, the same assumption is adopted in relation to stock exchange indices as underlies the macroeconomic scenario[10].

In the case of *real estate wealth,* trends over time can be assessed based on changes in the market price of housing, since these trends over time are dominated by changes in price, and much less significantly so by the growth in the housing stock. There are, however, various options for estimating the value of real estate wealth. The various alternatives available to estimate this value give rise to differences that affect both the distribution of wealth between real and financial assets and the estimates of change in household net wealth; such differences must be assessed by analysts and compared with other sources of information. In this context, the recently available results of the survey of household fi-

[9] The institutional sectors accounts, including the income accounts, *inter alia,* are published with a lag of almost one year. INE, however, does publish an initial estimate during the second quarter of the following year. Banco de España prepares estimated income accounts using the latest information published by INE.

[10] In the Banco de España macroeconomic model, net financial wealth is calculated using a different formula. See Chapter 5, Section 4.1 and Section 3.1.1 of this chapter.

TABLE 2 INCOME ACCOUNTS OF HOUSEHOLDS AND NPISHs. CURRENT PRICES

	Year-on-year rates				Contributions of income to growth				Percentages of GDP and GDI (a)			
	2001	2002	2003	2004	2001	2002	2003	2004	2001	2002	2003	2004
ALLOCATION, DISTRIBUTION AND USE OF INCOME AND CAPITAL ACCOUNT												
Compensation of employees	6.9	6.2	6.7	6.2	5.3	4.8	5.2	4.8	77.2	76.7	77.3	77.0
Wages and salaries net of contributions	6.1	6.0	7.4	5.9	3.3	3.2	4.0	3.2	53.8	53.3	54.1	53.8
General government effect (b)	14.8	3.9	7.9	3.2	-1.9	-0.5	-1.1	-0.4	-13.8	-13.4	-13.7	-13.3
Social security contributions	8.8	6.8	5.1	6.8	-2.0	-1.6	-1.2	-1.6	-23.4	-23.3	-23.2	-23.2
Social benefits (not including social transfers in kind)	5.6	9.1	2.6	7.3	1.2	1.9	0.6	1.5	20.9	21.3	20.6	20.8
Current tax on income, net wealth, etc.	9.6	7.7	3.7	3.3	-1.0	-0.9	-0.4	-0.4	-11.3	-11.4	-11.2	-10.8
Gross operating surplus and mixed income	8.8	8.3	5.4	6.2	2.8	2.7	1.8	2.0	32.5	32.9	32.7	32.6
Income from property and other income	-10.2	-0.0	0.9	3.2	-0.5	0.0	0.0	0.1	4.2	3.9	3.7	3.6
Net interest					-0.7	-0.4	-0.3	-0.3	-0.3	-0.6	-0.9	-1.2
Dividends and other net income	10.7	9.1	17.2	13.7	0.3	0.3	0.6	0.5	3.2	3.3	3.6	3.9
Other net current transfers	-11.8	11.4	-18.0	-5.6	-0.2	0.1	-0.2	-0.1	1.2	1.2	1.0	0.9
GROSS DISPOSABLE INCOME	5.7	7.0	5.9	6.5	5.7	7.0	5.9	6.5	100.0	100.0	100.0	100.0
Gross disposable income as percent of GDP									64.8	64.9	64.5	64.0
Final consumption expenditure	6.2	6.3	6.1	6.6					58.4	58.1	57.8	57.5
Gross saving (c)	2.4	9.2	6.2	5.3					6.7	6.9	6.8	6.7
Gross fixed capital formation	7.7	10.2	12.4	12.3					6.8	7.0	7.4	7.7
Capital transfers (d)									0.8	0.9	0.8	0.9
NET LENDING (+)/BORROWING (–)									0.8	0.8	0.3	-0.1
MEMORANDUM ITEMS												
Gross disposable income (constant prices) (e)	2.3	3.5	2.7	3.4	2.3	3.5	2.7	3.4	65.7	66.5	66.7	67.1
Saving rate (f)	10.4	10.6	10.6	10.5								

SOURCES: INE and Banco de España.

a. Items that comprise gross disposable income (GDI) are expressed as a percentage of income *per se.*
b. The general government effect reflects, with a negative sign, social security contributions (including those paid by companies) and income and net wealth tax paid by households; and, with a positive sign, social benefits received from general government.
c. Includes adjustment to reflect change in net participation of households in pension fund reserves.
d. Net capital transfers, changes in inventories, and net purchases of valuables and of non-produced financial assets.
e. Deflated by the private consumption deflator.
f. Ratios are provided for these series.

nances have provided very useful information on the composition of Spanish household net wealth.

Forecast changes in *housing prices* are obtained from the projections of the econometric models[11], which must be qualified with other factors, such as demand for housing by non-residents, which has acquired greater significance in recent years and is only partially incorporated into these models. With respect to the real *interest rate*, the assumptions made are for an ex post real rate and result from combining the nominal interest rate and inflation paths underlying the macroeconomic forecasting exercise. The lack of suitable indicators concerning consumer price expectations limits the use of other kinds of approaches.

Last, there are other factors that are difficult to measure, related to consumer sentiment and attitudes regarding the future: expectations about their economic situation, and degree of uncertainty. Indicators relating to the labour market (employment growth and temporary hiring) and to the stock market and, especially, consumer opinion and sentiment indicators contribute information of this type.

3.1.1 Residential investment and consumption in the MTBE

The macroeconometric model of Banco de España (MTBE) contains two equations to describe household demand. In the first equation, private consumption is modelled, depending, in the long term, on variables that approximate permanent income and the real interest rate. The latter captures intertemporal substitution between present and future consumption, in response to changes in the return on saving. A second equation reflects the behaviour of residential investment, which is also a function of permanent income and of the user cost of housing. Both equations, are shown in Table 3, which contains the long-term relationship and the complete dynamic specification, formulated in terms of an error correction mechanism equation. In addition, there is a third one relating to the residential investment deflator[12], and three identities in the model which determine household disposable income, real asset wealth and net financial assets[13].

In the consumption equation, the elasticities in respect of income (0.96) and wealth (0.04) add up to unity, thus verifying the constraint that derives from the most usual permanent income models. The elasticity to the real interest rate is –0.006. In the short term, the response of consumption to changes in real assets is greater than to changes in net financial assets. In the case of residential investment, on the long-term path, private consumption has replaced permanent income, thus reflecting the complementarity of both expenditure decisions derived from the fact that both are a function of permanent income. Similarly, residential investment responds to the user cost with an elasticity of –0.03. The dynamic adjustment of this variable includes some degree of short-term substitution between investment in housing and in financial assets, as reflected by the negative coefficient of the latter variable.

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[11] See Chapters 13 and 14 and Section 3.1.2 in this chapter.

[12] See Chapter 13 for a description of this equation.

[13] See Chapter 5.

TABLE 3 PRIVATE CONSUMPTION AND RESIDENTIAL INVESTMENT EQUATIONS (MTBE) (a)

Long-term:

1) $\bar{c} = -0.24 + 0.96\, y^{d} + 0.04 \ln\left(FW_{-1} + NFW_{-1}\right)^{r} - 0.57 uc^{h}$

2) $\bar{i}^{r} = 2.46 + \left(c\right)^{r} - 0.03 uc^{r}$

Dynamic specification:

1) $$\Delta c = \underset{(0.78)}{0.00} + \underset{(3.63)}{0.35}\Delta c_{-2} + \underset{(4.50)}{0.27}\Delta y^{d} + \underset{(2.24)}{0.11}\Delta y^{d}_{-1} + \underset{(2.78)}{0.02}\Delta fw_{-2} + \underset{(2.12)}{0.14}\Delta nfw_{-2} - \underset{(-1.21)}{0.14}\left(\Delta uc^{h}_{-2} + \Delta uc^{h}_{-3}\right) - \underset{(-1.98)}{0.11}\left(c - \bar{c}\right)_{-1}$$

2) $$\Delta i^{r} = \underset{(1.45)}{0.01} + \underset{(1.17)}{0.23}\left(\Delta y^{d} + \Delta y^{d}_{-4}\right) - \underset{(-1.82)}{0.07}\Delta fw_{-3} - \underset{(-1.46)}{0.01}\left(\Delta uc^{r} + \Delta uc^{r}_{-2}\right) - \underset{(-3.07)}{2.64}\Delta U_{-3} - \underset{(-2.63)}{0.20}\left(i^{r} - \bar{i}^{r}\right)_{-1}$$

Where:

c = real private consumption	$\mathbf{i^r}$ = real domestic residential investment
$\mathbf{y^d}$ = real gross household disposable income	**FW** = Real net private-sector financial wealth
NFW = real private-sector non-financial wealth	$\mathbf{uc^h}$ = real user cost of households = $\left(\frac{R^d}{4} - \Delta p^c\right)$, where R^d is the interest rate on 10-year debt and P^c is the private consumption deflator
$\mathbf{uc^r}$ = real user cost of housing = $\frac{P^{ir}}{P^c}\left(\frac{R^h}{4} + \delta^{ir} - \Delta p^{ir}\right)$, where δ^{ir} = 0,02 is the depreciation rate of the stock of residential capital and P^{ir} is the residential investment deflator	**U** = unemployment rate (EPA)

a. Variables in lowercase are expressed in logarithms. The superscript "r" indicates that the parameter is restricted in the estimation. Bar variables ($\bar{x}$) denote long term. t-statistics are in brackets. Estimated using seasonally adjusted quarterly series for the period 1980.I-1998.IV. For further details, including goodness of fit test, see Estrada et al. (2004).

If the dynamic response of each of the equations is analysed separately, the adjustment in relation to changes in the factors that determine its long-term path is in all cases completed in just over two years, except in the case of a change in real assets, in relation to which the expenditure variable and the price of housing will take longer to achieve the new long-term equilibrium.

When simulations or predictions are made with the complete model, consumer demand and housing investment respond in keeping with a traditional Keynesian mechanism. Both household expenditure decisions impact aggregate demand and, in the short term, output, so that the aggregate income of the economy is affected and, accordingly, household disposable income, thereby further supporting the initial impact on consumer expenditure decisions. Disposable income is therefore a mechanism that amplifies the initial shock.

When interpreting the predictions of the model, we must consider the fact that the wealth variables used by the MTBE are endogenously determined within the model in accordance with certain constraints, and not in the form that might appear most appropriate for the analysis of the determinant factors of household expenditure. Thus, financial wealth includes the net financial assets of the overall private sector rather than the part relating to households, which makes wealth excessively sensitive to stock market fluctuations. Second, non-financial wealth is only partially valued at market prices, as the residential investment deflator, which is the variable that approximates housing prices in the model, does not incorporate the value of land.

The MTBE is an essential tool for projecting and analysing household expenditure in the context of the economy as a whole, taking into account the main interrelations with other variables. It imposes, however, a number of constraints on the determinants appearing in the expenditure equations, not only regarding the definition of wealth, but also regarding the use of other variables not included in the model. For these reasons, in order to analyse household demand decisions, a partial analysis model is also used that incorporates a definition of wealth variables more in keeping with wealth directly held by households, and appears in the customary consumption models. The most noteworthy features of this model are described below.

3.1.2 A satellite model for household expenditure decisions[14]

The household satellite model was designed with the aim of modelling the main expenditure decisions made by households, namely consumption and housing investment, and distinguishing, moreover, consumption of durable goods, with characteristics similar to capital goods, from consumption of non-durable goods, which would have the customary features of consumer goods. Similarly, as indicated above, the definition of wealth is more appropriate. This model consists, therefore, of three expenditure equations: one for the consumption of durable goods, a second for the consumption of non-durable goods and services, and a third for residential investment. As we observe in Table 4, the three equations include as determinants current labour income and net wealth, comprising net financial wealth and real

[14] A brief discussion of this model is included in Chapter 5.

assets, both valued at market prices. Non-durable consumption and residential investment depend, moreover, on the real interest rate. Durable consumption, on the other hand, does not respond directly to changes in the interest rate[15]. Likewise, residential investment depends on expectations of change in the price of housing, which are proxied, in this model, by the change observed in this variable during the previous period. In order to complete the model, four dynamic reduced form equations are also included, which explain changes over time in income, wealth, the real interest rate and housing prices. Joint consideration of these equations enables biases to be avoided in estimating the coefficients of the equations for household expenditure with the presence of endogenous variables. Table 4 provides long-term relationships and the dynamic specification in terms of a vector error correction model (VECM), including the four dynamic reduced forms referred to above.

The elasticities of private consumption to income and wealth that both consumption equations involve are 0.57 and 0.25, respectively, the elasticity to the interest rate being –0.012. Residential investment responds to labour income with unitary elasticity and to wealth with an elasticity of 0.13, which is less than that shown by consumption. Similarly, expenditure on the purchase of housing depends on the real interest rate, with an elasticity of –0.13, and on expectations of changes in housing prices, with an average elasticity of 0.01.

These values differ from those obtained with the quarterly macroeconometric model, the elasticities to wealth and to the interest rate being higher, while that of income is lower. In principle, in the satellite model, which includes labour income, the income elasticity is expected to be lower and the elasticity of wealth greater in comparison with the MTBE, which uses disposable income[16]. On the other hand, the definitions of the wealth variable in the MTBE and in the satellite model differ significantly, as has already been pointed out. We should also add the fact that the macroeconometric model imposes the constraint that the elasticities of private consumption to income and wealth should add up to unity, while this constraint has not been imposed in the satellite model and the results of the estimates of Table 4 indicate that this is far from being confirmed. If the elasticities of household expenditure (consumption and residential investment) to income and wealth are considered together, the sum of these elasticities is 0.84, which is a value less than unity, so that the constraint that derives from the theory of permanent income is not satisfied by household demand within this model. According to the analyses performed, this result is due to the fact that the wealth-income ratio is not stationary in the sample period, while the saving rate is. Both observations can only be compatible if the sum of the income and wealth elasticities is other than unity[17].

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[15] Sastre and Fernández (2005) describe a specification with similar properties to that presented in Table 4, in which it is durable consumption that depends on interest rates in the long term. The high degree of correlation between the two types of consumption makes it difficult to estimate the direct impact of interest rates on durable and non-durable consumptions simultaneously.

[16] Using labour income, which excludes returns on capital, reduces the income elasticity and increases the wealth elasticity of consumption, since it precludes the double accounting that arises when disposable income is used together with wealth.

[17] In the expression of a consumption function in terms of ratios to income: $c - y = (\alpha - 1)(w - y) + (\alpha + \beta - 1)w$, where the variables are expressed in logarithms, if the wealth-income ratio $(w - y)$ is not constant and $(c - y)$, i.e. the saving rate, with the sign changed, is constant, necessarily $\alpha + \beta - 1 \neq 0$, on the usual assumption that wealth is not constant.

The use of labour income, which does not include the returns on wealth held in the form of financial assets, and the market valuation of the household wealth used by the satellite model are factors that explain this feature of the wealth-income ratio in the estimation period. By contrast, in the MTBE, the non-stationary nature of this ratio is less marked, owing to the use of disposable income and a different definition for wealth.

The values that are obtained with the satellite model are close to those estimated for OECD countries[18], which obtain an income elasticity of around 0.5 for the majority of the developed economies, and differ from those previously estimated at Banco de España, for a different time period, which placed the income elasticity at 0.75 in estimates with labour income[19]. The reduction in the value of this parameter and the increase in elasticity to wealth, which is obtained in the satellite model, might reflect a reduction in the liquidity constraints that arises from the development of the financial markets and, possibly, from changes in the income distribution and a greater importance of wealth in consumers' decisions, combined with marked growth in the latter and with the greater weight that variable-return financial assets gained in the household portfolio during the last decade of the 20th century.

As adjustment mechanisms, this model incorporates, in addition to the adjustment towards equilibrium of the expenditure variables that is usual in single-equation models with an error correction mechanism, a mechanism of adjustment through income, which differs from the traditional Keynesian response process. Both the growth in consumption and income respond to shocks that deviate consumption from its long-term path or displace that path. This is derived from the fact that consumers base their income expectations on relevant information concerning future income; these expectations are manifested in consumption decisions in the present and in departures from the equilibrium path determined by wealth and current income. In this context, such deviations are, in fact, informative as to future movements in income, so that, empirically, it is found that income growth depends on the magnitude and sign of such departures[20]. In accordance with the simulations performed, the end result of the simultaneous adjustment through income and consumption is a long-term response of income less than would be found in a traditional aggregate demand mechanism[21].

3.2 Conjunctural monitoring and short-term forecasting

To obtain forecasts for the very short term (two or three quarters), the information provided by household demand indicators plays an essential role. The analysis and assessment of this set of indicators enables a diagnosis to be conducted of the short-term outlook for this aggre-

[18] See Bayoumi (2003).

[19] See Estrada and Buisán (1999).

[20] This implication, derived under relatively non-restrictive hypotheses in the work of Ludvingson, is a generalisation of the analysis conducted by Campbell, drawing on the hypotheses underpinning the permanent income theory. See Lettau and Ludvingson (2001 and 2003) and Campbell (1987).

[21] Adjustment mechanisms of this type have also been obtained for the U.S. and the U.K. See Lettau & Ludvingson (2001) and Fernández Corugedo et al. (2003). The credit and consumption model, which is described in Chapter 5, also incorporates an adjustment mechanism of this type.

TABLE 4 HOUSEHOLD EXPENDITURE DECISIONS (SATELLITE MODEL) (a)

Long-term relationships:

1) $\bar{c}^{nd} = 0.50\, y^{l} + 0.23\, w - 0.83\, RR^{h}$

2) $\bar{c}^{d} = y^{l} + 0.37\, w - 0.10\, D90$

3) $\bar{i}^{r} = y^{l} + 0.13\, w - 8.99\, RR^{h} + 1.35\, \Delta p^{v}_{-1}$

Vector error correction model:

1) $$\Delta c^{nd} = \underset{(3.3)}{-0.17}\left(c^{nd} - \bar{c}^{nd}\right)_{-1} + \underset{(3.3)}{0.40} - \underset{(1.2)}{0.12}\,\Delta c^{nd}_{-1} + \left(\underset{(2.5)}{0.05\,L} - \underset{(2.2)}{0.05\,L^{2}}\right)\Delta i^{r} + \left(\underset{(1.7)}{0.06\,L} + \underset{(3.4)}{0.12\,L^{2}} + \underset{(1.5)}{0.06\,L^{3}}\right)\Delta w - \underset{(2.6)}{0.36}\left(L^{3} + L^{4}\right)\Delta RR^{h}$$

2) $$\Delta c^{d} = \underset{(4.3)}{-0.26}\left(c^{d} - \bar{c}^{d}\right)_{-1} - \underset{(4.3)}{1.83} + \underset{(2.8)}{1.23}\,\Delta c^{nd}_{-2} + \underset{(1.4)}{0.14}\,\Delta i^{r}_{-1} + \left(\underset{(3.5)}{0.60\,L^{3}} + \underset{(1.6)}{0.28\,L^{4}}\right)\Delta w - \underset{(2.2)}{1.26}\,\Delta RR^{h}_{-2}$$

3) $$\Delta y^{l} = \underset{(1,8)}{0,16}\left(c^{nd} - \bar{c}^{nd}\right)_{-1} + \underset{(0.0)}{0.00} + \underset{(2.5)}{0.05}\left(c^{d} - \bar{c}^{d}\right)_{-1} - \underset{(1.0)}{0.07}\,\Delta y^{l}_{-2} + \underset{(1.6)}{0.10}\,\Delta w_{-3} - \underset{(1.4)}{0.30}\,\Delta RR^{h}_{-3} + \underset{(2.2)}{0.15}\,\Delta^{2} p^{v}_{-3}$$

4) $$\Delta i^{r} = \underset{(2.4)}{-0.14}\left(i^{r} - \bar{i}^{r}\right)_{-1} - \underset{(2.4)}{0.54} + \left(\underset{(2.1)}{0.37\,L^{2}} + \underset{(1.3)}{0.23\,L^{3}}\right)\Delta w + \left(\underset{(1.6)}{1.08\,L} - \underset{(2.4)}{1.57\,L^{4}}\right)\Delta RR^{h}$$

5) $$\Delta^{2} p^{v} = \underset{(3.6)}{-0.06}\left(i^{r} - \bar{i}^{r}\right)_{-1} - \underset{(3.5)}{0.23} - \underset{(2.0)}{0.05}\,\Delta c^{d}_{-1} + \left(\underset{(3.8)}{0.72\,L^{2}} + \underset{(1.7)}{0.33\,L^{4}}\right)\Delta RR^{h} - \left(\underset{(7.5)}{0.50\,L} + \underset{(5.7)}{0.46\,L^{2}} + \underset{(3.7)}{0.29\,L^{3}} - \underset{(3.4)}{0.23\,L^{4}}\right)\Delta^{2} p^{v}$$

TABLE 4 HOUSEHOLD EXPENDITURE DECISIONS (SATELLITE MODEL) (cont´d)

Vector error correction model:

6) $$\Delta RR^h = \underset{(4.4)}{-0.03}\left(i^r - \bar{i}^r\right)_{-1} \underset{(4.4)}{-0.14} + \underset{(2.4)}{0.14}\Delta c^{nd}_{-1} + \underset{(2.0)}{0.03}\Delta i^r_{-2} + \left(\underset{(2.9)}{-0.26}L + \underset{(3.6)}{0.30}L^3\right)\Delta RR^h - \left(\underset{(4.4)}{0.14}L^2 + \underset{(2.6)}{0.09}L^3 + \underset{(3.5)}{0.11}L^4\right)\Delta^2 p^v$$

7) $$\Delta w = \underset{(2.9)}{0.01} - \underset{(1.8)}{0.10}\Delta i^r_{-2} + \left(\underset{(1.7)}{0.20}L + \underset{(1.6)}{0.19}L^2\right)\Delta y^l + \left(\underset{(1.7)}{0.16}L^2 + \underset{(2.6)}{0.26}L^3\right)\Delta w - \underset{(2,5)}{0.86}\Delta RR^h_{-1} + \left(\underset{(2.8)}{0.35}L + \underset{(2.7)}{0.35}L^2 + \underset{(3.2)}{0.36}L^4\right)\Delta^2 p^v$$

Where:

c^{nd} = real non-durable private consumption	c^d = real durable private consumption
i^r = real domestic residential investment	y^l = real household labour income
w = real net total wealth deflated by the consumption deflator	p^c = Private consumption deflator
RR^h = interest rates on house purchasing loans deflated by the consumption deflator	**D90** = dummy variable from 1990.III
p^v = relative price of housing in relation to the consumption deflator	

a. Variables in lowercase are expressed in logarithms. Bar variables ($\bar{x}$) denote long term. Parentheses are used for t-statistics. L denotes the lag operator. Estimated using seasonally adjusted quarterly series for the period 1980.I-2001.IV. For further details, including goodness of fit tests, see Sastre and Fernández (2005).

gate demand component, and enables quantitative estimates of these variables to be obtained in the short term from statistical models that link these indicators to household demand.

In the case of *private consumption,* short-term indicators possibly comprise one of the most extensive sets of information relating to the same variable in the National Accounts. Some are comprehensive, or indicative of total consumption of goods and services, while others are more specific and offer information only on certain components of consumer expenditure (see table in Annex 1). This variety of indicators, although it has clear positive aspects, also involves the need to interpret and prioritise messages that may not always be homogeneous.

The first group comprises indicators that provide quantitative information derived from surveys such as the household expenditure survey *(Encuesta Continua de Presupuestos Fa-*

miliares – ECPF), which provides information on household income and expenditure on consumer goods and services, and the retail trade index *(Índice de Comercio al por Menor – ICM),* which provides information on the turnover of companies devoted to retail trade. The survey on household expenditure also includes a number of variables that are subjectively perceived. Another indicator providing quantitative information is that of *new car registrations,* which includes the number of vehicles registered in Spain by manufacturers established in that country. Although such data are used from time to time as an indicator of trends in expenditure on durable goods, they may give an inaccurate picture of this variable as they only represent slightly more than 50 percent of total expenditure on durable goods. *Apparent consumption indices* combine data on domestic production of and foreign trade in consumer goods[22], therefore providing information on consumption of goods. A number of different organisations, including Banco de España, produce indices of this type.

During the past few years, opinion indicators have been gaining importance in conjunctural analysis. These provide qualitative information derived from surveys conducted on a regular basis. Part of such information is designed, in principle, with the aim of anticipating trends and indicating when a turning point may occur. The *consumer confidence indicator* is one such opinion indicator derived from the consumer survey that the European Commission publishes monthly, although this survey provides broader information on households' perceptions and expectations concerning the economic environment and their own economic and financial position. Similarly, the *retail confidence indicator,* which incorporates the perception of retail outlets concerning their situation and expectations in terms of sales and inventory levels, and the *consumer goods industrial climate indicator,* constructed from opinions of the companies producing such goods, contain information relevant to the conjunctural monitoring of the consumption of goods.

Banco de España[23] produces a synthetic private consumption indicator *(Indicador Sintético del Consumo Privado – ISCP)* that summarises the information contained in various statistics and is an overall indicator of expenditure on consumer goods and services. The ISCP is produced as an aggregate of various partial indices that cover the following categories of consumption: cars, other durable consumer goods, energy, food, other non-durable consumer goods and services, for each of which an expenditure index is produced from information derived from other indicators. All these components are aggregated using the weightings that result from the classification of expenditure on final consumption by purpose that is published annually with the CNE. The components of the ISCP are also used to estimate the breakdown of private consumption between durable and non-durable goods and services, pending availability of the data from the INE (available with a two-year lag).

Last, there are various indicators of the financing obtained by consumers for the purchase of goods and services (loans for purchase of durable consumer goods, for current goods and services, etc. See table in Annex 1). The relationship between these indicators and private consumption is more indirect, since only a fraction of consumer expenditure is financed by bank credit and, where this is obtained from euro area statements, the data include loans to sole proprietors, which they may use to acquire capital goods.

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[22] Indices of this type are described in detail in Estrada and Buisán (1999).

[23] See Sánchez and Sastre (2004).

TABLE 5 CORRELATION BETWEEN PRIVATE CONSUMPTION AND ITS INDICATORS

Indicator	Sample	Correlations					Coefficient of variation	
		Annual series (a)	Quarterly series (b)					
			Fourth-order difference		First-order difference		Fourth-order difference	First-order difference
		t	t	max. (c)	t	max. (c)		
PRIVATE CONSUMPTION (QNA)	1992-2002						0.80	0.90
Synthetic indicator of private consumption	1992-2002	0.84	0.77	0.79 [t-1]	0.33	0.33 [t]	0.45	0.71
Retail trade index	1996-2002	0.70	0.63	0.63 [t]			1.00	
Total expenditure (ECPF)	1992-2002	0.62	0.51	0.51 [t]	0.23	0.24 [t-1]	1.36	2.36
Apparent consumption index of goods	1993-2002	0.68	0.55	0.74 [t-2]	0.13	0.49 [t-2]	2.72	6.92
Consumer confidence (d)	1992-2002	0.88	0.93	0.93 [t]	0.64	0.64 [t]	1.12	1.12
Retail trade opinions (d)	1992-2002	0.93	0.92	0.92 [t]	0.66	0.66 [t]	1.53	1.53
Services opinions (d)	1996-2002	0.82	0.46	0.52 [t-2]	0.22	0.22 [t]	0.20	0.20
Industrial climate, consumer goods (d)	1993-2002	0.94	0.88	0.89 [t-1]	0.59	0.59 [t]	1.39	1.39
Credit to individuals (excluding housing) (e)	1998-2003	0.93	0.72	0.74 [t-1]	0.33	0.35 [t-1]	0.34	0.48
Financing for households (excl. housing) (e)	1995-2003	0.84	0.66	0.66 [t]	0.40	0.33 [t-2]	0.90	1.06

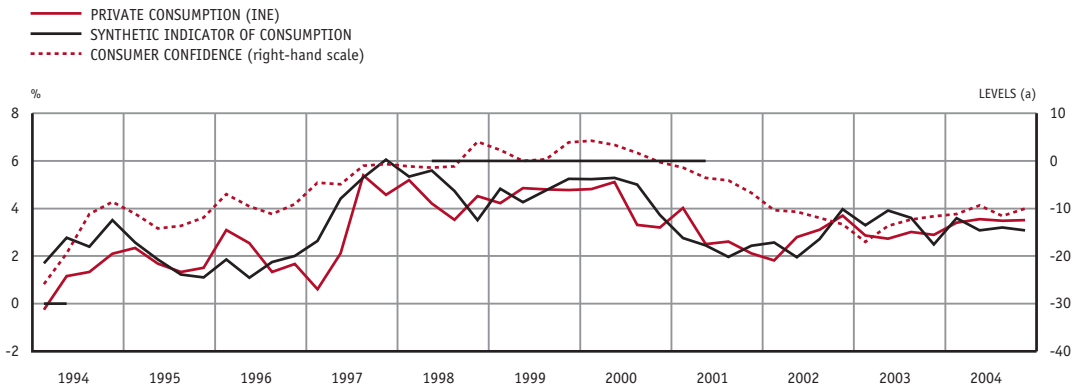
a. First series difference in logarithms.
b. Seasonally adjusted series.
c. Time lag (l) for which the correlation between the CNTR variable (t) and the indicator (t-l) is maximum.
d. Opinion series are taken in levels.
e. Deflated by the consumption deflator.

When using consumer indicators, various factors are taken into account: (a) the consistency or intensity of the relationship between movements in the indicator and the reference variable; (b) the lead or lag structure in respect of said variable; (c) predictive power and (d) the lag after which data are received.

In accordance with these criteria, the best indicators for estimating and projecting short-term private consumption (one or two quarters) are the synthetic private consumption indicator and a number of opinion indicators (consumers, retail trade and industrial climate of the consumer goods sector), which are those that register a higher correlation with the aggregate (see Table 5 and Chart 2) and are published with a smaller lag (see table in Annex 1). Only the consumer confidence indicator and the ISCP can be considered overall consumption indicators, since the other two relate only to part of such expenditure. Similarly, credit to individuals for purposes other than housing purchases registers a high correlation with consumption of goods and services, although the publication lag limits its usefulness for conjunctural analysis[24]. Generally, most indicators have a contemporaneous relationship

[24] Information on household lending obtained from euro area harmonised statements is published with a shorter time lag, although the correlation with this variable is slightly less pronounced.

CHART 2 PRIVATE CONSUMPTION AND KEY INDICATORS



SOURCES: INE, Banco de España and European Commission.

a. Balance between positive and negative replies.

with consumption, with a quarterly frequency, although a few may be somewhat ahead of their normal pattern at certain times. Table 6 shows the statistical model used to project private consumption in the short term. This is a transference function, formulated in terms of the quarterly rate of change, which contains a simple dynamic structure and incorporates the synthetic private consumption indicator with a coefficient close to unity, and is the one that provides the best predictive results.

With regard to *domestic residential investment,* we should bear in mind that Spanish National Accounts now only provide housing investment estimates with an annual frequency and with a lag of approximately one year. Given that domestic residential investment is not disaggregated directly in the quarterly macroeconomic framework, but appears as an integral part of the construction aggregate, this variable is monitored basically from the annual disaggregation of gross fixed capital formation. However, interpolations and projections are available quarterly, obtained from indicators of that frequency (see table in Annex 3), which are necessary for operation of the econometric models. These quarterly indicators are part of the dataset with which the conjunctural analysis of the whole construction sector is undertaken, and enables the annual estimate of investment in housing to be updated throughout the year in progress and, since some of those indicators are leading in nature, they can be used to prepare projections with an approximate horizon of one and one half years.

There are primarily two groups of residential investment indicators: leading and coincident indicators. The former provide information on the procedures prior to the start of construction works, thus constituting leading estimators for the execution and completion of such works, while the latter provide direct information on the execution process. Among the leading indicators, two are the sources of basic information: *approvals by the authorities for new works on buildings intended for housing,* which include approvals issued by provincial associations of

TABLE 6 TRANSFERENCE FUNCTION, PRIVATE CONSUMPTION (a)

Dependent variable: **Private consumption (c)**
Indicator: **Synthetic indicator of private consumption of goods and services (iscp)**

Equation:

$$\Delta c = \underset{(38.5)}{0.9009}\,\Delta iscp_{-1} + \underset{(-7.5)}{0.0166}\,\Delta 1Q1995 + MA(2)$$

a. Variables in lowercase are expressed in logarithms. Parentheses are used for t-statistics. Estimated with data up to 2002.04 (updated to March 2004) and seasonally adjusted series.

technical architects, and *permits granted by municipal governments for buildings intended for housing,* compiled by the Spanish Ministry of Development. This body also publishes data on *housing starts and housing completions,* which it obtains from information concerning works approvals and from start and completion certificates for protected housing.

The main coincident indicator on residential construction derives from the short-term construction industry survey *(Encuesta Coyuntural de la Industria de la Construcción – ECIC)* (see Chart 3), which provides data on the value of works executed by companies, at current prices, by type of work: residential and non-residential building and civil works. Opinion indicators are also available, derived from the short-term industrial survey *(Encuesta de Coyuntura Industrial – ECI)* of home construction companies, concerning their order book and production trends, among other variables.

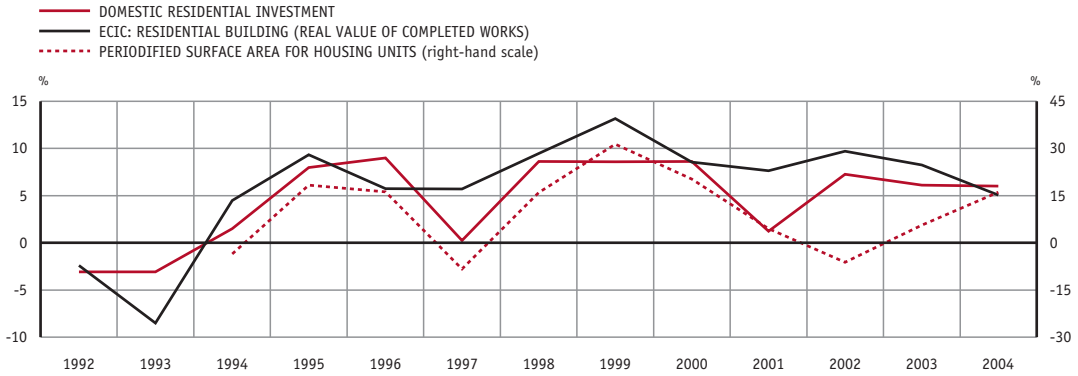
The application of a specific works execution timetable to data from approvals or permits enables alternative coincident indicators to be obtained from work starts, as well as projections with a time horizon of approximately two years. Banco de España produces various indicators[25], both in terms of surface area and number of housing units, using information from approvals and assuming different execution timetables, in accordance with those used by INE and the Ministry of Development. One such indicator is the *periodified indicator of construction surface area for housing purposes,* which assumes a uniform execution timetable of 18 months.

Last, there are also indicators that provide additional information to enable trends in residential investment to be set within the wider context of the housing market. These include: *indices of construction costs in building, assessed unsubsidised housing prices* (reflecting the value of home assessments conducted by the main appraisal companies and therefore providing information on market prices of housing); *accessibility indicators,* which provide information on the opportunities for a representative household to purchase a home[26], and *financing for housing purchases.* However, the relationship be-

[25] See Artola and Montesinos (2004).

[26] Essentially, two indicators are used: the ratio between housing prices and wages per person, which approximates the relationship between housing prices and household payment capacity; and the proportion of annual household income that must be earmarked to repaying loans used to finance housing purchases.

CHART 3 RESIDENTIAL INVESTMENT AND KEY INDICATORS



SOURCES: INE, Banco de España and Ministry of Development.

tween financing for housing purchases and household investment in housing is affected by the fact that most of such loans finance the purchase of used homes, which is not included in residential investment.

3.3 Overall assessment of household demand

Assessment and final forecasting of expenditure on private consumption and residential investment are derived from comparing, for the current year, the information provided by conjunctural indicators of consumption and residential investment with the predictions based on the equations in the MTBE and household satellite model. Throughout the forecasting horizon, we must also consider the information on expenditure determinants not explicitly included in the equations, and assess the implications that a given expenditure pattern may have on the household saving rate and its consistency with the factors that impact the choice between present and future consumption. The comparison of the results of the various forecasting tools will make it possible to assess household demand and the risk factors that may impact its future course.

Among the risk factors, special attention should be given to the household financial position, assessing to what extent this position may lead to expenditure adjustment processes, as indicated by the VECM model linking consumption and debt[27]. Similarly, the assessment of the household net wealth position derived from an analysis of various indicators (debt-to-income ratios, composition of the financial assets portfolio, interest burden, saving not earmarked for debt service, etc.)[28] enables the degree to which consumers are exposed to adverse macroeconomic shocks to be examined. When assessing such in-

[27] This model is described in detail in Chapters 5 and 14.

[28] See Chapter 14.

dicators, we must take due account, however, of the fact that they have certain limits, owing to their aggregate nature. A specific overall behaviour may therefore conceal a position of substantial vulnerability among some groups of consumers, with potential implications for their expenditure decisions, offset by a comfortable, low-risk position in other population groups.

The estimation and projection of the household income account provides additional data for comparing and assessing household expenditure, while constituting one of the mechanisms to link the set of macroeconomic forecasts. As indicated above, disposable income is an endogenous variable that depends substantially on other variables such as employment, wages, taxes, etc. that are determined simultaneously with consumption. On the other hand, estimation of the household income account and the sectoral distribution of gross capital formation is part of a more general framework of estimating and forecasting institutional sector accounts. In each forecasting exercise, these accounts are supplemented with estimates and forecasts of those items not obtained from the macroeconomic model. This provides us with forecasts of the institutional sectors' financing capacity or needs, which are consistent with the assumptions and forecasts for the exercise, and that enable various consistency checks to be made. On the one hand, the rationality of the changes in each sector's financing capacity or needs is assessed based on the trends that set their patterns of change within the forecasting horizon. On the other hand, a comparison is made for the current year of the value of the financing capacity of households and non-financial corporations with the available estimates of net financial saving for each of these sectors. Both magnitudes should coincide, except for a relatively minor statistical discrepancy. This comparison constitutes a first check against the information set on the financial assets and liabilities of these sectors. Last, the implications of changes in financing capacity on the indebtedness of households and non-financial corporations are assessed.

4 Corporate demand

Business investment decisions are reflected in gross capital formation in the form of either fixed capital or inventories. The first of these categories consists of net purchases of tangible or intangible fixed assets intended for use in production processes[29], while changes in inventories consists of increases or decreases in the value of inputs, work in progress and finished products held in stock. As we observe in Table 1, in 2003 firms' gross fixed capital formation was estimated to amount to just over 14 percent of GDP (clearly a percentage far smaller than the percentage of GDP accounted for by household demand) and approximately 60 percent of total fixed capital investment in the economy. However, since business investment is far more variable than other components of expenditure, it is a core determinant of the economic cycle despite its lower weight in aggregate expenditure.

[29] ESA 95 defines these assets as assets intended for repeated, continuous use in production processes for a period in excess of one year.

The corporate sector encompasses a variety of units, including non-financial corporations[30], financial institutions (whether corporations or quasi-corporations) and producers of market goods and services that have no legal personality and are referred to as "sole proprietorships". What all these economic agents have in common is that they produce goods and services for the market[31]. While firms engage in these productive activities they incur the expenses that constitute investment in fixed capital and inventories.

As mentioned in Section 2, gross fixed capital formation expenditure by companies and sole proprietorships (either on equipment, construction, or other products) is referred to as private productive investment or PPI. It should be stressed that the concept of PPI is not one of the aggregates published directly in connection with the Spanish National Accounts but rather an internal estimate that combines National Accounts estimates for investment by companies and financial institutions (which are annual and published in nominal terms only) with estimates of expenditure attributed to sole proprietorships. The breakdown of private productive investment between construction and equipment[32], real-term estimates for the data series and their quarterly interpolations are calculated in conjunction with estimates for residential investment and public investment, based on the indictors and additional information from the National Accounts.

4.1 Corporate demand: determinants and modelling

4.1.1 Private productive investment

Traditional approaches to the analysis of business demand for fixed asset investment adopt a neoclassical model framework in which financial markets are assumed to be without friction, capital demand is dictated by conditions of profit maximisation and investment patterns reflect the manner in which companies adjust their stock of capital to the desired level. Thus, assuming the cost of capital to be equal for all firms, the determinants of investment are the same as those of the stock of capital (and rates of change of these determinants), namely output, user cost of capital and the price of all other factors of production. To explain the short-term dynamics, a number of other variables that have temporary effects may also be included. The investment equation of the MTBE essentially reflects this type of approach.

The equation for private productive investment (PPI) of the quarterly model is estimated within the supply-side block, which includes demand for factors of production, the value

[30] The non-financial corporation category also includes State entities not included in general government under ESA definitions. These include all agencies attached to the Spanish Ministry of Development, such as AENA and GIF (the agencies responsible for airport/air traffic management and for railway infrastructures, respectively), which are referred to collectively in Spain with the acronym EPEGF.

[31] Or for their own use, in the case of sole proprietors.

[32] Investment in other products attributed to companies is divided between the two aggregates (capital goods and construction). The weighting of each in PPI is approximately 50 percent, although capital goods are considered to have a marginally heavier weighting.

added deflator, wages and the labour force. The demand for capital obtained as the solution to the profit maximisation problem constitutes the long-term section of the investment equation, as shown in Table 7. In the long term, the capital-output ratio (using private-sector value added as the measure for output) is a decreasing function of the relative cost of capital in terms of labour (user cost of capital relative to wages), with an elasticity of –0.64. Total factor productivity also has a slightly negative impact, denoting the capital-saving nature of technological progress.

The dynamic specification, at the bottom of Table 7, is set as an investment equation where the ratio between gross investment and the desired capital stock converges towards its equilibrium level in the long term. Thus, in the long term, gross investment and the stock of capital will grow at the same rate, which, in turn, corresponds to growth in value added[33]. In the short term, however, business investment will be driven by the rate of change in output and the real user cost of capital. The equation also incorporates a variable representative of cash flow (defined as corporate revenue as a percentage of the stock of capital), although this variable has a low level of significance. The error correction mechanism is not ultimately significant (raising doubts as to the real stability of the ratio between investment and the desired stock of capital in the long term). In any case, the low value of its coefficient suggests that the adjustment of investment to its equilibrium level relative to the desired capital stock is very slow.

Full-model simulations show that private productive investment initially overreacts to a demand shock that raises (or lowers) long-term output levels. This overreaction is attributable to the accelerator mechanism, which reflects the greater variability in short-term investment compared to output. The subsequent, albeit slow, return to the long-term path means that ultimately investment increases in the same proportion as value added. Moreover, the response of PPI to changes in the relative price of the various factors of production induces a gradual convergence towards the new long-term level, as companies adjust to the new long-term capital-output equilibrium ratio.

The MTBE equation can be used to interpret investment behaviour in recent years. Chart 4 depicts the contributions of the various determinants of PPI to its rate of change as calculated with the MTBE equation, for the period 1996-2004. The greatest average contribution over that period corresponds to output, highlighting the significance of the accelerator effect. However, the real user cost of capital makes a contribution of almost equal magnitude. It is important to bear in mind that at the start of this period, which coincided with the run-up to European Monetary Union, interest rates underwent a considerable downward correction, so that the effect of the reduction in the cost of capital could have been particularly marked relative to other periods. All other variables (including cash flow, real wages and trend total factor productivity) have a far more limited impact on PPI, although in the case of profitability the effect is slightly more pronounced. The chart also shows that the equation tended to overestimate investment growth up to 2002. These systematic errors could be indicative of the exclusion of certain other significant determinants of investment from the model equation. For instance, the equation does not take into account the degree of un-

[33] Given a depreciation rate δ, $K_t=K_{t-1}(1-\delta)+I_t$, such that, in the long term, I/K is stable. Given that K/Y is also stable, it follows that the three variables must all grow at the same rate.

TABLE 7 PRIVATE PRODUCTIVE INVESTMENT AND INVESTMENT IN INVENTORIES (MTBE) (a)

Long-term:

1) $$\overline{k}^{p} = -1.43 - 0.001PTF + y^{p} - 0.64\left(uc^{p} - w^{p}\right)$$

2) $$\overline{S} = 0.73Y^{pot}$$

Dynamic specification:

1) $$\Delta i^{p} = \underset{(-2.05)}{-0.24} + \underset{(2.34)}{1.06}\left(\Delta y^{p}_{-1} + \Delta y^{p}_{-2}\right) - \underset{(-2.83)}{0.05}\,\Delta\left(uc^{p} - p^{p}\right) + \underset{(1.66)}{2.25}\,cf^{p} - \underset{(-1.89)}{0.05}\left(i^{p} - \overline{k}^{p}\right)_{-1}$$

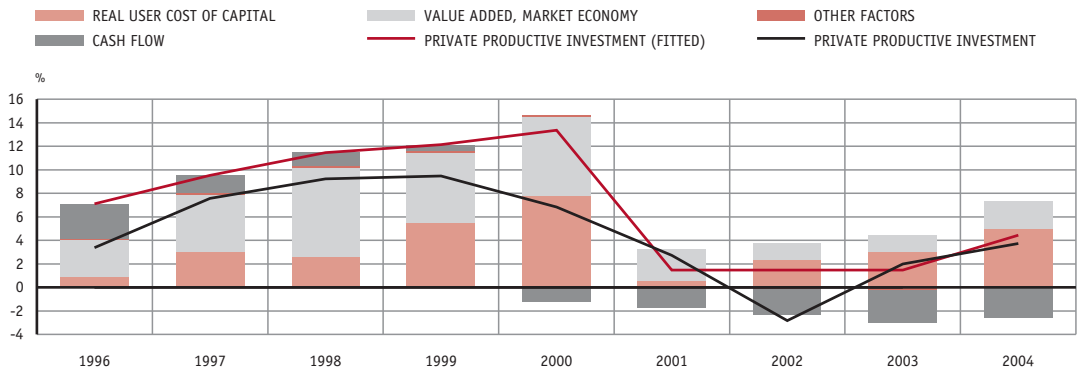
2) $$\Delta S = \underset{(-2.28)}{-161.0} - \underset{(-2.18)}{0.06}\left(\Delta SA - 0.97\Delta Y^{pot}\right) + \underset{(8.01)}{0.41}\left(\Delta SA_{-1} - 0.97\Delta Y^{pot}_{-1}\right) - $$
$$- \underset{(-1.07)}{0.06}\left(\Delta\left(uc^{s}Y^{pot}\right) + \Delta\left(uc^{s}Y^{pot}\right)_{-1}\right) - \underset{(-7.23)}{0.49}\left(S - \overline{S}\right)_{-1}$$

Where:

k^p = stock of real private productive capital	**PTF** = total factor productivity
y^p = real private sector value added	uc^p = real user cost of investment = $\frac{P^{ip}}{P^c}\left(\frac{R^{cp} + R^e}{4} - \delta^{ip} - \Delta p^{ip}\right)$, where R^{cp} the three-month interbank rate, R^e is the interest rate to companies, $\delta^{ip} = 0.2125$ is the depreciation rate of the stock of private productive capital and P^c is the private consumption deflator
w^p = private sector compensation per employee	i^p = real productive investment
p^p = private sector value added deflator, not including taxes	cf^p = companies' cash flow = gross disposable income of companies/stock of nominal private productive capital
Y^{pot} = private sector potential output	**S** = real investment in inventories
SA = sales of finished products	uc^s = real user cost of investment in inventories = $\frac{R^d}{4} + \delta^s - \Delta p^p$, where $\delta^s = 0.14$ is the depreciation rate of the stock of inventories and R^d is the interest rate on 10-year debt

a. Variables in lowercase are expressed in logarithms. Bar variables ($\overline{x}$) denote long term. Parentheses are used for t-statistics. Estimated using seasonally adjusted quarterly series for the period 1980.I-1998.IV. For further details, including goodness of fit tests, see Estrada et al (2004).

CHART 4 PRIVATE PRODUCTIVE INVESTMENT AND DETERMINANT FACTORS (a)



SOURCE: Banco de España.

a. Contributions to growth in the year-on-year rate.

certainty surrounding investment decisions. Corporate financial conditions may also have effects that are not adequately represented by the variables in the equation.

Several studies, most of them conducted using individual data, have shown that corporate financing conditions have a significant bearing on investment decisions. With reference to Spain, a number of studies related to this issue has been carried out using the database of the Banco de España Central Balance Sheet Data Office[34].

The presence of variables that represent the financial structure of the firms in investment equations reflects the fact that the cost of external funds is higher than the cost of internal funds, and that this depends on the financial situation of each individual company. This dependence is generally explained as the result of asymmetries between the information available to companies and the information available to their potential lenders on the profitability of the investment projects they finance. This situation leads lenders to take companies' financial and net wealth position, estimated on the basis of their self-financing capacity or debt, as an indicator of their profitability. Since certain groups of companies (for example, small companies, companies not partially held by financial institutions and/or not listed on the stock markets) are more likely to suffer the effects of information asymmetries than others, the influence of net wealth position on the cost or availability of financing is more pronounced for these groups of firms, as available studies have confirmed. There is also evidence that the effects of financial variables on investment decision-making are non-linear, and that they are more pronounced or more significant in the case of companies exposed to greater financial pressures.

It is therefore appropriate, in principle, to incorporate such variables into macroeconometric equations. Although in practice factoring such dependencies into models that use

[34] See studies by Estrada et al. (1997), Chatelain et al. (2001), Hernando and Tiomo (2002), Benito and Hernando (2002) and Hernando and Martínez-Carrascal (2003).

aggregate variables is a difficult matter, the fact that, in the MTBE equation, cash flow is shown to have an (almost) significant effect supports this rationale. In addition, tests that incorporate into the investment equation indicators of financial pressure, calculated using information of individual firms that report to the Banco de España Central Balance Sheet Data Office, have confirmed that such indicators are significant and help mitigate some of the problems of overestimation associated with the equation[35]. As we know, in certain sectors, particularly service sectors such as telecommunications and transportation, major investments were made at the end of the last decade that proved less profitable than expected in the short term, thus increasing the financial pressure; as a result, firms in these sectors also suffered increases in their financial costs that have forced them to embark on restructuring operations.

Nonetheless, other explanations for the weak growth in investment observed during the recent expansionary cycle should not be ruled out. Weak investment could be linked, for example, to the severe geopolitical uncertainties surrounding expectations for growth in a world economy marred by various crises. It is also possible that the elasticity of PPI to output, which in Spain is very high relative to the estimated elasticity of other countries, may have been affected by past periods of exceptionally intense investment, such as the expansion of the 1980s, and is thus no longer representative of the true elasticity that governed investment in the more recent expansionary cycle of the 1990s. Research into this hypothesis is currently under way.

4.1.2 Investment in inventories

It is generally assumed that the desired level of inventories is a percentage of potential output and that this percentage is dependent on interest rates. In the short term, fluctuations around this desired level may be observed due to departures of sales from levels consistent with potential output that prompt dynamic adjustments to return to the equilibrium level.

Table 7 also sets out the equation used to calculate change in inventories. The long-term equation indicates that the equilibrium level of inventories is somewhat more than 70 percent of potential output, with this percentage being constant. In the short term, inventories act as a buffer stock, so that sales growth in excess of potential output growth has an immediate negative effect on changes in inventories, whilst the subsequent dynamic implies an adjustment (of the opposite sign) to the equilibrium level. The interest rate also has the expected negative effect.

4.2 Monitoring investment using indicators and global estimates

This section describes the short-term indicators and models used to assess investment behaviour and draw up forecasts for fixed capital investment and changes in inventories. As already noted in Section 2, given the information available, we prefer to base our short-

[35] See Martínez-Carrascal (2004).

term models for fixed capital investment in the Spanish economy on a breakdown of investment by type of product (capital goods, construction and other products) since indicators available in this form tend to be more current and more detailed than information relating to investment broken down by type of agent.

It should be borne in mind that when investment is analysed by type of product, investment decisions by all sectors are being jointly considered. However, in the case of capital goods, investments by firms account for the clear majority; general government expenditure on capital goods accounts for a very small share of the total. It can therefore be said that trends in this aggregate are essentially a reflection of corporate investment decisions. In the case of investment in construction, however, household and general government demand is considerable, jointly outstripping demand from firms. To make our analysis of this component of expenditure as clear as possible, in this section we will consider, first, available information specifically intended for the purpose of analysing investment by firms; and second, information available for analysis of investment by type of product. We will then take a brief look at the monitoring of changes in inventories before concluding with a few reflections on the overall assessment of business investment used in forecasting exercises.

4.2.1 Private productive investment

As mentioned above, in the case of firms, information on business investment at the aggregate level is either insufficiently close to expenditure or else subject to considerable publication lags. Accordingly, this information is not used directly for short-term quantitative projections but instead used simply to supplement the forecasts produced using the econometric model. Available information on overall trends in business investment (see table in Annex 2) includes the half-yearly survey on investment in industry *(Encuesta semestral de inversiones en la industria),* which monitors the opinions of managers in the industrial sector regarding factors conducive or detrimental to investment, in addition to providing quantitative estimates of their investment plans. All information provided by this survey is annual in frequency. Other opinion indicators referred to in our assessment of investment conditions include those provided by the European Commission's *surveys of business opinions.* These surveys reflect the responses of managers in the main branches of activity and are used to construct business climate indicators in industry, construction and the service sector. Managers' responses to questions concerning the status of their order books are also relevant. In the case of industry, quarterly information on plant capacity utilisation and adequacy of production capacity is also important.

The *Banco de España Central Balance Sheet Data Office* provides annual information on investment by non-financial corporations. The main advantage of these data is that they are accompanied by information on companies' financial position and activity, both of which are central determinants of investment decisions. However, this information is published annually and thus only becomes available for conjunctural analysis with a certain lag. The quarterly infomation of the Central Balance Sheet Data Office is more limited (specifically, it does not include data on investment) but it suffices to provide indicators as

to the financial situation of companies that prove extremely useful when it comes to drawing up investment forecasts for the more immediate future[36].

Data on corporate credit and financing are additional sources of information that can prove useful when assessing trends in investment, although the correlation between these data and expenditure is less direct than the correlation between expenditure and other indicators, since not all investment is funded from external resources nor do all financing flows necessarily coincide with the time profile of a company's expenditure. In fact, when the correlation between corporate credit (or financing) and business capital expenditure is analysed, credit trends are often found to lag behind expenditure trends, which reduces the usefulness of these indicators as a means of forecasting short-term expenditure.

The weighting of construction expenditure attributed to firms (i.e. *private productive investment in construction)* in GDP (7 percent) is similar to the weighting of residential expenditure. This component constitutes almost 50 percent of business fixed capital investment and consists of non-residential building and civil works projects carried out by companies. Where civil works are concerned, it is worth noting that the non-financial corporations sector includes some of the largest State agencies responsible for infrastructure construction (EPEGF), the weighting of which has grown in recent years.

As in the case of residential investment, there are also leading and coincident indicators for PPI in construction, which for the most part are derived from the same statistics. Among the leading indicators, there is information for *works approvals and permits issued by municipal authorities for the construction of non-residential buildings* similar to the information available for residential buildings. Statistics on *public tenders* also provide information on the value of works put out to tender by the principal EPEGFs. Coincident indicators include two components of the construction industry survey (ECIC), namely *non-residential building* and civil works, w hich reflect trends in civil works relative to trends in PPI. In addition, by applying execution schedules to data on building approvals and permits it is possible to construct coincident indicators that also provide forecasts for investment several quarters ahead. Finally, the short-term industrial survey *(Encuesta de Coyuntura Industrial – ECI)* provides specific information on sub-sectors of the construction industry (e.g. industrial construction and civil works) that are closely linked to PPI.

4.2.2 Monitoring investment by type of product

As stated previously, better indicators are available when investment is broken down by type of product. Accordingly, this is the approach chosen to construct quantitative short-term projections of investment. In the case of *investment in capital goods,* which accounts for almost 7 percent of Spanish GDP[37], there are few short-term indicators available. The

[36] See Chapters 6 and 14.

[37] Investment in capital goods and other products by companies accounts for approximately 7.3 percent of GDP. This percentage rises to above 8 percent when general government capital goods investment is included. These percentages incorporate the share of investment in other products not associated with construction expenditure in these sectors.

TABLE 8 CORRELATION BETWEEN GFCF IN CAPITAL GOODS AND ITS INDICATORS

Indicator	Sample	Correlations					Coefficient of variation	
		Annual series (a)	Quarterly series (b)					
			Fourth-order difference		First-order difference		Fourth-order difference	First-order difference
		t	t	max. (c)	t	max. (c)		
GFCF CAPITAL GOODS (CNTR)	1992-2002						3.52	6.27
Apparent investment index of capital goods	1992-2002	0.92	0.90	0.90 [t]	0.69	0.69 [t]	2.85	7.99
Industrial confidence indicator (d)	1992-2002	0.78	0.77	0.77 [t]	0.46	0.46 [t]	-1.39	-1.39
Order book (d)	1992-2002	0.80	0.76	0.76 [t]	0.43	0.43 [t]	-1.29	-1.29
Capital goods confidence indicator	1993-2002	0.81	0.46	0.63 [t-1]	0.24	0.42 [t-1]	3.79	5.28
Order book, capital goods	1993-2002	0.82	0.57	0.63 [t-1]	0.24	0.39 [t-1]	4.07	6.59
Sufficiency of industrial production capacity (–)	1992-2002	-0.76	0.44	0.44 [t]	0.00	0.23 [t-2]	10.87	22.79
Capacity utilisation (industry)	1992-2002	0.66	0.64	0.64 [t]	0.22	0.22 [t]	70.86	46.15
Credit to productive act. (excl. construction) (e)	1992-2002	0.45	0.14	0.42 [t+4]	0.17	0.31 [t+2]	1.14	1.58
Financing to non-financial corporations (f)	1993-2002	-0.38	-0.35	0.31 [t+8]	-0.16	0.16 [t+5]	2.53	3.24

a. First series difference in logarithms.
b. Seasonally adjusted series.
c. Time lag (l) for which the correlation between the CNTR variable (t) and the indicator (t-l) is maximum.
d. These series are in levels.
e. The annual correlation delaying the indicator by one year is 0.68 and by two years is 0.79.
f. The annual correlation delaying the indicator by one year is 0.37 and by two years is 0.90.

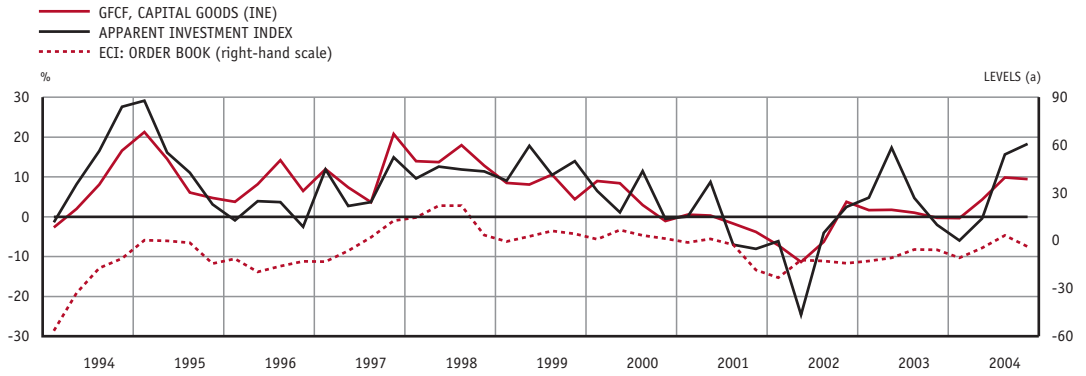
main indicator that may be employed is the *indicator of apparent investment in capital goods,* which is constructed on the basis of real data for domestic output and foreign trade in goods of this type. Chart 5 shows the monthly indicator of apparent investment compiled by the Banco de España[38].

Conclusions drawn from the indicator of apparent investment may be fleshed out using information from *opinion surveys.* First, opinion surveys carried out by the Spanish Ministry of Industry among the sub-set of companies formed by capital goods manufacturers provide information on *production trends, order book, industrial climate indicator and capacity utilisation,* among other items. Second, the results of the same survey with reference to industry as a whole are also considered relevant in any assessment of capital goods expenditure.

Table 8 provides a systematic summary of the quantitative relationships between indicators of investment in capital goods and the CNTR aggregate. The table shows that movements in the indicators selected are coincident with investment except in the case of opinion indicators relating to capital goods, which move to some degree ahead, and in the case of credit and financing indicators, which tend to lag behind. The table also shows the indicator that most closely reflects movements in the CNTR variable to be the indicator of apparent investment. This close correlation can also be observed in Chart 5. In line with this analysis

[38] The INE and Spanish Ministry of Economy publish similar indicators.

CHART 5 INVESTMENT IN CAPITAL GOODS AND KEY INDICATORS



SOURCES: INE, Banco de España and Ministerio de Industria, Turismo y Comercio.

a. Balance between positive and negative replies.

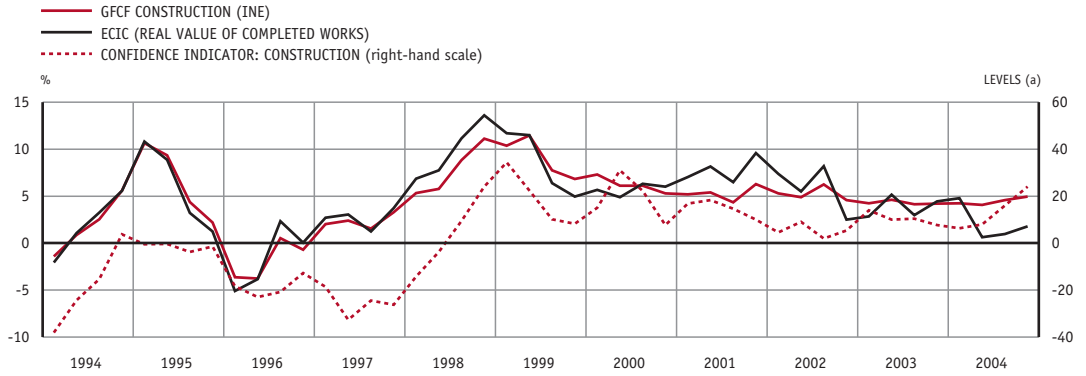
of correlations, the indicator used to forecast investment in capital goods two and three quarters ahead, employing the relevant transference function, is the indicator of apparent investment. This indicator enters the model with a high and very significant coefficient.

Investment in construction includes all expenditure incurred in residential and non-residential building and in civil works. The assumptions underlying the National Accounts estimates of construction, namely, that there is no accumulation of inventories of construction goods and that all works supplied or built are simultaneously demanded or bought, mean that trends in construction investment (demand) and trends in construction activity (supply) follow a very similar pattern[39]. Accordingly, construction indicators are used indiscriminately in the monitoring and short-term forecasting of both supply and demand, regardless of whether they are compiled from the demand or the supply-side perspective (see Chart 6).

A number of the indicators available for monitoring construction investment, including leading indicators (building approvals and permits), have already been discussed above. To these, however, we can add statistics on *public tenders,* which include information on projects put out to tender by private companies and EPEGF. For short-term forecasting, leading indicators are generally less efficient than coincident and opinion-based indicators. Opinion-based indicators (i.e. Eurostat and Ministry of Industry surveys) provide information on both the current situation and the short- and medium-term outlook. Coincident indictors tend to take a supply-side perspective and generally relate to the full range of activities within the construction branch of activity. They can be further divided into those that track changes in intermediate consumption (e.g. *cement consumption and production of building materials)* and employment (e.g. the labour force survey, social security participants and unemployed persons), on the one hand, and those that are designed to measure

[39] The fact that supply is measured in terms of value added and demand in terms of final output undoubtedly introduces scope for divergent movement in the two aggregates, but in practice the differences are minimal.

CHART 6 GFCF CONSTRUCTION AND KEY INDICATORS



SOURCES: INE, Banco de España, Ministry of Development and European Commission.

a. Balance between positive and negative replies.

activity directly (e.g. *value of works executed by construction companies, of the ECIC,* a survey that also provides leading information), on the other. Finally, there are financial indicators such as *mortgage credit* and *construction activity financing* which can be used to provide both demand-side and supply-side perspectives.

Table 9 sets out the correlations between investment in construction and a selection of the indictors mentioned above. The indicator that most closely monitors trends in aggregate CNTR data is value of works executed by construction companies deflated with construction costs. Other good indicators are apparent cement consumption, employment statistics and the construction sector confidence index. In line with these findings, the indicator included in the transference function used to forecast short-term investment in construction is the value-of-works-executed indicator, of the ECIC. The use of this indicator, however, poses some problems due to the time lag before publication of results which are generally released after the CNTR data for the period in question. For this reason, to take advantage of the more current information provided by other indicators, cement consumption is also taken into account in the forecasting process.

The final component monitored in the short-term forecasting of gross fixed capital formation (GFCF) by type of product is *investment in other products.* As mentioned at the start of this chapter, this component of investment is highly heterogeneous and more variable than the other two components of GFCF. This heterogeneous nature (it includes products as varied as real estate services, software, expenses incurred in oil prospecting and capital equipment produced by the primary sector) means that it is difficult to find globally representative indicators. However, since products closely linked to GFCF in construction, such as real estate services, have the greatest weighting in the aggregate, the short-term model for forecasting investment in other products is constructed using investment in construction as an indicator.

TABLE 9 CORRELATION BETWEEN GFCF IN CONSTRUCTION AND ITS INDICATORS

Indicator	Sample	Correlations					Coefficient of variation	
		Annual series (a)	Quarterly series (b)					
			Fourth-order difference		First-order difference		Fourth-order difference	First-order difference
		t	t	max. (c)	t	max. (c)		
GFCF CONSTRUCTION	1992-2002						1.88	2.38
Value of work executed (real ECIC)	1992-2002	0.98	0.97	0.97 [t]	0.95	0.95 [t]	2.57	3.59
Cement	1992-2002	0.94	0.91	0.91 [t]	0.64	0.64 [t]	2.20	3.45
Construction IPI (d)	1992-2002	0.72	0.70	0.77 [t-1]	0.43	0.52 [t-2]	2.79	4.57
Social Security participants	1992-2002	0.93	0.88	0.89 [t+1]	0.73	0.73 [t]	2.40	2.57
Unemployed persons, INEM	1992-2002	-0.77	-0.73	-0.73 [t]	-0.59	-0.59 [t]	5.48	4.40
Occupied persons, EPA	1992-2002	0.90	0.84	0.84 [t]	0.62	0.62 [t]	2.00	2.37
Construction confidence index (e)	1992-2002	0.91	0.87	0.87 [t+1]	0.55	0.68 [t+1]	3.08	3.08
Credit to productive act. (construction) (f)	1993-2002	0.53	0.47	0.79 [t+5]	0.23	0.51 [t+4]	2.82	3.80

a. Annual rate of change.
b. Seasonally adjusted series.
c. Time lag (l) for which the correlation between the CNTR variable (t) and the indicator (t-l) is maximum.
d. Includes only the other non-metallic minerals category.
e. Annual or quarterly average of the balance of positive or negative replies (differences not applied).
f. Deflated by the construction costs index.

4.2.3 Change in inventories

C*hange in inventories* is one of the most variable components of expenditure. Its content is also quite varied, and for this reason the available indicators are either unsuitable or lack the breadth of coverage needed for monitoring. As a result, the variable is very often included as an adjustment item in preliminary estimates of quarterly GDP and subject to substantial revision in subsequent calculations.

Available indicators that may be used to track changes in inventories, all of which are partial, include responses to questions on *inventory levels* derived from the *Eurostat opinion surveys* relating to industry[40] and trade. There is also good reason to expect that c*apacity utilisation* should be negatively correlated with changes in inventories. However, neither of these indicators provide satisfactory results. Statistically, the variable showing the closest (negative) correlation with changes in inventories is net external demand. This correlation could, in part, be an indication that inventories act as a cushion between changes in domestic expenditure, which is relatively stable, and foreign trade flows, which – at least statistically – are subject to pronounced fluctuations. Accordingly, short-term forecasts of changes in inventories draw on the correlation between this variable and external demand.

[40] The short-term industrial survey carried out by the Spanish Ministry of Industry, Trade and Tourism also provides this type of information.

As in the case of households, combining results drawn from the various different instruments used to analyse business expenditure will give a final forecast for private productive investment and changes in inventories in the context of the macroeconomic forecasting exercise. Short-term forecasts will be the result of combining information from the MTBE with information drawn from short-term indicators. For more medium-term forecasts, the results of the model should be tested with and supplemented by other variables. Among these variables are indicators of expectations of demand growth and the degree of uncertainty associated with such expectations as well as indicators of companies' financial position, the strength or weakness of which tends to be poorly reflected in aggregate equations, as highlighted above. In this connection, an examination of the balances and the composition of the income statements of non-financial corporations, as obtained in the forecasting exercise, provides an initial indication of the resources on which companies are able to draw when facing capital outlays in each phase of the cycle, in that they serve to highlight the financial constraints under which companies are operating. Factoring business demand and companies' income statements into overall economic forecasts, following the procedures described in other parts of this book, and comparing these data with estimates of their financial accounts represent additional stages in the process of producing final investment forecasts.

5 Final comments and avenues of future research

This chapter and the preceding one provide a detailed review of the tools needed to monitor and forecast the principal components of real GDP from the perspective of expenditure in the private sector, given certain assumptions on the set of exogenous variables relevant to the exercise. As explained in the introduction, this is the most popular approach to analysing the behaviour of an economy and projecting its medium-term performance. Drawing on conjunctural information and statistical forecasting models, it is possible to construct shorter-term forecasts for GDP from the demand side, using available indicators as points of departure. Employing these tools, it is possible to draw up annual and quarterly estimates of the macroeconomic situation, and a breakdown into the various components of demand.

Short-term GDP estimates then need to be compared with and analysed against estimates obtained using supply-side indicators, that is, indicators of value added, to provide a harmonised estimate of output growth over the short term. On a more medium-term horizon, estimates of potential output and the output gap in the economy are also useful tools in corroborating the GDP forecasts built from demand-side analysis.

While the instruments used to monitor and forecast demand are more sophisticated than those available on the supply side, improving and broadening these tools must be an ongoing project. In the case of both consumption and investment, analysis of the impact of agents' financial position remains an area in which further research is needed. The increasing availability of individual data to analyse household and business decisions provides a new field for the pursuit of this type of research.

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Annex 1: Private consumption indicators

Indicator	Units	Source	Freq.	Publication lag	Comments
Synthetic indicator of private consumption (ISCP)	Real index 1998=100	Banco de España	Quarterly Since 1993	Updating as new information on any components becomes available	Broken down into: food, non-food non-durable goods, cars, non-car durable goods and services
Apparent consumption index	Real index 1998=100	Banco de España	Monthly Since 1993	2 months	Broken down into: food and non-food, the latter into durable and other
Retail sales index	Real and nominal index 2001=100	INE	Monthly Since 1995	1 month	Broken down into food and non-food. Specific information is available for large retail outlets
Total expenditure. Average expenditure per household	Current and constant price euro	INE, Household expenditure survey	Quarterly Since 1999	1 quarter	Broken down into: food, beverages and tobacco, and other expenditure. Also offers qualitative information: level of difficulty for households to reach end of month, possibility of earmarking some money for savings and suitability of the present time to make large purchases
Retail trade confidence	Balance between positive and negative replies	European Commission, "Business and Consumer Survey Results"	Monthly Since 1988	Last day of the reference month	Average of: current and future trends in business and level of inventories. The survey includes additional questions
Consumer confidence	Balance between positive and negative replies	European Commission, "Business and Consumer Survey Results"	Monthly Since 1986	1 week	Average of: future situation of households and the country, possibility of saving in the coming months and future changes in unemployment. Survey includes additional questions
Industrial climate, consumer goods	Balance between positive and negative replies	Spanish Ministry of Industry, Trade, and Tourism, «Short-term Economic Survey for Industry»	Monthly Since 1993	Last day of the reference month	Average of: current order book, projected trends in production and level of inventories. The survey includes additional questions
New car registrations (saloons and four-wheel-drive)	Number of registrations	Spanish association of car manufacturers (ANFAC)	Monthly Since 1995	1 day	Breakdowns are available between: sales to individuals and to car rental firms. The Spanish Directorate-General Traffic offers similar data.
Credit to individuals (not for housing purchases)	Euro (nominal value)	BE. Prudential returns (breakdown of credit by purpose)	Quarterly Since 1993	2 months	Break in 1998
Financing for households & NPISHs (not incl. housing purchases)	Euro (nominal value)	BE Euro area statements	Quarterly since 1997 Monthly since 2003	1 month	Including securitised loans

Annex 2: Real fixed capital investment indicators

Indicator	Units	Source	Freq.	Publication lag	Comments
Apparent investment index of capital goods	Real index 1998=100	Banco de España	Monthly Since 1993	2 months	
Industrial climate, capital goods	Balance between positive and negative replies	Spanish Ministry of Industry, Trade, and Tourism short-term economic survey for industry	Monthly Since 1993	1 week	Average of: current order book, projected trends in production and level of inventories. The survey includes additional questions
Industry confidence	Balance between positive and negative replies	European Commission "Business and Consumer Survey Results"	Monthly Since 1987	Last day of the reference month	Average of: current order book, projected trends in production, and level of inventories. The survey includes additional questions
Level of capacity utilisation	Percentage of total plant capacity	European Commission "Business and Consumer Survey Results"	Quarterly Since 1985	Last day of the reference month	
Sufficiency of plant capacity	Balance between responses that consider capacity excessive and those that consider it insufficient.	European Commission "Business and Consumer Survey Results"	Quarterly Since 1985	Last day of the first month of the reference quarter	
Half-yearly industrial investment survey (excluding construction companies)	Rate of change	Spanish Ministry of Industry, Trade, and Tourism	Half-yearly Total: Since 1988 Sectoral: Since 1998	Spring: available in July Autumn: available in January	Quantitative information on nominal investment started and completed, and revisions of earlier forecasts
Half-yearly industrial investment survey (excluding construction companies)	Balance between positive and negative replies	Spanish Ministry of Industry, Trade, and Tourism	Half-yearly Factors: Since 1995 Purpose: Since 1998	Spring: available in July Autumn: available in January	Qualitative information on factors that influence investment and its purposes
Information from the Central Balance Sheet Data Office	Absolute values, indices and rates of change	Banco de España	Quarterly and annual	Quarterly: one quarter	Various information on activity and financial situation of corporations
Industrial vehicle registration	Number of registrations	Spanish Directorate-General of Traffic	Monthly Since 1964	Less than one week	
Credit for productive activities	Euro (nominal value)	BE. Prudential statements (breakdown of credit by purpose)	Quarterly Since 1993	2 months	
Financing for non-financial corporations	Euro (nominal value)	BE. Euro area statements	Quarterly since 1997. Monthly since 2003	1 month	Including securitised loans

Annex 3: Construction indicators

Indicator	Units	Source	Freq.	Publication lag	Comments
Works approvals (College of technical architects)	Number of buildings, housing units and useful surface area in square metres	Spanish Ministry of Development	Monthly	2-3 months	Information is available on new works, rehabilitation, expansion, etc. Breakdown between housing and non-residential building
Major works permits (municipal authorities)	No. of buildings, housing units and useful surface area in square metres	Spanish Ministry of Development	Monthly	5-6 months	Information is available on new works, rehabilitation, expansion, etc. Breakdown between housing and non-residential building
Public tendering proposals	Millions of current euro	Spanish Ministry of Development	Monthly	3-4 months	Breakdown by agent (gen. government and EPEGF) and by type of works (residential, non-residential and civil works)
Index, no. of housing units under construction	Index 1995=100	Sp. Min. of Devel. and Banco de España	Monthly	5-6 months	Obtained from the number of housing starts and completions published by Ministry of Development
Index of surface areas under construction intended for housing	Index 1995=100	Sp. Ministry of Development and Banco de España	Monthly	Leading	Obtained from approvals in t-3 assuming a uniform execution period of 21 months
Periodified surface area for approved housing units	Useful surface in square metres	Ministry of Development and Banco de España	Monthly	Leading	Obtained from approvals in t-3 assuming a uniform execution period of 18 months
ECIC: Value of works executed by the company itself	Millions of current euro	Ministry of Development	Quarterly	4-5 months	Broken down by type of works, into civil works and building; and the latter into residential and non-residential
IPI. Production of other non-metallic mineral products	Index 100. 2000	INE	Monthly	2 months and one week	This category includes most subcategories that were included in the IPI for construction materials that is no longer published
Apparent cement consumption	Metric tonnes	Spanish cement manufacturers (OFICEMEN)	Monthly	3-4 weeks	
Employed persons according to EPA. Construction sector	Persons	INE	Quarterly	1 month	
Social Security participants. Construction sector	Persons	Ministry of Labour and Social Affairs (MTAS)	Monthly	1 week	
Reg. unemployed. Construction sector	Persons	INEM	Monthly	1 week	
Construction confidence indicator	Balance of replies	Eurostat	Monthly	1 week	
Credit for productive activities. Construction sector	Euro (nominal value)	BE. Prudential returns (breakdown of credit by purpose)	Quarterly Since 1993	2 months	

12. Output and the labour market

Ángel Estrada and Mario Izquierdo

1 Introduction

The analytical approaches to different components of aggregate expenditure in the economy are more developed and structured than their counterparts for supply. The information provided by the National Accounts is organised on the basis of Keynesian theoretical models, in terms of consistency and utility in assessing the impact of macroeconomic policies on agents' decisions. Accordingly, estimates on real economic growth in short- and medium-term horizons are based primarily on demand analysis. This approach, however, becomes substantially less valid when we adopt more protracted horizons, as it does not reflect the role of different productive sectors or the productive factor endowment (capital, labour and technology) in determining sustainable production levels, or interactions between all of these factors in the process of cost and price formation, at the aggregate and disaggregate levels.

This chapter emphasises the importance of economic supply conditions. This perspective is fairly widespread in National Accounts systems. In fact, the only approach to the economic supply curve is found in the accounting identity reflected in the economic operating account. Alternatively it can be developed through what is known as the cost table, which makes it possible to link the GDP deflator with average production costs. A basic determinant of the position and slope of the aggregate supply curve is the labour market, whose operation, which is affected by its institutional features, is essential in delimiting potential growth in an economy. As a result, the supply-side approach to economic analysis has been structured around its most important components: productive

TABLE 1 OUTPUT AND LABOUR MARKET. RECENT TRENDS

RATES OF CHANGE (%)

	1995-2000	2001	2002	2003	2004
1. GDP	3.7	2.8	2.2	2.5	2.7
1.1. Net taxes	5.4	1.8	3.0	6.5	4.0
1.2. GVA	3.6	2.9	2.2	2.1	2.6
Market economy	*3.7*	*2.9*	*2.1*	*1.9*	*2.4*
Agriculture	1.8	-2.9	1.7	-1.4	-0.6
Industry and energy	3.9	2.5	0.7	1.3	2.1
Construction	4.8	5.3	5.2	4.3	3.7
Commercial services	3.6	3.2	2.2	2.1	2.5
Non-commercial services	*2.8*	*2.9*	*2.7*	*3.3*	*3.5*
2. Labour market. Market economy (a)					
2.1. Employed persons	3.1	2.5	1.5	1.7	2.5
Employees	*3.9*	*3.1*	*2.1*	*2.5*	*2.5*
Self-employed	*0.5*	*0.4*	*-1.0*	*-1.4*	*2.3*
2.2. Compensation per employee	3.2	3.9	4.0	4.0	3.2

SOURCE: INE (National Statistics Institute).

a. There is a detailed listing by branch of activity for these variables.

activity and the labour market. First, we describe the conditions of supply in the economy from an aggregate standpoint, and its main determinants in the medium term, as we observe in the supply block of Banco de España's quarterly model (MTBE). We then move down to the level of the key branches of economic activity, showing how the productive process can be rationalised based on sectoral production functions. This analysis is carried out for what is referred to as the market economy, that excludes non-commercial activities carried out primarily by the public sector, whose determinants are specific to this sector. In the case of the labour market, the analytical techniques available for short-term monitoring and analysis of the key macro-magnitudes that characterise it in the longer term are described. To that end, we first introduce the key institutional aspects of this market, that are essential in understanding its functioning, and we review the setting of wages and the labour supply, which, along with demand, determine the levels of employment and unemployment. Table 1 provides an overview of the main magnitudes in the National Accounts system that reflect developments in economic activity and the labour market, that will be analysed in this chapter. Last, we shall briefly describe a number of different methodologies used to estimate growth potential and to distinguish among the factors that determine long-term economic growth and its cyclical or medium-term movements, which is the time frame normally used for forecasting exercises.

2 Analysis of supply and activity in the productive sectors

As indicated in the introduction, in the short term, demand determines the level of production in an economy, while the long-term equilibrium level of production is determined by the supply conditions in the productive sectors. As a result of the interaction of these two types of factors, prices and quantities gradually adjust to equilibrium in the medium term. Schematically, we can say that the intersection of notional demand (which is negatively dependent on the price level) and equilibrium production in the economy (which is not affected by the price level) generates a number of price fluctuations that end up adjusting this notional demand to potential output in the economy. The objective of this section is to describe the nature of the mechanisms triggered when discrepancies exist between demand and the level of potential output. To that end, we shall first conduct an aggregate analysis referring to the market economy using the supply block in the quarterly model of the Spanish economy[1]. We will subsequently analyse the relationship between supply and demand in the main activity sectors of the market economy, and will present a number of technological features of these activity sectors. Last, we will review the short-term indicators that make it possible to obtain very short-term projections for each productive sector.

2.1 The supply block in the quarterly model. An aggregate approach

The customary way to rationalise the productive process in an economy is through production functions. A production function is a technical relationship that combines productive factors to obtain a specific output. Where the MTBE is specifically concerned, the representative variable of aggregate production is value added in the market economy[2] and, as a result, only primary productive factors are considered: employment (L^p) and capital (K^p), along with a third non-observable variable known as total factor productivity, which reflects the portion of the increase in value added that cannot be explained by the increase in the productive factor endowment. Accordingly, in the quarterly model, the technical relationship that describes output or value added (Y^p) of the representative firms is expressed as follows:

$$Y^p = A\left(L^p\right)^{1-\beta}\left(K^p\right)^{\beta}\exp\left[(1-\beta)\gamma T\right] \qquad [1]$$

In this Cobb-Douglas production function, there are constant returns of scale and productivity registers a linear trend (T). Parameter A is a scale constant, β is the elasticity of output in respect of capital and γ is the average growth rate in productivity.

The objective of the representative firm is to maximise profits generated in the sale of its products. We assume that the firm has a certain degree of market power, i.e. the demand function of its products is known:

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[1] See Chapter 5.

[2] Value added for the public sector is added independently to compute total value added for the economy.

$$P^p = \left(Y^p\right)^{-\varepsilon} \quad [2]$$

where P^p represents the sale price. Given the production function and demand, the firm will determine its requirements for production factors and the sale prices of its products. Specifically, the two first-order conditions in the optimisation problem solved by the firm (in respect of capital and labour) and the production function itself provide the equilibrium expressions for capital, employment and prices. First, the following equation will be used to determine capital (lowercase letters reflect variables in Neperian logarithms):

$$k^p = (1-\beta)\ln\left(\frac{\beta}{1-\beta}\right) - a + y^p + (1-\beta)\left(w^p - uc^p\right) - \gamma(1-\beta)T \quad [3]$$

where W^p represents wages and UC^p[3] represents the user cost of capital. In this expression, it is easy to see how capital requirements will be greater the higher the levels of demand and wages, and the lower the user cost of capital (substitution effect among productive factors).

Employment demand will be given by the inverse of the production function, to ensure that the production function is satisfied in the long term:

$$l^p = -\frac{1}{(1-\beta)}a + \frac{1}{(1-\beta)}y^p + \frac{\beta}{(1-\beta)}k^p - \gamma T \quad [4]$$

If we consider jointly this expression and the foregoing one, we observe how employment is positively dependent on demand and user cost of capital, and negatively dependent on wages, as we would expect.

Last, as firms have a certain degree of market power, they determine prices *(P^p) as* a mark-up over marginal costs. Further, to reflect the small, open nature of the Spanish economy, we presume that this mark-up is dependent on competitiveness[4]:

$$p^p = (1-\mu)\left[\mu_0 - \ln(1-\beta) - \frac{1}{(1-\beta)}a + \frac{\beta}{(1-\beta)}\left(y^p - k^p\right) - \gamma T + w^p\right] + \mu\, cp^x \quad [5]$$

where CP^x reflects external prices and μ_0 reflects the average mark-up level. We confirm that prices are positively dependently on wages, external prices and the output-capital ratio.

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[3] The user cost I is defined as: $UC^p = P^{ip}\,(R + \delta^{ip} - \Delta p^{ip})$, where P^{ip} is the price of capital goods, R is the nominal interest rate, δ^{ip} is the depreciation rate, and Δp^{ip} is the inflation rate of capital goods.

[4] An increase in external prices makes it possible to increase the mark-up. See Chapter 5 for a more detailed explanation.

The latter ratio reflects a direct positive effect of activity on prices. When demand increases, the stock of capital required to meet this demand is accumulated in time. Prices then adjust upward as a result of the disequilibrium.

There is also an indirect effect of activity on prices, generated through wages, as the latter change when disequilibria occur between demand and potential output[5]. In particular, if wages resulted from a collective bargaining agreement in which employers and workers maximise their objectives (profits and utility for members, respectively), the determination process could be rationalised with the following expression:

$$w^p = w_0 + p^p + \left(y^p - l^p\right) - \lambda\left(U - \overline{U}\right) \qquad [6]$$

where w_0 is a constant, U is the observed unemployment rate and $\overline{U}$ is the equilibrium level of unemployment (considered exogenous). Accordingly, increases in demand reflected in greater employment requirements will lead to a reduction in the observed level of unemployment, generating upward pressure on wages. It is therefore essential to analyse the labour market to determine how prices react to demand shocks. This analysis is provided in Section 3 of this chapter.

As we observe in expression [2], price fluctuations are reflected immediately with changes in quantities demanded, as the result of a convergence to long-term equilibrium.

2.2 A disaggregated approach to supply analysis[6]

The aggregate approach described above corresponds to a model with a single good. In many cases, however, the analysis is enriched considerably with the existence of different branches of activity: for example, we can reflect the different performance of activities exposed and not exposed to competition. To that end, we require a model that uses a disaggregated approach, in which the interaction between supply and demand reflects a similar concept to the aggregate model: to verify that demand is equal to supply, for each activity sector. Therefore, a basic element of the disaggregated analysis is to determine the notional demand addressed by each sector.

To obtain demand for each activity, we begin with the fact that each component of aggregate expenditure (consumption, gross capital formation and exports) is in fact a good composed of value added from different input and production branches for each type of product. We presume that agents attempt to acquire this composite good at a minimum cost. To that end, they solve a minimisation problem that determines the optimal combination of value added in each productive sector and imports for each component of demand. The first-order conditions of this optimisation problem determine demand for consumption, investment and exports directed at each activity sector as a function of consumption, invest-

[5] See the last section of this chapter for an analysis of potential output.

[6] This section discusses the basic method of a future supply model that uses a disaggregated approach by economic sector.

TABLE 2 COMPOSITION OF DEMAND COMPONENTS

Percentage of total expenditure in each component	Private cons.	Gvt. cons.	Capital investment	Construction investment	Other investment	Change in inventories	Exports of goods	Exports of services
Domestic	77.89	89.15	25.76	83.21	80.22	58.67	58.72	85.33
Agriculture	3.63	0.15	0.40	0.37	0.06	-0.97	6.73	0.16
Industry	16.02	7.25	20.40	20.88	4.23	48.34	42.33	6.66
Construction	2.62	1.41	0.11	50.50	5.31	0.22	0.26	0.95
Commercial services	52.77	17.71	4.86	11.45	70.62	11.09	9.40	77.56
Non-commercial services	2.84	62.63	0.00	0.00	0.00	0.00	0.00	0.00
Imports	18.19	7.41	66.27	10.49	12.14	41.07	41.19	10.92
Taxes	11.10	3.44	7.96	6.29	7.64	0.26	0.10	3.76
Non-resident purchases	-8.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Resident purchases	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SOURCE: Banco de España.

ment and aggregate exports, which are given. One way to represent this result is with equations for manufactured goods *(M)* and services *(S)*:

$$VA^{MF} = \omega_C^{MF}\left(P^{MF}/P^{c}\right)^{-\rho_C} C^{p} + \omega_I^{MF}\left(P^{MF}/P^{ip}\right)^{-\rho_I} I^{p} + \omega_X^{MF}\left(P^{MF}/P^{x}\right)^{-\rho_X} X \qquad [7a]$$

$$VA^{S} = \omega_C^{S}\left(P^{S}/P^{c}\right)^{-\rho_C} C^{p} + \omega_I^{S}\left(P^{S}/P^{ip}\right)^{-\rho_I} I^{p} + \omega_X^{S}\left(P^{S}/P^{x}\right)^{-\rho_X} X \qquad [7b]$$

where ω indicates scale parameters, ρ indicates elasticities of substitution between different types of expenditure, and P^c, P^{ip} and P^x are deflators for private consumption, investment and exports, respectively. These analytical expressions make it possible to distribute aggregate demand forecasts among the value-added figures of the economic sectors.

In the long term, the product of relative prices appearing in expressions [7] and the scale constants should converge with the weight of value added of the different sectors and imports in the different expenditure components according to the input-output tables[7]. These weightings are provided in the different columns of Table 2, where eight components of final demand and five activity sectors are identified. As we observe, domestic output has a majority status in all demand components, except capital investment. Within domestic production, commercial services dominate in private consumption, part of investments and service exports; non-commercial services dominate in public consumption, while value

[7] Input-output tables should be converted for that purpose. See Estrada et al. (2004).

added in the industry and energy sector is the majority component in capital investment, change in inventories and exports of goods. As we might expect, value added in the construction sector dominates in construction investment.

Given the notional demands of each branch of activity and given the technology of the representative firm, in maximising profits, sector demand for employment and capital, and prices by sector are obtained. These prices will be positively related to sectoral demand and will also depend on sectoral wages. Given that sectoral wages are not related to sectoral unemployment, but to aggregate unemployment, demand in any of the sectors can ultimately affect prices in the remaining activities.

2.3 Technological features of different activity sectors

Assuming that each branch of activity uses Cobb-Douglas technology with constant returns of scale, as in [1], but subsuming the scale constant and total factor productivity in the same variable, A, we obtain the following result (in logarithmic differences):

$$\Delta va^s = \Delta a^s + (1-\beta)\Delta l^s + \beta\,\Delta k^s \qquad [8]$$

As trends in value added, employment and capital are known, it would be enough to have a calibration of β to obtain an estimation of total factor productivity growth in the factors. Under relatively restrictive conditions (firms are price takers of inputs and there is perfect competition in the product market), the first-order conditions to maximise profits mean that the parameter β equals the share of earned income in value added (S_L^s), from which we can obtain an estimation of total factor productivity growth in factors (known as *Solow's residual*), with the expression:

$$\Delta a^s = \Delta va^s - S_L^s\,\Delta l^s - (1-S_L^s)\,\Delta k^s \qquad [9]$$

Apparent labour productivity is normally used for the technological characterisation of a branch of activity rather than total factor productivity, as estimates of capital stock are normally available with a substantial lag and are only approximate. There is, however, a very close relationship between both concepts of productivity. Using the foregoing expression, we learn that apparent labour productivity is simply the sum of total factor productivity and the weighted capital-labour ratio:

$$(\Delta va^s - \Delta l^s) = \Delta a^s + (1-S_L^s)(\Delta k^s - \Delta l^s) \qquad [10]$$

Tables 3-6 provide some descriptive statistics on the technological features of the main branches of activity in the market economy in Spain as well as their trends in the past two decades. The *share of the agriculture and fishing branch* in value added of the market economy declined by approximately 1.5 percentage points (pp) and is now situated slightly below 5 percent. As we observe in Table 3, average growth in apparent labour productivity was situated at 4.6 percent, although we observe a clear downturn since the beginning of

TABLE 3 DESCRIPTIVE STATISTICS FOR ACTIVITY IN THE AGRICULTURAL BRANCH

Rates of change	1981-1985	1986-1990	1991-1995	1996-2000	2001-2004	1981-2004
Value added	0.32	3.80	-0.74	3.11	-0.82	1.21
PRODUCTIVE INPUTS						
Employment	-3.17	-4.09	-6.21	-1.13	-1.91	-3.36
Capital	2.15	0.51	-0.95	0.48	0.42	0.52
Apparent productivity	3.49	7.89	5.46	4.24	1.10	4.58
Capital-employment ratio	5.32	4.60	5.25	1.61	2.34	3.89
Share of earned income (a)	61.85	54.89	51.64	46.19	47.30	52.59
Total productivity	1.50	5.85	2.98	3.42	-0.13	2.84

SOURCE: Banco de España.

a. Ratio of compensation of employed persons to value added.

the 1990s. This sector has registered a notable increase in capital intensity, with an average increase of 3.9 percent of the capital-employment ratio. Probably for this reason, the share of earned income in value added, most of which dates prior to the mid-1990s, is now below 50 percent. Total factor productivity increased less (an average of approximately 2.8 percent) than apparent productivity, although, as we will observe below, this is the sector that demonstrated the most progress in productivity.

The industry and *energy sector* also lost importance in the overall market economy, declining from 30 percent of value added to 27 percent. Average growth in apparent labour productivity was slightly above 2 percent during these two decades (see Table 4), showing a pronounced deceleration during the latter half of the 1990s. Where the intensity of capital use is concerned, the capital-employment ratio also increased, although to a lesser extent than in the case of agriculture. Even so, the share of earned income in value added increased systematically, to exceed 65 percent. As in the preceding case, total factor productivity increased below apparent productivity (an average of approximately 1.5 percent), showing a clear downturn since the early 1980s.

Construction has gained some importance in the past 20 years. Its present weight in value added in the market economy is 10 percent. Apparent productivity growth was less than 1 percent, and it is one of the branches lagging behind in technological progress, although there has been no appreciable decelerating trend in recent years (see Table 5). In the average for the period studied, this branch showed the smallest increase in the capital-labour ratio, which has remained stable since 1986. This is also the most labour-intensive branch, owing to the substantial weight that earned income occupies in value added. Last, we should point out that average total factor productivity growth is quite similar to that of apparent labour productivity, and in recent years has not shown the downturn observed in the other sectors.

TABLE 4 DESCRIPTIVE STATISTICS FOR ACTIVITY IN THE INDUSTRIAL BRANCH

Rates of change	1981-1985	1986-1990	1991-1995	1996-2000	2001-2004	1981-2004
Value added	0.33	3.96	0.66	3.89	1.62	2.11
PRODUCTIVE INPUTS						
Employment	-3.52	2.51	-2.11	3.05	-0.38	-0.08
Capital	0.88	2.05	1.25	2.15	1.82	1.62
Apparent productivity	3.86	1.45	2.77	0.84	2.00	2.19
Capital-employment ratio	4.40	-0.46	3.36	-0.90	2.20	1.70
Share of earned income (a)	56.87	54.16	62.06	63.09	65.35	60.10
Total productivity	2.03	1.66	1.47	1.19	1.24	1.53

SOURCE: Banco de España.

a. Ratio of compensation of employed persons to value added.

TABLE 5 DESCRIPTIVE STATISTICS FOR ACTIVITY IN THE CONSTRUCTION BRANCH

Rates of change	1981-1985	1986-1990	1991-1995	1996-2000	2001-2004	1981-2004
Value added	-1.57	8.54	-0.84	4.37	4.51	2.94
PRODUCTIVE INPUTS						
Employment	-6.22	9.27	-1.70	5.63	4.07	2.13
Capital	-3.99	3.94	3.33	4.60	4.37	2.37
Apparent productivity	4.65	-0.73	0.86	-1.27	0.44	0.80
Capital-employment ratio	2.22	-5.33	5.04	-1.03	0.30	0.24
Share of earned income (a)	73.25	63.72	71.35	74.62	67.26	70.16
Total productivity	4.11	1.16	-0.57	-1.02	0.34	0.82

SOURCE: Banco de España.

a. Ratio of compensation of employed persons to value added.

Commercial services increased from 54 percent of value added in the market economy in 1980 to 58 percent in 2004. However, it is the sector in which apparent labour productivity has grown the least (see Table 6). Further, if we set aside construction, it is the sector in which use of capital has intensified the least. We observe a downward trend in the share of earned income in value added. Growth in total factor productivity is lowest of all branches considered (it is, in fact, negative during the whole period considered), and we observe a pronounced downward trend in recent years.

TABLE 6 DESCRIPTIVE STATISTICS FOR ACTIVITY IN THE COMMERCIAL SERVICES BRANCH

Rates of change	1981-1985	1986-1990	1991-1995	1996-2000	2001-2004	1981-2004
Value added	1.76	3.87	2.16	3.72	2.48	2.81
PRODUCTIVE INPUTS						
Employment	-0.23	4.58	1.24	3.64	3.09	2.44
Capital	2.35	4.38	4.20	4.60	4.86	4.05
Apparent productivity	1.99	-0.71	0.92	0.09	-0.60	0.37
Capital-employment ratio	2.58	-0.21	2.96	0.97	1.78	1.61
Share of earned income (a)	64.36	63.63	62.55	59.77	58.16	61.84
Total productivity	1.07	-0.63	-0.17	-0.30	-1.34	-0.23

SOURCE: Banco de España.

a. Ratio of compensation of employed persons to value added.

2.4 Short-term indicators

There are many short-term economic indicators to assess trends in value added of different economic branches and to obtain short-term forecasts (1-2 quarters). This section will present a selection of indicators that have proven most useful for that purpose. For each branch, one indicator will be selected as most relevant after prior statistical analysis in order to prepare quantitative value-added projections for this sector. These projections will be fine-tuned with the results from the remaining indicators.

In the case of the *agriculture and fishing sector,* there is no single activity indicator that covers the overall sector. For this reason, Banco de España has prepared a summary indicator (known as the agricultural production index – *índice de producción agraria,* or IPA), that encompasses "periodified" statistics on progress in agricultural output and cattle slaughter, although it does not include fishing owing to the absence of sufficiently current indicators for this activity. Other indicators more indirectly related to value added refer to the use of productive factors in this branch of activity: employment in Social Security register or water catchment facilities[8]. The upper section of Table 7 provides an initial overview of the relationship of these indicators with value added in agriculture and fishing. As we confirm, the IPA shows a higher correlation with value added in the sector (in both annual and quarterly frequencies). As a result, this indicator was selected to obtain quantitative short-term projections with a transference function between value added for the branch and the indicator.

[8] The annex includes a number of tables providing a summary of the key features of the indicators for the remaining economic sectors.

TABLE 7 VALUE-ADDED INDICATORS FOR ECONOMIC BRANCHES

	Sample	Correlations (a)					Coefficient of variation (a)	
		Annual series (b)	Quarterly series					
			4th order difference		1st order difference		4th order difference	1st order difference
		t	t	Max. (c)	t	Max. (c)		
AGRICULTURE & FISHING								
Agricultural output	1996-2002	0.98	0.79	0.82 [t+1]	0.50	0.50 [t]	1.6	2.9
Social Security registrations	1996-2002	-0.33	-0.22	0.65 [t+6]	-0.02	0.54 [t+4]	-1.5	-3.5
Water storage facilities	1996-2002	0.85	0.67	0.67 [t]	0.34	0.34 [t]	3.9	10.6
INDUSTRY & ENERGY								
Industrial production index	1996-2002	0.87	0.82	0.82 [t]	0.69	0.69 [t]	1.4	2.2
Industrial climate indicator	1996-2002	0.64	0.66	0.66 [t]	0.40	0.40 [t]	-316.9	11.6
Social Security registrations	1996-2002	0.72	0.64	0.74 [t+1]	0.42	0.42 [t+1]	1.0	1.1
CONSTRUCTION								
Short-term construction industry survey	1996-2002	0.96	0.98	0.98 [t]	0.96	0.96 [t]	3.9	1.6
Apparent cement cons.	1996-2002	0.87	0.83	0.83 [t]	0.67	0.67 [t]	1.5	1.6
Social Security registrations	1996-2002	0.94	0.88	0.88 [t]	0.63	0.63 [t]	0.6	0.7
COMMERCIAL SERVICES								
Comprehensive summary indicator commercial services	1996-2002	0.98	0.89	0.89 [t]	0.51	0.51 [t]	0.3	0.3
Social Security registrations	1996-2002	0.96	0.89	0.89 [t]	0.61	0.61 [t]	0.3	0.3

SOURCE: Banco de España.

a. Calculated with seasonally adjusted series.
b. For series with data, at least from 1990. First series difference in logarithms.
c. Gap between the indicator and CNTR (Quarterly National Accounts) variable for which the correlation is maximum.

For the *industry and energy sector,* the foremost indicator is the industrial production index *(índice de producción industrial* – IPI). The main advantage of this indicator is that it reflects activities in the overall sector, while entailing the disadvantage that it refers to gross production rather than value added; to the extent that, in the short term, intermediate consumption maintains a stable relationship with output, it can be considered a good short-term indicator. The industrial climate indicator *(indicador de clima industrial* – ICI) is also important. It is based on the results of opinion surveys and therefore is a qualitative indicator. The industry turnover index *(índice de cifras de negocio de la industria* – ICN) and the incoming orders index *(índice de entradas de pedidos* – IEP) have recently been introduced and therefore have yet to be properly analysed in terms of their quantitative relationship

with value added. From the standpoint of productive factors used to generate value added, information on social security employment is included. Table 6 provides the correlations between value added in the branch of activity and the main indicators. As we might expect, The IPI is the most effective indicator, as it provides the basis for preparing quantitative projections.

The *construction* sector is characterised by the many short-term indicators it includes. Generally speaking, these indicators or estimators are normally classified as flash and contemporaneous. We should bear in mind that value added in each quarter reflects the value of that portion of works in progress completed during the period, regardless of when they started. Flash estimators are so named because they reflect the start of the construction activity. As the completion of works normally requires a construction period exceeding one quarter, the value added is assigned to each quarter to reflect the percentage of the works completed during the period. This implies that, to synchronise the flash estimators with value added in the sector, execution schedules must be applied to work starts so that more forward-looking trends in value added can be projected. The most relevant flash estimators are approvals from works authorities and licences granted by the municipalities, broken down into residential and non-residential building and rehabilitation; and public tendering procedures, broken down into building and civil works.

Contemporaneous indicators in construction reflect trends in this branch of activity at each point in time, without requiring periodification. The most important indicator, that covers all activity in the sector, is the short-term construction industry survey *(encuesta coyuntural de la industria de la construcción* – ECIC), with quarterly periodicity. Other indicators reflect the use of intermediate consumption and production factors by this branch, such as apparent cement consumption or social security employment. The middle section of Table 6 provides the correlation of these value-added indicators with value added for the branch of activity. As we confirm, the highest correlation, that is also contemporaneous, is registered by the ECIC, although the other two indicators also register quite favourable performance. For this reason, the ECIC is the indicator selected to formulate the transference function, which is used to prepare short-term predictions. Given that the ECIC is published with a relative lag, however, projections of this indicator are normally obtained using cement consumption, which in turn are used to project value added, thus allowing for more current information.

Last, activity indicators in *commercial* services are characterised by their fragmentation. In recent years, the INE has made a substantial effort to provide uniform information for the branch having the greatest weight in the market economy. The result of this effort has been the publication of the service sector activity indicator *(indicador de actividad del sector servicios* – IASS), which weights information on the turnover in each of the constituent secondary branches. Although we can expect this indicator to move into the forefront over time, we do not currently have a sufficient history as to how it can be used in statistical analysis. For this reason, Banco de España continues to prepare the comprehensive summary commercial services indicator *(indicador sintético integral de los servicios de mercado* – ISIS), that combines information from retail sales indices, overnight hotel stays, transportation indices and data on employment in those subsectors in which there is no direct information on output. Another important indicator is participation in social security. As we

observe in Table 6, the summary indicator and participations register a high degree of correlation with value added, and the first of these is introduced in the transference function used to prepare the short-term projections.

3 Labour market

In this section we shall address analysis of the labour market from the standpoint of its forecasting and the monitoring of its key magnitudes, which are a fundamental part of economic supply. In addition, the overall diagnosis of the operation of the labour market, based on a number of different indicators and analytical techniques, is addressed in Chapter 19. Before we begin to describe the different key indicators and tools available to analyse trends in the key magnitudes of the labour market, however, we should review the institutional factors that determine its operation and the course of the adjustment processes occurring within it. The analysis of the labour market is based on more predetermined factors, at least against a medium-term backdrop, such as wages and labour supply, moving to more endogenous variables such as employment and unemployment, defined in this case as the market adjustment variable. Each section will first introduce the available short-term indicators and will subsequently present the analytical tools used in medium-term analysis.

3.1 Institutional factors

The institutional factors of the labour market are of vital importance, not only to understand its operation, but to assess the efficiency of supply in an economy. The existing rules for collective bargaining, for example, to a large extent determine how wages will react to different shocks that may affect the economy. Similarly, the level of employment protection directly affects corporate recruitment and dismissal decisions in light of an increase or decrease in their demand. Before describing the indicators and key tools available to analyse trends in employment, wages, or unemployment, we should therefore review the main institutional features that characterise the labour market in Spain. Among the most representative institutions, we observe the importance of collective bargaining, which establishes wage conditions for most employees *(asalariados),* recruitment and dismissal mechanisms that establish the conditions for entering and leaving employment, intermediation mechanisms and unemployment benefits, that affect movements of workers between employment, unemployment and inactivity.

The *collective bargaining system* in Spain is governed by the principles of the Workers' Statute *(Estatuto de los Trabajadores* – ET) of 1980. Among the basic characteristics that define the system, we find, first of all, the criteria to assess union's representation, based on electoral proceedings, making it possible to establish the most representative form of the union, that gives it legitimacy to participate in negotiations. Second, the principle of general automatic efficacy establishes that any agreement that exceeds the framework of the firm must be applicable to all firms and to all workers in the geographic and sectoral framework involved, even if they have not participated in the bargaining process. Last, "ultra-activity"

in agreements means that they will be indefinitely extended until a new agreement is signed. There has been little change to this bargaining system with the two reforms during the 1990s, which had a very limited impact on their operation[9].

The general principles of collective bargaining have led to the configuration of a system characterised by virtually total coverage of the group of employees, making the analysis and monitoring of their results a central component in understanding wage trends. This system is dominated by agreements whose framework exceeds the firm, in particular, agreements of a sectoral scope negotiated at the provincial level. In terms of the wage formation process, the system is characterised by offering some substantially uniform wage increases by branch of activity, related to trends in inflation and having little to do with the specific circumstances of the firm or activity. In addition, the generalised existence of safeguard clauses against upturns in inflation increases the nominal inertia of the system, enabling temporary price shocks to be reflected in wages.

Where *contracting mechanisms* are concerned, a wide variety of labour contracts now exists in Spain, entailing a variety of allowances for contracting with specific groups of workers, in some cases also entailing different costs for termination of labour contracts. Table 3 of the annex provides a summary of the main available contracting mechanisms, potential groups for each type of contracting and the dismissal costs involved. Basically, the main distinction is established between indefinite contracts and temporary contracts. The former include regular contracts and those intended to promote indefinite contracting, introduced in 1997, which entail lower levels of severance pay should the worker be dismissed for factual cause[10]. Where temporary contracting is concerned, the current legislation restricts its use to non-permanent tasks in the firm and training activities. However, owing to the difficulty in verifying the specific use of each contract and its application to temporary or indefinite activities, these restrictions are, in practice, more formal than real.

The tendency to use temporary contracts is linked to substantial differences between indefinite contracts and temporary ones in the event of termination. Indefinite contracts are subject to greater protection, in terms of economic compensation entitlements and the legal guarantees associated with the dismissal process. On the other hand, temporary contracts expire at the end of their term with a lower economic cost and without requiring any legal procedure. On the whole, the different contracting mechanisms with different termination costs have produced a labour market in which there are more temporary workers than in other European countries, with these levels remaining above 30 percent despite the different reforms carried out to reduce them. This market entails a dual structure. While flows of workers between the different situations (employment, unemployment, or inactivity) are high with a

[9] The ET reform approved in 1994 attempted to broaden the contents of collective bargaining and to encourage decentralisation, while in 1997 social agents signed the Interconfederal Agreement on Collective Bargaining *(Acuerdo Interconfederal sobre Negociación Colectiva),* aimed at enhancing coordination in the negotiation mechanism.

[10] In most cases, these contracts are subject to substantial subsidies (in the range of 25-100 percent) in respect of employer contributions to social security, depending on the population group, during the first two years the contract is in effect.

magnitude similar to countries having more flexible labour markets, such as the U.S. and the U.K., these flows are concentrated with workers holding temporary contracts. By contrast, fewer workers tend to move to unemployment situations when they have fixed contracts. Once they enter this situation, however, the probability of exiting is also quite low[11].

Last, the main element of the intermediation system between supply and demand for labour in Spain is the National Employment System, which is comprised of the state Public Employment Service and the respective public services in the regional (autonomous) communities (Comunidades Autónomas). This system also offers coverage for unemployed persons seeking jobs, through a contribution-based system of unemployment benefits and an assistance system, and is responsible for implementing public employment policies, aimed primarily at improving the capacities of integration into the labour market for groups experiencing the greatest difficulties. The coverage system is a contribution-based system, i.e. it is financed with contributions from employers and employees, and it provides income for unemployed workers when they leave their jobs for reasons beyond their control. This system offers coverage of one day of benefits for every four contributed, and the maximum duration of benefits is two years[12]. Under the assistance system, coverage of the benefit system can be extended for a further period of 6-18 months, in cases where there is no other income, for specific groups of unemployed persons, depending on their age and family responsibilities[13].

Unemployment benefits theoretically serve as insurance for workers so that, if they should lose their jobs, they are assured an income to enable them to look for a new job more efficiently. However, if the duration or quantity involved is excessive, this can have negative effects on the intensity of the job search and reduce the probability of exiting unemployment. For example, Bover *et al*. (2002), use the data from individual EPA files to estimate duration models for the probability of exiting unemployment. From this analysis, we learn that unemployed persons who receive INEM benefits are less likely to exit their unemployment situations. This negative effect of benefits on the probability of exit is also substantial. In addition, if we make the distinction between temporary and indefinite job exits, we find that unemployment benefits have a more intense negative impact in the case of indefinite employment exits[14].

3.2 Wages

The variable used in the National Accounts to reflect trends in wage costs per person is compensation per employee (see Table 1). For analysis of short-term trends in this variable, two short-term indicators are basically used. First, the statistic on collective bargaining arrangements from the Ministry of Labour and Social Affairs (MTAS) provides information with monthly periodicity on collective bargaining agreements registered with the Ministry

[11] See Estrada et al. (2002).

[12] With a minimum requirement of one year of employment to be eligible for benefits.

[13] In the case of unemployed persons over 52 years of age, this benefit can be extended until retirement age.

[14] The majority of persons who exit unemployment do so with temporary jobs. See Bover and Gómez (2004).

of Labour. This information includes wage increases agreed in the collective bargaining process by economic branch of activity, making the distinction between newly-signed and revised agreements signed in earlier years. As collective bargaining covers virtually the whole group of employees, this indicator offers very useful information on the wage formation process. Among the main advantages, we observe its monthly periodicity, its rapid availability and its overall coverage of the market economy. In addition, by providing information on wage increases agreed in arrangements valid for a number of years (with increasing frequency), this source is providing some indications on future wage trends.

However, the statistic on collective bargaining agreements is not a complete indicator of trends in compensation per employee in National Accounts, as wage increases generally reflect a drift in respect of increases agreed in collective bargaining arrangements, and remuneration includes other non-wage costs not covered by the agreements. The quarterly labour cost survey *(Encuesta Trimestral de Coste Laboral* – ETCL), prepared by INE, provides information on this set of wage and non-wage concepts, with a quarterly periodicity and breakdown by economic sector, although it does not cover the agricultural sector or non-commercial service activities. Non-wage costs include contributions to social security covered by the employer and unemployment contributions, as well as other payments such as severance pay and further social benefits. The wage drift includes the effects on aggregate wages of the composition of employment (employment entries and exists of groups of individuals with different wage levels) and other wage payments not linked to average wage increases negotiated in collective bargaining agreements, such as payments for productivity, raises, or promotions. Further, there is a wage indicator for agriculture known as agricultural wages and salaries, published by the Ministry of Agriculture, with monthly periodicity.

Table 8 provides the relationship between wage and salary indicators and compensation per employee in the National Accounts (CN), by economic sector (the level of forecasting). For the market economy, forecasting is obtained by aggregation of projections by branch[15]. In general, the correlations between indicators and the CN aggregate are quite high, and in some cases they exceed 0.90, particularly in the annual series. In all activities, the indicator selected to estimate the transference function used to prepare short-term projections is the ETCL (and the agricultural wage and salary indicator, for agriculture). Although the increases established in agreements show a substantial correlation with compensation per employee, they do not include all wage items and their presentation in the form of annual increases reduces their value in dynamic analysis.

From a medium- and long-term standpoint, wage trends are analysed based on equations reflecting performance of compensation per employee in the quarterly macroeconometric model. As discussed in the second section of this chapter, the wage equation reflects a wage bargaining model in which firms and unions negotiate workers' wages and the level of employment is decided later by firms. Accordingly, the wage equation can be written as follows:

[15] Forecasting for the non-commercial service sector is discussed in Chapter 9.

TABLE 8 WAGE AND EMPLOYMENT INDICATORS BY ECONOMIC BRANCH

	Sample	Correlations (a)					Coefficient of variation (a)	
		Annual series (b)	Quarterly series					
			4th order difference		1st order difference		4th order difference	1st order difference
		t	t	Max. (c)	t	Max. (c)		
Agriculture and Fishing								
Wages								
Agricultural wages	*1991-2002*	*0.82*	*0.81*	*0.81[t]*	*0.69*	*0.69[t]*	*0.4*	*0.6*
Collective bargaining agreements	*1991-2002*	*0.58*	*0.51*	*0.51[t]*			*0.4*	
Employment								
Social Security	*1991-2002*	*0.77*	*0.64*	*0.64[t]*	*0.12*	*0.12[t]*	*1.3*	*1.7*
Labour force survey	*1991-2002*	*0.88*	*0.87*	*0.87[t]*	*0.88*	*0.88[t]*	*1.0*	*2.6*
Industry and energy								
Wages								
Labour cost index	*1991-2002*	*0.94*	*0.92*	*0.92[t]*	*0.82*	*0.82[t]*	*0.4*	*0.4*
Collective bargaining agreements	*1991-2002*	*0.97*	*0.95*	*0.95[t]*			*0.4*	
Employment								
Social Security	*1991-2002*	*0.04*	*0.92*	*0.92[t]*	*0.80*	*0.8[t]*	*7.5*	*9.2*
Labour Force Survey	*1991-2002*	*0.95*	*0.95*	*0.95[t]*	*0.91*	*0.91[t]*	*9.5*	*9.4*
Construction								
Wages								
Labour cost index	*1991-2002*	*0.92*	*0.90*	*0.9[t]*	*0.75*	*0.75[t]*	*0.2*	*0.2*
Collective bargaining agreements	*1991-2002*	*0.97*	*0.91*	*0.91[t]*			*0.5*	
Employment								
Social Security	*1991-2002*	*0.96*	*0.94*	*0.94[t]*	*0.81*	*0.81[t]*	*2.7*	*2.6*
Labour force survey	*1991-2002*	*0.99*	*0.99*	*0.99[t]*	*0.96*	*0.96[t]*	*2.2*	*2.5*
Commercial services								
Wages								
Labour cost index	*1991-2002*	*0.75*	*0.71*	*0.75[t+2]*	*0.42*	*0.42[t]*	*0.4*	*0.7*
Collective bargaining agreements	*1991-2002*	*0.98*	*0.94*	*0.94[t]*			*0.4*	
Employment								
Social Security	*1991-2002*	*0.92*	*0.88*	*0.88[t]*	*0.65*	*0.65[t]*	*0.5*	*0.6*
Labour force survey	*1991-2002*	*0.90*	*0.87*	*0.87[t]*	*0.77*	*0.77[t]*	*0.9*	*1.1*

SOURCE: Banco de España.

a. Calculated with seasonally adjusted series.
b. For series with data, at least from 1990. First series difference in logarithms.
c. Gap between the indicator and CNTR (Quarterly National Accounts) variable for which the correlation is maximum.

$$\overline{w}^{p} = w_0 + p^{p} + (y^{p} - l^{p}) + \phi tw + \varphi(p^{c} - p^{p}) + \lambda(\rho U - s\ RU) \qquad [11]$$

Where *tw* is the fiscal gap, i.e. the tax burden on the labour factor, comprised of social contributions and income tax, and p^c is the private consumption deflator. We presume that the alternative wages that workers would obtain if they left the firms is a weighted average of average wages in the economy and unemployment benefits, weighted to reflect the unemployment rate *(U)*. According to this equation, real wages would vary directly with productivity, the fiscal gap and the difference between consumer and basic prices; and inversely with unemployment.

Table 9 provides the estimated equations. In light of theoretical specification [11], in the long term, of the estimated equation, the difference between trends in consumer prices and basic prices was not found to be significant. On the other hand, the fiscal gap coefficient is constrained to be unity. The wage response coefficient to unemployment is estimated at −0.42, which implies a high level of real rigidity as compared with other countries. In addition, a unitary coefficient is imposed for the productivity effect. In the dynamic specification, estimated by instrumental variables, we obtain a significant coefficient for the error correction mechanism. The appearance of an autoregressive term indicates a certain inertial performance of wage increases, although the estimated coefficient is not very high. This inertia is also observed in the fact that delays in changes in consumer prices are substantial. In the short term, the wage response to increases in productivity is less than unity, while the contemporaneous response of wages to price increases is significant.

To interpret the results derived from the wage equation, it is useful to analyse the contribution to wage growth of each of the variables included in the estimates. Chart 1 shows that the equation adjusted the observed performance of compensation per employee reasonably well, although we detect some tendency toward over-prediction in recent years. The nominal component included in the equation explains much of the wage moderation observed during the 1990s, although unemployment also contributed to wage moderation during the first half of the decade. Beginning in 1998, however, the effect became positive as a result of wage pressures derived from the sharp decline in unemployment that occurred during the previous years. The combined effect of the rest of the variables included in the regression was negative during most of the decade, reflecting the favourable effect on wage moderation of the performance of variables such as the fiscal gap.

3.3 Labour supply

The labour supply is comprised of persons prepared to participate in the labour market, that is, those who are working and those without employment, but who are actively seeking work. This sector of the population is known as the labour force. The main indicators available to monitor developments in the labour force are derived from the labour force survey *(Encuesta de Población Activa* – EPA). To analyse participation decisions we normally calculate the activity rate (or participation rate) as the quotient of the labour force and the pop-

TABLE 9 EMPLOYMENT AND WAGE EQUATIONS (MTBE) (a)

Long term:

1) $$\bar{l}^p = -1.10 - 0.002\,PTF + 1.56\,y^p - 0.56\,k^p$$

2) $$\bar{w}^p = -0.80 + 0.08\,D84 + \left(p^p + y^p - l^p\right) - 0.42\left(U - 0.03RU\right) - \left(tw\right)^r$$

Dynamic specification:

1) $$\Delta l^p = \underset{(-4.50)}{-0.00} + \underset{(-)}{0.10}\,\Delta\left(l^p_{-1}\right)^r + \underset{(8.59)}{0.65}\,\Delta y^p + \underset{(3.40)}{0.18}\,\Delta y^p_{-4} - \underset{(-3.27)}{0.13}\,\Delta\left(w^p - p^p\right) - \underset{(-5.70)}{0.13}\,\Delta\left(l^p - \bar{l}^p\right)_{-1}$$

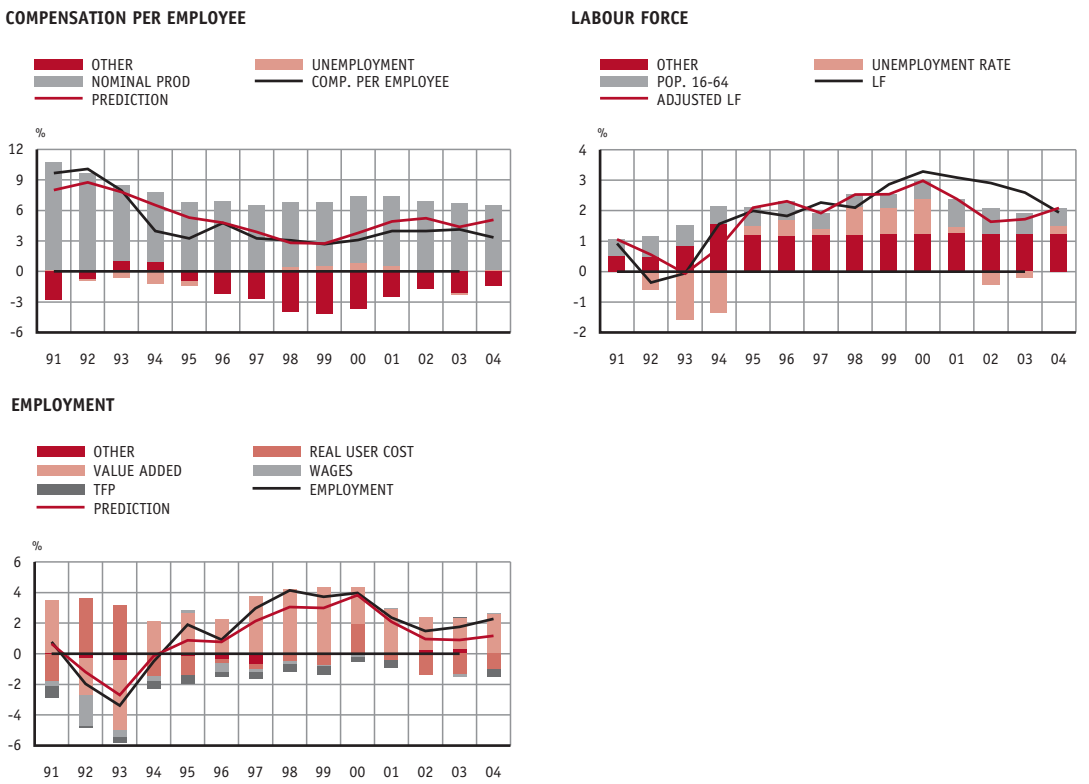
2) $$\Delta w^p = \underset{(0.76)}{0.00} + \underset{(1.18)}{0.13}\,\Delta w^p_{-1} + \underset{(4.24)}{0.47}\left(0.5\Delta\,p^p + 0.5\Delta\,p^c + \Delta y^p - \Delta l^p\right) + \underset{(1.97)}{0.28}\,\Delta\,p^c_{-2} - \underset{(-0.86)}{0.19}\,\Delta U_{-3} - \underset{(-2.34)}{0.10}\left(w^p - \bar{w}^p\right)_{-1}$$

Where:

l^p = persons employed, private sector	w^p = compensation per employee in the private sector
PTF = total factor productivity	y^p = real private sector value added
k^p = real private productive capital stock	p^p = value-added deflator, private sector, not including taxes
U = unemployment rate (EPA)	p^c = private consumption deflator
RU = unemployment replacement ratio = $U^b\frac{(1\text{-}td^u)}{w^pU^p(1\text{-}td^e)}$, where U^b is the unemployment benefit, td^u is the direct taxation rate for unemployed persons, td^e is the direct taxation rate for employees, and U^p is the number of unemployed persons	**tw** = tax wedge = $(1 - td^e)\left(1 - \frac{tc^e}{1+tc^e}\right)(1 + tc^a)$, where tc^e = contribution rate of employees and tc^a = contribution rate of employees
D84 = artificial scale variable from 1984.I.	

a. Variables in lowercase are expressed in logarithms. The superscript "r" indicates that the parameter is restricted in the estimation. Bar variables ($\bar{x}$) denote long term. Estimated using seasonally adjusted quarterly series for the period 1980.I-1998.IV. Parentheses are used for t-statistics. For further details, including the dependability checks for model adjustment, see Estrada et al. (2004).

CHART 1 CONTRIBUTION TO GROWTH OF EACH VARIABLE ACCORDING TO THE MTBE



SOURCE: Banco de España.

ulation over 16 years of age, as it is illegal to participate in the labour market under this age. The activity rate measured using this procedure was situated at 55 percent in 2003. In international comparisons, however, it is customary to calculate the activity rate with reference to the population 16-64 years of age, which raises the level to 68.5 percent during the same year.

In comparison with other European countries, the Spanish participation rate is still fairly low and far from the objectives European policy has established in the area of employment. This rate, however, has maintained an increasing trend, having risen nearly 8 percentage points during the period 1990-2003, primarily as a result of the gradual incorporation of women into the labour market. The female participation rate increased approximately 15 percentage points during the period, while the male participation rate remained stable. Despite this substantial growth, the female activity rate was still 9.2 pp below the 2002 rate representing the EU at an earlier stage.

Another factor behind the rising trend in labour participation in recent years is immigration. The foreign population accounted for 6.24 percent of the total population in 2003, ac-

cording to data from the population register. By contrast, the EPA – a survey that entails some difficulties in adequately incorporating immigration – indicates that 4.8 percent of the working-age population was foreign during the first quarter of 2004, as against 1.1 percent for first-quarter 2000, for example. In addition to increasing the overall population, the immigrant population has a proportionally more intense effect on the labour market magnitudes, as the main reason for immigration is normally employment, and immigration accounts for a greater level of participation in the labour market. The activity rate of the foreign population is 75.8 percent – 78.2 percent when measured in relation to the population 16-64 years of age – clearly higher than the rate of 54.7 percent or 68.6 percent, observed, respectively, for the Spanish population.

These factors presume a structural change to a higher level of participation in the labour market that is difficult to include explicitly in the econometric specification adopted in the MTBE. The approach used to model the active population in fact is fairly simple, as it follows an equation such as the following:

$$nf = h_0 + h_1\, trend + pop1664 + \kappa(\rho\, RU - U) \qquad [12]$$

where *nf* is the labour force, which is positively dependent on the population of working age[16] *(pop*1664) and on the difference between the market wage and a reserve wage. To reflect developments in this difference, we include in this equation the replacement ratio of unemployment benefits *(RU)* and the unemployment rate *(U)*. Including the latter variable enables cyclical factors that increase (reduce) the rate of employment to increase (reduce) labour participation. By contrast, it enables structural factors, that impact the unemployment equilibrium rate, to affect labour participation decisions as well. Last, the aim is to reflect the effects of the factors discussed above, such as greater women's participation and immigration, with the inclusion of artificial (trend) variables. As we observe in the second section of Chart 1, the model reflects the positive effects on labour participation of the increase in the working-age population and reduction in unemployment that occurred during the latter half of the 1990s. In addition, the relevance of another series of factors is clear, and can only be reflected by the model with the inclusion of artificial variables to explain observed growth in the labour force.

3.4 Employment

Where employment is concerned, short-term monitoring is still primarily carried out through monitoring of information from the EPA and the register of Social Security. Although this section focuses on analysis of the number of employed persons and the composition of this group, provided by the EPA, and its relationships with the National Accounts magnitudes, the information on employees and self-employed workers provided by Social Security participation records is also used in forecasting the number of wage earners in the National Ac-

[16] We observe that a unitary coefficient has been imposed for this variable, which is equivalent to modelling the activity rate.

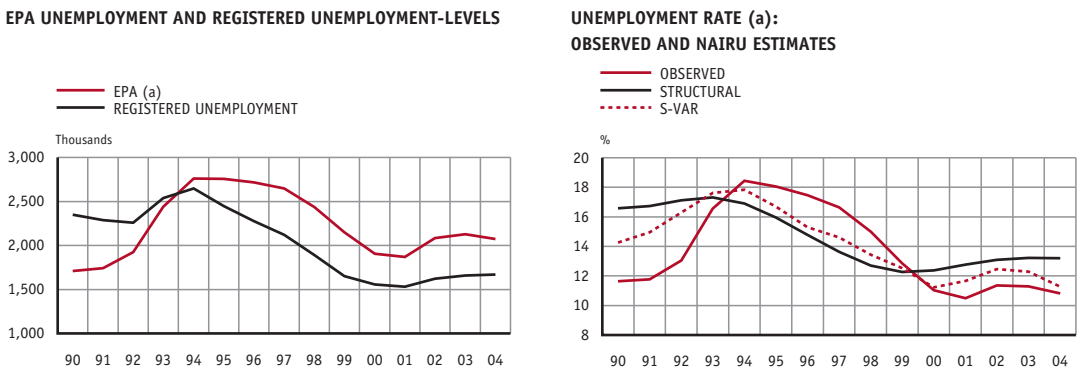
counts. The EPA is available approximately one month after the end of the corresponding quarter, one month ahead of the publication of the National Accounts figures. The social security register provides monthly information in the total number of employees in different social security regimes, covering practically all of the economy, except the group of civil servants. Its main advantage is rapid availability as the monthly figures are published the second business day of the month following the month to which the data refer.

As is true for wages, employment projections are carried out by branch of activity. Table 8 shows the correlations between employment indicators and National Accounts magnitudes: as we observe, the correlations of the annual series clearly exceed 0.90, except in the case of agriculture, while they are somewhat smaller in the quarterly series, particularly in the quarter-on-quarter rates. In any case, the relationship between the indicators with employment in the National Accounts is substantial, being somewhat higher in the case of the EPA than for social security data; by sector, we observe the substantial correlation in industry and construction. Although the indicators from the EPA are those selected to prepare short-term projections for employment magnitudes in the CN, the monthly data on Social Security employment are used to predict the EPA figures before applying the estimated transference functions between EPA and the National Accounts.

In the medium and long term, employment forecasting is based on the MTBE. In the second section of this chapter, we showed the specification of the employment equation [4] based on the inverse of the production function. The results obtained in estimating this equation are shown in Table 9. In the estimation of the long-term relationship, elasticity of output with respect to employment 1-β was calibrated using the average value of the participation of earned income in total output, 0.64. Further, we estimate an average annual total factor productivity growth of 0.8 percent (0.2 percent quarter on quarter). Last, in the estimation of the dynamic relationships between variables conducted as in the case of wages using instrumental variables, we observe, as expected, that employment responds positively to changes in output, contemporaneous and delayed four quarters, and negatively to increases in real wages. The coefficient of the error correction mechanism is found to have an adequate sign and to be significant, and the autoregressive term of employment is imposed in the equation to prevent substantial responses attributable to short-term employment.

As in the case of wages, the equation in the model makes it possible to calculate the contributions to growth in employment in more recent years. This information is presented in the third section of Chart 1. First, we observe how the equation adequately reflects trends in employment during the 1990s, although, unlike wages, in this case, we observe some degree of under-prediction in the latter periods. The scale variable – value added or real output – explains much of the trends in employment. We also observe that real wages contributed to the substantial job creation through reduced growth during the latter half of the 1990s, which obviated during that period the negative effect observed in the early years of the past decade. Further, the substantial reduction in the real user cost of capital, derived from the observed reduction in interest rates, assumed a relative increase in the cost of employment in respect of capital, which contributed negatively to job creation.

CHART 2 UNEMPLOYMENT, UNEMPLOYMENT RATE AND NAIRU



SOURCES: INE, National Employment Institute and Banco de España.

a. The EPA unemployment series has been linked by the *Servicio de Estudios* of Banco de España.

3.5 Unemployment

Unemployment is one of the basic indicators of the well-being of a country's citizens. For this reason, it is important to define what unemployment means. A generally accepted definition is that a person who does not have a job during a certain reference period, who is available to work and who is actively looking for work is unemployed. Given this definition, it is clear that not all persons who do not work are unemployed, but only those who are actively seeking work. Owing to this requirement to make the distinction between persons depending on the intensity of the job search, the estimated number of unemployed persons is normally based on surveys. In Spain's case, the EPA is the basic source for monitoring unemployment. Another frequently cited source is registered unemployment from an administrative register managed by the National Employment Institute (INEM). In the case of the EPA, individuals are classified as unemployed in accordance with their replies to a broad battery of questions. Where registered unemployment is concerned, registration is voluntary, although it is a requirement for receiving unemployment subsidies[17].

Chart 2 shows trends in the number of unemployed persons in recent years according to the EPA and registered unemployment. We note that the profiles of both statistics are similar. In fact, the contemporaneous correlation between the two series is almost 0.9. However, the level of unemployment under the EPA has been higher than registered unemployment since 1994. This is true because registered unemployment excludes broad groups that theo-

[17] According to the EPA, referral of an individual to the public employment office is not itself a sufficient reason to consider the person to be unemployed.

TABLE 10 TRENDS IN THE EPA UNEMPLOYMENT RATE

IN PERCENT

	2001	2002	2003	2004	2003				2004			
					Q I	Q II	Q III	Q IV	Q I	Q II	Q III	Q IV
Unemployed persons Year-on-year rates (a)	-1.9	11.4	2.1	-2.5	4.9	2.9	0.4	0.4	-0.8	0.4	-3.9	-5.6
Unemployment rate	10.5	11.4	11.3	10.8	11.7	11.1	11.2	11.2	11.4	10.9	10.5	10.4
BY GENDER												
Men	7.5	8.0	8.2	7.9	8.4	7.9	8.1	8.2	8.4	8.0	7.9	7.6
Women	15.2	16.4	15.9	14.9	16.7	15.8	15.6	15.6	15.7	15.2	14.4	14.4
BY AGE												
16-29 years of age	16.8	18.0	18.0	17.0	18.7	17.6	17.7	18.0	18.1	17.2	16.7	16.2
30-44 years of age	8.9	9.8	9.9	9.6	10.2	9.9	9.8	9.8	10.2	9.7	9.2	9.3
45 years of age and over	6.6	7.3	7.2	7.2	7.5	6.9	7.1	7.1	7.2	7.2	7.1	7.1
BY EDUCATION (b)												
Elementary education	11.0	12.1	12.3	12.3	12.5	11.9	12.3	12.4	12.5	12.5	12.5	11.8
Middle education	11.1	12.0	12.0	11.4	12.5	12.0	11.6	11.8	12.2	11.7	11.0	11.0
Higher education	8.0	8.7	8.4	7.7	8.8	7.8	8.7	8.4	8.2	7.4	7.7	7.5
L-T UNEMPLOYMENT												
Incidence (c)	40.4	37.5	37.1	35.6	37.3	36.9	36.9	37.1	36.3	36.2	34.6	35.4

SOURCES: INE and Banco de España.

a. Homogenous series from the *Servicio de Estudios* of Banco de España.
b. Lower: no studies or primary education; higher: university and other.
c. Weight in total unemployed persons who have been unemployed for more than one year.

retically are included in the EPA[18]. For this reason, the estimates of unemployment according to the EPA are considered most appropriate.

Although the number of unemployed persons existing at a given time is an important magnitude, it is normally relativised through division by the active population producing the ratio known as the unemployment rate. The unemployment rate reflects a contracyclical trend, i.e. it increases when economies enter recession and declines when they begin to expand. Further, unemployment does not equally affect different groups comprising the labour force. Table 10 shows the breakdown of the Spanish unemployment rate by gender, age and education. As we observe, the unemployment rate is much higher among women, younger persons and those having lower levels of education. Another important dimension of unemployment analysis refers to its duration, as greater difficulties are normally detected in exiting unemployment in persons who have spent more time unemployed. Specifically,

[18] This is the case of students over 16 years of age, individuals seeking employment with specific features, (schedules of less than 20 hours or duration less than three months) and subsidised farm workers.

we consider long-term unemployed persons those who have been unemployed for more than one year, and the percentage of these persons represented in total unemployed persons is the incidence of long-term unemployment. As we observe in the table, in Spain's case, the ratio is below 40 percent, although in the past it has exceeded 50 percent.

For a more thorough analysis of trends in unemployment, we should make the distinction between its long-term component and short-term trends around this equilibrium level. The long-term component is identified as the non-accelerating inflation rate of unemployment (NAIRU). The NAIRU is non-observable and therefore must be estimated; Chapter 3.2 of this book presents alternative methods for that purpose. As indicated in that chapter, both methods provide substantially similar methods of estimation. Accordingly, this section will focus only on the estimation deriving from price and wage equations of the MTBE, making it possible to determine the contribution of determinant factors of the NAIRU to its developments.

As we observe on the right hand side of Chart 2, the NAIRU of the Spanish economy, which was above 17 percent at the beginning of the 1990s, registered a sharp decline beginning in 1993, one year before the observed unemployment rate began to decline. This reduction process continued until 1990, when structural unemployment stabilised at around 12 percent, remaining relatively stable thereafter. Table 10 shows explanatory factors of NAIRU trends. These factors affect the labour supply (replacement ratio and rate of social security contributions) and labour demand for firms (mark-up). Accordingly, an increase in mark-ups presumes that that employment demand is lower for the same real wage level. The replacement ratio is defined as the percentage or workers' wages represented by unemployment benefits. As a result, increases in this ratio presume an increase in alternative income for the unemployed, thereby reducing the incentives to work. Last, effective rates of social security contributions determine the difference between the labour cost paid by the firm for a given worker and the wage that he or she collects, so that increases in the relevant taxes will, if the labour cost paid by the firm is not adjusted, lower the wages collected by the worker, therefore once again reducing the incentives to work.

During the 1990s, the process of reducing the NAIRU was a result of the reduction in the replacement ratio, which registered a reduction in 1993. Later, social security benefits were cut sharply, in 1995 and 1997, when incentives were introduced to develop stable employment. In recent years, the NAIRU, calculated using this procedure, has once again begun to increase slightly.

4 Potential output and the economic cycle

As occurs with the unemployment rate, to expand analysis of economic supply, we must make the distinction between the long-term component of production, or potential output, and short-term movements around this equilibrium level, or cyclical component. Macroeconomic focuses associate potential growth with sustainable growth in output, in the sense that it is consistent with maintaining stable inflation levels. The output gap, i.e. the difference between observed output and its equilibrium level provides a guide for disequilibrium between economic supply and demand, and is an indicator of inflationary pres-

sures. This measurement is also used in fiscal policy analysis, as an output gap should be available for calculation of the structural balance and the deficit corrected to reflect the cyclical effect.

As is the case with the NAIRU, the basic problem in this breakdown is that potential output is not directly observable and therefore it must be estimated, which introduces uncertainty into the results. In principle, we distinguish two broad groups of techniques that can be used to make this breakdown. First, statistical techniques associate potential output with trend developments in output. Second, the macroeconomic approaches are based on broadly accepted rules derived from economic theory.

We provide below a description of some of the most commonly used procedures. Beginning with purely statistical procedures, we should mention the Hodrick and Prescott (1980) filter, whose purpose is to obtain a smooth trend adjusted to the GDP series. The relative importance attached to smoothness vis-à-vis the level of adjustment is given by a *lambda* parameter, which in most applications with quarterly data takes on the value of 1,600[19]. More recently, Baxter and King (1999) proposed a procedure to estimate the cyclical component by eliminating the trend and irregular components.

Moving to approaches that use some type of restriction derived from economic theory, the first method is proposed by Blanchard and Quah (1989), based on the estimation of a structural vector autoregression (VAR) model. The application by Álvarez and Sebastián (1998) uses an inflation and output model in which two types of shocks, known as demand and supply, are considered. Demand shocks have a transitory effect on output. As a result, estimated potential output entails correction of the impact of these shocks on output.

Among the macroeconomic procedures, the production function explicitly models output to reflect productive factors, which requires specification and estimation of functions linking output with capital, labour and total factor productivity (PTF, which is obtained as a residual). To obtain potential output with this procedure, the productive factors must be assessed in levels consistent with stability in the inflation rate. Where capital is concerned, its observed value is taken owing to its inertial performance. Where the PTF is concerned, a smoothed series is used. Last, potential employment is obtained as the product of the working-age population, the trend activity rate and the NAIRU. This method also makes it possible to break down potential output trends into the contributions of productive factors, labour and capital, and a residual term that reflects the PTF.

The application of the production function methodology in Estrada, Hernández de Cos and Jareño (2004) has some specific features. First, the PTF is estimated from a disaggregated standpoint for the five major activity sectors of the market economy, which makes it possible to isolate potential bias in aggregate results, as a result of the change in the relative weight of the sectors. Second, the non-nmarket economy, whose value added has specific characteristics, is isolated. Last, hours worked is used as a representative variable of the labour factor to reflect the gradual reduction in the workday that is occurring in the Spanish economy.

[19] See Dolado, Sebastián and Vallés (1993) for an application to the Spanish economy.

TABLE 11 TRENDS IN THE NAIRU AND ITS DETERMINANT FACTORS

	Annual differences				
	Observed unemployment rate	NAIRU	Mark-up	Replacement ratio	Taxes
1990-1993	4.5	0.7	-3.3	-0.1	4.0
1994-1999	-3.7	-5.1	0.3	-0.4	-4.9
2000	-1.8	0.0	-0.5	0.0	0.5
2001	-0.5	0.3	-0.6	0.0	0.9
2002	0.9	0.3	-0.8	0.0	1.0
2003	-0.1	0.2	-0.8	0.0	1.0
2004	-0.5	0.2	-0.8	0.0	0.9

SOURCE: Banco de España.

5 Conclusion and areas of future research

As we indicated at the beginning of this chapter, economic analysis from the supply standpoint is somewhat less developed than from the expenditure standpoint. However, the design of analytical tools in support of this approach is essential, to provide an element of comparison in the short-term assessment carried out from the demand standpoint, and to provide a solid basis for medium- and long-term analysis that includes a diagnosis on economic growth potential and the factors that can contribute to its development. Therefore, further study must be pursued in a series of future areas of research to strengthen this component of analysis, which traditionally receives less attention. One of such activities is to finish the supply model broken down by branch of activity, that will provide the tools required to understand the processes of production and price formation in the different activities that comprise the economy.

At the same time, in the framework of the labour market, the analysis must be enhanced of the effects of immigration, on the determinants of participation decisions, for women and older workers, and on the way to achieve greater operational flexibility. Analysis of immigration should focus on identifying the potential effects of this phenomenon on wages, the unemployment rate, equilibrium, or potential growth in the economy. In this connection, there are a number of different aspects of immigration that should be assessed: immigration involves an increase in labour supply that can correct imbalances betweens labour supply and demand in some sectors and/or locations, owing to its greater mobility; it can also serve as a complementary production factor for the domestic labour supply, replacing women in domestic tasks and enabling them to integrate more effectively into the labour market. Distributive effects can also occur if immigrants replace Spanish workers in the lower wage brackets. With reference to the activity rate for women and older workers, growth in these groups is essential to develop economic growth potential and to achieve the

labour participation objectives established in the EU framework. Similarly, a more flexible labour market is consistent with the objective of increasing growth potential in the Spanish economy. Greater flexibility can be achieved through wages as well as through employment. In the first case, it is important to enhance knowledge of wage bargaining mechanisms and potential alternatives. Where employment flexibility is concerned, the analysis should continue to focus on the consequences of and ways to overcome problems derived from duality between permanent workers, with a high level of job security, and temporary workers, whose job instability has negative repercussions on human capital investment decisions and therefore on productivity.

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Annex

TABLE 1 VALUE-ADDED INDICATORS FOR ECONOMIC BRANCHES

Indicator	Units	Source	Freq.	Publication lag	Comments
Agricultural output	1995 = 100	Banco de España	Quarterly	6 months	Periodified baseline statistics
Social Security registrations in Agriculture	No. of persons	Ministry of Labour and Social Affairs	Monthly	1 month	Includes the special scheme for agriculture and sea workers
Water storage facilities	Cubic metres	Ministry of Environment	Weekly	1 week	Peninsular reservoirs
Industrial production index	2000 = 100	INE	Monthly	1 month	Breakdown by branch
Industrial climate index	Balance	Ministry of Science and Technology	Monthly	1 week	Breakdown of output, demand, and change in inventories
Industry turnover index	2000 = 100	INE	Monthly	2 months	Breakdown by economic purpose
Index of incoming orders in industry	2000 = 100	INE	Monthly	2 months	Breakdown by economic purpose
Social Security registrations in industry	No. of persons	Ministry of Labour and Social Affairs	Monthly	1 month	—
Approvals by works authorities	Square metres	Min. of Development	Monthly	2-3 months	Breakdown by type of works
Public tender	Millions of euro	Min. of Development	Monthly	3-4 months	Breakdown by type of works
Short-term construction industry survey	Millions of euro	Ministry of Development	Quarterly	4-5 months	Breakdown by type of works
Apparent cement consumption	Metric tonnes	OFICEMEN	Monthly	1 month	—
Social Security registrations in construction	No. of persons	Ministry of Labour and Social Affairs	Monthly	1 month	—
Activity indicators in services	2000 = 100	INE	Monthly	2 months	Breakdown by branch
Comp. summary indicator commercial services	1995 = 100	Banco de España	Quarterly	—	Breakdown by branch
Social Security registrations in commercial services	No. of persons	Ministry of Labour and Social Affairs	Monthly	1 month	—

TABLE 2 LABOUR MARKET INDICATORS

Indicator	Units	Source	Freq.	Publ. lag.	Comments
Statistics on collective bargaining agreements	Year-on-year increase	Ministry of Labour and Social Affairs	Monthly	1 month	Breakdown by economic economic sector and duration of agreement
Quarterly Labour Cost Survey	euro	INE	Quarterly	3 months	Breakdown by economic sector and labour cost component
Agricultural wages	100 = 1985	Ministry of Agriculture	Monthly	3 months	—
Labour Force Survey	No. of persons	INE	Quarterly	1 month	Information on the key magnitudes of the labour market with highly detailed information
Social Security registrations	No. of persons	Ministry of Labour and Social Affairs	Monthly	1 month	Breakdown by economic sector
Statistics on contracts	No. of contracts	INEM	Monthly	1 month	Breakdown by type of contract, according to duration and type of work schedule
Registered unemployment	No. of persons	INEM	Monthly	1 month	—
Short-term Labour Survey	No. of persons	Ministry of Labour	Quarterly	3 months	Information on employees with breakdown by sector

TABLE 3 TYPES OF CONTRACTS AND DISMISSAL COSTS ASSOCIATED WITH THEM

Type of contract	Workers affected	Cost of dismissal / Severance pay			
		Objective unjustified dismissal	Unjustified disciplinary dismissal	Objective justified dismissal	Justified disciplinary dismissal
Indefinite contracts					
Regular	All workers	45 days per year worked Max: 42 months	45 days per year worked Max: 42 months	20 days per year worked Max: 12 months	No cost
New indefinite contract	Unempl. pers. under 30 years of age	33 days per year worked Maximum: 24 months	45 days per year worked Maximum: 42 months	20 days per year worked Maximum: 12 months	No cost
	Unemployed women, employed in sectors in which they are under-represented				
	Unemp. persons over 45 years of age				
	Persons unempl. for more than 6 months				
	Disabled persons				
	Conv. temp. contracts to indefinite contracts				
Discontinuous fixed	Worker having indefinite contracts in discontinuous activities without a clear start date	Depending on the type of contract, regular or new indefinite contract			
Temporary contracts					
For work or service	All workers	8 days' wages per year			
Potentially for circumstances of production	All workers	8 days' wages per year			
Training					
Practice	Workers with at least university education/ middle or 2nd degree occupational education	No cost			
Training	Workers 16-21 years of age no university qualifications	No cost			

13. Price dynamics

Luis Julián Álvarez and Pablo Burriel

1 Introduction

The purpose of this chapter is to describe the set of analytical tools used by the Banco de España Directorate General, Economics, Statistics and Research to monitor inflation, describe its situation and forecast its future trends. Because price stability is the primary objective of all central banks, regardless of their specific monetary focus or the institutional framework involved, and owing to the lags with which monetary transmission mechanisms operate, the availability of accurate inflation forecasts is extremely important. Spain's membership in the European Monetary Union (EMU), and the Banco de España's consequent membership in the Eurosystem, have not diminished the need for price monitoring and forecasting. They have, however, introduced an unprecedented need for coordination and have accentuated the importance of certain analytical aspects, such as inflation differentials between Spain and other countries in the euro area.

Consumer price indices (CPIs) are particularly important as an inflation monitoring tool. Designed to measure changes in the purchasing power of final consumers, they are frequently used as a benchmark in wage bargaining, pension reviews, various types of contractual agreements and numerous other areas. CPIs are also the main tool used by governments and central banks to set inflation targets, this function being fulfilled in Spain by the consumer price index (CPI) and the harmonised index of consumer prices (HICP). The HICP, aggregated with the HICPs of the other EMU member countries, is also the principal reference for the measurement of euro area inflation. In addition, the CPI and HICP are the main indicators used to estimate short-term trends in the

private consumption deflator, one of the most important deflators of the National Accounts.

Using the estimates and forecasts provided by the set of demand and value-added deflators, inflation forecasts can be incorporated into the National Accounts framework and thus analysed and assessed in conjunction with other macroeconomic variables. The table of deflators and costs, which show the relationship between the main aggregates, are particularly important in this exercise. The Banco de España Quarterly Macroeconometric Model (MTBE) helps ensure that the set of price forecasts is economically consistent with forecasts for the other variables. The MTBE can also be used to simulate the possible impact of changes in a broad range of factors on the medium- and long-term rate of inflation.

This chapter is structured into six sections. Section 2, which follows this introduction, describes the references used by Banco de España to analyse the price formation process, essentially the National Accounts demand and value-added deflators and the costs table. Section 3 looks at short-term price dynamics, focusing in particular on the role of the CPI as key indicator for the analysis of short-term inflation trends. Section 4 describes the medium-term MTBE price model, while Section 5 considers the findings of a series of research projects currently underway that are designed to enhance understanding of price setting mechanisms in the Spanish economy at individual level. Last, in Section 6, we draw a few conclusions from the preceding analysis.

2 Cost and price analysis within the National Accounts framework

In the Spanish National Accounts (CNE), the price formation process may be analysed from various perspectives: the demand side, the value-added perspective and the costs side. In a demand-side analysis, the corresponding approach entails the breakdown of the final demand deflator into its different expenditure components:

$$\Delta P_{df} \approx \omega_c \left[\Delta P_c + \Delta\lambda_c\right] + \omega_I \left[\Delta P_I + \Delta\lambda_c\right] + \omega_g \left[\Delta P_g + \Delta\lambda_c\right] + \omega_x \left[\Delta P_x + \Delta\lambda_c\right] \qquad [1]$$

where Δ represents the logarithmic difference, P_{df} the final demand deflator, P_c the consumption deflator, P_I the investment deflator, P_g the public expenditure deflator and P_x the export deflator; λ_i represents the contribution of each component to final demand in real terms and ω_i represents the weighting of each component in nominal final demand. This equation explicitly expresses the respective contributions of the various demand deflators to the evolution of final prices. This contribution is two-fold, dependent not only on the behaviour of each individual deflator but also on changes in each component's weighting in final demand, expressed in real terms.

One possible theoretical interpretation of this equation assumes the existence of a perfectly competitive distribution sector that buys goods and services from Spanish and foreign firms to combine them in a basket of final goods and services that it sells to consumers for consumption, and to other firms for investment. These goods and services may also be sold to non-residents who, in turn, either consume them or invest them. The weighting of each component in final demand is governed by agents' preferences. Table 1 provides an

overview of how the final demand deflators and various components of expenditure have evolved over the past decade.

Production and operating accounts for the economy as a whole provide an alternative view: final price setting from the supply side[1]. From this perspective, the final demand deflator may be expressed as a function of costs incurred, as follows:

$$\Delta P_{df} \approx \omega_y \left[\Delta P_y + \Delta\lambda_y\right] + \omega_m \left[\Delta P_m + \Delta\lambda_m\right] \quad [2]$$

where

$$\Delta P_y \approx \omega_{va} \left[\Delta P_{va} + \Delta\lambda_{va}\right] + \omega_t \frac{\Delta TN}{\Delta y} \quad [3]$$

and

$$\Delta P_{va} \approx \omega_r \Delta UCL + \omega_e \frac{\Delta EB^*}{\Delta va} \quad [4]$$

where P_{df} represents the final demand deflator, P_y the GDP deflator, P_{va} the value-added deflator and P_m the import deflator, λ_y, λ_m and λ_{va} represent, respectively, the contributions of GDP and imports to final demand and the contribution of value added to GDP, in real terms, and ω_i represents the weightings of the different components of final demand and GDP. In equation [3], *TN* represents indirect taxes net of subsidies, while in equation [4] *ULC* corresponds to labour costs per unit of value added and *EB** represents gross operating surplus[2], all at current prices; finally, y corresponds to GDP, in real terms, while *va* represents gross value added.

Equations [2] to [4] express the formation process of final prices as a function of its different external and domestic contributing factors. As equation [2] shows, the respective contributions of domestic factors and external costs to movement in the final demand deflator depend on in the evolution of the GDP and import deflators, respectively, and in their respective market shares, i.e. the proportion of final demand, in real terms, that is met first, by domestic output and second, by imported goods and services.

The external component of final prices is governed by the factors that dictate import price movements; namely, prices on the international markets and exchange rates[3]. Meanwhile, equations [3] and [4], which represent the GPD deflator and value-added deflator, respectively, are expressions of the principal sources of domestic inflationary pressures.

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[1] See L'Hotellerie (1997).

[2] EB* represents gross operating surplus adjusted to exclude compensation of non-employees, which is included in labour costs.

[3] Movements in external variables also undoubtedly impact on price dynamics in a given economy in other ways, including through competition from external products or the time that these factors take to feed through to import and domestic prices. These alternatives are discussed in the chapter on the external sector and external demand.

TABLE 1 FINAL DEMAND AND GDP DEFLATORS, AND ADDITIONAL FACTORS

Deflators	Rates of change				
	1995-2000	2001	2002	2003	2004
Final demand	2.9	3.3	3.1	3.0	3.9
Private consumption	2.8	3.3	3.4	3.1	3.0
Government consumption	2.8	3.2	3.4	3.4	4.7
Capital goods investment	2.0	1.0	1.6	1.9	2.1
Construction investment	4.0	5.5	5.3	6.0	7.9
Investment in other products	4.4	3.7	4.7	5.4	7.1
Exports of goods and services	2.6	2.7	1.1	0.7	-0.2
Final demand	2.9	3.3	3.1	3.0	3.9
Imports of goods and services	2.8	0.5	-1.3	-0.2	2.7
GDP	2.9	4.2	4.5	4.0	4.4
1. Net indirect taxes	5.1	2.3	5.3	5.0	7.7
2. Gross value added	2.7	4.4	4.4	3.9	4.1
2.1. Market economy	2.6	4.6	4.5	3.9	4.2
Agriculture	*-1.4*	*7.3*	*-0.6*	*4.2*	*2.3*
Industry	*1.4*	*2.1*	*1.7*	*1.3*	*2.9*
Energy	*-1.4*	*0.5*	*2.7*	*1.4*	*1.9*
Construction	*3.9*	*6.8*	*7.1*	*6.7*	*8.5*
Market services	*3.5*	*5.1*	*5.4*	*4.2*	*4.0*
2.2. Non-market services	3.0	3.2	3.6	3.7	3.1
GVA (a)	2.7	4.4	4.4	3.9	4.1
Unit labour cost	2.6	3.4	3.5	3.9	3.6
Compensation per employee	*3.1*	*3.8*	*4.3*	*4.3*	*4.0*
GVA per employee	*0.5*	*0.4*	*0.8*	*0.4*	*0.4*
Unit surplus	2.7	6.4	6.2	3.8	5.0

a. This focus may be addressed by branch of activity.

The impact of indirect taxation on the GDP deflator is a consequence of public sector decisions. Unit labour costs (ULCs) reflect the pressures deriving from wage and other labour costs, as well as the impact of public sector decisions, which affect costs through taxes and social security contributions. Through productivity, ULCs also reflect the technological conditions and current cyclical state of the economy. Lastly, unit margins[4] are the product of many factors, ranging from the level of competition existing in product markets to the degree of demand-side pressure. Equations [2] to [4] may in fact be treated as a price setting model of the mark-up type, in which the component *(EB*/va)* reflects the extent to which business owners pass the impact of cost changes and indirect taxation on to prices. Table 1 also provides an overview of in the behaviour of the various components of domestic and external costs since the mid-1990s.

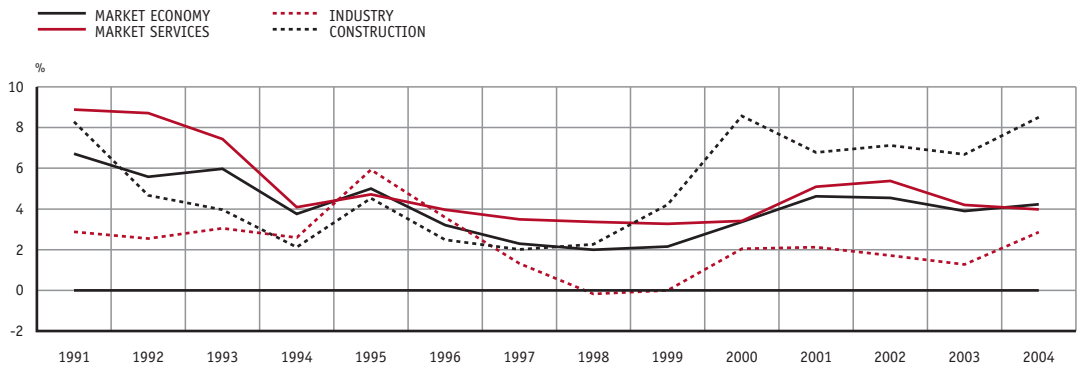
Domestic price components, as expressed in the gross value-added deflator, may also be analysed from a disaggregated perspective, by branch of activity. The first stage in the disaggregation exercise is to segregate market economy prices from the price of non-market services (basically the productive activities of general government, whose behaviour is dictated by different considerations to those governing market prices). The second stage entails disaggregating market economy data, which standard Quarterly National Accounts (CNTR) definitions break down into five branches of activity: agriculture and fishing, industry, energy, construction and market services (see Table 1). in the evolution of the gross value-added deflator for each of these five branches may be expressed, in turn, as a function of costs, taking an approach similar to that which is used to track gross valued added in the economy as a whole, as in equation [4]. These data reveal the differing historical behaviour of the various cost components and of unit margins from one branch of activity to another, and the contribution of each to overall price dynamics[5].

The evolution of the deflators by branches of activity show that the Spanish economy has been subject to a dual inflation phenomenon, according to which the inflation rate in the commercial services sector has been systematically several percentage points higher than inflation in other sectors (see Chart 1). These relative price disparities are in part a reflection of differences in productivity growth rates from one sector to another. To a greater extent, however, they reflect divergent patterns in firms' margins. In the service sector, margins tend to remain constant following a rise in costs, with the increase being passed on to final prices. But in the industrial sector, which is subject to substantial foreign competition, businesses are generally forced to accept slimmer mar-

[4] The measure of margins included in equation [4] is imperfect, as it encompasses both firms' profits *per se,* which corresponds to actual margins, and the return on capital used in the production process. This is nonetheless the approach generally used, due to the difficulty in obtaining measures of investment and capital stock at the sector level. This approach can be especially problematic in those sectors and at those times where wage trends and returns on capital are moving in opposite directions; for example, when the labour market is expanding and the user cost of capital is falling. See Box IV.3 of the Banco de España *Annual Report* (2004).

[5] Annex 2 of this book includes tables showing the breakdown of the deflators for the different productive branches in terms of costs and unit margins.

CHART 1 EVOLUTION OF DEFLATORS (rates of change)



SOURCE: INE (National Statistics Institute).

gins following a cost increase. This situation inevitably generates changes in relative prices[6]. Chart 1 depicts the rapid advance in the gross value added (GVA) deflator for the construction sector in the second half of the 1990s, which brought a substantial expansion in firms' margins.

Short-term forecasts for the GDP and final demand deflators are drawn up from the demand side and the value added perspective. Both approaches allow for the possibility of incorporating in a coherent manner short-term data into the estimates and projections obtained using medium-term models. The price formation perspective, meanwhile, using costs as point of departure, is obtained by incorporating price forecasts into the complete national accounts framework and, in particular, by interpreting them in conjunction with aggregates from the labour market. On the medium-term horizon, the inflation forecasts produced using the models in terms of deflator and cost tables provide an explicit expression of the implications of the aggregate forecasts in respect of their distribution by branch of activity[7], thereby facilitating their analytical interpretation.

3 Short-term analysis

Data drawn from the consumer price index and CNTR deflators combined with the production of short-term forecasts for these variables are the principal elements of analysis of the short-term price scenario. In this analysis and forecasting exercise, precedence is given to statistical-econometric tools, with transference function models, for example, having proved particularly useful.

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[6] See Estrada and López-Salido (2002).

[7] The pricing block in the quarterly model, which is described in Section 4.1 of this chapter, is built exclusively with aggregate data for the market economy.

In the production of short-run forecasts, it is essential that the projections used are regularly updated, as forecasts tend to have a relatively short time horizon (no more than one year in the case of the CPI and HICP). Transference function models[8] are one of the best available tools, as mentioned above, since they provide a good approximation of changes in the series' seasonality and general trends, and also ensure that the impact of exceptional events is adequately reflected. These models also tend to have better predictive performance than univariate models, such as ARIMA models, since they incorporate information contained in other variables. Additionally, as mentioned in Chapter 4, any new information that may be contained in the indicator data can be assessed more efficiently if it can be compared with a forecast.

3.1 Final demand prices

Short-term price analysis from the demand side focuses first on evaluating and forecasting the various price indicators (essentially the CPI); and second, on estimating the deflators of the different components of domestic and external demand[9], using these indicators as a point of departure.

3.1.1 The consumer price index

The CPI is the most important of the various price indicators in the Spanish economy and is used as a benchmark in numerous situations, including wage bargaining, pension reviews and various types of contracts, including rental agreements. It is also the indicator on which the Spanish government bases its official inflation forecasts and the principal variable on which forecasts of the private consumption deflator draw. The main purpose of the HICP, which is very similar to the CPI[10], is to provide an aggregate indicator comparable with the HICPs of the other EMU and EU countries. The HICP is a key indicator in the Eurosystem and provides the basis for the definition of price stability in the euro area, the primary objective of the single monetary policy. By its nature, the HICP can also be used to draw comparisons between the inflation scenario in Spain and inflation in other EMU and EU countries.

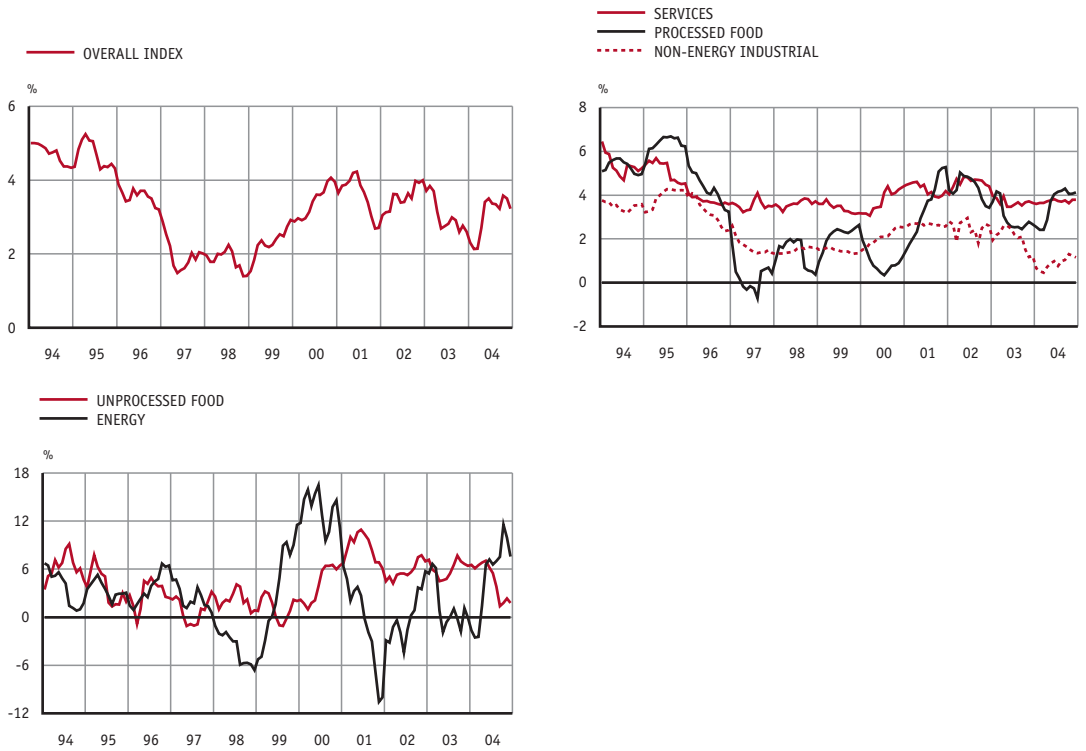
As it is well known, the purpose of the CPI is to track changes in the cost to consumers of purchasing a representative basket of goods and services. To compile the CPI, a price sample representative of the full set of goods and services available to consumers that takes account of the relative weighting of each item in overall household expenditure is needed. This sample is defined and the respective weightings determined on the basis of informa-

[8] See Chapter 5.

[9] For details of the short-term analysis of external sector deflators and prices, see Chapter 10.

[10] The methodological differences between the two indices are insignificant and due fundamentally to different criteria with respect to geographical coverage, reference population and items included. Furthermore, in recent years, disparities between the rates given by the two indices have been extremely small.

CHART 2 CPI (a)



SOURCE: INE.

a. Year-on-year rate.

tion drawn from the Household Budget Survey. The current CPI[11], which has 2001 as its base year, is designed as a dynamic consumption basket that can be adjusted to changes in the structure of consumption and in the type of items consumed. For the first time in the CPI's history, it also takes discounts and special offers into account. In technical terms, the CPI is a chained Laspeyres index.

Given the diverse nature of the index components, overall CPI data are generally broken down into smaller groups of relatively homogeneous items for analysis purposes. The usual breakdown segregates the data into processed and unprocessed foods, non-energy industrial goods, services and energy. Among the different features of these groups of products, first of all, the level of foreign competition to which each is exposed varies. Most services, for example, are less exposed to external competition. Second, excise duties apply to certain processed foods and to some energy products. Third, in the services and energy sectors,

[11] The National Statistics Institute (INE) began publishing this index in January 2002.

TABLE 2 FREQUENCY AND SIZE OF MONTHLY PRICE CHANGES

IN PERCENT

Component	Frequency of changes in prices	Frequency of increases in prices	Frequency of decreases in prices	Average change in prices	Average increase in prices	Average decrease in prices
Unprocessed food	49.5	26.3	23.2	15.2	14.9	-15.6
Processed food	18.1	10.7	7.4	7.3	6.9	-8.0
Non-energy industrial goods	7.0	5.3	1.8	6.5	6.1	-8.3
Services	5.7	4.9	0.8	8.4	8.2	-11.2
Total	14.8	9.2	5.6	8.6	8.2	-10.3

SOURCE: Álvarez and Hernando.

prices are frequently subject to government regulation. Short-term disruptions to supply, meanwhile, are most likely to affect unprocessed foods and energy products. Last, discounts and special offers are significant only in respect of certain non-energy industrial goods and, to a lesser extent, processed foods.

The heterogeneity of the CPI's components is clearly visible in Chart 2, which plots year-on-year increases (or decreases) in the general index and each of its principal components. The chart shows that unprocessed food, energy and non-energy industrial goods (the latter since the introduction of the 2001 base year) have been subject to greater price fluctuations than other components. Table 2 sets out data on the individual price behaviour of the different components[12] revealing that food products are subject to far more frequent price changes than other components while service sector prices change the least frequently. Individual prices are generally subject to significant fluctuation in all categories, but the fluctuations are considerably more pronounced in the case of unprocessed foods.

Table 3 describes the equations for the transfer functions that are used to produce short-run forecasts for individual CPI components. To improve its efficiency, the model used to forecast unprocessed food price inflation incorporates information from the index of agricultural wholesale prices (IPPA)[13]. However, since this component is subject to greater fluctuation than others and therefore is more difficult to forecast accurately, it is advisable to include additional indicators, such as information on food retail prices compiled by the Ministry of Industry, Trade and Tourism, when producing one month ahead forecasts.

[12] See Álvarez and Hernando (2004).

[13] The IPPA is used to build an indicator that reflects the price of food intended for household direct consumption, using an aggregation methodology similar to that used to construct the CPI and applying a homogenisation process owing to the variability of the disaggregated series, so that specific shocks in certain agricultural markets do not have an excessive effect on the aggregate index. Because of the time lag in its publication it is advisable to supplement the IPPA with information drawn from the national control prices published by the Ministry of Agriculture, Fishing, and Food.

TABLE 3 TRANSFER FUNCTIONS FOR CPI COMPONENTS (a)

Dependent variable: **CPI unprocessed food (ipcane)**
Indicator: **IPPA fresh food indicator (ippaaf)**

Equation:

$$\Delta\Delta_{12} ipcane = \underset{(6.7)}{0.771}\,\Delta\Delta_{12} ippaaf + \underset{(4.9)}{0.584}\,\Delta\Delta_{12} ippaaf_{-1} + \\ + Dummies + ARMA(0.0)(0.1)$$

Dependent variable: **CPI Processed food (ipcae)**
Indicator: **IPRI processed food indicator (ipriae)**

Equation:

$$\Delta\Delta_{12} ipcae = \underset{(5.7)}{0.3742}\,\Delta\Delta_{12} ipriae + \underset{(2.0)}{0.1246}\,\Delta\Delta_{12} ipriae_{-1} + \underset{(2.9)}{0.1733}\,\Delta\Delta_{12} ipriae_{-2} + \\ + Dummies + ARMA(0.0)(0.1)$$

Dependent variable: **CPI non-energy industries (ipcine)**
Indicator: **IPRI non-energy industrial indicator (ipriine)**

Equation:

$$\Delta\Delta_{12} ipcine = \underset{(1.9)}{0.2002}\,\Delta\Delta_{12} ipriine + \underset{(2.2)}{0.2182}\,\Delta\Delta_{12} ipriine_{-1} + \\ + \underset{(3.1)}{0.2919}\,\Delta\Delta_{12} ipriine_{-2} + Dummies + ARMA(0.0)(0.1)$$

Dependent variable: **Services CPI (ipcser)**

Equation:

$$\Delta\Delta_{12} ipcser = Dummies + ARMA(4.0)(1.1)$$

a. Variables in lowercase expressed in logarithms. Parentheses are used for t-statistics. Estimated using seasonally-adjusted monthly series for the period 1980.1-2003.12.

The index of energy prices, which is also subject to considerable fluctuation, is composed of two subsets of clearly differentiated items. In the first subset, which includes electricity, butane gas and natural gas, prices are regulated. In the second, which consists of fuel products, very short-term forecasts are produced on the basis of petrol and diesel prices while longer-term forecasts are based on the price of crude oil futures, assumed future trends in the euro exchange rate and expected changes in indirect taxation. In this case, no transfer function is available for forecasting.

To forecast the non-energy industrial goods component, a transfer function incorporating data sourced from the industrial price index (IPRI) is used. The IPRI is a direct indicator of domestic market prices at the first stage of the marketing chain[14]. Although imported goods account for a substantial proportion of expenditure at this stage, close, stable correlations between changes in that component and import prices are not easily identifiable. One possible explanation for this lack of correlation is that external prices are tracked using unit value indices, which tend to be highly erratic, in part due to changes in their underlying composition. The estimates of this component are also affected by discounts and special offers; garments, footwear and household goods in particular frequently attract price reductions of this kind. Data for the admittedly short period in which such pricing practices have been monitored reveal substantial fluctuations in the level of discounts and in the period of their application.

Forecasting processed food prices is in many ways akin to forecasting non-energy industrial goods prices, given the relevance of industrial prices and the difficulties of finding an explanatory role for the price of imported products. Other factors to take into account include changes in indirect taxation and the product-specific determinants of the price of certain goods, including cigarettes and oil.

Last, the model for the services component of the CPI is a univariate one that incorporates changes in regulated prices; to date, no other indicators with explanatory power sufficient and stable enough to track all service prices have been identified. However, since this component has a relatively stable rate of inflation, univariate models are in practice a perfectly adequate short-term forecasting tool.

The quality of information available on short-term trends in consumer prices has improved since March 2004, when the INE began publishing a flash estimate of the general HICP, at the end of the reference month, as part of the corresponding flash estimate of the euro-area price index[15]. Research carried out by the INE indicates that differences between the flash estimate and final data rarely exceed one decimal point. And since month-on-month increases in the CPI and HICP are very similar, the HICP flash estimate may be used as a leading indicator of the CPI as well.

[14] The weighting structure applied to the IPRI reflects the cost of production and not the price paid by households. To obtain adequate indicators, IPRI components linked to expenditure on non-food manufactured consumer goods are aggregated using the CPI weightings and methodology.

[15] This flash estimate is estimated by the INE using price information collected in the field to calculate the index and information available until the date of the flash estimate publication for most of the centrally collected products.

3.1.2 Domestic demand deflators in the CNTR

CNTR deflator forecasts are an important part of the Banco de España's short-term price analysis, as mentioned above, as they allow for price estimates to be analysed in conjunction with the other macroeconomic aggregates. This section details the methods and data used to track the deflators of private domestic demand which, together with the deflators of public consumption and the external sector[16], are used to produce forecasts for final demand and GDP deflators from the demand side. Subsequently, in Section 3.2, we look at forecasts for these same deflators from the value-added perspective.

Table 4 lists the indicators available for each deflator of domestic demand and the correlations between them. These indicators – which for the most part incorporate current information and are monthly in frequency – are used to forecast movements in the deflators prior to publication of the CNTR data, using transfer functions. They also provide economists with additional information with which to evaluate the CNTR data.

Given their characteristics, the CPI and HICP (which, as explained earlier, differs from the CPI in certain aspects of its coverage only) are the main indicators used to track the private consumption deflator. The data set out in Table 4 reveal a very high correlation between the private consumption deflator and both price indices. However, since the CPI shows the highest correlation, it is this index rather than the HICP that is incorporated into the transfer function used to draw up short-term projections for the deflator. This transfer function shows a contemporaneous correlation between the two variables, with a coefficient not statistically different to unity.

Data used to track the capital goods investment deflator are sourced mainly from the capital goods component of industrial prices[17], which measures movement in the basic price of capital goods manufactured and sold in the domestic market. To factor in the influence of external prices, unit value indices for capital goods are also used. These indicators combined are used to draw up a summary indicator that encompasses both domestic and external prices, and uses weightings derived from input-output tables. As can be seen in Table 4, the correlations in annual terms between the external price and summary indicators and the CNTR variable are higher than the correlation between these same indicators and the IPRI. Accordingly, the transfer function used to produce short-term forecasts of the capital goods deflator is formulated using the summary indicator, resulting in a contemporaneous correlation between the two.

A number of different indicators may be used to estimate trends in the construction investment deflator, including construction costs, responses to questions on the price outlook included in the Eurostat survey and housing prices. The summary indicator used as the construction sector gross value-added deflator and described in the following section of this chapter may also be used. Although, as shown in Table 4, it is this summary indicator that displays the closest correlation with National Accounts data, Banco de España

[16] See Chapters 9 and 10.

[17] It should be noted that EU definitions of the major industrial sectors classify automobiles as capital goods while Spanish National Accounts definitions consider them to be household consumer goods. The INE data series should therefore be redefined.

TABLE 4 CORRELATION BETWEEN DOMESTIC DEMAND AND VALUE-ADDED DEFLATORS AND THEIR INDICATORS (a)

Indicator	Sample	Correlations							Coefficient of variation	
		Annual series (b)	Quarterly series							
			Fourth-order difference			First-order difference			Fourth-order difference	First-order difference
		t	t	Max. (c)		t	Max. (c)			
Private consumption										
CPI	1993-2002	0.97	0.96		[t]	0.78		[t]	0.3	0.4
HICP	1993-2002	0.94	0.93		[t]	0.79		[t]	0.3	0.4
Capital goods investment										
IPRI capital goods	1992-2002	0.39	0.37		[t]	0.33		[t]	0.5	0.6
UVI	1992-2002	0.82	0.79		[t]	0.60		[t]	1.5	2.1
Synthetic indicator	1992-2002	0.85	0.82		[t]	0.62		[t]	1.2	1.6
Construction investment										
Cost of civil works	1992-2002	0.74	0.74		[t]	0.67		[t]	0.9	1.4
Total cost	1992-2002	0.64	0.65		[t]	0.65		[t]	0.5	0.7
Housing prices	1992-2002	0.57	0.56		[t]	0.57		[t]	1.0	1.5
Summary indicator	1992-2002	0.89	0.89		[t]	0.80		[t]	0.7	0.8
Price expectations	1992-2002	0.74	0.66			0.55			1.2	1.1
Fixed investment in other products										
Capital goods deflator	1992-2002	0.24	0.26	-0.51	[t+5]	0.32	-0.41	[t+5]	0.6	0.8
Construction deflator	1992-2002	0.85	0.83		[t]	0.83		[t]	0.5	0.6
PPI computer hardware	1993-2002	0.21	0.14		[t]	-0.05		[t]	-0.5	-0.7
IPRI agricultural equipment	1992-2002	-0.37	-0.35		[t]	-0.13		[t]	0.6	1.0
Housing prices	1992-2002	0.62	0.61		[t]	0.57		[t]	0.9	1.1
GVA agriculture										
IPPA	1995-2002	0.62	0.79	0.79	[t]	0.77	0.77	[t]	-160.6	-32.7
GVA Industry and energy										
IPRI	1992-2002	0.70	0.62	0.65	[t-1]	0.18	0.35	[t-1]	1.0	1.6
UVI exports	1992-2002	0.71	0.62	0.62	[t]	-0.02	0.37	[t-1]	1.0	1.4
GVA energy										
IPRI energy	1992-2002	0.18	0.24	-0.45	[t+5]	0.40	0.4	[t]	3.3	4.8
GVA industry										
IPRI non-energy	1992-2002	0.83	0.67	0.71	[t-1]	0.29	0.37	[t-1]	0.9	1.3
UVI non-energy exports	1992-2002	0.71	0.55	0.55	[t]	-0.15	0.40	[t+1]	1.2	3.0
GVA construction										
Housing prices	1992-2002	0.85	0.83	0.80	[t]	0.74	0.74	[t]	0.9	1.0
Cost of civil works	1992-2002	0.50	0.52	0.52	[t]	0.47	0.47	[t]	0.9	1.0
Summary indicator	1992-2002	0.96	0.95	0.95	[t]	0.83	0.83	[t]	3.7	-24.3
GVA market services										
CPI Services	1992-2002	0.89	0.87	0.87	[t]	0.68	0.68	[t]	0.3	0.3

a. Calculated with seasonally adjusted series.

b. Series with data from at least 1990. First series difference in logarithms.

c. Lag of the indicator in respect of the CNTR (Quarterly National Accounts) variable for which the correlation is maximum.

has chosen to include separate variables for civil works costs and house prices in its transfer function model, since this segregated approach has been found to yield more accurate results.

Investment in other products is an extremely heterogeneous aggregate that includes activities as diverse as real property services, software and investment in agriculture, livestock and fishing. This heterogeneity suggests that the best indicators to use to track the deflator of this component would be indicators of the producer price of agricultural machinery, the consumer price of IT equipment, or housing prices. The possibility of using the deflators of the other components of fixed capital expenditure has also been examined and ultimately selected as the preferred approach, since, apart from the construction deflator, the other indicators considered displayed only minor correlations with the National Accounts variable. Accordingly, the transfer function used to project the deflator of investment in other products is based on the correlation between this variable and the construction deflator, which is a contemporaneous one.

3.2 Value-added deflators

The analysis of short-term price dynamics from a supply-side perspective focuses on the examination of value-added deflators by branch of activity, paying special attention to the market economy and the economy as a whole. As in the case of demand-side analysis, the first stage of this exercise is essentially a statistical one, in which short-term trends in the deflators are modelled using transfer functions that incorporate various indicators for each branch of activity. In the next stage, these initial estimates are used as a basis for the construction of a disaggregated model of short-term costs that can be used to check the implications of the indicator-based projections for the price formation process.

The usual methodology is to identify, for each branch of activity, those indicators that display the closest correlation with the value-added deflator and to use these to model and forecast the short-term behaviour of the deflators using transfer functions. In some cases, there is only one indicator for each branch that may be used to approximate in the evolution of the different deflators on the supply side. In the agricultural sector, for example, the only available indicator is the index of agricultural output prices, or IPPA. For industry and energy, the general industrial price index (IPRI) is used to provide, in more disaggregated form, an indicator for industry (the non-energy component of the IPRI) and another for energy (the energy component). Models are needed for only two of the above three aggregates; given the relationship between them, the third can be obtained by subtraction or addition. The GVA deflator for commercial services, meanwhile, can be computed from the services sector CPI. Last, unlike the preceding deflators, the GVA deflator for the construction sector must be projected using partial indicators, such as housing prices per square metre, the civil works construction cost index and the index of building construction costs, which are combined to produce a synthetic indicator[18].

[18] The synthetic indicator weightings are obtained based on the average proportion of production as principal contractor by type of works during the period 1998-2001. [See Jareño et al. (2004).]

Table 4 shows the resultant correlations between indicators and CNTR deflators. The correlations are very high in the case of market services and construction, high for agriculture and industry, and moderate for energy and industry and energy combined. The correlations for market services and industry are, however, substantially reduced when quarter-on-quarter rates are used. A final point to note is that the closest correlations are the contemporaneous correlations in all cases except for the industry, where the non-energy IPRI leads the deflator by one quarter. These correlations are used to model the transfer functions between the indicator (or indicators) and the GVA deflator in each branch of activity, most of which are estimated in first differences. As regards these functions the only significant point of note is that, in the case of industry and energy, in the end it was decided that estimates for the GVA deflator for industry and energy would be constructed from their respective models, whilst forecasts for industry alone would be obtained as a residual. To estimate the construction sector GVA deflator a model based on the synthetic indicator was chosen, in recognition of its greater forecasting performance.

Short-term supply-side price analysis is improved by making a more comprehensive and systematic use of the information drawn from individual price and cost indicators for each productive branch, aggregating their components using the weightings of resources and expenditures tables to produce a set of quarterly indices of aggregate prices and costs. Given the coherence of these data series, an indicator of gross operating margin per unit can be obtained, as a residual, that, under a given set of assumptions, would approximate the mark-up.

4 Medium- and long-term modelling

The first section of this section describes the price block incorporated into the MTBE, the main econometric tool available for analysis of medium-term price formation behaviour and construction of forecasts and simulations with this time horizon. The following section considers other models and estimates used to analyse specific issues, such as the effect of inflation persistence on price dynamics and specific aspects of price formation, such as housing price trends.

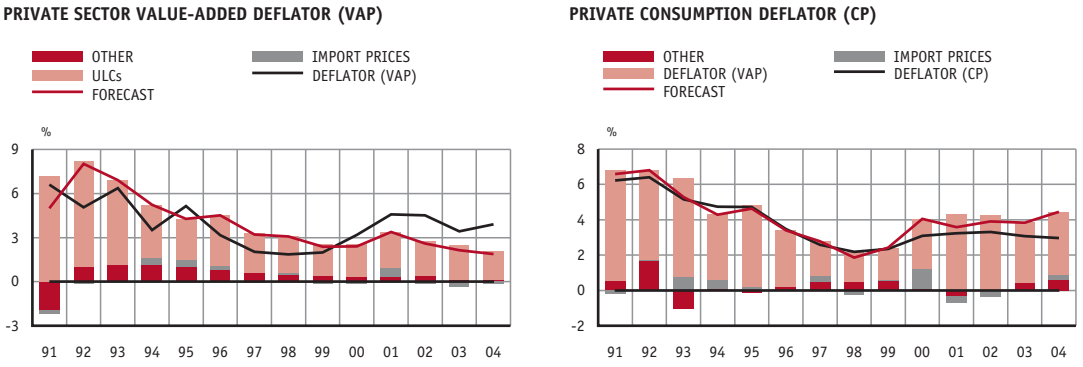
4.1 Price setting analysis in the Banco de España quarterly model (MTBE)

From the supply standpoint, the MTBE models exclusively the market economy, which is assumed to consist of a continuum of identical firms that produce a single product[19]. The representative firm has a certain degree of market power and is thus able to price its product (the value-added deflator net of indirect taxes) at a certain margin above its marginal costs, which in this case are equivalent to unit labour costs[20]. Similarly, in recognition of

[19] A detailed description of the MTBE supply block can be found in Chapters 5 and 12.

[20] This is true because this model assumes that the representative firm produces according to a Cobb-Douglas technology, using capital and labour as sole factors of production.

CHART 3 CONTRIBUTION TO GROWTH OF EACH VARIABLE ACCORDING TO THE MTBE



SOURCE: Banco de España.

the size of the Spanish economy and its degree of openness, frims margins are modelled as a function of the level of competition, which means that increases in external prices reduce competition from the external sector and permit Spanish corporations to increase their margins. Domestic prices are therefore a weighted average of domestic and external factors. Last, it is assumed that the various factors dictating firms' pricing levels have overall a unitary effect guaranteeing that, in the long term, prices are independent of quantities.

The equations described in Table 5 include a long-term cointegration relationship between the variables that govern the value-added deflator. Corporate margin elasticity to external competition is 0.1 and average annual growth in total factor productivity is 0.8 percent. In the short term, in the behaviour of the deflator is assumed to show some degree of persistence, although the contemporaneous change in real wages (deflated with the CPI) is the most significant component. Similarly, the lagged change in the import deflator has a positive impact and the error correction mechanism is significant.

To illustrate the results of the equation describing the value-added deflator, it is useful to analyse the respective contributions to inflation in the prices of each variable included in the estimates. Chart 3, shows that this equation provides an adequate approximation of the behaviour observed in the deflator, albeit with a tendency to over-predict in the initial years and under-predict in subsequent years. Labour costs accounted for much of the price moderation observed during the 1990s, whilst the contribution of import prices was negligible in the later years.

In the quarterly model, domestic demand is modelled assuming the existence of a perfectly competitive distribution sector that buys goods and services from Spanish and foreign firms to combine them in a basket that it sells to consumers for consumption and to firms for investment. The respective weightings of each component in the consumption and investment baskets are dictated by consumer preferences. Accordingly, demand deflators – the consumption deflator, the private productive investment deflator and the energy and non-energy components of the HICP – are modelled over the long term as a weighted average of

the price of goods and services provided by Spanish firms (the private value-added deflator) and the price of goods and services produced by foreign companies (the import deflator)[21].

The estimates drawn from the demand deflator equations are set out in Table 5[22]. In the long term, the relative impact of domestic prices is greater in the case of the private consumption deflator than in the case of the investment deflator, as would be expected given the weighting of imports in each demand component. A cointegration relationship between the variables that determine long-term relationships can be identified in both cases, albeit with a lesser degree of certainty in the case of the productive investment deflator. The dynamic specifications of the equations reveal some degree of inertia in the consumption deflator, whereas both long-term determinants and taxes have a significant impact with the appropriate sign. As regards the productive investment deflator, the limited significance of the error correction mechanism confirms the uncertainty as to the existence of a long-run cointegration relationship.

The demand deflator chosen to illustrate the contributions to demand growth of each variable in the calculation is the private consumption deflator. As we observe in Chart 3, the equation provides a reasonably accurate approximation of the observed behaviour of the deflator, but has a tendency to over-predict in the later years. The private sector value-added deflator explains much of the price moderation observed in the 1990s, while import prices have been making a negative contribution since 2001.

A different modelling strategy is used for residential investment. To obtain an equation for the deflator that can be checked against empirical data, it is assumed that investment in new homes represents only a small percentage of total housing stock, an assumption implying that the supply of real property services is determined by housing stock already existing in the previous year. In this context, the residential investment deflator is the equilibrium price between supply and demand for real property services. Accordingly, the deflator depends negatively on home financing costs and positively on the difference between demand for real property services and supply. The estimation of the deflator[23] confirms the significance of these variables, which also appear with the expected sign, although a trend, truncated at 1997, must be incorporated to achieve a long-term cointegration relationship. In the short term, the deflator, which displays a certain degree of inertia, depends on the contemporaneous change in the consumption deflator and its acceleration, as well as on the contemporaneous variance in real interest rates.

4.2 A disaggregated approach to price setting analysis

A supply-side price setting model in which data are disaggregated by branch of activity provides a more detailed analysis of supply in the Spanish economy and, in particular, of

[21] In the productive investment deflator equation, the import deflator excludes petroleum prices, as petroleum is not considered a capital good.

[22] The model also incorporates equations for the energy and non-energy components of the HICP.

[23] The residential investment deflator equation is estimated in conjunction with the consumption equation and the residential investment equation (see Chapter 11).

TABLE 5 EQUATIONS FOR DEFLATORS OF GVA, PRIVATE CONSUMPTION, PRIVATE PRODUCTIVE INVESTMENT, AND PRIVATE RESIDENTIAL INVESTMENT (MTBE) (a)

Long term:

1) $$\overline{p}^{p} = -0.60 - 0.08\,D84 - 0.002\,PTF + 0.50\left(y^{p} - k^{p}\right) + 0.90\,w^{p} + 0.10\,cp_{be}^{xe}$$

2) $$\overline{p}_{n}^{c} = -0.02 - 0.02\,D8691 + 0.94\,p^{p} + 0.03\,p_{be}^{m} + 0.02\,p_{br}^{m} + 0.01\left(p_{s}^{m}\right)^{r}$$

3) $$\overline{p}_{n}^{ip} = 0.01 + 0.02\,D8691 + 0.69\,p^{p} + 0.21\,p_{be}^{m} + 0.07\,\frac{p_{br}^{m} - 0.23\left(p^{o}\right)^{r}}{0.77} + 0.03\left(p_{s}^{m}\right)^{r}$$

4) $$\overline{p}_{n}^{ir} = 2.15 + 0.08\,D84 - 0.00\,TRENRI + p_{n}^{c} + 0.95\left(c - k_{-1}^{r}\right) - \\ - 0.02\ln\left(\frac{R^{h}}{4} + 0.005 - \Delta p^{ir}\right)$$

Dynamic specification:

1) $$\Delta p^{p} = \underset{(2.28)}{0.00} + \underset{(2.06)}{0.17}\,\Delta p_{-2}^{p} + \underset{(4.84)}{0.43}\,\Delta w^{p} + \underset{(2.41)}{0.07}\,\Delta p_{b_{-4}}^{m} - \underset{(-4.09)}{0.27}\left(p^{p} - \overline{p}^{p}\right)_{-1}$$

2) $$\Delta p_{n}^{c} = \underset{(1.07)}{0.00} + \underset{(3.80)}{0.19}\,\Delta p_{n_{-2}}^{c} + \underset{(16.35)}{0.71}\,\Delta p^{p} + \underset{(2.93)}{0.04}\,\Delta p_{be}^{m} + \underset{(7.07)}{0.05}\,\Delta p_{br}^{m} - \underset{(-8.46)}{0.38}\,\Delta ti^{c} + \\ + \underset{(4.69)}{0.25}\,\Delta ti_{-2}^{c} - \underset{(-3.53)}{0.20}\left(p^{c} - \overline{p}^{c}\right)_{-1}$$

3) $$\Delta p_{n}^{ip} = \underset{(0.22)}{0.00} + \underset{(11.49)}{0.71}\,\Delta p^{p} + \underset{(2.76)}{0.11}\,\Delta p_{be}^{m} + \underset{(2.07)}{0.07}\,\Delta\frac{p_{br}^{m} - 0.23\,p^{o}}{0.77} - \underset{(-2.27)}{0.12}\left(p^{ip} - \overline{p}^{ip}\right)_{-1}$$

4) $$\Delta p_{n}^{ir} = \underset{(2.47)}{0.00} + \underset{(5.20)}{0.43}\,\Delta p_{n_{-1}}^{ir} + \underset{(3.22)}{0.36}\,\Delta p_{n}^{c} + \underset{(4.02)}{0.38}\,\Delta^{2} p_{n}^{c} - \underset{(-2.40)}{0.01}\,\Delta\ln\left(\frac{R^{h}}{4} + 0.005 - \Delta p^{ir}\right)_{-1} - \\ - \underset{(-5.72)}{0.35}\left(p^{ir} - \overline{p}^{ir}\right)_{-1}$$

TABLE 5 EQUATIONS FOR DEFLATORS OF GVA, PRIVATE CONSUMPTION, PRIVATE PRODUCTIVE INVESTMENT, AND PRIVATE RESIDENTIAL INVESTMENT (MTBE) (a) (cont´d)

Where:	
$\mathbf{p}^{p}$ = private-sector value added deflator excluding taxes	$\mathbf{p}^{ip}$ = deflator of productive investment
$\mathbf{p}_{n}^{ip}$ = deflator of productive investment net of taxes	$\mathbf{p}^{ir}$ = deflator of residential investment
$\mathbf{p}_{n}^{ir}$ = deflator of residential investment net of taxes	$\mathbf{p}^{c}$ = deflator of private consumption
$\mathbf{p}_{n}^{c}$ = deflator of private consumption net of taxes	$\mathbf{w}^{p}$ = compensation per employee in the private sector
$\mathbf{cp}_{be}^{xe}$ = competitor prices of euro area exports in the euro area	$\mathbf{p}_{b}^{m}$= deflator of goods imports
$\mathbf{p}_{be}^{m}$ = deflator of euro area goods imports	$\mathbf{p}_{br}^{m}$ = deflator of goods imports from the rest of the world
$\mathbf{p}_{s}^{m}$ = deflator of services imports	$\mathbf{p}^{o}$ = price of energy imports in euro
$\mathbf{ti}^{c}$ = implicit rate of indirect tax on private consumption	$\mathbf{R}^{h}$ = interest rate on loans to households for housing purchase
PTF = total factor productivity	$\mathbf{y}^{p}$ = real private-sector value added
c = real private consumption	$\mathbf{k}^{p}$ = real private productive capital stock
$\mathbf{k}^{r}$ = real residential capital stock	**D84** = step dummy in 1984
D8691 = step dummy from 1986 to 1991	**D8086** = step dummy from 1980 to 1986
TREN (RI) = truncated deterministic trend	

a. Variables in lowercase are expressed in logarithms. The superscript "r" indicates that the parameter is restricted in the estimation. Bar variables ($\bar{x}$) denote the long term. t-statistics are given in parentheses. Estimates were prepared with seasonally adjusted quarterly series for the period 1980.I-1998.IV. For further details, including checks for model adjustmet dependability, see Estrada et al. (2004).

the cost structure in each branch, distinguishing between the production deflator and the gross value-added deflator. Chapter 12 gives a more detailed description of the various possible approaches to constructing a model of this type. One possibility is to model the production of each branch (Y_s) in accordance with a CES methodology in which imported inputs (M_s) and value added (VA_s) are combined, at the branch level, to produce a differentiated good:

$$Y_s = \left\{ \gamma_s^{1/\sigma_S} VA_s^{1-1/\sigma_S} + \left(1-\gamma_s\right)^{1/\sigma_S} M_s^{1-1/\sigma_S} \right\}^{\frac{\sigma_S}{\sigma_S - 1}}$$

Value added in each branch, meanwhile, may be modelled by applying a Cobb-Douglas production function to the capital factor (K_s) and labour factor (L_s):

$$VA_s = \left(Z_s L_s\right)^{\alpha_S} K_s^{1-\alpha_S}$$

Taking this approach, the gross value-added deflator for each productive branch (P_s^{VA}) would be a function of firms margins over value added (μ_s^{VA}) and of the cost of producing value added, which is equivalent to unit labour costs (over value added) (S_s^{VA}):

$$P_s^{VA} = \mu_s^{VA} S_s^{VA}$$

Margin over value added, meanwhile, is a function of firms production margins (μ_S^Y) (which are either constant in the long term or a function of external competition) and the ratio between unit labour costs and the price of imported raw materials (P^M):

$$\mu_s^{VA} = \mu_s^Y \left[1 + cte \left(\frac{S_s^{VA}}{P^M} \right)^{\sigma_S - 1} \right]$$

Under this production structure, changes in the price of inputs and, in particular, changes in the price of petroleum, have an impact on each branch's value-added deflator (which is not the case in the aggregate quarterly model). But if, in contrast, we were to assume a Cobb-Douglas production technology ($\sigma_S = 1$) at both value-added and final production levels, firms' production margins would be equivalent to the value-added margin and the value-added deflator for each branch would be solely a function of the firm's production margin and unit labour costs, as in the aggregate-level quarterly model.

A disaggregated model of the demand deflators could take a similar approach to that used in the MTBE. As described in Chapter 12, each component of aggregate expenditure (consumption, investment and exports) may be considered a good consisting of the value added of the different productive branches, imports of each type of product and inputs. Thus, the deflator of each component of demand may be expressed as a weighted average of the value-added deflator for the different productive branches, the deflator of imported goods and services, the energy deflator and the deflators for other raw materials, with the weightings being assigned on the basis of the weighting of each component in aggregate expenditure, as set out in the input-output tables. These weightings are included in Table 2 of Chapter 12.

5 Price analysis using individual data

This section looks at the findings of a current research project[24] designed to enhance understanding of price setting mechanisms in the Spanish economy at the individual level. The research considers individual consumer and producer prices, and the findings of a recently developed survey on price formation processes in Spanish firms. The rationale behind the research is to develop extensive literature on macroeconomic theory showing that the manner in which inflation and output respond to demand and supply shocks is essentially dictated by the nature of nominal rigidities. This situation has clear implications for the design of monetary policy. At present, however, there is insufficient empirical research on the degree of price flexibility in the Spanish economy to support the theory. Most research con-

[24] Similar research is being carried out in other Eurosystem member countries by a research network focusing on the determinants of inflation persistence, known as the Inflation Persistence Network (IPN).

ducted in this field to date has used the U.S. economy as its reference universe and has focused on specific products and/or specific markets.

As part of their research, Álvarez and Hernando (2004) took a database of approximately 1.1 million consumer prices from the 1992 base year corresponding to a set of categories covering approximately 70 percent of total household expenditure. The data reveal significant nominal rigidities in the price of various types of products. Consumer prices are shown to be subject to moderate rigidity, with a tendency to change around once a year only, but with the changes being quite pronounced (close to 10 percent). No particularly strong downward nominal rigidity is apparent, but there are marked differences in levels of rigidity from one type of product to another. Some firms implement time dependent price setting strategies, which are reflected in the seasonality apparent in the frequency of price changes. However, the fact that the frequency of price changes is also influenced by the inflation rate and/or the rate of indirect taxation points to the existence of firms that pursue state dependent price setting strategies, the greatest price changes, as expected, being observed when inflation is high. Lastly, the use of commercially attractive prices (that is both psychologically attractive and rounding) is associated with less frequent but more pronounced price adjustments.

The analysis carried out by Dhyne et al. (2004), which compared the price setting policies applied to consumer prices in most EMU states, indicates that price stickiness in the Spanish economy is close to the euro-area average but higher than in the U.S.. Likewise, the factors underpinning price setting policies in Spain are very similar to those in the other EU countries. The work of Álvarez, Burriel and Hernando (2005a) is also revealing, positing that a stylised description of consumer and industrial price setting strategies in the Spanish economy requires analysis of four types of agents, which analysis may then be used to build macroeconomic models based on microeconomic foundations.

A project by Álvarez, Burriel and Hernando (2005b) looks at producer prices, analysing the price of 1.6 million individual products representing virtually all branches of industrial activity. The results of this project are very similar, in qualitative terms, to those obtained in the consumer price study. Once again, a moderate degree of rigidity is identified in industrial prices, which tend to change somewhat less than once a year, the change in this case being around 5 percent. Price increases are only slightly more frequent than price reductions, and there are quite pronounced differences in degrees of rigidity from one product type to another. The research identifies one group of firms that pursues time dependent price setting strategies, reflected in the seasonality of the frequency of price changes, whilst the price setting behaviour of a second group is governed by the state of the economy, which renders the frequency of price adjustments dependent on the rate of inflation and/or rate or indirect taxation. Last, the use of attractive prices is associated with less frequent but more pronounced price adjustments. Analysis of the data by homogenous product group reveals greater flexibility in producer prices than in consumer prices, a finding suggesting that retailing activity is characterised by greater price rigidity.

Last, alternative information is provided by the recent Banco de España survey on the price setting behaviour of firms, which took as its reference population all manufacturing corporations, energy producers and a substantial number of commercial service providers with more than six workers. Although the study of this data is not yet complete, preliminary analysis [Álvarez and Hernando (2005) and Fabiani et al. (2005)] indicates that the

level of price rigidity in Spain is similar to levels in the other EMU countries. A more general finding of this survey is that medium-sized corporations adjust their prices once a year.

6 Closing comments

This chapter has examined the key elements of short-term price analysis and the various models that may be used to produce short- and medium-term price forecasts. Monitoring inflation is an essential part of the economic analysis central banks must carry out. It should be stressed, however, that a comprehensive diagnosis can only be achieved if price dynamics are analysed within the wider context of aggregate economic performance. Moreover, price analysis is essential to any fully comprehensive macroeconomic analysis, the other essential elements being analysis of output, from the standpoint of expenditure, value added and the labour market (as outlined in the preceding three chapters).

Attempts to improve price analysis techniques generally entail taking a more disaggregated approach, whether segregating data by branch of activity or looking at individual prices. Examples of this first approach include the project discussed in this chapter, which is designed to facilitate a more comprehensive application of the information contained in the various price and cost indicators for individual productive branches. Formulating a supply-side model that segregates price and cost behaviour by main productive branch, with the aim of reflecting differences in price formation processes attributable to differing levels of competition in each branch and differences in the way the respective markets function is another potentially useful means of improving the available analytical tools. As regards analysis using individual price data, the Inflation Persistence Network (IPN) is engaged in a number of on-going projects that take this approach.

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Annex

TABLE 1 PRICE INDICATORS

Indicator	Units	Source	Frequency	Publication lag	Comments
Consumer price index	Index 100=2001	INE	Monthly	Mid-month	Broken down into unprocessed food, processed food, non energy industrial, energy, and services.
Harmonised index of consumer prices	Index 100=1996	INE and Eurostat	Monthly	Mid-month	Broken down into unprocessed food, processed food, non-energy industrial, energy, and services. Advance estimation available.
Industrial price index	Index 100=2000	INE	Monthly	1 month	Broken down into durable and nondurable consumption goods, intermediate goods, energy, and capital goods. Industrial price indicators are prepared for processed food and nonenergy industrial goods.
Index of farmer output prices	Index 100=1995	Ministry of Agriculture, Fishing, and Food	Monthly	2 1/2 months	An indicator is prepared on unprocessed food consumption
Unit value indices for foreign trade	Index 100=1995	Ministry of Economy	Monthly	2 months	Broken down into food and industrial consumption, intermediate goods, energy and non-energy, and capital goods.
Fuel prices	Cents/litre	Ministry of Economy	Weekly	0 weeks	Prices are a weighted average of prices provided by the main companies.
Hotel price index	Index 100=2001	INE	Monthly	1 month	Measures changes in prices applied to different customers staying in Spanish hotels.
National control prices	Euro/(kg, dozen, etc.)	Ministry of Agriculture, Fishing, and Food	Weekly	3 days	Average weighted prices of agricultural products in the most representative markets. An unprocessed food indicator is prepared for control prices related to the CPI.

14. Financial decisions of the private sector

Juan Ayuso and Ana del Río

1 Introduction

Economic agents take their spending and financing decisions simultaneously. In earlier chapters the main focus has been on the overall determinants of spending and the specific role of financial variables in bringing about changes in consumption and investment. This chapter examines the relation between these two types of decision from another standpoint. That is, we take a closer look at the financial impact of spending decisions (or "real" decisions) by households and corporations, having first explained in detail the basis of these decisions and their main features.

All spending decisions give rise to a series of financial flows that follow substantially the same pattern. In this pattern three fundamental components can be distinguished: a sector that provides the financing, a sector that receives the financial resources and a conduit through which the financing is channelled from one sector to the other. Studying these movements brings added value to economic analysis in two ways.

First, it allows judgements to be made about the soundness and efficiency of the mechanisms by which the financial resources generated by ultimate lenders are allocated. More sound and efficient mechanisms will, other things being equal, result in higher levels of consumption and investment and, consequently, social welfare. But the efficiency of these mechanisms will also affect the transmission, and hence the effectiveness, of the forces exerted by economic policy actions generally, and by actions associated with monetary policy in particular.

Second, studying the financial implications of real decisions is of value in identifying the main risks surrounding the most likely macroeconomic scenarios. Analysing the behav-

iour of such variables as wealth, indebtedness and the financial burden borne by different economic agents under these scenarios is a key factor in detecting possible causes of tension between the real and the financial dimensions of projections and in highlighting the risk factors inherent in them.

With the aim of discussing the financial implications of spending decisions, the chapter will be divided into four sections in addition to this introduction. In the first two sections we explain how the main financial flows in which households and non-financial corporations participate are analysed from the point of view of their dual role as ultimate lenders and borrowers (Section 2), and from the standpoint of the channels through which these flows are directed (Section 3). In Section 4 we explain the methods used to identify and assess the main financial risks to which projections in the central macroeconomic scenario are exposed. Some concluding remarks bring the chapter to a close.

2 Financial transactions of households and non-financial corporations

The basic tool in the study of financial flows is the Financial Accounts (CCFF). For the Spanish economy, the financial accounts are prepared quarterly by the *Servicio de Estudios* of Banco de España[1] in accordance with rules that are common to all European Union (EU) Member States, as established the European System of National Accounts (ESA 95). This harmonised system allows uniform international comparisons to be made, which is clearly very useful[2].

The Financial Accounts make it possible to adopt a fully consistent multi-dimensional approach based on both institutional groupings and financial instruments. A substantial degree of disaggregation is available in each case and this has made it possible to carry out a complete analysis of a changing financial system such as the Spanish, in which, for example, the role of non-bank intermediaries, capital markets and flows to and from the rest of the world have been increasing, as we discuss in Chapter 19. This goes beyond the traditional approach based on monetary aggregates and their counterparts which is increasingly proving to be inadequate as a result of a developing financial system, constant financial innovation and the blurring of the distinction between assets held for transaction purposes (high liquidity, low risk) and for saving purposes.

The Financial Accounts also make it possible to adopt a consistent sectoral approach from the dual standpoint of *financial transactions* and *financial balance sheets.* For each institutional sector the market value of the sector's financial assets and liabilities at the end of a period is the result of the *financial transactions* that have taken place during the period, the impact of any change in the prices of financial assets and liabilities in the opening balance sheet *(revaluation account)* and other changes in volume:

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[1] See Chapter 4 for further details.

[2] For the euro area as a whole, the European Central Bank, with the assistance of the national central banks, prepares and distributes quarterly tables of investment and financing in the euro area. These follow the ESA 95 methodology and are a first step in drawing up financial accounts for the Monetary Union.

$$Balance\ Sheet_t = Balance\ Sheet_{t-1} + Revaluation_t + Financial\ transactions_t + Other\ changes_t$$

Financial transactions are the financial counterparts of the "real" decisions of institutional sectors. Each sector is subject to a budgetary constraint according to which internal resources (income) plus external resources (financing or a net increase in liabilities) are ultimately reflected in consumption and real investment (gross capital formation[3]) or financial investment (a net increase in financial assets). This formulation vertically integrates financial decisions and non-financial decisions, as reflected in an identity between the balance on the capital account of the various institutional groups in the National Accounts *(net lending (+) or borrowing (–)) and the balance on the financial transactions account (net financial transactions)*[4].

$$Net\ financial\ transactions = \Delta\ Financial\ assets - \Delta\ Liabilities$$
$$Saving + \Delta\ Liabilities \approx Investment + \Delta\ Financial\ assets$$

Although the Financial Accounts provide a full and consistent framework of reference, their availability lag, approximately 100 days from the reference period, means that supplementary indicators are used in regular analysis to approximate some of the main aggregates. Most of these indicators are taken from the balance sheets of financial intermediaries, which become available more quickly and sometimes also with greater frequency.

The use of the Financial Accounts and supplementary indicators forms part of an approach in which five institutional sectors are distinguished: households (and NPISHs), non-financial corporations, general government, financial institutions and the rest of the world. In view of the purpose of this chapter, however, and of this section in particular, the discussion that follows will focus on the behaviour of households and non-financial corporations only[5]. For each of the sectors, we examine, first, their net financial transactions (which determines whether the sector is a net lender or a net borrower) and how this changes over time, with reference both to historical data and to the behaviour of these variables in other countries of our environment. Next, we look at the overall volume and the breakdown by instrument of their financial transactions, both on the asset and liability side[6].

2.1 Households

The need for an in-depth analysis of households' financial transactions arises from the substantial relative share in Spain's GDP of spending decisions by this sector (private con-

[3] Net of transfers and changes in inventories.

[4] However, there is usually a statistical discrepancy between these two balances owing to the different sources of data on which the two calculations are based.

[5] The role of financial institutions in channelling financial flows is discussed in the following section, while general government and the rest of the world are the central themes of other chapters of this book.

[6] The analysis of net wealth positions based on financial balance sheet data is discussed in Chapter 7.

sumption and residential investment accounted for an average of approximately 67 percent of GDP during the period 1980-2003). Through their decisions on saving, on investment in financial assets and on financing, households are able to shift resources in time and thus spread their spending over their life cycle and accumulate wealth with which to accommodate changes in their incomes, whether expected (e.g. on retirement) or unexpected. Moreover, household saving and the financial assets in which this saving is held are vital in providing, together with the rest of the world, the funds needed by companies and by government to finance investment.

Households traditionally show a positive net balance in their financial transactions; that is, their consumption and investment (consisting largely of investment in housing) does not use up all of their gross disposable income (net of transfers). However, financial saving by Spanish households has shown a downward trend in recent years, and this is an important issue to analyse and monitor in order to ensure that the net equity position of the household sector and its exposure to possible adverse shocks can be accurately assessed. This analysis and monitoring is based on historical and international comparisons and also, ultimately, on qualitative aspects, given the difficulties that arise in attempting to optimise the level of household saving within a well developed analytical framework.

Moreover, the continuing position of the household sector as a net lender has, in recent years, been compatible with major shifts in the volume and types of borrowing and lending transactions by the sector (Chart 1). An ability to identify these changes rapidly is crucial to the process of updating the indicators used to characterise its financial position at any given moment.

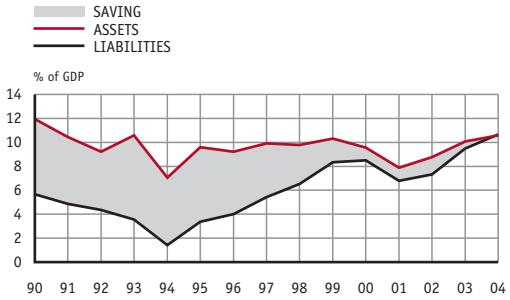
On the asset side, transactions reflect not only the investment of new household saving in financial instruments, but also decisions of a purely financial nature (such as changes in portfolio structure) that have no effect on the balance of financial transactions. The types of instrument used in these transactions, which depend on the liquidity, risk, return and taxation variables, provide important data on the degree to which households are exposed to changes in interest rates or in the prices of particular financial assets.

For example, as shown in Maza and Sanchis (2003), it can be seen that, over a long period, saving by Spanish households, which has traditionally been reflected in bank balances, has shifted to instruments issued by non-bank intermediaries such as mutual funds or insurance companies and pension funds. These instruments have generally received a fairly favourable tax treatment, and have encouraged greater diversification of household asset portfolios by directing their saving towards the domestic and foreign markets, thus increasing the sensitivity of spending decisions to changes in the prices of market-traded assets. Despite this, cash and deposits, with their higher liquidity and lower risk, continue to account for a substantial proportion of household financial investment.

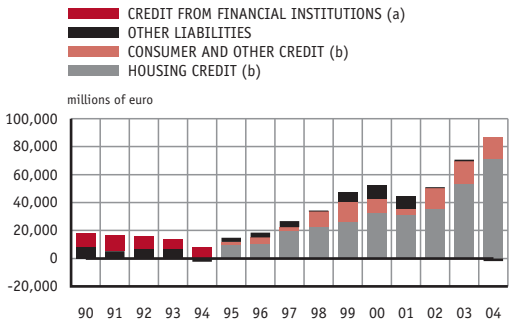
On the liability side, transactions by Spanish households have shown a strong upward trend in recent years with bank loans accounting for the largest share (see Chart 1). A breakdown of these loans by purpose shows that the majority of them were, at least originally, home loans. It should be noted, however, that this information is based on the initial purpose of loans, that is, it has a microeconomic basis and therefore needs to be supplemented from time to time with other indicators to enable conclusions to be reached on the

CHART 1 FINANCIAL TRANSACTIONS OF HOUSEHOLDS AND NPISHs

HOUSEHOLDS AND NPISHs



DISTRIBUTION BY INSTRUMENT



SOURCE: Banco de España.

a. Disaggregation by purpose is not possible prior to 1995.
b. Includes securitised loans.

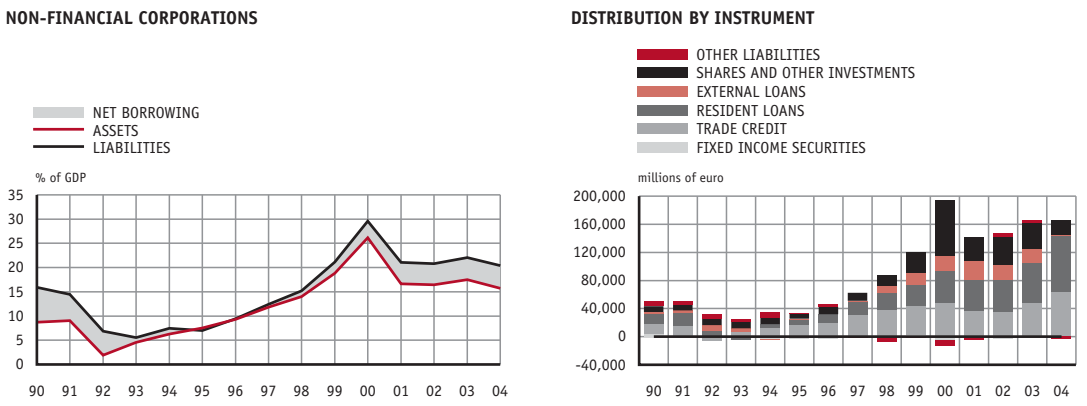
end use of resources when viewed from a macroeconomic perspective[7]. These indicators include what has been called *Mortgage or Housing Equity Withdrawal*[8], a detailed study of which has been carried out by Marqués and Nieto (2003). Essentially, this compares the net increase in loans whose original or declared purpose was to buy a home with the amount actually spent on property by the household sector as a whole (domestic residential investment). As Marqués and Nieto point out, in Spain there is no evidence of significant equity withdrawal in the late 1990s or the early years of this century, contrary to what is shown by the available estimates for countries such as the U.S., the U.K. and Holland.

However, the rapid expansion in financing operations by Spanish households requires that other indicators besides the traditional measure of financial saving be taken into consideration to gauge the extent to which households are vulnerable to changes in income or in interest rates. Higher debt levels imply that, other things being equal, households must allocate a higher proportion of their income to debt servicing, in the form of both interest payments and principal repayments. In the Spanish National Accounts, *Interest paid* is one item within the *Income Account* of households, and is therefore included within (or, more precisely, deducted from) the *Gross disposable* income heading from which *Gross saving* and *Net lending* measurements are derived. However, loan amortisation is treated as a reduction in liabilities in the Financial Accounts (although the available data do not allow this to be isolated). As some gross saving of indebted households must be used to make regular obligatory payments, an additional indicator has been developed, known as *saving*

[7] The simplest example of this is when a family sells its (possibly second) home to a household that has taken out a loan for the purpose and then uses the proceeds of the sale for consumption.

[8] See, for example, Davey (2001).

CHART 2 FINANCIAL TRANSACTIONS



SOURCE: Banco de España.

after debt service, which reduces *gross saving* by an estimate of amortisation payments associated with the total amount of household debt[9].

2.2 Non-financial corporations

Like households, non-financial corporations play a central role in the operation of the Spanish economy, accumulating capital and leading the way in bringing technical progress into the productive processes that drive increases in the country's per-capita income. Traditionally, non-financial corporations have relied on external resources for gross capital formation, and changes over time in their need for finance therefore provide relevant information on the ability of businesses to finance investment from their own resources (see Chart 2). However, the growing internationalisation of Spanish corporations has tended to weaken the information content of this indicator. Business expansion beyond national boundaries has given rise to a flow of outward investment, which takes the form of acquisitions of financial assets (mainly, though not exclusively, shares). This is duly recorded as a financial transaction, but has no effect on the sector's *net borrowing.* The net borrowing requirement aggregate does not therefore include the funds needed to finance (direct) foreign investment by Spanish corporations.

To take account of this development, analysts use an indicator known as the *financing gap,* defined as the difference between *broad gross capital formation* and gross saving. Broad gross capital formation includes, along with gross capital formation, an approximation of long-term financial investment abroad. Thus the financing gap measures the extent to which corporations seek external funding, whether from domestic or foreign sources, to finance their productive investment.

[9] See Maza and del Río (2002) for more details on the construction of this indicator.

As in the case of households, analysis of the net financial transactions for the corporate sector is supplemented by analysis of the asset and liability flows. As Chart 2 shows, Spanish non-financial corporations make use of a wide variety of instruments to finance their investment decisions [see also Nieto (2004)]. The volume of borrowing transactions, and its breakdown by instrument, will depend not only on the relative costs of financial instruments but also on the state of development of financial markets and the ease with which businesses can have access to them. These aspects are of interest because of their implications on monetary policy transmission. Consider, for example, the implications of variations in the proportional share of bank lending, and their role in determining the level of exposure of the sector to changes in the macroeconomic environment. Here again, the increasingly international character of Spanish business and its financing, plus the rapid pace of financial innovation, introduces difficulties into the analysis of financial flows based on aggregate data, which can only be resolved by constantly searching for further supplementary indicators.

One such difficulty is the fact that Financial Accounts are not obtained on a consolidated basis, which tends to produce a certain upward bias in the sector's liabilities (and assets). This is the case, for example, with inter-company loans or where certain large corporations raise capital with fixed-income issues on the global markets through subsidiaries, which then channel the funds to the other corporations in the group via other financial instruments. Issues of this kind have to be analysed in order to arrive at a correct interpretation of changes in the sector's financial flows. Factors such as these explain why movements in the corporate sector's financial assets are monitored, even though, given the role played by businesses in the economic framework, it is their borrowing transactions that are the main focus of analytical interest.

3 The channelling of financial resources

The financial flows generated in an economy are directed through two main channels. First, ultimate borrowers can obtain the funds they need by issuing securities on the financial markets. Alternatively, they can approach ultimate savers indirectly through financial institutions, which act as intermediaries between borrowers and savers. In Spain, as in other countries in what is known as Continental Europe, this second channel is predominant, with banks and other credit institutions playing the most important role in the process of financial intermediation. Despite this, the role of the markets, along with other financial intermediaries, has been clearly expanding in the last few years, which justifies the attention they have been receiving in regular analytical exercises.

3.1 The markets

The primary purpose of studying financial markets, as part of the analysis of the Spanish economy, is the identification of any factor that could hinder an efficient allocation of financial resources among different sectors and thus undermine the aim of achieving higher levels of social welfare. For the same purpose, key developments in the global financial markets are

TABLE 1 ISSUES AND PUBLIC OFFERINGS OF MARKETABLE SECURITIES

MILLIONS OF EURO

	2001	2002	2003	2004
Net resident issues (a)	33,222.2	44,989.1	77,241.2	147,147.8
Fixed income	28,420.2	41,231.5	75,466.0	129,643.9
Central government	*4,334.1*	*7,586.2*	*327.7*	*6,650.1*
Territorial governments	*756.7*	*3,169.5*	*1,715.4*	*1,533.0*
Monetary financial institutions	*13,008.8*	*13,656.6*	*42,410.9*	*60,814.2*
Other financial intermediaries	*9,899.9*	*19,098.3*	*31,892.6*	*60,626.3*
Non-financial corporations (b)	*420.8*	*-2,279.2*	*-880.7*	*20.3*
Equities	4,801.9	3,757.5	1,775.2	17,503.9
Monetary financial institutions	*2,191.4*	*1,725.0*	*248.2*	*15,728.4*
Other financial intermediaries	*323.4*	*140.8*	*62.4*	*486.3*
Non-financial corporations	*2,287.2*	*1,891.7*	*1,464.5*	*1,289.2*
Public offerings	3,085.8	1,009.4	417.4	2,557.0
Privatisations	696.4	0.0	0.0	0.0
Other	2,389.4	1,009.4	417.4	2,557.0
MEMORANDUM ITEMS:				
Net issuance by foreign subsidaries	23,326.1	14,378.1	12,473.2	-30,436.2
Financial institutions	11,838.3	12,678.9	8,325.1	-26,844.3
Non-financial corporations	11,487.8	1,699.2	4,148.1	-3,591.9

SOURCES: Spanish National Securities Market Commission (CNMV) and Banco de España.

a. Includes issuance by residents, in domestic and foreign currency.
b. Short-term issues comprise commercial paper registered with the CNMV.

also kept under review. There are two reasons for this approach. First, in a context of ever greater economic internationalisation and globalisation, global markets have a major impact on the performance of domestic markets; and secondly, international experience provides a benchmark against which comparisons can be made. Analysis is focused on three areas of interest: the primary markets, the secondary markets and secondary-market price movements.

Taking the primary markets first, it will be seen from the example in Table 1 that data on new issues are organised according to the issuing sector and the type of security. Data are also collected, as already mentioned, for issues of securities on non-domestic markets by foreign subsidiaries of resident financial and non-financial corporations; this activity has become increasingly important in recent years as a result of the growing international presence of a number of major Spanish corporations. By comparing the main magnitudes shown in Table 1

historically and against data for other countries we can identify particular areas where activity may be overconcentrated or underdeveloped. For example, the available information shows that despite advances made in recent years, the private fixed-income market remains fairly small in relative terms, while at the same time the level of issues by non-resident subsidiaries of Spanish corporations suggests some comparative disadvantage in this segment relative to other international markets.

Data on changes in issues by institutional sector and in each market segment are supplemented with the information on performance in various secondary markets. Through the monitoring of market trading activity, aspects such as the depth and liquidity of markets, which determine their efficiency, can be measured. Special attention is also paid to the share of non-residents in securities transactions, a variable which provides important information on the international integration and competitiveness of Spanish markets in an increasingly globalised environment. Although these assessments are based on both historical and international comparisons, the lack of reference points supported with solid analytical foundations requires an element of subjective judgement on the part of the analyst.

Last, the review of the domestic financial markets is supplemented with an analysis of the prices of the assets quoted in them. Many of these play a key role in determining the financial conditions in which spending decisions are made by the different economic agents. But the behaviour of economic agents may also, from time to time, be influenced by changes in idiosyncratic micro-structural factors which go beyond their expectations on likely changes in key price determinants. Identifying these factors can at times be crucial in detecting potential causes of inefficiency although, once again, this can be made difficult by the complexity involved in formulating and estimating comprehensive models for the valuation of financial assets.

In fact this is an area of analysis in which subjective or qualitative judgements are quite important, and where increased efforts may be required to shift the focus towards more quantitative or objective factors.

3.2 Financial intermediaries

The study of financial intermediaries is also based largely on qualitative or subjective factors. The Spanish financial system is more akin to the type of system found in the Continental European countries than it is to the U.S. or the U.K. model. In the Spanish system, financial intermediaries, particularly credit institutions, are the main means through which the flows generated between the various institutional sectors are channelled, and the evaluation of their financial position and their efficiency is therefore of crucial importance. There are, it should be noted, clear synergies between this analysis, whose ultimate purpose is related to the broader aim of ensuring macroeconomic stability, and the analysis practised by the Banco de España as part of its obligation to supervise credit institutions, where financial stability is the primary aim.

The analysis of credit institutions as part of the study of macroeconomic stability tends to emphasise the study of aggregate developments for the sector, with the primary focus being on changes in the size and composition of its balance sheet. Such aspects as the relative

TABLE 2 DEPOSIT INSTITUTIONS. STRUCTURE OF THE BALANCE SHEET AND PROFIT AND LOSS ACCOUNT

% OF AVERAGE BALANCE

	Total (a)		Banks		Savings banks	
	2003	2004	2003	2004	2003	2004
ASSETS						
Cash and central banks (b)	1.3	1.3	1.2	1.1	1.5	1.5
Interbank market assets (c)	14.5	14.0	18.7	18.3	9.3	8.7
Lending	56.9	58.0	49.7	49.7	65.7	68.3
General government	*2.3*	*2.2*	*2.4*	*2.4*	*2.2*	*2.0*
Other resident sectors	*52.0*	*53.4*	*43.7*	*44.1*	*62.1*	*64.9*
Non-residents	*2.6*	*2.4*	*3.5*	*3.2*	*1.4*	*1.4*
Securities portfolio	20.6	20.5	23.2	24.1	18.0	16.4
Of which:						
Government debt	*7.7*	*6.4*	*7.4*	*5.8*	*8.5*	*7.4*
Equities	*6.2*	*6.3*	*7.5*	*7.7*	*4.8*	*4.7*
Other assets (d)	6.7	6.3	7.3	6.9	5.5	5.2
LIABILITIES						
Banco de España	1.5	1.6	2.2	2.4	0.6	0.6
Interbank market liabilities (e)	17.8	17.2	24.2	24.0	9.7	8.6
Customer funds	61.7	61.4	51.7	50.2	74.3	75.9
Asset repo sales to customers	*6.8*	*6.0*	*6.8*	*6.0*	*7.3*	*6.5*
Creditors: general government	*3.1*	*2.9*	*3.4*	*3.0*	*2.7*	*2.8*
Creditors: other resident sectors	*38.6*	*38.2*	*25.5*	*24.1*	*54.2*	*55.2*
Creditors: non-residents	*8.3*	*6.8*	*10.9*	*8.4*	*5.1*	*5.0*
Debt securities	*4.9*	*7.4*	*5.1*	*8.7*	*5.0*	*6.3*
Own funds, special reserves and subordinated financing	12.8	12.5	13.7	13.4	11.4	11.2
Of which:						
Subordinated financing	*3.3*	*3.3*	*3.7*	*3.5*	*3.2*	*3.2*
Other liabilities (f)	6.3	7.3	8.2	10.1	4.0	3.8
PROFIT AND LOSS ACCOUNT						
(+) Interest income	4.03	3.69	3.98	3.69	4.07	3.68
Of which:						
Dividends	*0.38*	*0.42*	*0.51*	*0.53*	*0.23*	*0.29*
(–) Interest expenses	1.90	1.73	2.06	1.93	1.71	1.48
Net interest income	2.13	1.97	1.91	1.75	2.36	2.21
(+) Commissions	0.64	0.63	0.68	0.66	0.58	0.58
(+) Profits on financial operations	-0.03	0.11	-0.10	0.15	0.07	0.06
Gross income	2.74	2.70	2.49	2.56	3.01	2.85
(–) Operating expenses	1.61	1.48	1.41	1.28	1.84	1.71
Net income	1.13	1.22	1.08	1.28	1.17	1.14
(–) Write-downs and provisions	0.41	0.37	0.41	0.40	0.39	0.31
(+) Other income	0.14	-0.04	0.19	-0.06	0.07	-0.03
(–) Taxes	0.17	0.12	0.18	0.13	0.15	0.11
After-tax profit	0.69	0.70	0.68	0.70	0.70	0.69
MEMORANDUM ITEMS						
After-tax profit (millions of euro)	9,507	10,839	5,302	6,184	3,767	4,152
As a % of own funds	*11.5*	*12.0*	*11.4*	*12.1*	*12.1*	*12.2*
Average total assets (millions of euro)	1,372,909	1,555,214	782,913	889,441	537,127	606,018
Year-on-year growth rate (%)	*10.1*	*13.3*	*9.6*	*13.6*	*10.7*	*12.8*

SOURCE: Banco de España.

a. Banks, savings banks and credit co-operatives. Total turnover figures, including banks' foreign branches but not subsidiaries, refer to all the institutions existing in each period.
b. Cash, central banks (except Banco de España repos).
c. Credit and savings institutions (forward accounts, repos and securities lending) and repo purchases from the Banco de España.
d. Premises and equipment, sundry accounts and other assets with credit and savings institutions.
e. Credit and savings institutions (forward accounts, repos and creditors on short sales).
f. Sundry accounts and other liabilities with credit and savings institutions.

share of loans and securities in institutions' asset portfolios, the proportions of variable rate or secured loans in the total, the relative importance of their foreign assets and liabilities, or the size of the gap between their loans and deposits and how this gap is financed are the main focus of this analysis, given their potential implications for the ability of the sector to continue to act as an efficient intermediary between savers and borrowers (see Table 2).

The measurement of changes in income and expenditure and, consequently, in the profitability of the sector, is another key area of analysis that provides a solid basis on which to make judgements about the continued effectiveness of financial intermediaries. Last, special attention is paid to the solvency of institutions, where "solvency" is given a broader interpretation than would be required for strictly regulatory purposes and includes not only compliance with statutory ratios but also variables such as loan loss provision ratios which give an indication of the sector's ability to absorb any shocks that could adversely affect performance.

Non-bank intermediaries include mutual funds, insurance companies and pension funds, asset securitisation funds and others. As mentioned, they account for a considerably smaller share, although the sector has grown substantially in the last few years. The available data for these entities are in any case less detailed and are received later than the data on credit institutions, and this affects the way they are studied. This is in fact a fairly heterogeneous group and is not only, or even mainly, a provider of financial intermediation services. The best example of this is probably the non-life operations of insurance companies. From the point of view of their role in channelling financial flows between sectors, the most characteristic activity of these "institutional investors" is managing savers' investment portfolios, and it is this portfolio-management role that is analysed in some detail.

Thus, although analysis naturally focuses on net subscription data for different investment instruments, which gives a good indication of the relative importance of non-bank intermediaries in the Spanish financial system, it is also concerned with measuring the sector's investment returns against a variety of market indices. These comparisons provide a basis for judging the effectiveness of its intermediation activities. Changes in the composition of intermediaries' balance sheets provide a further key source of information for the study of aspects such as the proportion of foreign securities in investor portfolios and the structuring of portfolios in general. See, for example, Maza and Sanchis (2003) for a study on how the composition of investment portfolios of Spanish households has changed over time.

4 Financial risks for macroeconomic scenarios

In order to reach a reliable assessment of the outlook for an economy, projections for the principal macroeconomic aggregates need to be supplemented with an analysis of the main potential risk factors that could prevent the most likely economic scenario from occurring. Among the factors that require study are the financial risks related to the net equity position of the private sector. In analysing these factors, it should be borne in mind that the duality between spending decisions and saving or financing decisions by the different economic agents, although evident at the theoretical level, cannot easily be incorporated into the empirical framework on the basis of which projections are made.

Integrating a fully developed financial block into the macroeconomic model is enormously complex both by the proliferation of equations required and by the difficulties involved in characterising the different types of financial friction that are key in capturing the essence of how the main variables behave. It is reasonable to suppose, for example, that the effects of a good number of financial variables on real aggregates will be non-linear[10], and it is well known that non-linearities analytically complicate model design and pose major problems in aggregating the behaviour of individual households or corporations[11].

It is therefore hardly surprising that the majority of macroeconomic models now being used by economic authorities and analysts fail to include a block that fully develops these aspects, and they are more likely to include stylised versions of some of the more significant financial relationships. Accordingly, as already discussed in detail in other chapters of this book, the quarterly econometric model of the Spanish economy used by Banco de España (MTBE) embodies financial and real property wealth into the consumption function, and a cash flow variable into the investment function. It also takes account of the effects of interest rates on the opportunity costs of both of these types of spending decision. Clearly, however, the requirements that have to be imposed, whether in terms of accounting consistency among variables or the (linear) nature of functional relationships, involve a high degree of simplification which ultimately makes it desirable to analyse the results side by side with the results produced by other types of models which, although more partial, do allow the financial aspects of spending decisions to be analysed in more detail.

In the Spanish economy, moreover, the last few years have seen far-reaching changes in the financial system which are likely to have altered the main relationships between real and financial variables. The relative speed and the fundamental nature of these changes give rise to a further difficulty, namely, the lack of samples of a sufficient size to allow the macroeconomic estimation of the relevant behavioural equations. These difficulties have been highlighted by a number of exercises carried out with the MTBE by Malo de Molina and Restoy (2004). As Chart 3 shows, recursive estimation of coefficients for financial variables in equations modelling the behaviour of households and companies is not able to capture any appreciable changes in the last few years. However, an alternative "rolling-over sample" procedure, which provides a better balance relative to the more distant as well as the more recent past, does show an increase in the absolute values of these coefficients[12]. The drawback with this approach, however, is a significant reduction in the size of the sample available for estimation, which naturally results in more imprecision, with wider confidence intervals around individual estimates.

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[10] Thus, for example, it is likely that private productive investment will only begin to be affected once the corporation's indebtedness has passed a certain threshold.

[11] Continuing the example in the previous note, the smaller investment of a corporation whose debt exceeds the threshold would not necessarily be offset (not offset exactly, in any case) by a higher level of investment of another corporation whose liabilities were below the threshold (by the same amount).

[12] Under this procedure, a particular sample size is chosen and in each new estimation a new quarter is added and replaces the oldest quarter. This means that the sample does not increase in size as it does in recursive estimation, where the oldest data are always retained, but is renewed each time. As a result, any change in the parameters is detected much sooner.

CHART 3 ESTIMATED DEVELOPMENTS IN FINANCIAL PARAMETERS OVER TIME IN THE BANCO DE ESPAÑA QUARTERLY MODEL

SOURCE: Malo de Molina and Restoy (2004).

a. Recursive estimation.

b. Rolling over estimation. Recursive estimation eliminating the oldest observation and adding a new one; sample size is always the same.

In this context, the solution adopted in the analysis of the main financial risks, given a central macroeconomic scenario, is based on a dual approach. This is, first, to identify a reasonably limited set of financial variables which are particularly significant as potential sources of risk. To identify these variables, account is taken of the available knowledge, from economic theory and historical experience in Spain and other countries, concerning the origins and development of economic crises. The second aspect of the approach is to formulate and estimate individual equations or small blocks of equations ("satellite" equations), which allow the behaviour of these variables to be characterised in a fairly detailed way. In addition, these satellite equations provide a solid platform for the development of a suitably sophisticated financial block within the macro model of the Spanish economy.

4.1 Households' decisions

As this chapter is being written, there are satellite equations for two variables for the household sector: housing prices and the debt-to-income ratio for the sector. The debt-to-income ratio is used as a basis to generate forecasts of households' financial burden and saving after debt service.

4.1.1 Housing prices

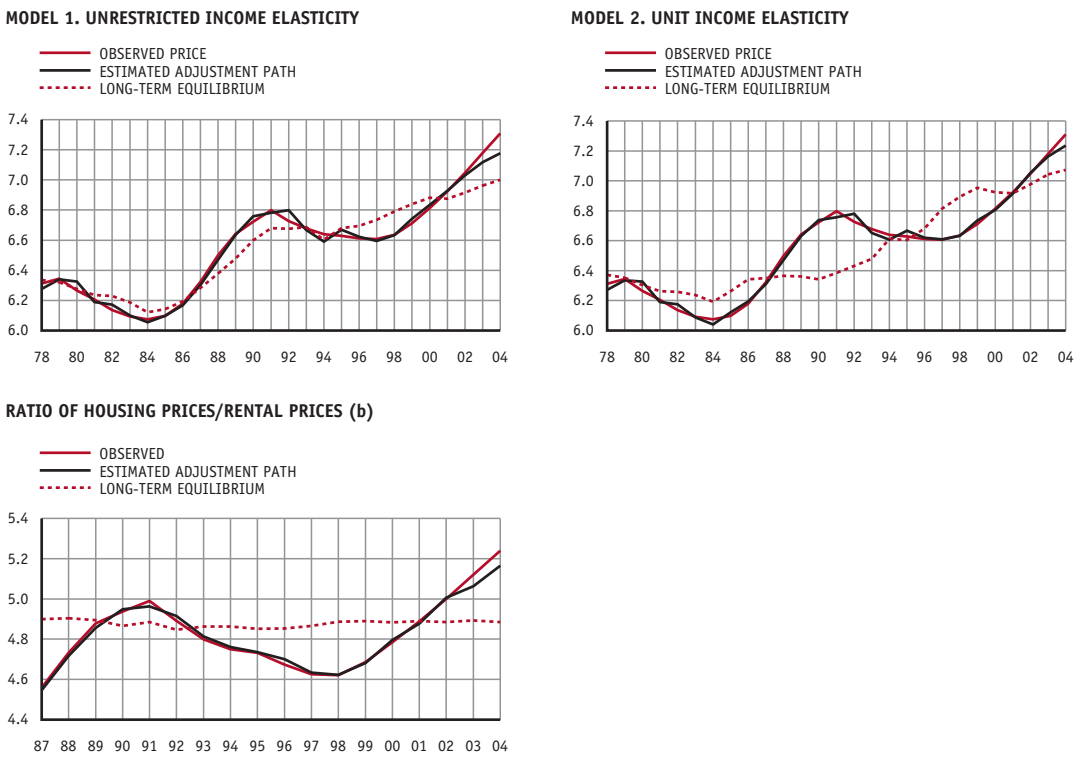
Housing makes up more than three-quarters of the total gross wealth of Spanish households and is the main asset used to provide security for loans. It follows that the prices of these real assets play an important role in the decisions of the household sector in relation to spending, saving and financing. Moreover, the particular nature of housing assets, which provide accommodation services while at the same time acting as investment assets (given their long useful life), makes it appropriate to study housing prices from a dual standpoint, according to the aspect which one wishes to emphasise.

In Ayuso and Restoy (2003) the focus is on the role of property as an investment asset, with two equations being simultaneously estimated: one long-term equilibrium equation and one short-term adjustment equation for the ratio between housing prices and rents. The conceptual framework is provided by an intertemporal general equilibrium asset valuation model in which housing is treated as a financial asset, the dividends on which would be either payments of rent to the owner, or the accommodation services that are provided if the property is owner-occupied. The equilibrium price ratio is determined by the discounted present value of future dividends. The discount factor, however, is stochastic and depends – and this is a point of difference compared with using a model of this kind with assets of a "purely" financial nature – on expectations of future rent costs (which, at equilibrium, are equal to the prices of accommodation services). The reason for this is that housing has features of a durable consumer good which are not present in, for example, a share or a derivative.

Another interesting difference between this model and the standard model for valuing purely financial assets is that it incorporates a partial adjustment mechanism which, essentially, takes account of the fact that adjustments in the housing market are subject to more severe friction than in the financial markets (transaction costs are greater, as is the time taken to produce the asset itself). More specifically, the model introduces a gap between observed prices and equilibrium prices which depends positively, albeit with a certain time lag, on a variable which reflects the existence of demand pressure in the market, to which the supply can only provide a somewhat delayed response.

Incorporating this mechanism into the model makes it possible to estimate, along with the long-term equilibrium ratio, a short-term adjustment ratio which is also significant from the point of view of economic analysis. In particular, comparisons of observed price levels with price levels determined by the long-term equilibrium ratio allow us to judge whether housing is undervalued or overvalued with respect to the equilibrium. Comparing these prices with the values estimated in the short-term adjustment equation provides val-

CHART 4 HOUSING PRICE TRENDS IN SPAIN (a)



SOURCES: INE, Ministry of Housing, Tecnigrama and Banco de España.

a. Price series deflated with the CPI, in logarithms.
b. In logarithms.

uable information on whether the degree of over- or undervaluation at any time is in line with what the rigidities normally present in the housing market would lead us to expect. This is illustrated in the third figure in Chart 4. Here it can be seen that observed values since the early 1990s have tended to be above the long-term equilibrium level, suggesting a certain degree of overvaluation. However, the relative proximity of the observed ratios to the estimated short-term adjustment path would suggest that the overvaluation is in line with what one would expect, given the normal housing market frictions. We can therefore conclude that in this case the most probable future scenario is a gradual approximation of the three series in the third figure of Chart 4, in line with the kinds of adjustment observed in the past.

It should be noted, however, that this model inherently cannot directly embody the central scenario derived from macroeconomic projections. Is usefulness in analysing potential risks therefore lies mainly in providing an indication of future price movements (short- and

long-term) which can then be compared with the price movements assumed in the central scenario.

The approach in Martínez Pagés and Maza (2003), however, does allow future housing price movements to be derived directly from macroeconomic projections. In this more macroeconomic approach, housing prices are determined essentially on the basis of consumer demand for accommodation services. The authors take as their starting point an equation for the demand for accommodation services (which are assumed to be proportional to the "quantity" of housing) in which the main determinants are household income and property user costs[13]. In the absence of friction, the property user cost is equal to the opportunity cost (net of tax effects) of the investment in property plus depreciation of the property, less the expected change in its price. At this point the equation is inverted so as to obtain a specification in which housing prices vary with changes in the variables mentioned above and in the number of properties.

Within this theoretical framework, Martínez Pagés and Maza propose and estimate two alternative equations. Both include an error correction mechanism. And the long-term equilibrium housing price level and the expected short-term adjustment path towards that level are simultaneously determined. The reason for proposing two equations, which are in fact complementary rather than alternatives to each other, is purely empirical. Thus, in the period for which information is available, a high (negative) correlation was found between household per-capita disposable income and interest rates (a major component of property user costs). This substantial correlation makes it impossible to gauge the effect of one or another of these variables with any precision and is, in fact, what justifies retaining two parallel models. The results are summarised in Table 3 and in the first and second figures of Chart 4.

In the first model, which has been estimated without parameter restrictions, the long-term income elasticity of housing prices is close to 3. This value can be considered as high from a theoretical standpoint and probably reflects the absence of the interest rate in the equation, so that the estimated coefficient captures, along with the pure income effects, other effects associated with changes in housing user costs. In the second equation, where income elasticity is constrained to unity, the interest rate does become significant in the long term, and in the expected direction. The interest rate used, it should be said, is the nominal rate. The nominal rate has proved to be more suitable to reflect changes in variables such as competition between mortgage lenders, which play a central role in this market where there are frictions on both the supply and demand side. For example, the nominal interest rate, not the real rate, is what determines the initial mortgage payment, and the quotient between this payment and the borrower's income is a key variable in determining the feasibility of many loan transactions.

Incorporating the projections for explanatory variables derived from the central scenario into these equations allows two alternative housing price paths to be plotted. By comparing these with the underlying trend in the central scenario, any risks inherent in the assumption adopted for housing prices can be identified.

[13] See, for example, Poterba (1984).

TABLE 3 MODELS FOR HOUSING PRICES IN SPAIN (a)

Long-term relationships:

Model 1 $$\overline{p}^{v} = 2.78\, y^{d}_{pc} + cte$$

Model 2 $$\overline{p}^{v} = 1.00\,(y^{d}_{pc})^{r} - 4.50\, R^{h} + cte$$

Dynamic specification:

Model 1 $$\Delta p^{v} = \underset{(-3.43)}{-1.32} + \underset{(5.25)}{0.66}\,\Delta p^{v}_{-1} + \underset{(4.42)}{2.16}\,\Delta y^{d}_{pc} - 0.16\,\Delta ib^{95} - \underset{(-4.92)}{0.49}\left(p^{v} - \overline{p}^{v}\right)_{-1}$$

Model 2 $$\Delta p^{v} = \underset{(4.46)}{0.72} + \underset{(4.61)}{0.59}\,\Delta p^{v}_{-1} + \underset{(3.90)}{1.91}\,\Delta y^{d}_{pc} - \underset{(1.90)}{1.30}\,\Delta R^{h} - \underset{(2.54)}{0.14}\,\Delta ib^{95} - \underset{(-4.04)}{0.19}\left(p^{v} - \overline{p}^{v}\right)_{-1}$$

Where:

$\mathbf{p^v}$ = relative price of housing in respect of the CPI	$\mathbf{y^d_{pc}}$ = per-capita household gross disposable income (in terms of the population aged over 25 years)
$\mathbf{R^h}$ = interest rate on loans to households for housing purchase	$\mathbf{ib^{95}}$ = Madrid general stock exchange index deflated with the CPI from 1995
cte = constant	

a. Variables in lowercase are expressed in logarithms. The superscript "r" indicates that the parameter is restricted in the estimation. Bar variables ($\bar{x}$) denote long term. Parentheses are used for t-statistics. Estimated using annual series for the period 1978-2002. For further details, including the evaluation of goodness of fit, see Martínez Pagés and Maza (2003).

4.1.2 Debt, financial burden and saving after debt service

Credit is a financial instrument that households use to consume and invest against their future wealth and income. Households rely on borrowing to achieve an optimum distribution of consumption over their life cycle. External financing allow households to purchase consumer durable goods that serve them for a long period of time (a home is the most obvious example) and whose cost requires a very substantial outlay of resources compared with the average current income level. Seen in this way, demand for credit should be a wholly passive response to households' consumption and investment decisions and changes in this demand would therefore offer little of interest to the analyst.

However, the credit market provides the classic example of a rationed market, in which major problems caused by asymmetrical information have the effect of restricting the volume of funds available to individuals. Consequently, consumption by credit-rationed indi-

viduals will be determined to a larger extent by their assets and their current income and, more importantly, by any change in the conditions that determine the supply of loanable funds or their ability to access it. For this reason, supply conditions in the credit market and any changes in the circumstances of individuals that could affect their ability to access the credit market, such as their wealth or employment situation, are equally important in determining an appropriate level of borrowing and, hence, spending by the household sector.

A higher level of debt will also normally involve a higher financial burden in terms of interest and repayment of principal which will restrict access to additional external funding. Both these factors reduce households' ability to withstand shocks that adversely impact their income, the value of their wealth, or interest rates. These factors are particularly significant if loans are taken out at a variable interest rate, which will make the associated debt servicing cost highly sensitive to changes in interest rates, at least in the short term. In addition, in a moderate inflation environment, the real value of debt will decline only slowly, causing the vulnerability of borrowers to changes in their financial situation to continue for a relatively longer period [see Alonso et al. (2004) for a more detailed analysis].

In fact a higher level of indebtedness can, in certain circumstances, help to intensify recessionary tendencies during a cyclical downturn or to limit the extent of an economic recovery. This is a good reason for detailed monitoring of this variable and its possible effect on households' spending decisions. Household indebtedness equations are therefore estimated and maintained so that changes in this component of households' net wealth position can be evaluated and potential risks in the central projections for household spending identified. Error correction models (ECMs) are currently in use in both single-equation specifications [del Río (2002) and Nieto (2003)] and equation systems [Martínez-Carrascal and del Río (2004)].

Single-equation ECM paths have been estimated by del Río (2002) and Nieto (2003), with indebtedness (the debt-to-income ratio) as the dependent variable in the former study and credit in real terms in the latter. This is shown in Table 4. Although the two approaches differ in terms of the dependent variable and in some of the explanatory factors, both studies have produced qualitatively similar results and the estimated equations have proved to be complementary. In del Río (2002) the long-term value of indebtedness is determined, first, by a per-capita real income which not only approximates the concept of *permanent income,* but has a direct impact on household debt in a context of credit rationing. Financing costs are reflected by the "financial burden per unit of debt" variable, which incorporates changes in interest rates and also changes in average loan repayment periods. Last, the model includes the unemployment rate, which correlates negatively with the population's propensity to borrow, and also with banks' willingness to grant loans. In Nieto (2003) the long-term specification is made up of the same elements although, as an alternative, it uses household sector consumption and investment spending as a scale variable to reflect the *permanent income* effects; as in the Martínez Pagés and Maza (2003) model for housing prices, the nominal interest rate approximates the cost of borrowing and the possible effects of certain factors related to the supply of credit. This last aspect has to do with the fact that the amount that banks are willing to lend tends to be governed by a rule of prudence by which the initial repayment on a loan should not exceed a certain percentage of the borrower's current income. The restrictiveness of this rule will therefore depend on the nominal

TABLE 4 CREDIT AND INDEBTEDNESS EQUATION FOR HOUSEHOLDS AND NPISHs (a)

Long-term relationships:

Model 1: real credit (1987.I-2002.II) $\overline{cr}^{h} = 1.41\left(c + i^{r}\right) - 0.01U - 3.12R^{cr^{h}} + cte$

Model 2: indebtedness (1983.II-2001.II) $\bar{e} = 0.95\, y^{d}_{pc} - 0.01U - 0.57cfd + cte$

Dynamic specification:

Model 1 $\Delta cr^{h} = \underset{(1.14)}{-0.99} + \underset{(2.84)}{0.23}\Delta nfw_{-1} + \underset{(3.12)}{0.47}\Delta ipc_{-1} - \underset{(4.19)}{0.17}\left(cr^{h} - \overline{cr}^{h}\right)_{-1} + \text{seasonal variables}$

Model 2 $\Delta e = \underset{(5.06)}{0.85} + \underset{(2.20)}{0.22}\Delta e_{-1} + \underset{(4.78)}{0.48}\Delta e_{-4} + \underset{(1.98)}{0.10}\left(\Delta nfw_{-1} + \Delta nfw_{-4}\right) - \underset{(4.45)}{0.16}\left(e - \bar{e}\right)_{-1}$

Where:

cr^{h} = credit from resident financial institutions to households, deflated with the CPI	**e** = ratio of debt over household gross disposable income
y$^{d}_{pc}$ = per-capita household gross disposable income	**c** = real private consumption
i^{r} = real domestic residential investment	**U** = unemployment rate (EPA)
R$^{cr^{h}}$ = nominal interest rate on total credit to households	**nfw** = real private sector non-financial wealth deflated with the consumption deflator
cfd = financial burden (total sector resources earmarked to meet payment obligations for interest and principal amortisation) per unit of debt	**Δipc** = CPI inflation (quarterly)
cte = constant	

a. Variables in lowercase are expressed in logarithms. Bar variables ($\bar{x}$) denote long term. Parentheses are used for t-statistics. Estimated using seasonally adjusted quarterly series. For further details, the evaluation of goodness of fit, see Nieto (2003) and del Río (2002).

interest rate, the loan amortisation period and the borrower's current income. To this extent, the decline in inflation and in nominal interest rates in the Spanish economy has resulted in an increase in household borrowing capacity.

The model in Nieto (2003), in which the determinants are treated as exogenous variables, is estimated and revised internally on a regular basis to obtain credit forecasts and project the debt-to-income ratio consistently with the central scenario forecast for the Spanish economy. Under a particular assumption for nominal interest rates, and on the basis of central forecasts for housing prices, unemployment, inflation, consumption and domestic residential investment, we obtain a credit forecast which is subsequently expressed as a ratio of the income projected by the central macroeconomic scenario.

More recently, Martínez-Carrascal and del Río (2004) have adopted a broader approach which models a system of equations with the aim of illustrating the possible two-way inter-

action between credit and consumption. This involves the estimation of a vector error correction model (VECM) for credit and consumption. Unlike earlier approaches, this one makes it possible to determine which variables adjust and in what proportions when credit and/or consumer spending deviate from their long-term equilibrium paths. Although in principle this offers a more complete analysis than the single-equation type, it is subject to other difficulties, one of which is the limited number of variables that can be incorporated when working with relatively small sample sizes. In this particular case, six variables were modelled: credit to households, total consumption, labour income, real property wealth, net financial wealth and nominal interest rates.

In this model, two long-term relationships are specified: one for credit and one for consumption[14]. In the case of credit, the long-term determinants are consumption, a variable to approximate *permanent income;* real property wealth, which reflects the role of property as collateral for mortgage lending; and the nominal interest rate which reflects the cost of borrowing and certain aspects related to the supply of loans, as explained above. In the case of consumption, the specification is very simple. In the long term, consumption is determined by earned income (which approximates human capital), by the two wealth aggregates and by credit. In this specification, therefore, the effects of changes in the interest rate are reflected mainly through the credit variable.

The estimated long-term coefficients are shown in Table 5. As can be seen, consumption varies positively with income, both types of wealth and credit. The credit equation shows that in the long term credit varies positively with consumption and real property wealth, and negatively with the interest rate. If these relationships are expressed in terms of income, the wealth variables and the interest rate, we find that the importance of labour income is relatively greater for consumption, whereas the effect of real property wealth and nominal interest rates is greater for credit. Moreover, the role of real property wealth is more important than that of financial wealth in determining the volume of credit, which is consistent with the fact that financial assets do not generally serve as loan collateral. In the case of consumption, however, the long-term effects of both these types of wealth are not statistically different.

The dynamic specification for these equations shows which variables are active in restoring equilibrium when either credit or consumption deviate from their long-term relationship. The results show that when credit is above (below) its long-term path, this implies future reductions (increases) in credit as well as in future consumption. In the case of consumption, positive (negative) deviations from the long-term path imply future reductions (increases) in consumption and increases (reductions) in labour income[15]. This last finding is consistent with what is predicted by the *permanent income theory,* namely that agents increase their current consumption when they upwardly revise their income expectations, given their preference for smoothing their consumption over their life cycles.

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[14] The results obtained are robust to alternative specifications of the VECM model in which, for example, no long-term relationship for consumption is modelled. For further details, see Martínez-Carrascal and del Río (2004). For similar studies for the U.K. and the EMU, see Chrystal and Mizen (2005) and Calza et al (2003) respectively.

[15] Evidence for this can also be found in the estimation of a VECM for household spending decisions [Sastre and Fernández (2004)].

TABLE 5 HOUSEHOLD CREDIT AND CONSUMPTION MODEL (a)

Long-term relationship:

$$\overline{cr}^{h} = 0.66c + 0.42nfw - 4.49R^{cr^{h}} + cte$$

$$\bar{c} = 0.55y^{l} + 0.04nfw + 0.05fw + 0.11cr^{h}$$

Long-term relationships as a function of income, wealth variables, and interest rate:

$$\overline{cr}^{h} = 0.39y^{l} + 0.48nfw + 0.04fw - 4.84R^{cr^{h}} + cte$$

$$\bar{c} = 0.60y^{l} + 0.09nfw + 0.05fw - 0.57R^{cr^{h}} + cte$$

Dynamic specification:

$$\Delta cr^{h} = \underset{(5,24)}{-0,14}\left(cr^{h} - \overline{cr}^{h}\right)_{-1} + \sum_{i=1}\hat{\Gamma}_{1i}\Delta z_{t-i}$$

$$\Delta c = \underset{(3.16)}{-0.40}\left(c - \bar{c}\right)_{-1} - \underset{(5.29)}{0.09}\left(cr^{h} - \overline{cr}^{h}\right)_{-1} + \sum_{i=1}\hat{\Gamma}_{2i}\Delta z_{t-i}$$

$$\Delta y^{l} = \underset{(3.63)}{0.71}\left(c - \bar{c}\right)_{-1} + \sum_{i=1}\hat{\Gamma}_{3i}\Delta z_{t-i}$$

Where:

cr^{h} = credit from resident financial institutions to households, deflated with the consumption deflator	**c** = real private consumption
nfw = real private sector non-financial wealth deflated with the consumption deflator	**y^{l}** = real household labour income
fw = real financial net wealth deflated with the consumption deflator	**$R^{cr^{h}}$** = nominal interest rate on total credit to households
cte = constant	**Δz** = first differences in the six variables used in the model

a. Variables in lowercase are expressed in logarithms. Bar variables ($\bar{x}$) denote long term. Parentheses are used for t-statistics. Estimated using seasonally adjusted quarterly series for the period 1984.I-2003.IV. For further details see Martínez-Carrascal and del Río (2004).

These estimations can be used to make combined credit and consumption forecasts on the basis of a particular scenario for the other explanatory variables. Comparing these forecasts against the projected path for consumption under the central scenario thus provides a further check when analysing possible risks.

Based on forecasts for household credit, a projection of the sector's financial burden is also made. To that end, assumptions need to be made on future interest rate movements (these assumptions will be consistent with those incorporated into the central macroeconomic scenario) and on the remaining terms of debt (which are normally assumed to be

constant). One of the components of this projection – the proportion of the burden associated with repayment of principal – is used to build a forecast of *saving after debt service* based on the gross saving aggregate as estimated in the central macroeconomic scenario. Future changes in these two variables (the burden and *saving after debt service)* are estimated and contextualised to determine whether they might give rise to any significant risks to the expected patterns in household spending.

4.2 Decisions of non-financial corporations

Corporations normally need to rely on external funding for production and investment. For this reason, as in the case of households, changes in the cost of, or ease of access to, funding will affect spending and hiring decisions[16]. Microeconomic data for Spanish corporations provide empirical evidence[17] to suggest that levels of debt or financial burden exceeding certain thresholds can have significant adverse effects on corporate investment and hiring levels. Consequently satellite models are used, in a way similar to that described in the discussion of households, to analyse, measure and predict changes in financing raised by non-financial corporations in a way that is consistent with the macroeconomic scenario.

The structure of financing in the corporate sector is, however, more complex than it is for households. For example, while bank loans from Spanish resident institutions remain the principal source of finance, a wider range of financing concepts must be taken into account, including fixed-income securities issued by companies and external loans. Both of these alternatives have been increasing in importance since the euro area came into being and the growth in these sources of finance in Spain has been linked to the expansion of Spain's larger corporations. Also of significance is the fact that the development of different sources of finance may sometimes vary considerably from one productive sector to another, and this has to be taken into account when interpreting the results for non-financial corporations as a whole. These intersectoral differences reflect such factors as cyclical asymmetries, divergences in the use of capital in the productive activity, trends related to productive specialisation of the economy, or specific processes such as the expansion into foreign markets.

As with households, the available credit models for non-financial corporations do not allow a clear separation to be made between supply and demand. The most important explanatory factors include the level of economic activity as a basic determinant of investment, the main purpose to which business finance is directed. This variable also reflects supply factors related to lenders' credit policies and changes in those policies, particularly their perceptions of risk at different stages of the economic cycle. Both of these approaches would suggest a positive correlation between these two variables.

A second key determinant of credit is its cost, both in absolute terms and in relation to the cost of available alternative sources of funding. Apart from the interest rates charged

[16] See, for example, Bernanke et al. (1996) or, for an empirically based application to the EMU, Vermeulen (2002).

[17] See Hernando and Martínez-Carrascal (2003) or Martínez-Carrascal (2004).

TABLE 6 NON-FINANCIAL CORPORATION CREDIT EQUATION (a)

Long-term relationships:

$$\overline{cr}^{S} = 1.30\,y - 0.10\,RR^{cr^{S}} + cte$$

Dynamic specification:

$$\Delta cr^{S} = \underset{(4.28)}{0.40}\,\Delta cr^{S}_{-1} - \underset{(2.45)}{0.25}\,\Delta ebe_{-4} - \underset{(2.47)}{0.03}\,\Delta ib_{-4} - \underset{(4.55)}{0.09}\left(cr^{S} - \overline{cr}^{S}\right)_{-1} + \underset{(1.16)}{0.25}$$

Where:

cr^{s} = credit from resident financial institutions to non-financial corporations, deflated with the GDP deflator	**y** = real GDP
RR$^{cr^{s}}$ = interest rate on total credit to non-financial corporations deflated with the GDP deflator	**ib** = Madrid general stock exchange index
ebe = real gross operating surplus, deflated with the GDP deflator	

a. Variables in lowercase are expressed in logarithms. Bar variables ($\bar{x}$) denote long term. Parentheses are used for t-statistics. Estimated using seasonally adjusted quarterly series for the period 1987.I-2004.IV.

on credit, this means taking account of alternative interest rates associated with other financing instruments (such as, for example, fixed-income markets), and such variables as the net wealth position of the sector as a whole, trade credit and the capacity to generate resources internally. It is not easy to establish, however, on *a priori* basis, how far these different sources of financing may be substitutes for, or complementary to, each other, especially when aggregate data are involved. This is because of the complexity of the factors that determine the structure of corporate finance, the degree to which problems arise from the information asymmetries between investors and funding sources, and the varying impact of these problems on different types of corporation. An example to illustrate this complexity can be seen in the literature concerned with the *balance-sheet channel,* or *financial accelerator*, in which the net wealth position of a corporation or its ability to generate resources internally is a determinant of the availability of interest-bearing financing. With this mechanism, a better corporate balance sheet could generate an increase in borrowing through its impact on the cost or availability of credit, although this could pass unobserved if the dominant trend was towards cheaper alternative sources of finance (such as internal saving or equity issuance). For small and medium-sized corporations, access to the securities markets is more limited and the financial intermediaries' lending policy, as partly reflected in the cost of loans, may prove to be a more important determinant.

Table 6 shows the results of the specification of a single-equation ECM for bank credit (resident lenders) to corporations in Spain. This variable (in real terms) is explained, in the long term, by the level of economic activity (approximated with real GDP) and the interest rate on bank credit expressed in real terms. In the short term, there is a negative effect from both stock-market prices and corporations' internal capacity to generate resources, approxi-

mated with changes in their gross operating surplus. Both coefficients point to a substitution effect among these alternative sources of finance[18].

Long-term elasticities for the scale variable and interest rate are relatively high in comparison with the values estimated in the available empirical literature. Interestingly, recursive and rolling-over estimations suggest a certain increase in these elasticities at the end of the sample. One explanation for this may be the different dynamism of certain productive sectors that account for an appreciable proportion of aggregate financing[19]. Specifically, in view of the sample period, the results could be reflecting the substantial growth in financing to the construction and property services industry, a highly leveraged sector and one for which the GDP variable is likely to be unsatisfactory as an indicator of activity given that, *inter alia,* the variables in the national accounts make no allowance for changes in land values[20].

A similar equation is also available for a broad financing aggregate which includes, along with loans from resident banks, external loans and securities other than shares. The results are qualitatively very similar to those shown in Table 6[21].

As explained above in the discussion on households, alternative models for different financing aggregates are estimated periodically in regular forecasting exercises, in a way which is consistent with the central scenario of the macroeconomic model. These forecasts are also being used to develop another key indicator of future levels of activity in the sector: the interest component of the debt burden[22].

5 Final comments

In this chapter we have provided a summary of how and why the financial implications of real decisions taken by corporations and households are analysed as part of the process of studying the working and future outlook of the Spanish economy. In addition, the discussion has highlighted a number of areas in which progress will need to advance at a firmer pace in the coming years. It is clear, for example, that progress in modelling the variables

[18] See Marqués, Nieto and del Río (2005). For alternative specifications used by the *Servicio de Estudios* in the past, see Vega (1992) or Manrique and Sáez (1998).

[19] Alternatively, financing may have been directed at investment outflows. To take account of this possibility, alternative specifications for variables measuring outward investment have been used but have not proved to be statistically significant. The absence of a variable that reflects the process of outward investment may be due to the fact that the available information tends to include activities carried out by financial institutions through non-financial corporations.

[20] To analyse these aspects in greater depth it would be necessary to carry out further econometric studies for different productive branches using sector-representative scale and interest rate variables, and these are not always available. Alternatively, some preliminary results for credit aggregates that exclude property sector operations do tend to show lower elasticities for the scale variable and interest rates.

[21] Readers interested in this topic should refer to Marqués, Nieto and del Río (2005).

[22] We observe that, unlike households, corporations are in a structural position of indebtedness. This implies that most of the funding raised by corporations tends to be rolled over before it is finally amortised.

that play the most important role in the behaviour of households has been greater than in the case of non-financial corporations.

However, we should not lose sight of other challenges which will need to be met in a different area, and probably over a longer timescale. Many of the questions which provide the ultimate motivation for studying the financial position of an economy cannot be definitively answered solely on the basis of information on aggregate sectoral behaviours or situations. Risk analysis, for example, requires us to identify not only possible behaviours by a representative agent, but also the behaviour it might adopt in a position of increased vulnerability. There are, in fact, already numerous studies to demonstrate the value of, and the need for, the kind of analysis that disaggregates down to lower levels in this way. This is probably one area in which efforts to collect and interpret new data will be most beneficial in the next few years.

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15. Comparative analysis: real convergence, cyclical synchrony and inflation differentials

J. David López-Salido and Gabriel Pérez Quirós

1 Introduction

The methods used for analysing the Spanish economy, which are among the tools of the *Servicio de Estudios* and which provide the basis for the assessment of risks and alternative scenarios of economic policy, have traditionally involved comparisons with the industrialised economies in our area that form a wider and relatively homogeneous economic area.

Gradual integration within this area has increased the importance of comparative studies, which have become essential in understanding the economy, the challenges and opportunities which it faces, and the constraints within which economic policy operates. With membership in the Economic and Monetary Union (EMU), concepts such as "convergence", "synchrony" and "differentials" have become central to the analysis, as they are essential in diagnosing how the Spanish economy evolves within an integrated monetary area. Renewed efforts have consequently been made to develop and apply comparative analysis techniques.

Comparative analysis can, in principle, be extended to a wide range of variables and indicators, although this chapter focuses solely on those which are of greatest relevance for the Spanish economy and for formulating the country's economic policies. This selective focus had led to concentration on three specific aspects of comparative analysis: real convergence, cyclical synchrony and inflation differentials.

Section 2 of this chapter, which covers real convergence, centres on an analysis of differences in economic welfare and its determining factors, so permitting comparison of alternative growth patterns and examination of the effects arising from economic integration. In the case of the Spanish economy, these questions are of particular interest as a consequence of

the founding of the EMU, as once the process of nominal convergence concludes and macroeconomic stability is achieved, the benefits of participation in the Monetary Union should materialise, mainly through increases in per-capita income, with the latter approaching the levels found among the more advanced members of the European Union (EU).

From a more short- and medium-term perspective, Section 3 describes the cyclical movements of European economies, and particularly of the Spanish economy in relation to them. This section focuses on two different aspects of the cycle. The first is the study and description of *cyclical synchrony,* a notion that attempts to address the question of whether economies move contemporaneously, are ahead or behind each other, or simply do not demonstrate a clear relationship. The lack of cyclical synchrony may reflect the presence of asymmetric shocks or may be the differential response of an economy confronted with common shocks, resulting from different macroeconomic adjustment mechanisms. The study is completed with a description and comparison of recessions and expansions in various economies and economic areas.

Section 4 then explores the relationship between inflation differentials and *competitiveness* in an economy that is part of a monetary union, such as Spain's. The adjustment of relative prices of the Spanish economy compared to the euro area provides the main mechanism for correcting disparities in competitiveness, a function which was performed by the exchange rate in the past. Evolution of the inflation differential in turn affects competitiveness of the economy and determines the bases of its macroeconomic stability and its capacity to progress to real convergence.

The analysis undertaken in this chapter takes a macroeconomic perspective, and enters into further detail concerning the determinants of inflation differentials for goods and services produced in Spain compared to its main competitors, distinguishing between trends in prices for internationally tradable goods and evolution of the relative price of non-tradable goods and tradable ones (or dual inflation). It is thus possible to identify to what degree the inflation differential is a consequence of an intrinsic competitiveness problem, arising from existing rigidities in the markets for products and in the labour market, which generate excessive pressure on wages and/or margins on prices; limited growth in productivity compared to competing countries; or whether, on the contrary, the origin of the differential is associated with productivity gains in the tradable goods sector, which normally accompany catching-up processes *(Balassa-Samuelson effect).*

The chapter closes with a section of conclusions.

2 Real convergence indicators

The degree of economic integration of the various economies and of its determinant factors has occupied a central place in the debate and in the development of economic theory during the 1990s, and has a substantial influence on the design of economic policies. One of the main objectives in establishing the EU was to increase levels of economic welfare of all members, so facilitating real convergence. The latter could be defined as the process by which countries or regions starting from different levels of development tend to reach similar – and higher – levels of per-capita income. The use of indicators in real convergence

analysis assists in distinguishing those factors that explain how different economies or regions can demonstrate persistent differences in their growth rates[1].

The Banco de España analyses real convergence by considering in particular the process of approximation of the Spanish economy to the average levels of income and economic welfare of the EU and of its more advanced European partners. The simplest summary indicator for studying the relative position of a country in a wider economic area is its per-capita GDP compared to that of the benchmark area. The countries that make up the euro area – or, alternatively, the most advanced nucleus of those comprising the EU 15 – naturally form this benchmark for the Spanish economy. Since 1 May 2004, the EU has expanded to 25 members, and the analysis has been extended to take account of this factor. However, given the differences in the degree of development of the new members, it remains useful to maintain a differential analysis of real convergence indicators, providing firstly levels for Spain relative to the EU 15 and, secondly, levels for Spain relative to the EU 25[2].

Despite the apparent simplicity underlying the relative per-capita GDP indicator, it should be noted that its calculation is affected by certain methodological problems, which are discussed in detail in Box 1. In order to understand the influences on evolution of per capita GDP, this measure can be broken down into its determinant factors:

$$GDP_{pc} = \frac{Pop.\,aged\,15-64}{Total\ \ population} * \frac{Employment}{Pop.\,aged\,15-64} * \frac{GDP}{Employment}$$

This equation is normally used in identifying the origin of international differentials in per-capita GDP. The first component on the right-hand side of the equation represents a demographic factor, relating to the age structure of the population, and is given by the ratio between working-age population and total population, the effect being that a higher ratio will result in a greater per-capita GDP. The second factor is related to the labour market and depends on the employment rate. A higher employment rate will result in a larger percentage of the population of working age being in paid employment, thus giving a greater per capita GDP[3]. The final factor, productivity per worker, is an indicator of the degree of efficiency of the labour factor, which depends on capital accumulation (available capital per worker), and of total factor productivity, which approximates the state of technology[4].

Put simply, the formula above allows us to relate growth in per-capita GDP to developments in demography, the labour market and productive efficiency. Moreover, given that in the long term the possibility of achieving increases in per-capita GDP through steady in-

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[1] Economic growth theory allows us to study the gradual, long-term developments in per-capita output that an economy undergoes [Barro and Sala-i-Martín (2004) is a useful reference in this regard].

[2] Most of this section is based on the contents of three studies, published in the *Boletín Económico* of Banco de España (2001b and 2004) and in Núñez and Pérez (2002).

[3] In Box 1, per-capita GDP is further broken down, relating employment rate to the activity rate and the unemployment rate.

[4] See Chapter 16.

BOX 1

Some considerations on real convergence indicators

As explained in the main text, per-capita GDP and its breakdown into components attempt to summarise the level of welfare achieved by an economy in comparison with others in its area, based on factors related to the labour market, to productive efficiency and to demographic variables. In order to carry out these comparisons, the variables must first be calculated using the same methodology pursuant to the European System of Accounts (ESA 95) manuals. Second, the monetary unit and levels of prices used in their valuation should be equal in order to guarantee uniform comparisons. Purchasing power parities (PPP) are conversion rates that allow comparisons to be made, as they correct distortions in the different price levels with respect to the area that is being used as the benchmark, expressing the variables in a common monetary unit. Consequently PPPs can be interpreted as nominal exchange rates, corrected for spatial deflators, which eliminate geographic price differentials.

PPPs are calculated from the expenditure standpoint, based on a maximum breakdown by item, or *rúbrica,* to subsequently obtain the main categories by aggregation, and finally GDP. The quality of the data is, however, not completely satisfactory, given the complexity involved in obtaining price levels of a basket of goods that is homogeneous and sufficiently representative of spending in the various countries concerned. Moreover, given that PPPs are spatial deflators, they are not suitable for conducting time comparisons of the variables converted using this procedure.

This restriction has determined how Banco de España publishes convergence indicators. Frequently, the per capita GDP that is used in international comparisons is assessed at current prices and in PPP. This procedure is used in Eurostat publications, which allows Spain's relative position to be seen with respect to the EU for each year with the relative prices of that year. This valuation method does, however, give rise to problems in breaking down per-capita GDP into components and conducting time comparisons, as this latter comparison is distorted, as we have explained, by movements in relative prices.

An alternative way of valuing per-capita GDP of each country is to use constant prices, also valued in terms of PPP. Here it becomes necessary to decide on the base year to use as the benchmark. One option is to use the last year that is presented in the estimates as a base, which has the advantage of facilitating contemporaneous comparisons and of permitting the use of the most current relative prices. This option does, however, present some disadvantages. First, it involves changing the base year each time a new datum is incorporated, which necessitates modifying, for each update, the level of all series expressed in constant prices; and second, it involves using highly provisional series (the deflator and the PPP for the last year) as benchmarks.

A third option is to use as the base year that used in the National Accounts (currently 1995 for the Spanish economy). This option offers the advantage that the real variables are referenced in the year for which the estimation of the relative price structure in each country has been obtained with greater precision.

In order to attempt to resolve all the issues described above, the Banco de España publishes in the convergence indicators per capita GDP for Spain and the EU, measured at constant 1995 prices, with a breakdown corresponding to its determinant variables, thus permitting homogeneous time comparisons to be made. The information also includes series for per-capita GDP at current prices, which permits an analysis of the position of each year with the prices of that year, and in particular the last year offered, with the most current relative price structure.

The per-capita GDP breakdown that is included in the real convergence indicators shows the movements in this variable as a combination of productivity per person employed, the employment rate and the percentage of the working age population in the total population. For a better understanding and quantification of the determinant factors of economic growth, and taking into account differences in hours worked per person employed, it is useful to further analyse the preceding breakdown, disaggregating apparent labour productivity per person employed into apparent productivity per hour worked and working days in the year per person employed measured in hours; productivity per hour in turn moves in line with the capital/labour relationship and with total factor productivity. The employment rate is also broken down into a component that is negatively dependent on the unemployment rate and the activity rate, which allows us to analyse labour market behaviour in more detail. That is:

$$GDP_{pc} = \frac{GDP}{Employed} * \frac{Employed}{Pop.\,aged\,15-64} * \frac{Pop.\,aged\,15-64}{Population}$$

$$GDP_{pc} = \frac{GDP}{Hours} * \frac{Hours}{Employed} * \left(1 - \frac{Unemployed}{Pop.\,aged\,15-64}\right) * \frac{Pop.\,aged\,15-64}{Population}$$

As explained in the main text, to better estimate the productive efficiency of the economy, the indicators published by the Banco de España provide information on the breakdown of physical capital stock into different components (and specifically into its public, private productive and residential components), which provides a measure of the capital/labour relationship that is closer to its utilization as a productive input. In order to calculate these stocks, the perpetual inventory method is applied to the investment series using the same breakdown and using depreciation rates for each type of stock (higher for private productive capital and lower for residential capital), together with an initial condition that is obtained by establishing a long-term relationship in the initial period between investment flow, stock level and the depreciation rate. The methodological aspects of this estimate can be reviewed in Núñez and Pérez (2002).

Finally, in order to identify sources of growth more precisely, estimations have been made for some of the variables that determine level and evolution of total factor productivity, such as technology and human capital. The construction of a technology capital series has been undertaken by applying the perpetual inventory method to the series for expenditure on R&D in real terms, using a depreciation rate of 15 percent and an initial condition that is obtained using a procedure similar to the case of physical capital. The

starting point for constructing the human capital series is information calculated for labour force surveys, which provides working-age population data classified by the level of education achieved. This information allows the population to be aggregated, with weightings that depend positively on the number of years required to reach each educational level. The indicator can then be interpreted as the percentage of population with education equivalent to university studies. This indicator is also offered with a correction for quality of education systems, so as to improve the comparison between countries. This correction attempts to address the fact that individuals from two countries who may have the same theoretical level of training can have very different capabilities, depending on resources and the quality of the education system in each country. Such corrections must reflect the results of the *Programme for international student assessment (PISA)* project of the OECD, conducted in 2000 and 2003, and movements in public expenditure per student [see Puente and Pérez (2004)].

creases in the employment rate is limited, this presentation highlights the close relationship between productivity and real convergence of the various economies[5]. However, analysis of the employment rate and of its determinant factors should also be a special consideration in studies of convergence.

The theory of growth and convergence highlights the wide-ranging and complex group of factors that determine productivity and, in the final instance, the long-term growth and welfare of economies. Among those of particular interest are not only physical capital accumulation, but also human capital formation, and the ability to develop new productive techniques and to adopt or adapt technological advances arising elsewhere. The institutional environment also has a substantial influence on growth and the convergence capacity of the various economies. The convergence indicators that are calculated by the Banco de España attempt to approximate, insofar as is possible, the evolution of these factors, although some remain outside the analysis owing to difficulties involved in their measurement and quantification.

The group of convergence indicators includes, firstly, a measure of physical capital stock and its composition, and distinguishes between public, private and residential capital, as according to the studies conducted in this area, each of these has a very different impact on labour productivity. A quantification of technological capital stock and of the stock of human capital is also included, given the relevance of these factors in explaining the evolution of total productivity and growth, through allowing more efficient utilisation of primary productive resources (see Box 1). It should be noted, however, that measurement of these aspects presents particular difficulties, as there is no single indicator that permits their evolution to be summarised; instead, there is a set of variables that provide information concerning particular aspects of innovation and of the level of labour qualification. A set of indicators has therefore been selected that

[5] In fact, most growth models presuppose an equivalence between growth in per-capita income and productivity, where the employment rate is constant. Similarly, some empirical studies directly analyse convergence, focusing on developments in productivity [see Temple (1999)].

provides evidence of the innovation capacity of the economy and the quality of human capital. Information is also provided concerning the variables involved in the accumulation of productive stocks mentioned above.

Finally, we should point out that per-capita GDP is a variable that only provides an imprecise approximation of the welfare of a population. This information therefore needs to be supplemented with indicators relating to quality of life and wealth distribution among the population. The set of convergence indicators is therefore accompanied by information on per-capita social expenditure, analysed by function, and the unemployment rate. Table 1 lists all these variables for the Spanish economy, compared to the average for the EU 15 and the EU 25, for 1990 and 2004.

2.1 Determinants of the sources of convergence in the Spanish economy

In order to illustrate the use of real convergence indicators, Charts 1 and 2 show their evolution in relation to the EU 15. As we observe in Chart 1, since 1960, the first year for which information is available, the level of per-capita GDP in the Spanish economy has tended to converge with that of its Europeans partners – with the exception of the period 1975-1985, which coincided with the development of the first two energy crises – so that by 2004 it reached 85.4 percent of GDP for the EU 15. The welfare differentials that still exist with this group of countries reflects, firstly, the lower productive efficiency of the Spanish economy, with labour productivity of approximately 93 percent of the EU average and, secondly, the lower employment rate.

In the final part of the period under analysis, the process of convergence has been sustained primarily by increased growth in the employment rate recorded in the Spanish economy, which was influenced by a series of labour market reforms that increased the capacity to generate employment. There has also been more expansive performance in the working-age population, although the impact of this factor has recently declined owing to a drastic reduction in the birth rate that took place at the beginning of the 1980s. During the last 15 years, improvement in labour productivity has been quite moderate and lower than the EU 15 average in practically all years.

In order to explain the development of labour productivity, we need to look to an analysis of its main determinants. In Chart 2, we observe that during the years following EU entry, the Spanish economy made a major effort to accumulate physical capital, maintaining high rates of gross capital formation – which were higher, in general, than the average rates for the EU 15 – in response to the need to adjust the productive apparatus. As a result, physical capital stock rose steadily from 1986 at a rate consistently higher than the EU 15 level. However, the capital/labour ratio only increased during the final years of the 1980s and early 1990s, and this growth was later slowed by substantial creation of employment in the growth model the Spanish economy followed from the mid-1990s. This led to a reduction in the high rates of unemployment accumulated during the preceding economic crisis. In any case, total factor productivity registered increases consistently below the average for the EU 15.

Spain's infrastructure, technology and human capital endowment has increased considerably, reducing the differences that the country had experienced compared to the EU dur-

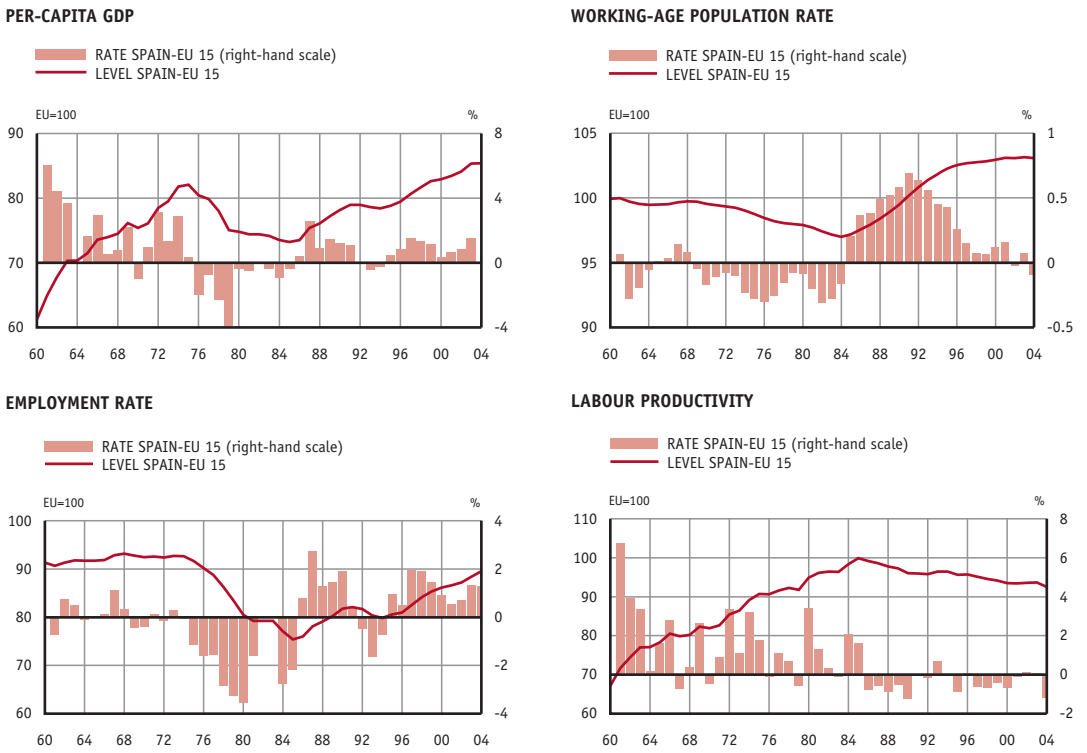
TABLE 1 RECENT CHANGES IN REAL CONVERGENCE INDICATORS IN SPAIN WITH THE EUROPEAN UNION

	SPAIN/EU 15			SPAIN/EU 25		
	Level 1990	Level 2004	Rate 2004/1990	Level 1990	Level 2004	Rate 2004/1990
1. Per-capita GDP and components						
Per-capita GDP (current)	78.1	87.4	0.8	86.1	95.0	0.7
Per-capita GDP	78.1	85.4	0.6	86.0	92.9	0.5
Population 16-64/Total population	*99.5*	*103.1*	*0.3*	*99.9*	*102.2*	*0.2*
Employment rate	*81.8*	*89.5*	*0.7*	*82.4*	*91.9*	*0.8*
Labour productivity	*96.1*	*92.5*	*-0.3*	*104.6*	*98.9*	*-0.4*
2. Total factor productivity and capital stock						
Total factor productivity	102.7	95.4	-0.5			
Total capital stock/employment	85.1	91.2	0.5			
Productive capital stock/employment	*88.8*	*98.7*	*0.8*			
Private productive capital stock/employment	97.9	99.9	0.1			
Public capital stock/population	57.4	88.6	3.1			
Residential capital stock/population	*66.4*	*76.8*	*1.0*			
Technological capital/GDP (a)	32.5	45.3	2.8			
Human capital/population 16-64 (b)	81.8	90.2	0.9	86.6	89.6	0.6
Human cap./population 16-64, quality-adjusted (b)	78.3	87.5	1.0	84.0	87.4	0.7
3. Supplementary indicators						
R&D expenditure/GDP (a)	42.8	52.5	1.7	44.3	55.3	1.9
Public R&D expenditure/GDP (a)	*54.1*	*64.0*	*1.4*	*53.6*	*63.8*	*1.5*
Private R&D expenditure/GDP (a)	*40.6*	*50.8*	*1.9*	*42.4*	*54.0*	*2.0*
Permits requested per resident/population (a)	8.1	16.1	5.8	9.8	19.0	6.3
Capitalisation venture capital securities/GDP (c)	65.7	121.4	5.2			
Gross fixed capital formation/GDP	114.0	121.5	0.5	114.7	118.8	0.2
Private productive GFCF/GDP	*109.1*	*112.7*	*0.2*			
Public GFCF/GDP	*159.9*	*143.2*	*-0.8*	*164.3*	*142.0*	*-1.0*
Residential GFCF/GDP	*101.5*	*130.5*	*1.8*			
Non-residential construction GFCF/GDP	*147.0*	*173.8*	*1.2*			
Public education expend./population 16-64 (d)	69.7	74.8	0.6	78.1	79.7	0.2
4. Income distribution indicators						
Total social expenditure per inhabitant (e)	62.3	63.5	0.2			
Total health expenditure per inhabitant (e)	*64.8*	*69.2*	*0.6*			
Total social benefit expenditure per inhab. (e)	*62.6*	*62.2*	*-0.1*			
Public expenditure on education per inhab. (e)	*16.6*	*32.4*	*6.3*			
Unemployment rate	178.5	142.3	-1.6	168.3	126.9	-2.0

SOURCES: Eurostat, Ameco, OECD and Banco de España.

a. Latest information, 2002.
b. Initial data: for EU 15, 1992; and for EU 25, 1997.
c. Initial data, 1991.
d. Latest information, 2002. For EU 25, the first available information is 1992.
e. Latest information, 2001.

CHART 1 REAL CONVERGENCE SPAIN-EU 15. PER-CAPITA GDP: COMPONENTS

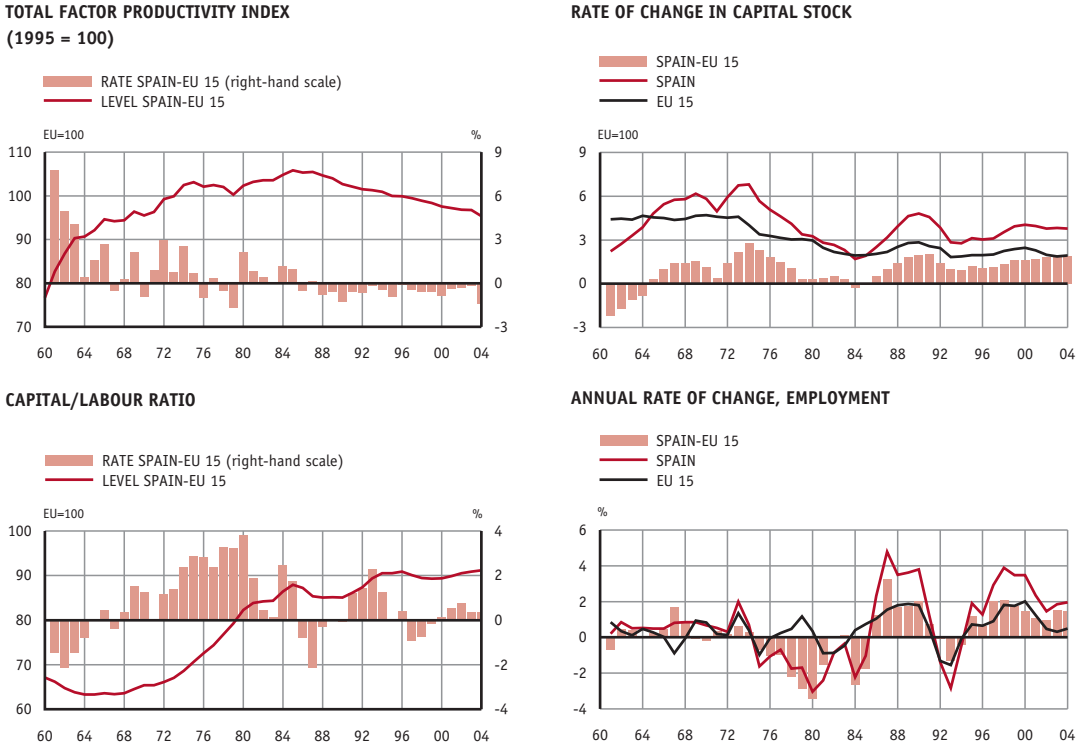


SOURCE: Banco de España.

ing the mid-1980s (see Chart 3). Growth in public capital stock, which entailed a substantial improvement in the infrastructure endowment and an increase in technological capital stock, has been particularly noteworthy, although in the latter case the position was still far from the European average at the end of the period under analysis. There has also been substantial progress in the human capital endowment, although this has been somewhat less pronounced. Overall, the increase in the productive factor endowment registered for the Spanish economy from the mid-1980s was noteworthy, but remained at some distance from the EU levels. This goes some way towards explaining why progress in total factor productivity lagged behind.

Long-term developments in per capita income since Spain's accession to the EU, and later to the Monetary Union, does on the whole demonstrate a clear convergence, on average, of the Spanish economy towards the welfare and income levels of other European countries. However, in the short and medium term, developments in the Spanish economy demonstrate different characteristics. Understanding the determinants of its cyclical fluctuations, and being able to relate them to those of other Euro-

CHART 2 REAL CONVERGENCE SPAIN-EU 15
KEY DETERMINANTS OF LABOUR PRODUCTIVITY



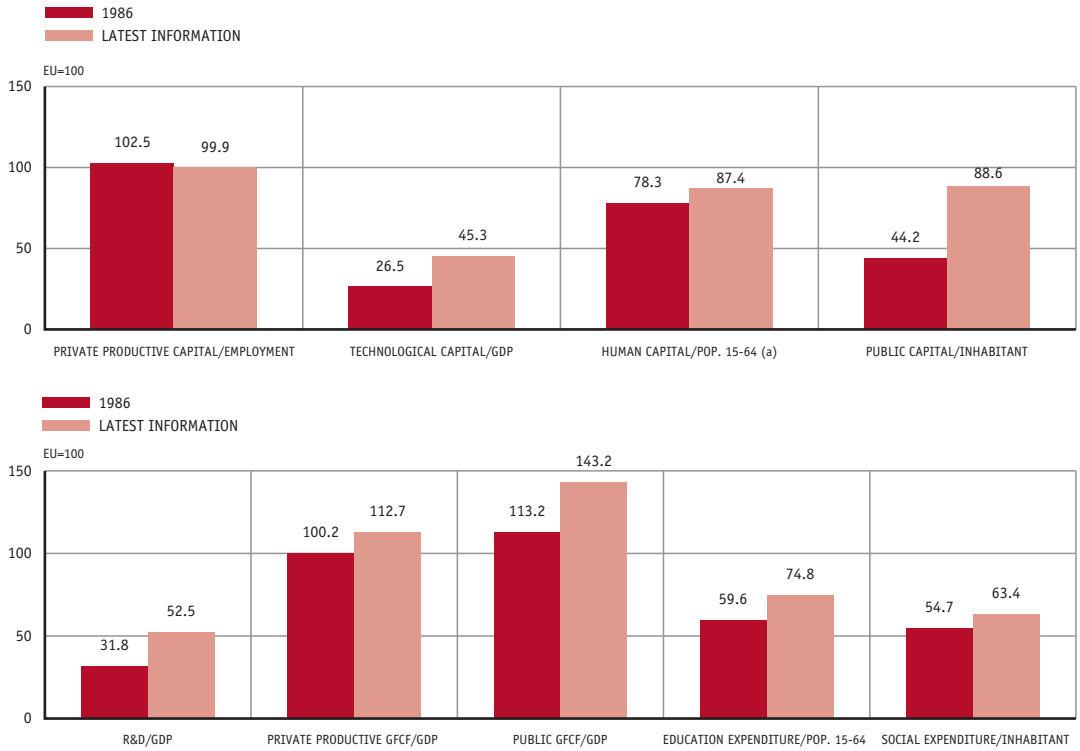
SOURCE: Banco de España.

pean economies, provides a useful tool for considering, among other issues, price and quantity adjustment mechanisms that operate in each case when faced with common disturbances and idiosyncrasies. The following sections of this chapter are devoted to an analysis of these issues.

3 Characterisation and synchrony of economic cycles

The characterisation of cyclical movements of an economy in comparison to others allows us to obtain valuable, complementary information for analysing adjustment mechanisms for prices and quantities, as well as the type of shocks that underlie the business cycle itself. In order to conduct such an analysis, we first need to answer the question of whether economies move in a synchronised way, identifying their cyclical co-movements. It is also useful to describe the form these movements take, which enables us to know whether the economies move in the same fashion.

CHART 3 REAL CONVERGENCE, SPAIN-EU. SUPPLEMENTARY INDICATORS (Spain/EU)



SOURCES: Eurostat, OECD, Ameco and Banco de España.

a. First available information, 1992.

3.1 Studying cyclical synchrony

Traditional analysis of cyclical synchrony starts from two types of assumptions: first, that the EMU cycle is representative of the cyclical movements of the Monetary Union economies and, second, that the method for calculating the trend and the cycle (the latter as difference between the data and the trend component) is valid for all the economies and reflects their cyclical fluctuations well.

There are two ways of determining whether an economy is evolving throughout the economic cycle in a similar fashion to the economies of the EMU. Determining the degree of cyclical similarity is usually performed by analysing correlations between the main macroeconomic variables for the various countries concerned. Obviously these correlations are not calculated with series in levels, as the macroeconomic data are dominated by trend components that are not subject to a cyclical analysis. The transformation most frequently used in the literature is to calculate the series trend with consideration of the cyclical com-

ponent as the difference between the data sequence and the trend component. This difference is known, in the case of GDP, as the output gap.

The results obtained by Cabrero, Chuliá and Millaruelo (2003) with GDP series for the period 1995-2003 show that the U.S. cycle leads the EMU cycle by two quarters, while the European economies are strongly correlated contemporaneously with the cycle series of the EMU[6]. For all countries, the cyclical series have correlation values greater than 0.90. Only Finland stands away from this trend, having a low correlation with the EMU (0.30) and lagging performance, perhaps owing to its old commercial relationships with the USSR and its particular productive structure.

A study of correlations provides an initial approximation, which is followed by an analysis of turning points. These are defined as the periods during which the cyclical component reaches a maximum or a minimum. Using the industrial production index (IPI)[7], nine turning points can be detected in the case of EMU in the period 1985-2002, which appear in the various columns in Table 2. This table shows the number of advance or lag periods in the turning points for each of the economies with respect to the EMU. In the case of Spain, for example, we can see that the maximums and minimums of the Spanish cyclical component move with a lag compared to the European cycle and that they in fact only coincide on one occasion (February 1998). Overall, it can be seen that the economies analysed fundamentally coincide with that of the EMU, with an average lag of two months (last column of Table 2). The only exception is Portugal, which has an average lag of 4.5 months behind the European economy.

An analysis of cyclical components between pairs of countries provides a further perspective to that described above. In this case, instead of using EMU as a benchmark, the national economies become the units of analysis[8]. This focus by country is also used in other studies conducted by the *Servicio de Estudios,* where, in addition to the measure previously used, focused on the correlation of output gaps, two further measures of cyclical co-movements are analysed[9]. The first of these is the correlation of dynamic transmission of shocks (two economies will be highly correlated if the same shocks affect them and are transmitted in the same way), and the second, co-movements of recessionary and expansionary periods (two economies will be highly related when their expansion and contraction periods coincide)[10].

Calculation of cyclical correlations two-by-two between the 30 countries covered by the study that is under discussion produces a group of very high correlations. In order to pro-

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[6] This publication presents estimates of the output gap for the EMU, each of the Member States, Japan and the U.S. The trend is calculated in all cases using the same methodology based on TRAMO-SEATS applications [Maravall (2002)].

[7] An analysis of turning points requires the use of series with greater than quarterly frequency. For this reason the IPI series is generally used for this type of analysis. This is highly correlated contemporaneously with GDP for all the countries concerned (except Greece), as we observe in the two first columns of Table 2.

[8] Of course, the co-movements for Spain and the EMU will be a statistic derived from Spain's movements against each of the countries.

[9] Camacho, Pérez Quirós and Saiz (2004).

[10] Given that there is no *a priori* criterion for defining whether one measure is better than another, or whether it should be used in one situation compared to another, an additional measure is proposed, which is the result of a linear combination of the foregoing ones.

TABLE 2 BUSINESS CYCLE TURNING POINTS FOR THE EMU AND THE MAIN NATIONAL ECONOMIES (a)

	Correlation and gap GDP - IPI		Gap with reference series maximums				Gap with reference series minimums					Median gap (b)
	Correlation	Gap	Aug-90	Mar-95	Feb-98	Oct-00	Jul-87	Jul-93	Oct-96	Apr-99	Apr-02	
Germany	0.70	-1	15	-3	1	0	5	0	-7	1	1	1.0
France	0.90	0	-4	-2	2	1	-2	1	0	0	*	0.0
Italy	0.70	0	-10	3	-2	1	-4	2	1	0	*	0.5
Spain	0.60	-1	-10	-1	0	-5	-12	-2	-2	-1	-2	-2.0
NL	0.50	0	2	11	*	2	1	-1	*	0	*	1.5
Belgium	0.80	0	-1	3	-2	-2	-3	1	-4	0	-5	-2.0
Austria	0.80	0	2	2	2	-1	-1	3	1	-2	*	1.5
Greece	0.30	0	-7	7	*	-2	-4	0	9	*	*	-1.0
Portugal	0.60	-1	1	11	3	-2	12	9	5	4	*	4.5
Finland	0.60	-1	-8	-3	4	-1	-22	-17	-2	1	-1	-2.0

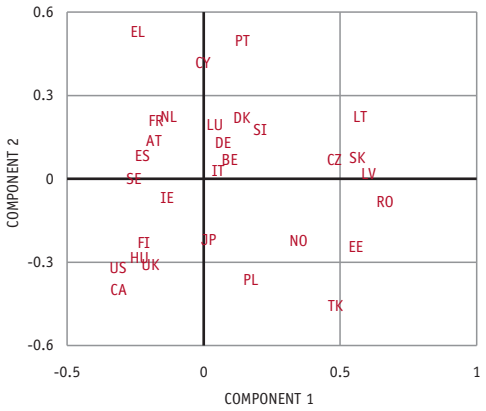
SOURCE: Cabrero, Chuliá and Miralluelo (2003).

a. An asterisk indicates that there is no relation for the reference turning point. The minus sign (–) indicates an advance and the plus sign (+) indicates a lag in respect of the reference indicator.
b. In months.

vide a measure that gives a joint approximation, the relationship between correlation and distance (1-correlation) has been employed. The Euclidean distances thus obtained, which represent the distances that exist between the data in reality, can be projected in a plane, as shown in Chart 4. The results show that the EMU country with cyclical movements closest to those of Spain is France (as well as Austria), while the country most distant from the Spanish economy is Portugal. Among the countries of the EU, the most distant from Spain is Lithuania. The fact that the average distance between Spain and the EMU countries is less than the distance with the United States is consistent with the greater cyclical proximity of the Spanish economy to those of European countries than to the U.S. economy.

Once the cyclical behaviour of output has been analysed, the analysis can be completed with a review of the components of GDP. In general, we find evidence that both private consumption and capital investment are correlated pro-cyclically and contemporaneously with GDP, so that expansion in output is accompanied by substantial increases in consumption and investment. Similarly, change in inventories behaves pro-cyclically and is advanced in relation to the output gap. The cyclical behaviour of the external sector has a major driving effect on GDP in all countries analysed, particularly in periods of recovery. Last, in the case of public consumption there are substantial differences: in France, for example, there is a marked anti-cyclical relationship, while we observe a positive and delayed correlation in the other countries.

CHART 4 MAP OF DISTANCES BETWEEN EUROPEAN ECONOMIES AND KEY INDUSTRIALISED AREAS



SOURCE: Camacho, Pérez Quirós and Saiz (2003).

Notes: Components 1 and 2 correspond to the breakdown of distances between their coordinates on the plane using the multidimensional scale statistical technique.
Map abbreviations correspond to the following countries: AT (Austria), BE (Belgium), CA (Canada), CY (Cyprus), CZ (Czech Republic), DK (Denmark), DE (Germany), EE (Estonia), EL (Greece), ES (Spain), FI (Finland), FR (France), IE (Ireland), IT (Italy), JP (Japan), LV (Latvia), LT (Lithuania), LU (Luxembourg), HU (Hungary), NL (Netherlands), NO (Norway), PL (Poland), PT (Portugal), RO (Romania), SI (Slovenia), SK (Slovakia), SE (Sweden), TK (Turkey), UK (United Kingdom) and US (United States).

Studies carried out by the *Servicio de Estudios* show that differences in the degree of cyclical synchrony between countries are explained by differences in savings rates, in labour productivity and in the relative weight of the public sector. Among European economies, greater cyclical synchrony is determined by trade relations, measured as the proportion of imports and exports of a country that originate in another. This analysis, however, only provides preliminary evidence that there is a high degree of cyclical similarity between Spain and other European economies, requiring a more detailed consideration of the economic cycle.

3.2 Features of economic cycles. Characteristics of the Spanish cycle

The importance of cyclical synchrony between countries necessitates an analysis of the features of economic cycles. High synchrony in the cycle between two countries is not sufficient in deciding whether the same economic policy stance should be applied, if the effects of the economic cycle are different in these two countries. For example, if an economy is characterised by deep, albeit brief, recessions, it would require a different policy than an economy characterised by prolonged but less acute recessions.

TABLE 3 KEY FEATURES OF ECONOMIC CYCLES

	Duration (months)		Amplitude (%)	
	Expansions	Recessions	Expansions	Recessions
Spain	39.4	16.2	0.14	-0.08
Euro area	44.0	13.0	0.12	-0.04
U.S.	47.2	11.9	0.17	-0.04

SOURCE: Camacho, Pérez Quirós and Saiz (2005).

Accordingly, the type of cycles that affect an economy would seem to be as important as their synchrony when we wish to devise the most appropriate economic policy measures.

The classical definition of a cycle states that one of its more important features is duration, that is, the average number of months (or quarters) of the recessionary and expansionary periods[11]. Amplitude, defined as the loss (in recessions) or gains (in expansions) in the level of the reference series, associated with each phase of the cycle, appears to be complementary to duration. It should be noted that, despite their intuitive features, the classical measurements of duration and amplitude present some problems. First, the dating of the cycle is determinant: alternative dating or small revisions to the series, which marginally change the sequence of maximums and minimums, can have a glaring impact on cyclical characteristics. Second, the number of recessions and expansions in economic series is not very large, so the calculations made are subject to considerable uncertainty and it is difficult to make inferences concerning these amounts[12].

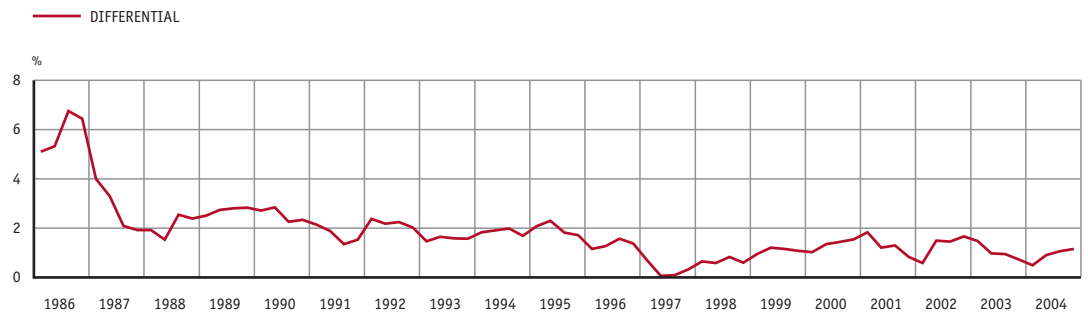
With these provisos, and by way of summary, Table 3 presents the results of an analysis of the cyclical characteristics of the Spanish economy[13]. The average duration of expansions in Spain is 39.5 months (approximately three years), which is less than that found in the EMU and the U.S. series; however, the gain associated with expansions is approximately 14 percent, which is greater than that for the large European economies. Where recessions are concerned, Spain's profile is closer to that of the other large countries of the EU. The average duration of recessions is 16 months (almost a year and a half), similar to that of other countries in its a rea, but greater than that of the U.S., where they only last for 12 months. The net loss of the Spanish economy during a recessionary period is approximately 7 percent, which is greater than that experienced in the EMU. Comparatively, therefore, cyclical fluctuations are more severe in the Spanish economy than in the rest of the economies analysed.

[11] See the pioneering work of Burns and Mitchell (1946).

[12] Even so, there are technical solutions for overcoming these problems, which are explained in Camacho, Pérez Quirós and Saiz (2005).

[13] For a sample between January 1980 and January 2004.

CHART 5 SPAIN-EMU INFLATION DIFFERENTIAL



SOURCES: Eurostat and INE (National Statistics Institute).

4 Inflation differentials

From the combination of cyclical and structural factors analysed in the preceding paragraphs, we can see the development of relative prices in the Spanish economy compared to those of the euro area. This relationship, which will affect its competitiveness as well as the opportunity for real convergence and the country's macroeconomic stability, is discussed below.

In general, economies that are integrated in a monetary union experience temporary but persistent divergences in their inflation rates. First, inflation differentials can be associated with processes of real convergence or catching up, given that the economies that experience greater productivity growth tend to record higher inflationary pressures. Secondly, the existence of these inflation differentials may be a reflection that the economies making up the Union are affected by asymmetric shocks that induce relative price adjustments. Third, even the presence of developments in common may generate temporary inflation differentials between the different economies, derived from differences that may exist between adjustment mechanisms in each one. Identifying the main cause or causes of differentials is essential in devising appropriate economic policies, as the existence of nominal and real rigidities makes the presence of persistent inflation differentials a greater concern[14].

Chart 5 shows developments in the inflation differential between Spain and the EMU from 1986 until end-2004. There are two aspects of this evolution that merit comment. First, the inflation differential fell significantly throughout the period, moving from 5 percentage points (pp) in 1986 to 1 pp by the end of 2004. Second, this process was not uniform: until 1999, a progressive movement in Spanish inflation towards levels more compatible with macroeconomic stability was observed, which culminated with its participation in the Monetary Union; from that year, however, the process slowed significantly and the Chart has tended to fluctuate persistently around 1 pp. It is therefore useful to explore the main determinants of this behaviour.

[14] López-Salido, Restoy and Vallés (2005) discuss in detail these three scenarios within a framework of various macroeconomic models.

This section is divided into two parts. In the first, we present one approach to breaking down inflation – and consequently the inflation differential between Spain and EMU – that permits us to explain the effect that productivity and the degree of rigidity in markets for labour, goods and services (factors that affect the determination of corporate costs and margins) have on developments in prices. In the second section, this breakdown is used to explain some of the more significant features in the evolution of Spanish inflation and its differential against the euro area.

4.1 Inflation differential accounting

The rate of change of the consumer price index (π_{it}) of a country i at a time t is determined by: (a) the change in prices for tradable goods (π^T_{it}) and (b) the change in the relative price of non-tradable and tradable goods $(\pi^N_{it} - \pi^T_{it})$, which we shall call dual inflation[15]. Formally:

$$\pi_{it} = \pi^T_{it} + \theta_{it}\left(1 - \alpha_{it}\right)\left(\pi^N_{it} - \pi^T_{it}\right) \qquad [1]$$

where θ_{it} represents the proportion of services over total final consumer goods and services produced domestically, and α_{it} is the proportion of imported consumer goods in relation to total consumer goods[16].

To analyse the ultimate determinants of inflation, the evolution of tradable and non-tradable goods prices can be further broken down by productivity and sectoral margins. The latter represent the proportion of added value that remains once the factors labour and capital have been remunerated, and are linked to the structure of markets for labour, goods and services. More formally, fixing of prices by firms depends on marginal costs and on business margins. Marginal cost is defined as the relationship between nominal wages and the (marginal) productivity of labour and, in certain circumstances, (nominal) marginal costs may be approximated by unit labour costs[17]. Firms usually operate within a context of imperfect competition, so that the price fixed will be determined by the application of a margin over these unit costs.

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[15] The tradable goods sector includes agriculture and industry (that is, manufacturing and energy). The international non-tradable services sector includes construction and commercial services.

[16] An additional component of inflation in a country is associated with changes in the real terms of trade, that is, the difference between the price of imported goods and goods produced domestically and likely to being traded internationally. As a result, the previous expression [1] is only an estimate. However, given that this component is normally small and not persistent, the previous breakdown allows us to explain most of the movements observed in a country's inflation.

[17] In general, if it is assumed that the production function is Cobb Douglas type, then apparent labour productivity (average productivity) approximates changes in marginal productivity of the labour factor. See Estrada and López-Salido (2004) for a more detailed treatment of the use of average labour productivity compared to total factor productivity in the context of dual inflation analysis in Spain.

In other words, movements in inflation rates for tradable and non-tradable goods can be broken down as follows:

$$\pi_{it}^{T} = \Delta\mu_{it}^{T} + \Delta clu_{it}^{T} = \Delta\mu_{it}^{T} + \Delta w_{it}^{T} - \Delta x_{it}^{T} \quad [2]$$

$$\pi_{it}^{N} = \Delta\mu_{it}^{N} + \Delta clu_{it}^{N} = \Delta\mu_{it}^{N} + \Delta w_{it}^{N} - \Delta x_{it}^{N} \quad [3]$$

where Δ is an operator representing the rate of change of any variable between periods *t* and *t* y *t-1,* and the variables μ_{it}^{j}, clu_{it}^{j}, w_{it}^{j} y x_{it}^{j} correspond to margins, unit labour costs, nominal wages and growth in labour productivity for each sector $j=N,T$, respectively[18].

From the expressions [2] and [3], we can reformulate the dual inflation in the expression [1] as:

$$\pi_{it}^{N} - \pi_{it}^{T} = (\Delta w_{it}^{N} - \Delta w_{it}^{T}) - (\Delta x_{it}^{N} - \Delta x_{it}^{T}) + (\Delta\mu_{it}^{N} - \Delta\mu_{it}^{T}) \quad [4]$$

From the two preceding expressions, we can infer that changes in relative prices between the sectors exposed and not exposed to competition do not depend only on relative productivity, but that both wage dispersion and the degree of rigidity in goods and services markets (as measured by changes in margins) are relevant determinants of inflation.

The breakdown of inflation which has just been described, for one country and any given other, can be similarly applied to inflation for the euro area, using an expression equivalent to [1]. It is thus made explicit that there are two main components in the inflation differential for one country compared to the average for the euro area: the inflation differential for tradable goods, and differences in movements of relative prices between goods that are tradable and those that are not tradable, that is to say, the differential behaviour of dual inflation. The evolution of each of these items will in turn depend on the behaviour of productivity, wages and relative margins between sectors and countries, respectively[19].

4.1.1 The Balassa-Samuelson Effect

The debate concerning the relationship between relative prices and competitiveness within the framework of the Monetary Union has focused basically on the model pro-

[18] In our empirical analysis, the preceding expressions allow us to obtain the rate of change in sectoral margins, $\Delta\mu_{it}^{T}$, as a residual. That is, they are obtained from wages, sectoral productivities (in other words, unit labour costs) and the observed movements in price changes.

[19] Once again, we observe that the existence should be considered of an additional, residual term (whose effect is insignificant) associated with relative differences in the real terms of trade with respect to the rest of the world, as well as possible changes in the country's sectoral composition compared to those occurring in the area.

posed by Balassa (1964) and Samuelson (1964) during the 1960s. However, in the light of the methodology above, this model is only adequate for analysing long-term trends in competitiveness. The reasons become apparent when we analyse the expression above [4].

The Balassa-Samuelson Effect is based on two fundamental concepts, which only operate clearly in the long term. The first is the existence of perfect competition, and the second, the existence of perfect mobility of productive factors[20]. Assuming these conditions, there are no permanent differences between sectors in nominal wages, and monopoly rents are not expected to be sustainable as the process of entry and exit of firms to and from the market would prevent it. The evolution of relative prices in the service sectors compared to industry would therefore only be linked to relative sectoral productivity, and increases in relative price could only reflect a greater rise in productivity in manufacturing compared to services. Consequently, countries experiencing real convergence processes based on major increases in productivity may register greater inflationary pressures, regardless of movements in wages and margins.

However, as we also observe in expression [4], in the short term there may be major deviations from these assumptions, so that movements in wages and sectoral margins play a significant role in the movement of relative prices in one economy against another. The earlier breakdown allows us to explore the origin and persistence of inflation differentials. If inflation differentials originate in the evolution of prices of internationally tradable goods, they will be reflecting the existence of an intrinsic competitiveness problem, a situation that is difficult to sustain in the medium and long term (and which in turn may be a consequence of excessive wage and/or margin pressure on prices, or of insufficient growth in productivity). If the source of the differential is associated with evolution of dual inflation, whether this arises from productivity growth (Balassa-Samuelson Effect) or from the behaviour of margins and wages in sectors not open to competition, this will determine whether rigidities in the service or labour markets constitute a reduction in competitiveness.

4.2 The main determinants of inflation differentials

To conduct an analysis of the (main) determinants of the inflation differential between Spain and the euro area, we need to begin by studying and describing Spanish inflation. This section is divided into two parts. The first uses the preceding analysis and describes the evolution of inflation in Spain from the beginning of the 1980s to the present. The second explains how these developments have affected the competitiveness of the Spanish economy, taking into account those factors that underlie the behaviour of inflation in the euro area[21].

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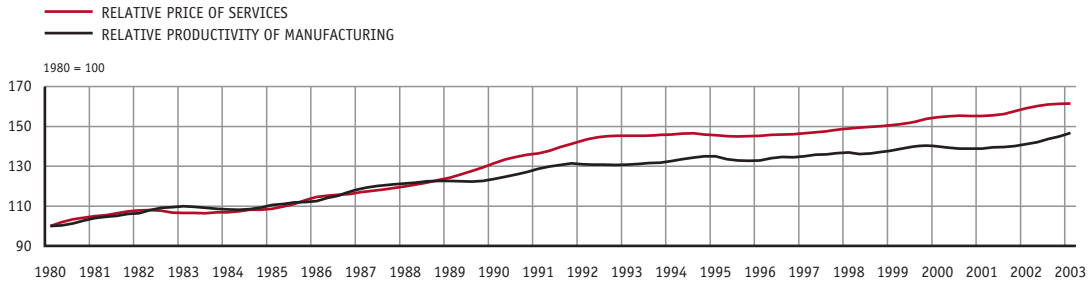
[20] These authors also assume that technology is such that returns to scale are constant and that the degree of substitution between capital and labour is unity. For further details, see Estrada and López-Salido (2004), which analyses the implications of relaxing these assumptions for inflation dynamics in Spain.

[21] The data used in the analysis of these sections are provided at the end, described in an appendix.

CHART 6 RELATIVE PRICES AND PRODUCTIVITY



SOURCES: Eurostat and INE.

4.2.1 Inflation, productivity and margins in Spain

The available evidence demonstrates that, during the last two decades, the contribution of technology factors and productivity have been insufficient to explain all relative price movements for services compared to manufacturing in Spain. On the contrary, the unequal movements in margins and wages across sectors constitutes a relevant factor in explaining persistent deviations in relative prices with respect to their long-term determinants.

Chart 6 shows developments in relative prices for services compared to manufacturing activities during the period 1980-2003, as well as the technological component [calculated from the (inverse) ratio of labour productivities][22]. As we observe, the trend (that is, the very long-term factors) in relative prices appears to be linked to changes in productivity. In particular, we can see that during more than 20 years of analysis, the relative prices of services have registered a sustained increase, corresponding to the similar evolution in the productivity ratio. However, two clearly differentiated stages can be distinguished, which indicate that technological factors are not sufficient to explain the medium- and short-term behaviour of relative prices.

Similarly, the relative price of services with reference to manufactured goods grew moderately during the first part of the 1980s, while at the end of the 1980s and in the 1990s there was a very marked increase, above all in the first half although also during the latter years. Until the start of the 1990s, this behaviour was consistent with developments in relative productivity. Later, however, the rise in relative prices of services coincided with a deceleration in the productivity differential between both sectors. In other words, the relative prices of services have registered increases persistently above those that should have occurred if technology factors had been the sole determinants. Consequently, their evolution is not well explained by the Balassa-Samuelson Effect, and we need to look to differential behaviour of margins and, to a lesser extent, inter-sectoral wages.

[22] In order to facilitate analysis and comparison of results, variables have been normalized, with a value of 100 for 1980.

TABLE 4 COMPONENTS OF INFLATION IN SPAIN

	Inflation	Inflation, tradable goods				Dual inflation				
		Total	Wages	Productivity	Margins	Contribution	Total	Relative wages	Relative productivity	Relative margins
	(1) + (2)	(1) = (a-b)+c	(a)	(b)	(c)	(2)	(d-e)+f	(d)	(e)	(f)
1986-1988	6.1	4.1	7.8	2.3	-1.4	2.1	3.3	-0.7	-2.9	1.1
1989-1993	5.8	3.3	10.2	1.6	-5.3	2.5	3.9	-1.9	-1.5	4.3
1994-1998	3.2	2.9	3.5	1.5	0.9	0.3	0.5	0.0	-0.9	-0.5
1999-2003	3.2	2.1	3.4	1.0	-0.2	1.1	1.6	-0.1	-1.4	0.4

SOURCES: Eurostat and INE.

4.2.2 The inflation differential with the euro area

Tables 4 and 5 break down both the Spanish inflation rate and the inflation differential with the EMU into their main components: wages, labour productivity and changes in margins. Within the tables, the various periods associated with different stages of the process of economic opening are identified. The initial period, between 1986 and June 1989, reflects the early years following entry to the EU until the incorporation of the peseta in the European Monetary System; the period between 1989 and January 1999 covers various stages in the process of consolidating macroeconomic stability; last, the final four years cover membership in the EMU. Chart 7 complements the information in Table 5, presenting developments in the inflation differential during those years, as well as its two main components: the inflation differential between tradable goods and the differential between relative prices for the service sectors and for tradable goods (or dual inflation).

Until 1988, the majority of the high inflation differential between Spain and the area (just over 3.5 percentage points) was determined by the inflation differential for tradable final consumer goods (2.2 percentage points). These findings can be attributed to the substantial pressure exerted by wages in Spain, compared to the experience of the euro area. This higher wage pressure was partly offset by a reduction in margins of manufacturing corporations. Moreover, as we observe in the first line of Tables 4 and 5, growth in service margins generated higher levels of dual inflation in Spain.

The process of convergence of the Spanish inflation rate towards that of the area was accentuated and consolidated from 1989. The average inflation differential between Spain and the area moved from 3.5 pp to below 1.5 pp. In order to explain the behaviour of this differential, we need to distinguish – as we note in Chart 7 and Table 5 – between the years prior to and following the shocks that affected the European Monetary System during the first half of the 1990s. During the period 1989-1993, which was characterised by a sustained appreciation in the peseta exchange rate, there was a drastic reduction in the infla-

TABLE 5 COMPONENTS OF THE INFLATION DIFFERENTIAL BETWEEN SPAIN AND EMU

	Inflation differential	Tradable goods inflation differential				Dual inflation differential			
		Total	Wages	Productivity differentials	Margins	Total	Relative wages	Productivity differentials	Relative margins
	(1) + (2)	(1)=(a–b)+c	(a)	(b)	(c)	(2)=(d–e)+f	(d)	(e)	(f)
1986-1988	3.3	2.2	2.7	-0.5	-1.0	1.1	0.0	1.1	2.2
1989-1993	2.1	1.2	3.4	-1.3	-3.5	0.9	-0.6	-0.3	1.2
1994-1998	1.2	1.5	0.5	-2.0	-1.0	-0.3	0.6	-1.2	-2.1
1999-2003	1.2	0.8	0.4	-0.1	0.3	0.4	0.1	0.4	0.7

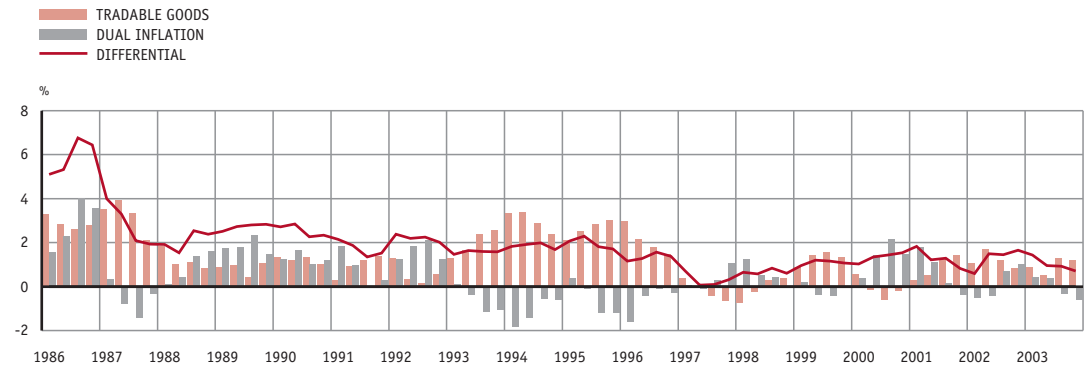
SOURCES: Eurostat and INE.

tion differential for tradable goods, while dual inflation (for services) for Spain compared to the area explained 0.9 pp of the 2.1 pp of inflation differential. Despite a greater increase in unit labour costs resulting from greater wage pressure and a lower rise in Spanish productivity compared to the area, the improvement in the differential for tradable goods was determined by substantial compression of margins in the Spanish manufacturing sector. However, as in the period 1986-1988, this compression of margins and adjustment of employment in manufacturing sectors did not translate into greater convergence as a consequence of the dual inflation component, as margins for the services sector – which are not subject to international competition – contributed significantly to Spanish relative prices rising more than those in other countries in the area (see the supplementary information in Table 4).

Following the devaluations that took place in the first half of the 1990s, there was a sharp decline in relative productivity in Spanish manufacturing sectors, which ceased adjusting employment, so raising the contribution of prices of these sectors to the inflation differential. At the same time, there was significant correlation of relative margins in the service sectors, which resulted in a renewed cut in the inflation differential between 1994 and 1998. In general, these results confirm that during the 1990s the cumulative loss of competitiveness in the Spanish economy was associated with a combination of structural factors. Among those that stand out are the notable slowdown in productivity growth and pressure exerted by firms margins, in comparison with the average performance registered in the euro area.

The data corresponding to membership of the Monetary Union show that convergence of tradable goods inflation has continued to progress, with a reduction in the differential, which reached 0.8 percentage points during the period 1999-2003. As we note in Table 4, what lies behind this reduction is not greater productivity gains in the Spanish manufacturing sector, but rather a renewed compression of margins. But when a comparison is made with the EMU, we can see that compression of margins has been less than that recorded by the manufacturing sec-

CHART 7 COMPONENTS OF THE INFLATION DIFFERENTIAL BETWEEN SPAIN AND THE EMU



SOURCES: Eurostat and INE.

tors of the area and that wages growth has also exceeded that of the area, so it has been relative changes in productivity which has facilitated a cut in the differential (see Table 5).

One of the factors that may have sustained the inflation differential for manufacturing products – so impeding more rapid convergence towards European inflation levels – is the component of the price of these products that is associated with costs of distribution, transportation and marketing, these costs not being subject to international competition. This factor, together with accumulated growth in unit labour costs (resulting from substantial wage growth and a slowdown in productivity) and with continued compression of sector margins, would contribute to reduced profitability of this sector and to a gradual loss of competitiveness in exporting corporations.

The remaining third of the average inflation differential between Spain and the area during the period of membership in the EMU, amounting to 0.4 percentage points, can be explained by the still persistent phenomenon of dual inflation, which is more acute in Spain than in the area. This is a consequence of an increase in margins in the services sector, compared to their developments in the EMU area. Moreover, if part of the inflation differential for tradable goods can be explained by the pressure exercised on industrial product prices by distribution, transportation and marketing costs, as discussed above, the need to introduce measures that promote greater competition and efficient functioning in the non-tradable product sectors is even clearer.

5 Conclusions

Within a context of the Spanish economy's increasing integration with the rest of the world, and particularly with the EMU, the development of techniques to conduct comparative analyses of the behaviour of the Spanish economy in relation to a wider area is of great importance. These analyses are useful and necessary for many reasons. In many respects, it is the

more advanced economies that establish the point of comparison and the objectives of economic welfare to be achieved by the Spanish economy. Further, depending on the degree to which the Spanish economy departs from the other economies with which it shares certain economic policy instruments, the economic policy stance established with those instruments may not be the most appropriate for the specific requirements of the Spanish economy, and may need to be accompanied by other policies applied nationally. Last, progress in levels of income and welfare require the Spanish economy to be competitive in the international context, and particularly within the EMU, and there is therefore a need to understand and closely monitor the factors determining competitiveness in the medium and long term.

In this chapter, application of some of the more relevant comparative analysis techniques has enabled an account to be provided of the more significant aspects of the Spanish economy with regard to its position within the EMU and its competitive capacity. The rise in income which has been achieved since Spain joined the EU has substantially moved its per-capita GDP to the average levels for the EU. The gap which still exists, and which can be estimated at 15 percent for the EU 15 and 7 percent for the EU 25, originates in differences in employment rates (which in Spain are 88 percent of the average for the EU 15 and 90 percent of the EU 25) and, in the case of the EU 15, also in labour productivity (which in Spain is 93 percent of the average for this group of countries).

Spanish inflation has moved from 5 percentage points above the average for the euro area in 1986 to approximately 1 percentage point in recent years. This convergence has been associated with a gradual reduction of margins in sectors producing tradable consumer goods. However, other determinants of the differential have tended to reduce inflation convergence, such as expansion of margins in sectors not exposed to competition and gradual slowing of productivity growth, with consequent upward pressure on unit labour costs. Given that the opportunities for reducing margins in manufacturing sectors are limited, convergence in inflation, which is necessary to maintain the economy's competitiveness, must be achieved through more competitive behaviour in the more protected sectors as well as through greater productivity gains.

In terms of cyclical analysis, there are two opposing forces that ensure that the cyclical characteristics and co-movements of European economies will evolve over time. On the one hand, greater integration leads to a more uniform European cycle; on the other, the loss by national economies of their traditional cyclical control instruments may lead to greater distancing. In this context, it should be noted that despite the Spanish economy's high degree of cyclical synchrony with the EMU economies, this synchronisation existed prior to Spain's entry into the EMU, a factor that has undoubtedly facilitated the Spanish economy's smooth transition towards full monetary integration. Finally, the knowledge that the Spanish economy is more sensitive to cyclical fluctuations than its European partners is relevant when it comes to devising appropriate macroeconomic policies.

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Structural aspects of the Spanish economy

16. Productivity, factor use and potential growth

J. David López-Salido, Soledad Núñez and Sergio Puente

1 Introduction

Since the mid-1990s, major changes in growth patterns have been observed in different geographic areas, manifested in disparate output growth trends and relative contributions of different factors that drive economic growth. These changes have affected potential growth opportunities in different areas and the speed of convergence in per-capita income levels. The comparison between the U.S. and European Union (EU) since the latter half of the 1990s is sufficiently illustrative of these developments. While the U.S. registered quite a significant increase in the productivity growth rate, the EU registered a slight deceleration in the rate of increase in this variable that, combined with a decrease in the relative intensity of labour factor use, led to a break in the process of per-capita income convergence between the two economic areas.

In this context, the analysis of potential growth determinants and, in particular, productivity, has come to occupy a central place in economic analysis for many institutions, and in economic policy debates. In this connection, we should bear in mind that, in the long term, growth in productivity constitutes the fundamental path to increase per-capita income, as there are limits to the increases in labour factor utilisation. As a result, for economic policies to reverse the decelerating trend in productivity observed in some economies, it is important to identify the causes of this process[1].

[1] Sapir et al. (2004) analyse economic performance of the EU 15 during the past decade and identify the economic, social and institutional factors preventing accelerated economic growth in the EU.

In the past few years, the Spanish economy has registered the decelerating trend in productivity observed in a number of European countries, which has not prevented the continued reduction in the per-capita GDP gap with the EU, owing to the expansive effects, unlike in Europe, of increased labour-factor use. Even so, the low level of growth in productivity may be symptomatic of sustainability problems in the growth pattern and limits to potential growth. In addition, the interest in knowing the determinants of economic growth in the case of the Spanish economy has been supported by the very process of integration into a monetary union, which, as observed in a number of chapters of this book, has radically changed the macroeconomic adjustment mechanisms and has led potential growth to depend on the economy's capacity to compete in a context of fixed exchange rates, which ultimately comes down to productivity gains. In the longer term, the outlook of an ageing population poses a number of questions on the sustainability of the convergence process through the use of the labour factor, which once again illustrates the importance of productivity analysis.

To conduct a diagnosis of productivity, the level of factor utilisation and potential growth in the Spanish economy, the *Servicio de Estudios* has conducted a series of studies, the methodologies and key results of which are summarised in this chapter. To begin this analysis, we must first identify the factors having immediate bearing on growth in production and productivity. To that end, we will use the growth accounting methodology. Its application to the Spanish case makes it possible to identify the contributions of the different factors to economic growth and the role played by the reallocation of productive factors between sectors or the influence of information and communication technologies (ICT).

With this objective, the chapter is organised in two major sections. Section 2 presents a number of productivity definitions, discusses their utility as tools in economic analysis and describes the growth accounting methodology. Section 3 presents some results of the work of the *Servicio de Estudios* in applying this methodology, stressing the role that the different sectors have played in the growth process. As indicated above, special treatment is given to the ICT sector. Last, Annex 1 is devoted to specific issues affecting the measurement of production and productive factors.

2 Growth accounting. Methodological factors

This section will present the analysis of growth in productivity based on the methodology known as growth accounting, that is founded on the pioneering work of Solow (1957) and that reflects subsequent applications by Jorgenson and Griliches (1967), among others. The purpose is to break down economic growth observed in an economy into its most immediate causes. The exercise should serve to quantify the productive factors contributing to GDP growth and to provide a residual known as total factor productivity (TFP), which is normally identified as technological progress.

This methodology is useful as it provides information on the sources of growth, which helps us to understand the process of growth in productivity, and to design possible policies aiming to support such growth. We must, however, bear two considerations in mind. The first entails how we should interpret the residual discussed above, as the impact of techno-

logical progress will only be reflected if the productive factors capital and labour have been correctly measured, provided that certain assumptions are met on the market structure and the type of production function involved. Second, this analysis quantifies the contributions of certain variables to growth, reflecting only their direct effects, so that the measurement of technical progress obtained is an exogenous residual. We should expect, however, that both technical progress and factor accumulation generally have their own determinants, although this factor is not reflected in the standard growth accounting approach.

This section is organised as follows. First, a number of definitions will be provided for productivity, and the economic relevance of each of them will be analysed. The following three sections will discuss problems in measuring intermediate consumption, the labour factor and the capital factor, respectively, as well as their implications on developments in productivity and possible solutions to correct biases that they may generate. We will then analyse certain factors other than capital and labour that can influence growth analysis, such as sectoral reallocation of productive factors and their level of use, and returns to scale. The last section will attempt to present the possible causes of growth in addition to the factors that directly affect it. In particular, we shall review the role of investment in research and development (R&D) and externalities of human capital and infrastructures, highlighting possible economic policy implications in each case.

2.1 What is productivity and why is it important

Productivity is a variable obtained by dividing production into one or more factors used to obtain that production. As a result, many different definitions of productivity can exist, depending on whether the production was generated in one sector or another, the level of aggregation or the production factor involved.

Productivity of physical capital and labour is calculated as the quotient of production of the productive unit in question and some measurement of capital or labour used in that production, respectively. Total factor productivity (TFP), on the contrary, attempts to measure the productivity of two factors, labour and capital, considered jointly. This is normally calculated as a residual, i.e. the portion that can be attributed to the presence of capital and labour is subtracted from production, and the remainder is identified as TFP.

Labour productivity has a special significance, as it is a particularly important variable in economic policy. This importance derives not only from the fact that labour productivity determines the real remuneration of workers in conditions of competition; but also from its close relationship with variables such as per-capita income and per-capita economic growth. Labour productivity is related to TFP. To that end, we shall consider the following production function:

$$Y_t = A_t K_t^{\alpha} L_t^{\beta} \qquad [1]$$

where L_t represents the labour factor, K_t the capital factor and Y_t production. Assuming constant returns to scale, that is, $\alpha+\beta=1$, and dividing the above equation by labour, we obtain labour productivity as follows:

$$y_t = A_t k_t^{\alpha} \quad [2]$$

where y_t and k_t are, respectively, production per worker and physical capital per worker. Let ΔX_t be the growth rate in variable X_t. If equation [2] is expressed in growth rates, we obtain the following:

$$\Delta y_t = \Delta A_t + \alpha \cdot \Delta k_t \quad [3]$$

In this equation, we observe how labour productivity growth should rest on increases in the capital-labour ratio or on increases in parameter A_t, which is interpreted as total factor productivity. Accordingly, although the ratio of capital per worker were to increase indefinitely, its contributions to growth in labour productivity would be expected to decline owing to the decreasing returns to scale to which physical capital accumulation is subject *($\alpha < 1$)*.

Having demonstrated the importance of TFP as a long-term determinant of labour productivity, we must now address the calculation of its growth, which is carried out with the well-known Solow decomposition. Equation [1] in growth rates is:

$$\Delta Y_t = \Delta A_t + \alpha \cdot \Delta K_t + \beta \cdot \Delta L_t \quad [4]$$

and solving for ΔA_t:

$$\Delta A_t = \Delta Y_t - \alpha \cdot \Delta K_t - \beta \cdot \Delta L_t \quad [5]$$

This is the simplest way to calculate growth in TFP, through what is known as Solow's Residual, calculated by subtracting the contribution of the labour and capital factors from growth in production. This residual is difficult to interpret, as, even if the productive factors have been effectively measured, it can be expected to reflect the effects on growth of *all* productive factors other than labour and physical capital. Therefore we must make a substantial effort to clear these effects from Solow's Residual. In the sections that follow, we shall attempt to identify a series of forces that tend to be reflected in Solow's Residual and that are not directly attributable to technological progress. Correct identification of these factors will enable us to obtain a more homogeneous residual closer to the idea of technological progress. Last, in Section 2.2, we will briefly summarise a set of theories attempting to explain the ultimate determinants of trends in total factor productivity. These theories emphasise the importance of investment in human capital (education), infrastructures and research and development as determinants of per-capita growth and, accordingly, of the welfare of economic agents in any economy.

2.1.1 Contribution of intermediate consumption

One of the variables involved in calculation of productivity is output. In general, there are two different ways to measure this variable, for each level of aggregation: through production

or through value added. The value-added approach to productivity has the advantage that total output can be obtained by aggregating value added from different branches of activity. On the other hand, using production to measure output makes it possible to reflect the role of intermediate consumption in the production process. If we use M to represent intermediate consumption, we can expand the equation as follows:

$$Y_t = A_t K_t^{\alpha} L_t^{\beta} M_t^{\varphi} \quad [6]$$

where once again we assume constant returns to scale ($\alpha + \beta + \varphi = 1$). Using the same procedure as above, Solow's Residual is now:

$$\Delta A_t = \Delta Y_t - \alpha \cdot \Delta K_t - \beta \cdot \Delta L_t - \varphi \cdot \Delta M_t \quad [7]$$

Parameters α, β and φ are defined as the respective share of capital, labour and intermediate consumption in output. Inclusion of the latter variable in the analysis is important if there is some degree of substitutability between intermediate consumption and the other two factors (labour and capital). This is reflected in the functional form selected for equation [6], in which this possibility of substitution exists. It is also important, even at the aggregate level, to analyse the role of certain imported intermediate consumption factors in the growth process, such as oil or other inputs. A detailed analysis of this issue is provided in Estrada and López-Salido (2004).

2.1.2 Contribution of the labour factor

There are many difficulties involved in measuring labour, most of which are attributed to the fact that this production factor is generally relatively heterogeneous. If all workers worked the same number of hours, if these hours were constant in time and if the skill level of all workers were the same, then this production factor could be measured adequately based on the number of workers. This is normally not the case, however, and workers differ in the number of hours they work and in terms of their quality or human capital. As a result, measurements of the labour factor not reflecting this heterogeneity will clearly introduce biases in the contribution of the labour factor to growth in output, which will ultimately be reflected in Solow's Residual. The sources of heterogeneity in the labour factor and possible solutions for their statistical treatment are analysed in greater detail in Annex 1.

One way to incorporate the contribution of human capital into the analysis of Solow's Residual consists in assuming that the contribution of a worker to the labour factor is comprised of the product of hours worked and quality. Accordingly, the labour factor can vary as workers' hours increase, or owing to increases in the quality of the labour force. The labour factor will accordingly be measured as follows:

$$L_t = H_t N_t \quad [8]$$

where H represents the quality of labour or human capital and N the number of hours worked. If we include this expression in [6] and [7], we obtain:

$$Y_t = A_t K_t^{\alpha} \left(H_t N_t\right)^{\beta} M_t^{\varphi} \qquad [9]$$

$$\Delta A_t = \Delta Y_t - \alpha \cdot \Delta K_t - \beta \cdot \Delta H_t - \beta \cdot \Delta N_t - \varphi \cdot \Delta M_t \qquad [10]$$

Using this approach, we can identify as the source of growth changes in quality of labour or human capital ($\beta \cdot \Delta H_t$), and eliminate this factor from the residual. The contribution of this factor is added to the other sources already analysed[2] (labour not adjusted for quality, physical capital and intermediate consumption). This gives us a more precise view of the sources of growth, having clearly identified one factor that contributes to growth (human capital) that previously was included in the residual and therefore could not be separated from the other sources, such as technological progress.

An estimated series for the labour factor adjusted for quality can be found in Moral and Hurtado (2003), whose results illustrate the importance that quality improvements in this factor of production can occupy in the growth process. They estimate that more than 47 percent of growth in TFP (when obtained as a residual, based on a labour factor series that does not incorporate quality adjustments) in Spain during the period 1987-2003 is in fact attributable to increases in human capital in the labour force.

Last, it is interesting to mention possible demographic factors affecting the labour supply. First, it is difficult to argue that demographic changes, such as increases in birth rates or immigration flows, can themselves have a long-term effect on labour productivity or TFP. Indeed, positive changes in the labour supply will be reflected immediately with increases in the productivity of physical capital (and the remaining factors) and therefore the capital-labour ratio will tend to increase, which will ultimately offset the effects of the demographic change. In the short term, however, the population structure by age or level of qualification can vary, and this can have effects on productivity. In the case of levels of qualification, it should be possible for the treatment of the quality of the labour factor to reflect these effects. However, the population structure by age can entail effects that are much more subtle and difficult to quantify. In addition to labour experience and training, worker age affects factors such as mobility (geographic and functional), effort capacity and receptiveness to innovation[3].

[2] We must observe that our treatment of human capital follows from an essential assumption reflected in equation [8]. This assumption is that the quantity of the labour factor is the product of hours and human capital. This is tantamount to maintaining that a worker with a certain level of human capital can be substituted with two possessing half the level of human capital, or four having one fourth, etc. Ideally, both factors (unskilled labour and pure human capital) would be treated with some flexibility in terms of the level of complementarity, and shares of income should be estimated separately for both. This approach would, however, require the capability to separate, in the wage data, the share of wages corresponding to pure labour, without qualification, and pure human capital, or quality of labour, which would not appear to be a simple matter.

[3] Gómez and Hernández de Cos (2003) provide a recent example in this connection.

2.1.3 Contribution of the capital factor

The capital factor intervenes in the productive process through the services it provides; however, capital services are difficult to observe[4] and, accordingly, we normally presume that they are proportional to the accumulated capital stock. This brings a second problem, i.e. that capital stock is also not observable, although it can be estimated based on investment time series using the perpetual inventory method described in Annex 1.

Another relevant question when determining the contribution to growth of the capital factor is how to resolve heterogeneity in the capital factor. In practice, capital goods used in production are quite diverse in nature and each one contributes differently to the productive process. Therefore, according to Jorgenson and Griliches (1967), growth in the capital factor must be computed as a weighted average of the growth levels of the different capital goods, where the weights are determined by the proportion of the user cost the corresponding element occupies in total user cost. The justification for the use of these weights is that, in conditions of competition, the user cost of capital will be equal to its productivity. These user costs attempt to estimate how much a corporation that owns a capital good would have to pay to rent the good if it did not own it.

As indicated in the following section, adequate treatment of the capital factor is particularly important in analysing the role that capital goods produced by ICT sectors play as productive factors.

2.1.4 Other factors that can affect proper measurement of productivity

To this point, the analysis has identified a series of factors that influence growth, such as accumulation of physical capital, human capital, or intermediate consumption. Having done so, we must consider and isolate other factors that may not be adequately reflected in the most common measurement of productive factors, before we can interpret the resulting residual as technological progress. Below we shall list some of these factors, a number of which have been studied by the *Servicio de Estudios,* along with a brief description of the effects they can have on growth analysis and the methods for their isolation. The more successful this task, the closer Solow's Residual or TFP will be to the concept of technological progress.

The first consideration has to do with the level of aggregation used, and illustrates the advisability of conducting the analysis at the most disaggregated level possible, and of constructing increasingly aggregated variables from that level. A disaggregated study in fact enables us to determine those sectors in which the most productivity growth is occurring and to identify the role the reallocation of productive factors between sectors may be playing in aggregate productivity growth. If factors in the economy are shifting to high productivity sectors, aggregate productivity growth will reflect more growth than observed at the sectoral level. In the productivity estimates, this effect should be isolated as effectively as possible to prevent mechanisms that only involve the reallocation of factors from being attributed to technological improvement. In the following section we will analyse this ques-

[4] For a detailed analysis of the statistical treatment of this production factor, see OECD (2001).

tion, in the case of the Spanish economy, in some detail. In particular, we observe that although the reallocation of factors from the manufacturing sector to the services sector might have played some role in trends in Spain's aggregate TFP, the recent decline in TFP growth also occurred at the disaggregate level in both sectors, which suggests the need to find more structural explanations for this decline.

The second consideration is attributed to the procyclical nature that TFP normally registers, a feature that may reflect the fact that productive factors are not always used fully owing to the existence of adjustment costs. If this were the case for physical capital and for labour, corporations facing a recession would try to adapt their production to demand by adjusting the intensity with which they use these factors, rather than the quantity, which is more costly. As a result, production will tend to decline during periods of recession, while the quantity of factors will not (although the intensity with which they are used can be expected to decline), which leads to artificially procyclical TFP estimates. Accordingly, computation of productivity requires inclusion of some measurement of the intensity with which the different factors are used. To solve the problem posed by the fact that this variable is generally not directly observable, methods have been proposed to derive it from the observable data. In particular, for the level of labour intensity, the number of hours per worker is normally used; while intermediate consumption, or the ratio of investment to capital, which would reflect wear and tear on machinery in light of more intense use, is used to measure capital use intensity.

Last, constant returns to scale are assumed to exist in the analysis of growth and productivity using the growth accounting methodology. Other approach is to consider the existence of increasing returns to scale, which requires application of econometric techniques to obtain TFP[5].

2.2 Determinants of growth in total factor productivity

The results of the growth accounting exercise have been to quantify the share of growth attributable to increases in hours worked, improvements in labour quality, increases in physical capital, reallocation of factors, intensity of use and technological progress, inter alia. However, we have not analysed the determinants of increases in quantity or quality of factors, or why technological progress exists. This is a complex issue, and the current state of economics does not make it possible to provide a single answer to these questions. For this reason, this section offers an approach to these issues based on the literature of endogenous economic growth[6].

[5] The existence of increasing returns to scale covers two types of situations: when economic agents internalise these economies, and when they do not. The first case is difficult to find in the aggregate data, although at low levels of disaggregation, economies of scale can exist. The second case is better known as the problem of externalities, and is more easily found in practice, as aggregate returns to scale can continue in the long term because agents are unable to internalise them and benefit individually from them through growth. If this occurs, the estimated factor remuneration will only reflect the private component, and the externality will still be reflected in the residual.

[6] For a more detailed analysis, see Barro and Sala-i-Martín (2004).

One type of models argue that technology expands based on research and development activities (R&D)[7]. Accordingly, the growth engine would be a continued increase in TFP, which in turn would be caused by R&D activities themselves. In some models, the government should be limited to providing a legal framework to ensure adequate defence of intellectual property with patents or other mechanisms, to ensure that economic agents find it profitable to engage in R&D activities. Other authors, however, recommend subsidies for private research and even publicly provided R&D, particularly in the field of basic research[8]. In general, analysis of the role of economic policy in this context is quite complicated, entailing typical problems such as provision of public goods, regulation of monopolies, or externalities.

Another type of broadly used theories includes those that grant a predominant role to externalities, particularly those resulting from human capital. Most of the relevant literature is based on the model by Lucas (1988), and the general idea is that individuals who are surrounded by agents having more human capital are positively affected by their higher productivity and ultimately become more productive themselves. Accordingly, although private returns from human capital accumulation are decreasing and do not ensure long-term growth, aggregate returns can be constant when the role of these externalities is taken into account, and therefore sustained growth can be generated. As indicated above, these external effects, with the exception of some recent works, are normally reflected with the residual term in growth accounting. The role of economic policy in this case is clear: to subsidise accumulation of the factor that produces externalities, i.e. human capital.

Last, a third group of theories attributes externalities to physical capital similarly to those described for human capital[9]. Although private returns from physical capital accumulation are decreasing, it is possible that this accumulation could finance the provision of certain public goods, such as infrastructures, that in the aggregate lead to increases in productivity and compensate for decreasing returns at the private level. As in the case of human capital, these externalities are normally reflected in the residual element.

Changes in some variables related to technological development and human capital are reflected in the convergence indicators referring to the stock of technological and human capital prepared by the *Servicio de Estudios* (for further details see the description presented in Chapter 15).

3 Analysis of growth determinants in the Spanish economy

The purpose of this section is to characterise the changes in productivity for the Spanish case during the past 25 years using the theoretical discussions from the previous section. To that end, this section is divided into three parts. First, we will study changes in labour productivity and TFP with a high level of aggregation. This analysis will make it possible to

[7] See, among many others, Romer (1990) and Aghion and Howitt (1992).

[8] Basic research is that which enhances results in the process of specific or applied research. It therefore includes areas such as mathematics or physics.

[9] One example is Barro (1990).

describe the trends that have characterised developments in production, employment and productivity. In the next two sections, we will attempt to explain the origin of these developments, using complementary dimensions. Accordingly, the second part will present a sectoral breakdown of labour productivity and total factor productivity. This analysis will make it possible to study whether the activity observed at the aggregate level reflects similar changes at the sectoral level, or whether the changes in these variables are heterogeneous at this higher level of disaggregation. In the third part, the exercise consists of a more thorough analysis of the determinants of the patterns observed in total factor productivity. Specifically, these trends in TFP will be related to the dynamics of the sectors producing goods and services related to information and communication technologies[10].

3.1 Aggregate productivity analysis

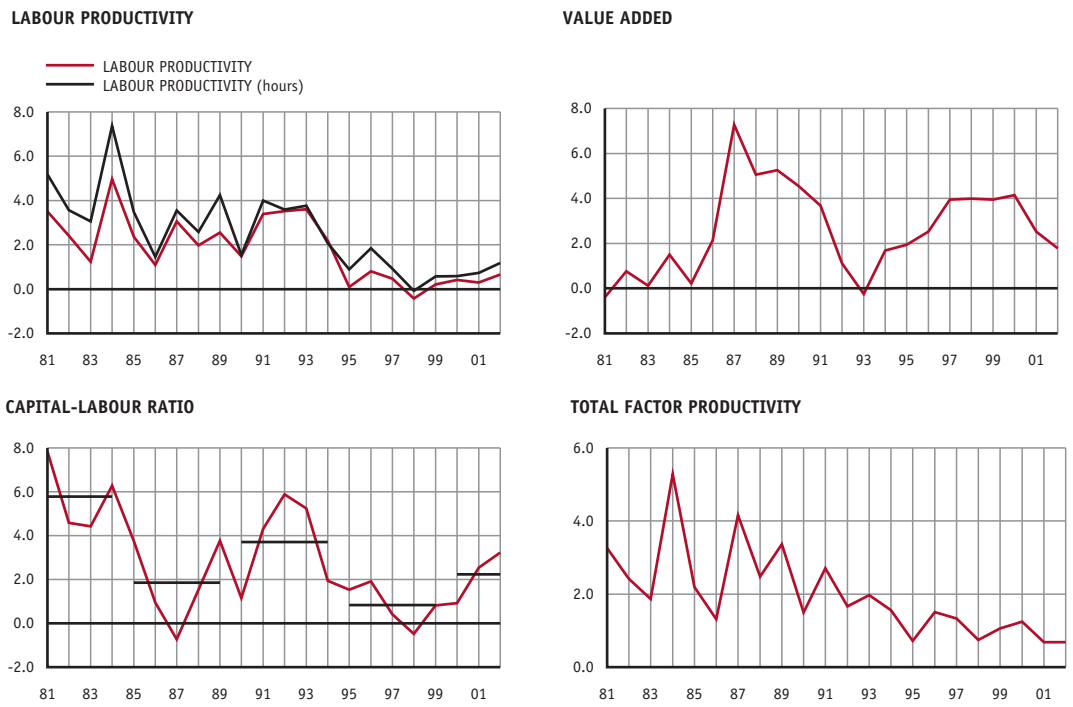
The top figures in Chart 1 present the changes in value added and labour productivity in the Spanish economy for the aggregate corresponding to the non-financial market economy[11]. Two main conclusions can be drawn from these changes. First, we observe a gradual reduction in the rate of growth in labour productivity, and this performance is particularly pronounced beginning in 1994. Specifically, the average labour productivity growth rate declined from just over 2.5 percent during the period 1980-1993 to below 1 percent from 1994 until 2002, averaging 1.8 percent for the entire period. This trend is the result of average value-added growth of just over 2.6 percent and an average increase in employment of 0.8 percent. Second, in addition to this growth pattern, there is a contracyclical pattern in productivity that depends on the combined dynamics of employment and output. Specifically, the correlation of labour productivity and growth in output is –0.25. In other words, labour productivity tends to be situated below average during periods of expansion, which tends to be higher during periods of recession. The reasons for such performance are complex and are attributed to the fact that, during periods of above- average growth in output, employment tends to grow more quickly, on average; while, during periods of low growth levels, employment growth lags behind production. The reasons for this cyclical pattern are related to the contracting structure in the Spanish economy and more generally to the structure and operation of the labour market itself.

As discussed in Section 2, apparent labour productivity is only an imperfect approximation of technical progress. TFP is a more appropriate concept than labour productivity to assess an economy's sources of growth. The lower right-hand figure in Chart 1 presents trends in total factor productivity. In recent years, we observe a gradual downward trend in the TFP growth rate. Although we observe the first symptoms of this deceleration at the end of the 1980s, this decline materialised in the form of growth rates systematically lower than 1 percent from the

[10] The database used is described in detail in the work of Estrada and López-Salido (2001a), supplemented with estimates of quality changes by Moral and Hurtado (2003), those of capital services by Hernando and Núñez (2002a and 2002b) and the sectoral estimates prepared by Núñez and Hurtado (2003) based on CBBE data.

[11] The difference in growth rates between this aggregate and the total for the market economy is minimal, as shown by Estrada and López-Salido (2001a and 2001b).

CHART 1 VALUE ADDED AND PRODUCTIVITY IN THE AGGREGATE NON-FINANCIAL MARKET ECONOMY. GROWTH RATES



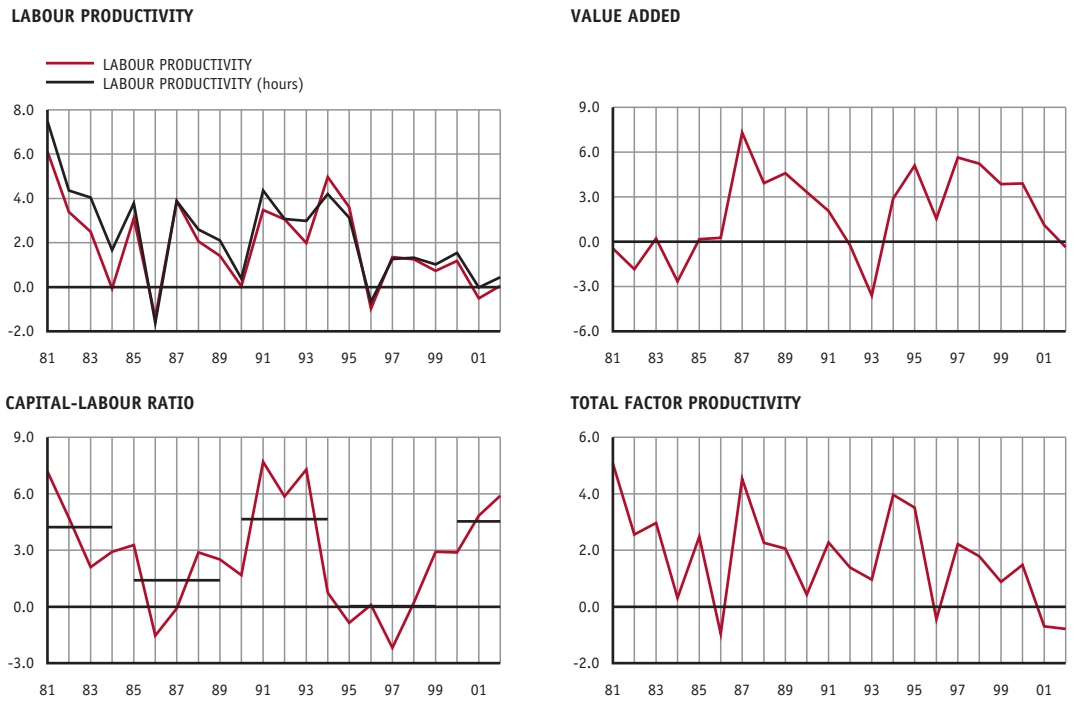
SOURCE: Estrada and López-Salido (2004).

latter half of the 1990s. Last, and unlike what might be expected to occur with labour productivity, the cyclical pattern of TFP tends to be slightly procyclical (the correlation between the growth rate in output and growth in TFP is just under 0.1). Accordingly, the decline in TFP occurred in parallel with the decline in apparent labour productivity, in line with a gradual reduction in the share of earned income in value added. However, beginning in 1998, we observe a clear increase in the capital-employment ratio, parallel with substantial growth in employment. The effects of this greater investment effort on TFP will be analysed in the third part of this section. First, we will discuss in the next part whether the aggregate features described above reflect some sort of sectoral heterogeneity, or, on the contrary, if they are the result of similar performance in the manufacturing and service sectors of the Spanish economy.

3.2 Sectoral contribution to productivity growth

One of the basic features of the data presented in Estrada and López-Salido (2001a and 2001b) is found in its sectoral nature, as it makes it possible to break down trends in aggregate productivity based on performance of output, employment and capital in the key sec-

CHART 2 VALUE ADDED AND PRODUCTIVITY IN THE MANUFACTURING SECTOR. GROWTH RATES

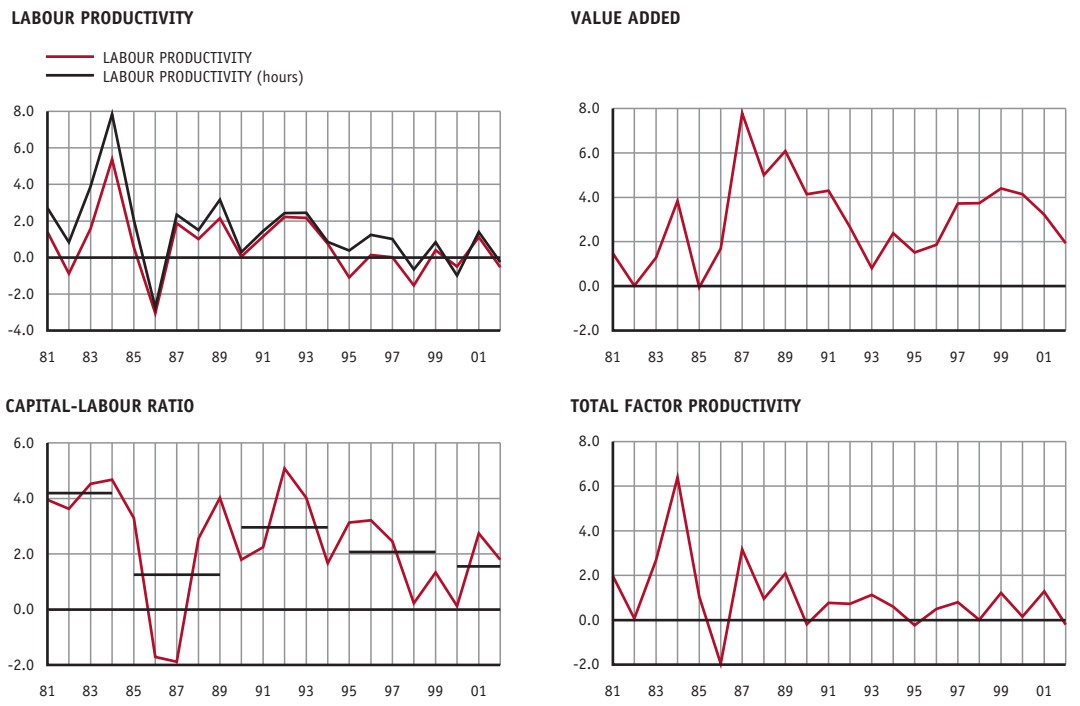


SOURCE: Estrada and López-Salido (2004).

tors of the Spanish economy (to a level of 17 productive branches). In this section, and for considerations of space, the breakdown of aggregate productivity trends is provided into two main sectors: the manufacturing sector, exposed to international competition; and the service sector. This breakdown is useful, as indicated in the above section, as it allows us to assess the effects of sectoral reallocation of productive factors and to identify possible differential behaviours between performance in the sectors analysed and the aggregate.

During the past 25 years, the share of the manufacturing sector in total output (in terms of value added and production) has gradually declined. If we use employment as a variable to quantify the importance of this sector in the total economy, the reduction is even more significant. This sharp reduction in employment is behind the high growth levels in apparent labour productivity observed until the mid-1990s (Chart 2). As occurred at the aggregate level, we now observe a significant deceleration in output per person employed. This effect has been associated with a gradual reduction in output growth and higher levels of employment creation. This movement in average productivity has also been related to a reduction in the TFP growth rate in the sector (parallel with the lower level of output growth) leading to negative growth rates at the beginning of 2000.

CHART 3 VALUE ADDED AND PRODUCTIVITY IN THE SERVICE SECTOR. GROWTH RATES



SOURCE: Estrada and López-Salido (2004).

Regarding the volatility and cyclical dynamics of variables in this sector, it is interesting to point out that there is virtually no correlation between labour productivity and production. In other words, a gradual reduction in employment in this sector is associated with structural characteristics, so that job eliminations have tended to be permanent. By contrast, the correlation between output growth and sectoral TFP is 0.31. As discussed in the preceding section, we can expect trends in TFP to reflect primarily technological progress, which tends to justify the importance of the latter in explaining some of the output fluctuations in this sector. However, some of this correlation may be provoked by cyclical changes in the level of factor use.

Contrary to what is indicated for the manufacturing sector, the non-financial commercial service sector registers average growth exceeding the total for the economy (just over 3 percent, as against 1.9 percent for manufactured goods). This higher level of growth in fact coincides with an average growth rate in output per person employed of just over 0.5 percent, as against 1.9 percent in the manufacturing sector (Chart 3) as a result of the increase in employment in that sector. In addition, average TFP growth in the service sector has been substantially modest, at around 1 percent, below the level of 1.7 percent registered in manufacturing (Chart 3). As in the manufacturing sector, the 1990s (and particularly the

TABLE 1 GROWTH RATE IN VARIOUS PRODUCTIVITY INDICATORS

	Production per person employed	Production per hour worked	Total factor productivity
Total			
1981-1995	2.34	3.12	0.84
1996-2002	0.76	1.35	0.13
Industry			
1981-1995	2.89	3.44	0.61
1996-2002	0.92	1.04	0.16
Services			
1981-1995	1.14	2.07	0.46
1996-2002	0.12	1.04	-0.10

SOURCE: Calculations based on Estrada and López-Salido (2004).

latter half of the decade) coincide with a reduction in the TFP growth rate, which was situated at 0.4 percent.

Table 1 shows trends in aggregate and sectoral productivity growth rates for the Spanish economy and confirms the earlier description, while suggesting that the reduction in apparent labour productivity observed in recent years is associated with a decline in TFP, on the one hand, and generalised at the sector level, on the other hand. We should therefore conclude that the unfavourable trends in labour productivity were caused by modest development in technological progress in most productive sectors.

The following section will study whether this trend in technological development includes any relationship with the incorporation of new technologies into productive processes, which may explain some of the decelerations in production per person employed observed at the sector and aggregate levels from the latter half of the 1990s. Similarly, the analysis will make it possible to quantify whether the investment effort has led to improvements in total factor productivity, both present and future.

3.3 New technologies and their contribution to growth in the Spanish economy

The substantial technological advances registered in the productive sectors of goods and services related to information and communication technologies have been one of the characteristic features of economic developments in recent decades, particularly during the 1990s. This progress has led to a substantial decline in prices for ICT goods and services, as well as to an improvement in their quality, which has led to a substantial increase in the level of the use of these new technologies by the overall economy.

The contribution of ICT branches to economic growth therefore occurs through different channels. On the one hand, production in these branches specifically will benefit from some degree of technological progress that, according to the methodology described in this chapter, will be reflected by TFP growth in these branches of activity. On the other hand, production in ICT branches is used to some extent as capital in other economic sectors. Accordingly, greater investment in this type of capital will lead to higher levels of growth in output attributed by our methodology to increases in the capital factor. Last, the use of new technologies may produce externalities in different sectors that, as explained above, will be reflected in their TFPs. There three paths will be referred to, respectively, as the *contribution of ICT branches, the contribution of ICTs as a productive factor and ICT externalities.*

The objective of this section is specifically to examine the contribution of ICTs, through the different mechanism discussed above, to economic growth during the 1990s. To that end, an exercise is conducted to break production down according to the description provided the previous section[12].

3.3.1 Contribution of ICTs as a branch of activity

This section describes changes in the contributions of ICT sectors to growth in value added, employment in hours, labour productivity and total factor productivity of the overall economy obtained from a series of studies conducted by the *Servicio de Estudios* based on data from the Central Balance Sheet Data Office[13]. The contribution of a given productive branch (in this case, ICT) to growth in value added, employment and labour productivity for the overall economy is determined by the rate of change of these variables in the branches analysed and by their weight in the overall economy[14].

Some differential patterns are observed in different ICT sectors. Accordingly, while in the case of manufactured ICT goods and communication ICT goods, the greatest contribution to growth in value added is made by growth in TFP, in computer service activities, it is made by growth in employment. In any case, growth in TFP in the three branches of activity is found to be higher than the levels observed for the rest of the economy.

The contribution of ICT branches to overall economic growth according to these estimations is presented in Table 2. As we observe, of the 3.48 percentage points (pp) of growth, on an annual average, in value added in a market economy, 0.37 pp is attributable to the branches that produce ICT goods and services, which entails a relative contribution of 10.6

[12] The analysis presented here is based on the work of Núñez (2002) and Hernando and Núñez (2002a and 2002b). Information is also used from the database described in Estrada and López-Salido (2001a).

[13] In the analysis presented here, the OECD definition of ICT sectors has been used. It encompasses three types of activities: manufacturing of computer and communication products (manufactured ICT goods), telecommunication services (communication ICT goods) and computer activity services (computer ICT).

[14] The ICT sectors in Spain represent a small percentage of the overall economy, although, in the years considered, they grew steadily, in 2002 amounting to 5.4 percent of value added and 2.3 percent of employment. This increasing trend was registered particularly in communication ICT and computer ICT. On the other hand, Spain presents a lower relative level of importance in ICT branches of activity as compared with other economies such as the EU and the U.S.

TABLE 2 CONTRIBUTION OF ICT BRANCHES TO ECONOMIC GROWTH (a)

	Value added	Employment	Labour productivity	Total factor productivity
Rate of change, total economy	3.48	2.77	0.69	0.38
Contribution of:				
Manufactured ICT goods	0.02	0.00	0.02	0.02
Communications ICT	0.23	-0.02	0.26	0.34
Computer services ICT	0.10	0.11	-0.01	-0.01
Total ICT	0.37	0.09	0.28	0.32

SOURCE: Prepared in-house with data from the Central Balance Sheet Data Office, Banco de España (CBBE); Corporate Directory, INE (DIRCE); and Estrada and López-Salido (2001a and 2001b).

a. Annual averages, 1996-2002

percent, i.e. a figure clearly higher than the weight that these sectors occupy in value added of the total market economy, which is situated at 5.4 percent. However, the contribution to the growth rate in employment was much smaller and is derived exclusively from the computer services branch of activity.

With relation to growth in labour productivity, ICTs contributed 0.28 pp to the 0.69 pp average annual increase in the overall non-financial market economy, a figure that, taking due account of the small share occupied by these branches of activity, can once again be considered substantial, evidencing the slow rate of progress in labour productivity in the remaining branches of activity.

With regard to the contribution of ICTs to growth in total factor productivity, we reach similar conclusions. As we observe in the last column of Table 2, the average annual contribution of ICT branches was 0.32 pp. In terms relative to the increase in TFP in the overall economy, this contribution amounts to almost 85 percent, implying that the growth rate in TFP in all of the remaining productive branches, potential beneficiaries of the externalities derived from the use of new technologies, has been quite limited.

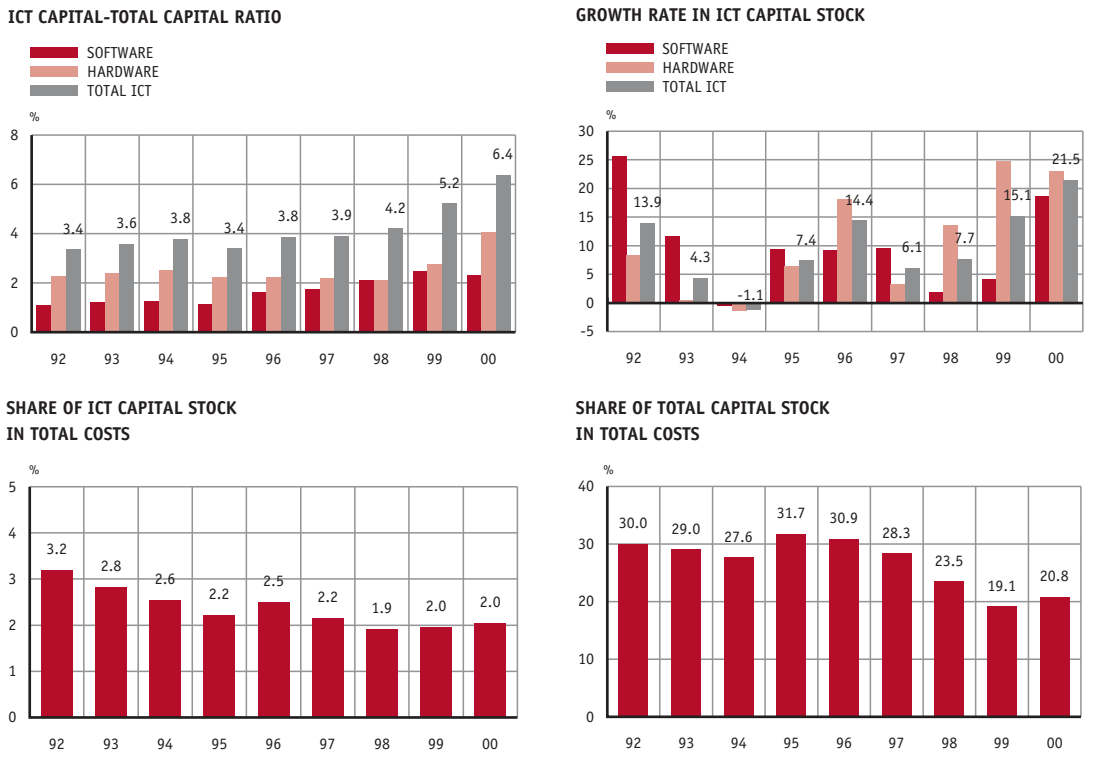
3.3.2 Contribution of ICTs as a productive factor

The methodology[15] to obtain the contribution of ICTs as a productive factor is explained in section 2.1.3., where capital is broken down into six different types[16]. According to this

[15] For further details, see Hernando and Núñez (2002a and 2002b).

[16] These types are software, hardware, non-residential construction, industrial equipment, transportation elements and other equipment and furnishings.

CHART 4 CAPITAL STOCKS. TOTAL NON-FINANCIAL MARKET ECONOMY



SOURCE: Hernando and Núñez (2002a and 2002b).

methodology, the contribution of each productive factor to growth in output is obtained as the product of the rate of change in the productive factor and its share in total costs. Changes in these two components for ICT capital are illustrated in Chart 4. The upper left figure shows that ICT capital goods occupy a small share of total capital, although this proportion grew steadily during the period studied (from 3.4 percent in 1992 to 6.4 percent in 2000), and this process accelerated during the second half of the decade. This growth in the ratio of ICT capital to total capital is explained by the substantial rates of ICT capital accumulation (upper right figure) observed throughout the decade, that were considerably higher than the levels for capital goods not related to new technologies. These trends are observed for the two components of ICT capital studied (hardware and software).

The lower figures in Chart 4 show developments in the share of ICT capital costs and the rest of capital in total costs. Where ICT capital is concerned, we observe a decreasing trend in its share in total costs, that is the result of two effects, that are substantial in scope, but of the opposite sign: the increasing weight of ICT capital in total capital and the intense reduction in its user cost, the latter being the dominant effect[17].

[17] Where the rest of capital is concerned, a slight downward trend is also observed in its share in total costs.

TABLE 3 CONTRIBUTION OF ICT CAPITAL TO GROWTH IN APPARENT LABOUR PRODUCTIVITY. RESULTS FOR THE NON-FINANCIAL MARKET ECONOMY (a)

	Total period	1992-1995	1996-2000
Labour productivity (b)	1.57	2.29	1.00
Contributions of:			
1. Software	*0.10*	*0.08*	*0.12*
2. Hardware	*0.16*	*0.11*	*0.19*
3. ICT (1 + 2)	0.26	0.20	0.31
4. Other capital	0.26	0.64	-0.05
5. TFP	1.06	1.45	0.74
MEMORANDUM ITEMS			
Employment growth	1.02	-1.08	2.69
Growth in capital/labour ratio:			
Software	*8.94*	*12.63*	*5.99*
Hardware	*9.74*	*4.53*	*13.91*
ICT	8.91	7.21	10.27
Other capital	0.93	3.43	-1.07

SOURCE: Prepared in-house with data from the Central Balance Sheet Data Office, Banco de España (CBBE); Corporate Directory, INE (DIRCE); and Estrada and López Salido (2001a and 2001b).

a. Obtained as the average of different sectors weighted by their share in total value added. Results for each sector are obtained as the simple average of the constituent enterprises.
b. In hours.

Table 3 presents the results of the exercise of breaking down apparent labour productivity growth. During the overall period, output per hour increased by an average of 1.57 percent per annum. Intensification of ICT capital use contributed an average of 0.26 pp to this productivity growth. This contribution of ICT capital was more pronounced during the latter half of the decade, increasing from 0.20 pp during the period 1992-1995 to 0.31 pp during the period 1996-2000. In relative terms with relation to productivity growth, this increase is even more pronounced. While ICT capital goods explain approximately 8 percent of productivity growth during the period 1992-1995, this share increased to 31 percent during the period 1996-2000. In light of these results, presented in Table 3, the reduction observed in apparent labour productivity in the second part of the sample studied is explained by a smaller contribution of non-ICT capital and by a deceleration in total factor productivity.

4 Conclusions

This chapter presented the results of the work of the *Servicio de Estudios* in analysing the main determinants of changes in productivity in the Spanish economy. These determinants constitute the basis for long-term growth and therefore are the source of its future development and progress, to ensure a sustained increase in per-capita income for the population.

Measurement of productivity goes beyond simply calculating production value per person employed, as this is only an estimate that is not exempt from problems of measurement and interpretation. In this connection, we must attempt to identify the factors that jointly determine the dynamics of production and employment in the economy. In this chapter, we have described a simple technique to break production growth down into the contributions of different productive factors and technical progress. Similarly, we have presented estimated changes in labour productivity and TFP with a high level of disaggregation. These figures indicate a gradual decline in TFP in parallel with the decline in apparent labour productivity, at the aggregate level and in the manufacturing and non-financial commercial service branches of activity. Beginning in 1998, however, we observe a clear increase in the capital-employment ratio, as well as substantial growth in employment. The effects of this greater investment effort in TFP were also analysed in this chapter. Last, development of new technologies has assumed increasing importance in the Spanish economy, in its production as well as, most importantly, its level of use as a productive factor.

The results presented suggest the need to continue to expand the measurements and ultimate determinants of trends in productivity and economic growth. In this context, substantial future research efforts will focus on continuing to improve measurement of productive factors. On the one hand, proper measurement of the quality of employment requires us to continue to combine information provided by the new waves of the wage structure survey and the labour force survey (EPA), in line with the results described in Moral and Hurtado (2003). On the other hand, the stock of technological capital is a decisive variable in technical progress and, therefore, we should continue expanding its study, based on the estimates of technological capital stock published and updated by Banco de España. The synergies deriving from establishment of technological capital through changes in work organisation at the corporate level should also be pursued. A second line of research is analysis of the impact of population ageing on long-term economic growth, through the effects generated via complementary channels: through relations between the working-age population and total population; and those generated by changes in the age structure of the labour factor[18].

[18] See Gómez and Hernández de Cos (2003).

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Annex 1. Measuring production and factors

This annex will describe certain questions related to the measurement of production and factors, as well as Solow's Residual. First, as we observe in equation [4], calculation of Solow's Residual requires the knowledge of parameters α and β, and an effective measurement of both growth in production and in labour and physical capital services and level of use.

Parameters α and β are normally computed, with the assumption of perfect competition, as the proportion of rent that will remunerate capital and labour, respectively. However, deviations from this assumption can be substantial in the short term and first require the use of the share of factor remuneration in total cost, rather than in total rent. Imperfect competition in productive factor markets is more difficult to address, as remuneration is not available as a productivity indicator.

Where production is concerned, the most important matter when obtaining effective output measurements is to use adequate deflators to reflect possible increases in the quality of that production. To that end, we must reflect technological and quality improvements associated with the good in question and not simply its price. This is particularly important in technological sectors such as computer services. In fact, in particularly innovative sectors, the problem is even greater as, in addition to quality improvements in existing products, production of completely new goods could begin, for which price changes in comparison with earlier periods cannot be computed. One mechanism to construct deflators that reflects these considerations, and that has been used by the *Servicio de Estudios,* Banco de España, is hedonic prices. This methodology consists in breaking down the price of a good using hedonic regressions that relate the price of the good with its technical features[19].

A further consideration is required when value added is used to assess production. In this case, it is a complicated matter to obtain the real equivalent of value added. The reason is that value added is a difference between the value of production and value of intermediate consumption, and therefore it is not generally advisable to use only one deflator. An alternative procedure is double deflation, which consists in obtaining the production value in real terms and subtracting from it the value of intermediate consumption in real terms.

Regarding the labour factor, its heterogeneity poses a series of measurement problems that can be included in two categories: those involving quantity and those referring to quality.

Where quantity is concerned, first of all, hours worked provides a better indicator of the labour factor than the number of workers, as not all employees work the same number of hours and, as a result, the contribution of each worker to the total is different. Second, hours worked is also a better measure, since the average number of hours worked is not constant in time. This is particularly important in analysing lengthy periods of time, as long-term trends may exist in the distribution in time between labour and leisure activity.

[19] In the example of computers, the features would be speed, memory, etc. Accordingly, we could obtain the price per MHz of speed or per MB of memory, so that a more expensive, but more powerful, computer could lead to a decrease in the price of the features. For further details, see Izquierdo and Matea (2001a y 2001b), for example.

Quality or human capital in the labour force also entails a substantial number of measurement problems. It is insufficient to include the level of studies achieved, as not all studies contribute the same amount to productivity, and not all workers with certain studies work in jobs that require their level of education. We also must consider that a substantial amount of human capital is accumulated on the job through acquisition of skills and practice[20]. Another problem is the existence of innate talents.

One way to address these problems consists in assuming that, in the medium and long terms, the differences in individuals' human capital that lead to different productivity levels generate proportional differences in wages or remuneration. Accordingly, the relative quality of two different jobs should be estimated through the relative wages of the two different workers involved[21].

Another problem in measuring the labour factor and its remuneration is the treatment of self-employed workers and more generally the measurement of unremunerated work in independent businesses, for which payment is received on an accounting basis as increased profits. Let us consider an economic agent who owns a corporation and who works in the corporation without collecting a standard wage. In this situation, the problem consists in estimating the productivity of this unofficial work, as, at first, this productivity is reflected as profits, when it should actually be considered earned wage. In addition, the time dedicated to this work should be computed in the number of hours worked. These considerations are important, to obtain the number of hours worked as well as to estimate parameter β, which is identified as the share of earned income in total costs.

When we study the measurement of the capital factor, the first operation to be carried out is to calculate the capital stock based on the investment data, which are directly observable. This is normally done using the perpetual inventory method. This method is based on the investment data observed for a series of periods, and presumes that the capital stock depreciates at a constant rate δ. Given this assumption on depreciation, the capital stock that remains from an investment made j periods ago is a proportion δ^j of that investment. Repeating this exercise for all past investments, we obtain aggregate capital stock, to which we must add the initial capital stock K_0 modified to reflect depreciation ($\delta^t K_0$ in the period t). Therefore, capital stock is estimated in period t by the following expression:

$$K_t = \delta^t K_0 + \sum_{j=0}^{t-1} \delta^j I_{t-j} \qquad [11]$$

where I_{t-j} is investment carried out in period t-j. In general, capital stock for the initial period is not known and, therefore, an assumption must be made to identify it. The most common approach is to assume a stationary condition for the initial period, although other options have been used such as reconciling this initial stock with another capital estimation from an independent source.

[20] An imperfect approach to this type of human capital normally used is worker age.

[21] An example of labour factor quality measurement is provided in Moral and Hurtado (2003).

In this case, we should also mention the user cost of capital components. On the one hand, we have the interest rate, which measures the opportunity cost of resources earmarked to purchase the capital good. We must also reflect depreciation, so that a good with a shorter useful life will generally have a higher user cost attributed specifically to that component. In addition, we must subtract (add) the increases (decreases) in the market price of a new capital good, as depreciation has already been taken into account.

17. Competitiveness analysis

Soledad Bravo and Esther Gordo

1 Introduction

Competitiveness is one of the terms most addressed by analysts and researchers. In recent years, technical progress and the globalisation of economic relations have placed competitiveness at the centre of economic debate and of economic policy strategy in most market economies. Its abundant use contrasts, however, with the absence of a sufficiently broad consensus on its conceptual content, the best way of measuring its developments, its determinant factors and its implications. There are, in fact, many definitions of competitiveness, which range from the most traditional definitions that focus substantially on the analysis of trade performance and its most direct determinants, to other broader conceptions that incorporate more structural considerations. These approaches attach considerable importance to the study of productivity, as it ultimately determines increases in economic welfare.

In the case of the Spanish economy, involvement in EMU has led to a general reconsideration of the role of competitiveness analysis, since monetary integration has meant the loss of the traditional adjustment mechanisms to address external shocks, and has conferred greater importance upon the structural aspects of the economy that determine its capacity to grow, to create employment and to generate income against a backdrop of substantial exposure to the international markets.

This chapter presents the framework used in the *Servicio de Estudios* of Banco de España to assess the Spanish economy's competitive position. The analysis aims to evaluate the Spanish economy's capacity to adapt to a changing global economic environment and its growth potential in the medium and long term. To that end, an eclectic approach is used

to reflect the different facets of competitiveness and the many factors that determine it. From this perspective, it is not a simple matter to prepare a diagnosis of economic competitiveness, as there is no single indicator available that summarises its relative position vis-à-vis competitor countries. Analysts must instead resort to a broad battery of measurements and indicators that reflect different aspects of competitiveness. There are, furthermore, still many areas where insufficient information is available.

This chapter is structured as follows: the next section reviews the most important positions that have made up the conceptual debate over competitiveness in recent years and discusses the implications that arise in the analytical approach used at Banco de España. Section 3 sets out the indicators used to analyse the competitiveness of the overall economy, discussing their principal advantages and disadvantages. Section 4 describes the framework and the indicators used in competitiveness analysis of manufacturing and market services. Last, a number of final points are set out.

2 The conceptual debate and implications on competitiveness analysis

In its most traditional version, the competitiveness of an economy appears to be linked to its trade performance, being defined as the capacity to maintain or to sustainably increase its presence in world markets, including the domestic market itself. According to the neoclassical theory of international trade, which for many years was central to the explanation of trade activities, relative costs and prices were identified as the fundamental determinants of trade performance and, therefore, of competitiveness, since they constitute the source of comparative advantages in economies.

This sense of the term has given rise, however, to much criticism. First of all, research carried out during the 1970s and 1980s brought to light the absence of a direct link between improvements in an economy's relative prices and costs and its position in the international markets[1]. At the same time, the most up-to-date international trade theories have drawn attention to the limits of external position analysis when based solely on a study of relative prices and costs. These theories stress the capacity of corporations to establish more active mechanisms of competition, with product differentiation through design and quality, and the influence of other more structural factors relating to technological, organisational and institutional matters[2].

In the last few years, the conceptual debate over competitiveness has moved outside the scope of international trade to consider that an economy's relative development must not be judged solely on the basis of its trade performance, but also on its capacity to achieve sustained improvements in its standard of living, in relation to the more developed countries

[1] This discovery is known as the "Kaldor Paradox", in honour of the first economist to have studied it.

[2] Furthermore, many authors have argued that underlying the traditional definition of competitiveness is a conception of international trade as a zero sum game in which an increase in one country's trade shares can only be achieved at the expense of its rivals or competitors. Accordingly, emphasis on these aspects could promote excessively protectionist or interventionist policies in international trade and industrial policy, that would ultimately reduce overall economic welfare [see Krugman (1994) and Porter (1990)].

[see Krugman (1996) and Porter (2002)]. From this viewpoint, competitiveness appears to be closely linked to productivity, inasmuch as the latter determines the economic growth capacity, the evolution of real wages and citizens' income levels.

In this broader approach, the determinant factors of competitiveness are linked to the theory of economic growth, which indicates that a long-term increase in productivity depends on the efforts made within the economy in terms of research, development and innovation. This includes not only the intensity of R&D expenditure, but also the capacity to incorporate innovations generated abroad, through trade and international investment flows, and the existence of channels for propagating the effects of these innovations to the overall productive structure. Such factors, in turn, are found to be closely linked to the infrastructure endowment and to the quality of training and education, which permits a better adaptation to new knowledge and technologies. Some of the most recent models have highlighted the importance of two other factors that influence productivity and growth. First, the strategic capacity of corporations, defined as a combination of intangible assets in which, together with the capacity for innovation, organisational and management skills, *inter alia,* stand out. Second, the existence of an institutional environment that drives capital accumulation facilitates innovation and its dissemination throughout the economic system and promotes an adequate allocation of resources.

This conceptual debate has had far-reaching implications in the area of economic policies required to improve a country's competitiveness. From this perspective, an improvement in the economy's competitiveness would essentially rest on supply policies that encourage the processes of knowledge creation and dissemination, and help create a business environment and sufficiently flexible markets for goods and factors, with the capacity to adapt to technological change and to modifications in the international environment. From the external standpoint, an improvement in productivity also constitutes the relevant objective, by simultaneously allowing increases in real wages and improvements in the economy's external position.

In the area of economic analysis, the conceptual debate has raised the need to address the study of competitiveness from an integrated viewpoint, combining the aspects relating to trade performance (external competitiveness), with other aspects more closely linked to productive efficiency (overall competitiveness). Under this approach, productivity is an essential element in competitiveness analysis, as it constitutes the basis for enhancing economic welfare, while decisively impacting trade performance. Competitiveness, however, is a broader concept, since it could happen that two countries with similar levels of productivity achieve very different results on the international markets, depending on their liberalisation strategies and productive specialisation patterns.

Competitiveness analysis therefore acquires a multidimensional character, given the wide variety of factors that determine its evolution. As a result, it is a complex matter to produce one diagnosis. Some international organisations have made significant efforts to obtain summary indicators reflecting changes in competitiveness – for example, those produced by the World Economic Forum and the Institute for Management and Development – which have yet to provide fully satisfactory results.

In the work of the *Servicio de Estudios,* competitiveness analysis of the Spanish economy is conducted based on a delimited, selective set of indicators organised according to the

TABLE 1 COMPETITIVENESS INDICATORS

	PERFORMANCE INDICATORS (results)	DETERMINANTS
EXTERNAL COMPETITIVENESS	Balance of trade Export shares in world markets Import penetration in the domestic market	Nominal exchange rate Costs, prices and relative profitability
OVERALL OR STRUCTURAL COMPETITIVENESS	Per-capita GDP and productivity	Endowment/use of productive factors: physical (including infrastructures), technological and human capital stocks Innovation capacity Productive specialisation Operating efficiency of the markets Features of business organisation

SOURCE: Banco de España.

outline presented in Table 1. At the first level, we note indicators that illustrate changes in competitiveness (performance or *ex post* indicators) and, on the other hand, factors that determine such performance (*ex ante* indicators). In the former, we distinguish between indicators related to trade performance (external competitiveness) and those related to welfare (overall or structural competitiveness). The division or classification of the determinant factors is more complicated, since, as we infer from the foregoing discussion, there are multiple relationships between both conceptions. For example, an economy's capacity to extend its presence in external markets depends on its capacity to enhance the quality of its products which, in turn, is closely linked to the innovation effort and to the qualification of human capital, these both being factors that constitute the basis for improvement in economic productivity. Taking these interrelationships into account, the second set of indicators has been assembled, distinguishing between the most immediate or short-term determinant indicators, such as relative prices or costs and other, more structural, aspects.

Furthermore, the analysis is approached from a macroeconomic perspective focused on the performance of the overall economy and of the main productive activities, specifically manufacturing and marketservices. The study of the competitiveness of the manufacturing industry is justified by its nature as a sector that produces tradable goods and, consequently, by its capacity to impact trade performance. Special attention is devoted in this context to matters relating the productive and trade specialisation pattern of the Spanish manufacturing industry, as this enables us to assess its capacity to adapt to changes in international demand and to characterise the structural transformations registered in recent years.

The growing importance of market services in the composition of value added and employment, and the role it plays as supplier of intermediate inputs to the other productive branches, make competitiveness analysis of this branch of activity essential in determining growth potential. Furthermore, the gradual internationalisation of some service activities is increasing their influence on the determination of trade performance. As we shall observe below, competitiveness analysis in this sector is subject to many limits owing to the lack of available information. Considerable effort is devoted, on the other hand, to a detailed treatment of tourism activities, owing to their specific influence in the Spanish economy and to their importance as a driving factor for related sectors.

Finally, competitiveness is a relative concept, and it is therefore necessary to establish a framework of reference for comparison, which, in the work of the *Servicio de Estudios* generally involves the EU 15, as this is the set of countries relevant in assessing the process of real convergence to which most of the trade flows of the Spanish economy are directed. Comparisons are also made with the EU 25, given that the accession of the latest 10 member countries to the EU has meant new competitiveness challenges for the Spanish economy, and with the U.S., which in recent years has shown significant progress in its productivity levels compared with the EU 15, and therefore constitutes a more demanding and enriching point of comparison.

3 Indicators for the aggregate competitiveness analysis of the economy and application to the Spanish case

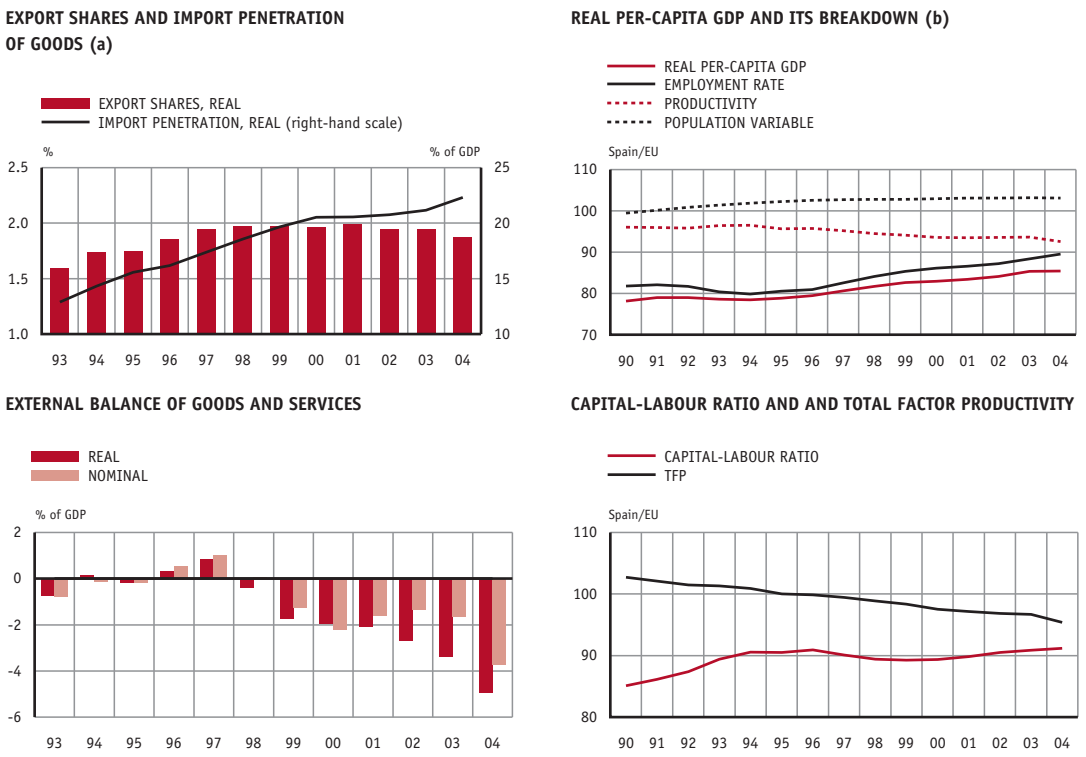
3.1 Performance indicators

The Spanish economy's competitive position is assessed initially from the standpoint of its performance on the international markets. Prominent among the indicators that attempt to evaluate such performance are export shares and the penetration of imports into the domestic market, which summarise a country's capacity to increase its presence in domestic and international markets[3]. Such measurements are usually complemented by analysis of balances of trade, although there is some controversy concerning the use of this indicator as an example of an economy's external competitiveness, since its developments are determined by cyclical fluctuations. Moreover, the existence of trade imbalances does not have the same significance for economies that register substantial productivity growth rates, in which imbalances will tend to correct themselves as supply increases to meet demand conditions.

Beyond trade performance, however, an economy's competitive behaviour is reflected in the levels of productive efficiency and population welfare it has attained. The variable used to assess changes in competitiveness from this standpoint is per-capita GDP, expressed in purchasing power parities (ppp). The application of this approach to competitiveness

[3] As we know, a country's export share in a specific market is calculated as the quotient between that country's exports to that market, divided by that market's total imports. Import penetration into the domestic market is the quotient between the total imports and final demand.

CHART 1 COMPETITIVENESS INDICATORS



SOURCE: Banco de España, based on data from Ameco, INE (National Statistics Institute), IMF and WTO.

a. Export shares calculated as a percentage of Spanish exports of goods in world imports of goods, in constant 1995 US$. Import penetration as a percentage of real imports of goods in final demand.
b. Chapter 16 provides a detailed explanation of how these variables are calculated.

analysis of the Spanish economy following its entry into the European Monetary Union (EMU) in 1999 shows the complementary nature of the different indicators mentioned. In the years that have elapsed since then, the increase in per-capita income has enabled the developmental gap that Spain continued to have, compared with the other more advanced economies of the EU, to be reduced. At the same time, from an external standpoint, an increasing imbalance has been observed vis-à-vis the rest of the world, accompanied by a greater import penetration into the domestic market and a slowdown in terms of capacity to increase Spain's presence in external markets (see Chart 1).

The breakdown in per-capita GDP growth in terms of apparent labour productivity, employment rate and population can be used to assess the bases underlying the convergence process. The results of this analysis show that, during that period, per-capita income growth in Spain, compared with the average for the EU, was essentially based on the intensity of

the job creation process, while apparent labour productivity registered moderate rates of progress below those observed on average for the EU.

In any case, it should be remembered that apparent productivity constitutes an imperfect measure of productive efficiency, especially in economies, such as Spain's, which have carried out major structural reforms of their labour markets. Accordingly, for a more appropriate assessment of the economy's efficiency, it is relevant to break down apparent labour productivity in terms of the relative intensity with which primary productive resources (capital and labour) are used, and total factor productivity, which reflects changes in the efficiency of productive processes (see Chapter 16 for a more detailed analysis of the estimation and of changes in this variable).

We can conclude that the indicators relating to changes in the competitiveness of the Spanish economy since its entry into EMU show that the population's economic welfare has continued to increase at a satisfactory rate, narrowing the gap with other more advanced countries. However, this convergence process has rested on bases that are difficult to sustain in the medium term, since they are not accompanied by a sufficient rate of progress in productivity. At the same time, from the external standpoint, the capacity to increase Spain's presence in the international markets has been diminishing, while domestic demand has tended to be met increasingly with imported products. The factors determining this evolution are analysed in the next section.

3.2 Determinants of changes in competitiveness

The empirical evidence resulting from the estimation of import and export functions indicates that relative changes in prices, costs and margins have a considerable influence in the short and medium term as determinants of external competitiveness.

Prominent within this group of indicators are the different measurements of the real effective exchange rate (REER) and the deflators and costs that enable the export sectors' relative profitability to be approximated. REERs constitute a measure of Spain's prices or costs in relation to those of a set of countries or areas that are assigned weightings based on their importance in Spain's total trade, and are produced as follows:

$$REER_t = NEER_t \left[\frac{P_t / P_0}{\prod_{i=1}^{n} \left(\frac{P_{it}}{P_{i0}} \right)^{w_i}} \right]$$

where NEER is the nominal effective exchange rate, defined as

$$NEER_t = 100. \prod_{i=1}^{n} \left[\frac{e_{i0}}{e_{it}} \right]^{w_i}$$

and where e_{i0} and e_{it} represent the bilateral exchange rates of the national currency compared with the currency of country *i,* in the base period and in period *t,* respectively; p_0 and p_t are Spain's cost or price indices, and p_{i0} and p_{it} those of country *i,* in the base period and in period *t,* respectively, and w_i is the weighting each country receives.

Ideally, these competitiveness indices should reflect changes in prices and costs of the tradable goods and services that dominate a specific country's productive and trade structure, compared with all those that are competing or are potential competitors for that country's production. In practice, the absence of comparable information at an international level forces decisions to be made relating both to the geographical coverage and to the price and cost indicators themselves used in their production, depending on the specific problem to be analysed. It should be emphasised, in this regard, that the set of competitiveness indicators produced by different institutions, including Banco de España, has been enriched with the passage of time. In particular, the geographical coverage has been extended, to reflect some areas, such as the countries of South-East Asia, which are acquiring a more significant share of international trade flows. Nevertheless, belonging to EMU has given special significance to the evolution of real interest rates compared with the Euro area, which are, in fact, a direct comparison of costs and prices between Spain and the area, with the nominal interest rate component being phased out. Table 2 summarises the set of price and cost measurements used in analysis of the determinants of external competitiveness[4].

The indices produced from consumer prices may not initially seem appropriate, since they reflect prices of non-tradable goods and services. It may therefore seem more relevant to focus on changes in the indices compiled from industrial prices or export prices, that include only prices of products subject to international trade. However, the analysis of prices in non-tradable sectors is still important, as they frequently entail intermediate inputs that impact industry production costs. Furthermore, the consumer price index provides an essential benchmark in the process of establishing wage increases for the overall economy.

Moreover, against a backdrop of monetary union with the principal competing countries, corporations from smaller countries, which have insufficient capacity to impact international price determination, tend to modulate export margins to establish prices of industrial goods in line with those of the principal competitor countries and to avoid deterioration in export shares and excessive import penetration. To assess whether there are differences in the cost pressures borne by an economy, compared with its competitors, analysis of competitiveness indicators produced using final prices must be supplemented with those produced using unit labour costs.

The combined analysis of export prices and of unit labour costs, as set out in Box 1, provides information on changes in business margins and in relative margins generated by export sectors, and shows whether these sectors have incentives to increase the degree of internationalisation of production and, therefore, to increase their market share.

[4] Among the works that describe the advantages and disadvantages of the various available indicators, we can mention Durand and Giorno (1987) and Gordo and L'Hotellerie (1993).

TABLE 2 INDICATORS OF COMPETITIVENESS, PRICES AND COSTS

	Average 93-98	Average 99-04	1999	2000	2001	2002	2003	2004
	COMPETITIVENESS INDICES (a)							
1. With developed countries								
Consumer prices	-2.7	1.3	-0.5	-1.5	1.2	2.6	4.3	1.9
Industrial prices, manufactured goods	-2.4	1.0	-0.8	-2.0	1.3	1.8	3.8	1.9
Export prices	-1.5	0.5	0.5	-2.2	-0.4	1.2	3.0	0.7
Unit labour costs	-3.0	1.7	-0.3	-1.7	1.4	2.3	4.9	4.0
Unit labour costs, manufactured goods	-2.8	1.9	-0.8	-0.1	2.3	3.4	3.5	3.0
Nominal component	*-3.9*	*0.1*	*-1.6*	*-3.0*	*0.5*	*0.9*	*3.0*	*0.8*
2. With the euro area								
Consumer prices	-2.3	1.1	1.1	1.4	0.4	1.4	1.1	1.0
Industrial prices, manufactured goods	-1.9	0.8	1.0	0.3	0.4	0.8	1.0	1.3
Export prices	-1.2	0.3	1.7	0.2	-0.7	0.2	0.8	-0.1
Unit labour costs	-2.4	1.5	1.3	1.6	0.8	1.0	1.5	3.1
Unit labour costs, manufactured goods	-2.2	1.4	-0.0	2.7	1.6	1.9	0.1	2.4
Nominal component	*-3.5*	*-0.0*	*-0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
3. With the EU								
Consumer prices	-2.4	1.2	0.8	0.6	1.0	1.6	2.3	0.9
Industrial prices, manufactured goods	-2.2	0.9	0.6	-0.2	1.0	0.9	2.0	1.0
Export prices	-1.5	0.1	1.1	-1.2	-0.6	0.2	1.1	-0.2
Unit labour costs	-2.6	1.5	0.9	0.4	1.0	1.1	2.6	2.7
Unit labour costs, manufactured goods	-2.4	1.6	0.1	1.8	2.1	2.0	1.6	2.1
Nominal component	*-3.6*	*0.0*	*-0.4*	*-1.0*	*0.4*	*0.1*	*1.1*	*-0.2*
4. With non-euro developed countries								
Consumer prices	-3.7	1.9	-3.9	-8.0	3.1	5.3	12.4	4.0
Industrial prices, manufactured goods	-3.4	1.5	-4.6	-7.1	3.5	4.0	11.0	3.2
Export prices	-2.2	0.7	-2.3	-7.5	0.1	3.5	8.6	2.6
Unit labour costs	—	2.1	-4.1	-9.0	2.7	5.4	13.6	5.7
Unit labour costs, manufactured goods	—	2.9	-2.2	-6.3	4.0	6.8	12.4	4.0
Nominal component	*-5.1*	*0.3*	*-4.9*	*-9.7*	*1.8*	*2.7*	*10.5*	*2.3*
5. With newly industrialised countries								
Consumer prices	-1.4	2.5	-9.0	-13.3	4.8	7.6	20.5	8.5
Industrial prices, manufactured goods	-0.9	1.6	-7.7	-13.4	7.0	5.4	16.8	4.6
Nominal component	*0.5*	*1.1*	*-9.6*	*-14.7*	*3.8*	*4.9*	*18.4*	*7.6*

SOURCE: Banco de España.

a. An increase in the index reflects a relative increase in cost of Spanish products and therefore a loss in competitiveness.

BOX 1 INDICATORS OF EXTERNAL SECTOR MARGINS AND RELATIVE PROFITABILITY

The indicators produced with real effective exchange rate indices normally used in the analysis of an economy's external competitiveness, such as those presented in Table 2, can be supplemented with another set of measurements that enable the margins and relative profitability of the sectors producing tradable goods to be assessed. These measurements summarise the relative development of export prices and unit labour costs, and reflect the implications of their changes in the profitability *per se* of the exporting sector. This analysis is important both for an economy in particular (as it can be used to compare, for example, profitability performance in the overall economy and in manufacturing), or with reference to a given area, such as the EU. This box describes the information content of these measurements and analyses their performance in the Spanish economy during the period 1993-2003.

First, the *export margins index* (see table) is a measure of profitability defined as the ratio between the export deflator and the unit labour cost index. This indicator is, in turn, a combination of two further measurements: first, the relative profitability of exports, which compares changes in export prices with the domestic prices for those products and therefore approximates the exporting sectors' incentives to place their products on external markets or on domestic markets; second, *the unit margins index,* which measures the share of the gross operating surplus in GDP (or in value added for manufacturing).

As we have pointed out, the monitoring of profitability indicators of this type has considerable analytical interest as it enables information to be obtained on the marketable products sector's incentives to place its products on the international markets. They also complement the competitiveness indicators produced with export prices. For example, improved or sustained competitiveness measured through such indicators might be accompanied by deterioration in exporting sectors' profitability, which, if maintained, might ultimately lead to a contraction in sales abroad. This occurred in the Spanish economy beginning in 1998, when, after the effects of the nominal devaluations of the peseta in the early 1990s – that had allowed a significant recovery in exporting sector margins – tapered off, these margins began to contract once more.

As the table below illustrates, the contractionary behaviour that export sector business margins began to reflect from 1998 onwards[1] can be explained by the growing disparity between the rise in export prices, which were subject to slower evolution in international prices, and the dynamic performance of domestic prices, which had risen to a greater extent, against a backdrop of the significant strength of domestic demand. During that period, deterioration in business margins was more pronounced in the manufacturing sector – owing to the unfavourable developments between export prices of manufactured goods and the gross value added deflator for manufactured goods, combined with successive contractions in unit margins for these goods, reflected in the negative performance of apparent labour productivity. Only in 2003, after a significant adjustment of employment, was the manufacturing sector able to stabilise its gross operating surplus per unit of output.

[1] The year 2000 involves an exception in the performance of these indices, since the euro's depreciating trend permitted a recovery of exporting sector margins.

When the evolution of these measurements of profitability is compared to the EU, the deterioration registered in corporate margins in the manufacturing branches, in relation to the average for this area, is evident. This performance worsened in the years after 1999. These results, derived from a more pronounced contraction of the unit margin for Spanish manufacturing, are explained in the first place by the growing disparity in the evolution of productivity in Spain and in the EU, and by the positive growth differential registered in compensation per person employed.

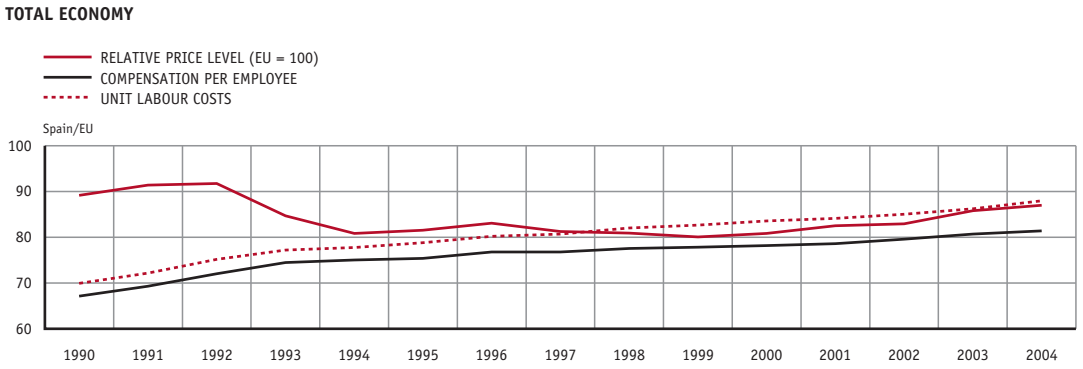
The performance of the different measurements of profitability during the decade analysed may help to explain the stagnation registered in the share of exports in the external markets, through reduced incentives for entrepreneur exporters to increase the internationalisation of their products.

Profitability indicators (a) Rates of change	Average 93-98	Average 99-04	1999	2000	2001	2002	2003	2004
	Margins							
1. Total economy								
a. Export margins	0.8	-1.1	-1.7	4.4	-0.8	-2.2	-2.8	-3.5
b. Relative profitability of exports	-0.1	-1.8	-2.3	3.8	-1.4	-3.2	-3.2	-4.4
c. Unit margin, total economy	0.9	0.7	0.6	0.6	0.6	1.0	0.5	1.0
	Spain/EU comparison							
d. Relative export margins with the EU	0.8	-0.0	0.3	2.0	1.2	0.4	-0.3	-3.7
e. Relative profitability of exports	0.9	-0.8	-0.6	1.0	-0.1	-0.6	-1.1	-3.6
f. Unit margin, total economy	-0.1	0.8	0.9	1.0	1.3	1.0	0.8	-0.1
2. Manufactured goods (b)								
a. Export margins	0.4	-1.2	-2.7	2.4	-1.3	-1.8	-3.0	-0.8
b. Relative profitability of exports	0.6	-0.9	-1.5	2.7	0.6	-0.6	-3.4	-3.1
c. Unit margin of manufactured goods	-0.2	-0.3	-1.2	-0.3	-1.9	-1.2	0.4	2.3
	Spain/EU comparison							
d. Relative export margins with the EU	-0.4	-1.3	-0.5	-2.0	-0.9	-0.4	-0.9	-2.8
e. Relative profitability of exports	0.9	-	-0.5	-1.3	-0.1	0.9	-1.7	-
f. Unit margin of manufactured goods	-1.3	-	-0.0	-0.7	-0.8	-1.2	0.8	-

SOURCES: Ministry of Economy, OECD, European Commission and Eurostat.

a. Operating margins index = Export price index/Unit labour cost index
In turn, this index is defined as:
Operating margin index = Relative profitability index * Unit margin index
where:
Profitability index = Export price index/GDP deflator
Unit margin index = GDP deflator/Unit labour cost index
Comparison of these indices with competitor countries makes it possible to obtain the:
Relative export margin index = Relative profitability index * Relative unit margin index
b. These indices are calculated for the manufacturing sector with the export price index for manufactured goods, the GVA deflator for the industrial sector and unit labour costs for the industrial sector.

CHART 2 RELATIVE PRICE AND LABOUR COST LEVELS



SOURCE: Banco de España, based on Ameco data.

It should be emphasised, however, that all of these competitiveness indices reflect only changes in prices and costs, and do not provide information on the relative levels of these variables. The latter comparison may also be important, since it enables us to assess an economy's margin to compete based on the traditional price or cost adjustment mechanisms. This type of comparison also provides information on some determinants of where industrial production is located, although this also depends on factors other than labour cost differentials.

In practice, international comparisons of price and unit labour cost levels entail two major methodological problems: first there are no sufficiently homogenous series relating to employment, hours of work, etc. Second, there are many shortcomings in the information on relative price levels obtained from surveys conducted by various international organisations, within the United Nations International Comparisons Programme. These problems are attributed to the difficulty in establishing a basket of consumer or production goods that is homogenous and comparable for all of the countries considered, owing to differences in production and consumption patterns, product quality levels, etc.[5]

Nevertheless, the information relating to price levels shows that, at the beginning of the present decade, cost and price levels in Spain were still below those observed on average for the EU 15, although this advantage had been decreasing in the immediately preceding years, as a consequence of persistent positive price and cost growth differentials compared with the more developed countries (see Chart 2). The information produced by the United Nations shows that such price advantages are no longer present when the comparison is made with the countries of the enlargement or with other countries that have industrialised more recently, emphasising the need for the Spanish economy to develop competitiveness mechanisms that complement relative price mechanisms.

[5] This information is used to compute purchasing power parities that are used as a conversion factor in international comparisons of price, cost and productivity levels. For a detailed discussion of factors relating to this comparison, see Van Ark and Timmer (2001).

The information provided by the indicators described above must be supplemented with data from the structural determinants of differentials in productivity and levels of economic welfare between countries: physical capital endowment, technological effort, human capital, etc. The measurement and international comparison of these variables also entail a number of difficulties. For example, in the area of innovation, corporations may adopt very different strategies on establishment, internalisation and absorption of technical change, through in-house research and development expenditure, external purchase of technology, acquisition of products with incorporated technology, transfer of knowledge through foreign direct investment, etc. There is, consequently, no single measure for the quantitative approach of these concepts; there is instead a broad set of indicators, each of which provides partial information on each of their multiple facets, while others remain without statistical coverage [see, for example, OECD (2001a)]. Accordingly, in order to establish an adequate diagnosis of competitiveness, we must select a well-defined set of information to illustrate the challenges faced by the economy in these areas. These indicators of course coincide to some extent with those used to evaluate the process of real convergence of the Spanish economy with EU countries (see Chapter 15 of this book).

Accordingly, the set of structural indicators of competitiveness is supplemented with information on the physical capital endowment and, in particular, on some transport and telecommunication infrastructures that are becoming very important in an environment in which the transmission of information and knowledge is increasingly important (see Table 3). As regards technological capital, research and development expenditure occupies a central place among these indicators and constitutes the basis for estimating technological capital stock [see Puente and Pérez (2004)]. It should be borne in mind, however, that technological innovation comprises a broader set of scientific, organisational and trading activities. In fact, according to the Oslo Manual of the OECD, innovation also incorporates expenditure on industrial engineering and design, launch of manufacturing, new product marketing and acquisition of tangible and intangible technologies. In this connection, the European Innovation Survey conducted by Eurostat constitutes an outstanding tool for evaluating and systematising information relating to these aspects[6]. Furthermore, the number of registered patents and, more importantly, measurements of the degree of presence and use of information and communication technologies (ICT) are included as indicators of the results of the research effort, as these activities have significant effects on the efficiency of the overall productive system, owing to the substantial change that has occurred, in this connection, in business relations and the forms of distribution and consumption [see, for example, Hernando and Núñez (2002)].

The endowment of human capital is also quite important in determining the competitiveness of an economy, since the accumulation of knowledge directly impacts labour pro-

[6] To illustrate this matter, we should point out that, according to the figures of the Technological Innovation Survey produced by the Spanish National Statistics Institute for 2002, in the case of the Spanish economy, during that year, domestic R&D expenditure represented slightly over one third (34.8 percent) of total expenditure on innovation activities carried out by Spanish corporations, while the purchase of machinery and equipment and other activities represented approximately 32.5 percent and approximately 32.7 percent, respectively.

TABLE 3 STRUCTURAL DETERMINANTS OF COMPETITIVENESS

	1993			2004			Latest info.
	Spain	Spain-EU	Spain-U.S.	Spain	Spain-EU	Spain-U.S.	
1. Physical capital							
Total capital stock (a)	114.6	89.4	95.5	132.4	91.2	90.9	2004
Private productive capital stock (a)	42.9	101.5	88.5	52.1	99.9	81.9	2004
Public capital stock (a)	5.9	67.9	56.3	8.9	88.6	66.5	2004
Road transport infrastructure endowment (b)	55.0	57.9	41.4	82.0	78.1	58.2	2000
Communication channels (c)	32.4	77.1	59.3	43.2	79.0	56.1	2000
2. Technological capital							
Technological capital stock/GDP	4.0	39.6	-	5.3	45.3	-	2002
R&D expenditure/GDP	0.9	45.8	35.2	1.1	55.0	40.7	2003
No. of patent applications (d)	9.6	11.5	11.0	25.5	16.1	16.5	2002
GVA of ICT branches (e)	3.7	75.9	65.0	4.0	71.1	-	2001
Per-capita expenditure on ICT (f)	448.9	56.8	26.0	1,034.5	70.2	42.9	2003
3. Human capital							
Human capital stock/population 16-64	47.6	79.8	-	55.7	87.5	-	2003
Public expenditure on education /GDP	4.9	86.7	100.2	4.4	82.0	83.0	2002
% of pop. 25-64 years w/ min. of secondary education	25.5	53.5	-	42.7	71.8	-	2003
% of pop. 18-24 years w/ max. of basic education	37.3	148.9	-	29.8	164.6	-	2004
Years of education (g)	14.0	97.5	87.5	16.0	95.6	100.0	2002
On-the-job training (h)	3.5	76.0	-	5.2	51.5	-	2004

SOURCES: EUROSTAT, OECD, INE, Ministry of Economy and Banco de España.

a. Measured as a percentage of employment.
b. EU=100 in 1993.
c. Conventional lines + cable, DSL and ISDN equivalents per inhabitant.
d. Patents per million inhabitants.
e. Percentage of GVA in the total economy.
f. Euro in PPP per inhabitant. Origin of series 1995.
g. Average years of schooling of working age population.
h. Percentage of persons 25-64 years of age enrolled in a training course during the four weeks prior to the survey (EPA).

ductivity, while permitting a more efficient use of physical and technological capital. There is no generally accepted methodology for estimating the human capital endowment, although it is usually approximated from the levels of training in the working-age population, based on the years of school attendance or on the percentage of the active population that has achieved a given level of education. In order to make comparisons between countries, an adjustment is normally introduced that attempts to reflect quality differentials in the different education systems [see Puente and Pérez (2004)]. This indicator is supplemented with others that measure the resources used, such as expenditure on education as a percentage of GDP. Overall, these measurements approximate the effort on or the results of education in the early stages of an individual's life, and it is therefore important to incorporate some measurement that approximates the effort on continuing worker training [see OECD (2001b)].

Table 3 shows these indicators of the structural determinants of competitiveness for the Spanish economy, in relation to the EU 15 and to the U.S. This information reveals that, during the 1990s, and during the initial years of the present decade, the Spanish economy made a significant effort to bring capitalisation levels up to those of EU countries. However, at the beginning of the present decade, the gap still to be bridged was considerable on all these fronts, and particularly in the area of technological capital.

Apart from the above factors, growth theory holds that the degree of competition in the markets and the quality of the institutional environment also constitute driving factors of efficiency and technological innovation. In order to measure the degree of competition in the markets, analysts generally use variables reflecting the degree of integration in the international markets – which is approximated through trade and foreign direct investment flows – and, on the other hand, the levels of competition and regulation in the markets for goods and factors where little information is available. In this regard, the effort the OECD is making to obtain a summary indicator of the level of competition and the degree of regulation for member countries of that organisation is noteworthy [see the OECD's *International Regulation Database,* and Nicoletti, Scarpetta and Boyland (2000)][7].

Finally, there is little comparable information on the strategic capacity of corporations and the quality of the business environment. Only some international organisations responsible for preparing summary indicators of competitiveness with a very broad perspective incorporate any factors connected with this area into their criteria [see World Economic Forum (2002) and International Institute for Management & Development (2003)].

[7] This organisation is responsible for compiling a set of comparable information for all OECD countries to characterise the degree of restriction that the regulatory environment involves for the functioning of the markets. The information is structured around two areas: assessment of measures geared to the domestic market and assessment of those targeting the regulation of relations with the rest of the world. In turn, government control of corporations and the legal and administrative barriers that impact the development of business relations and the dynamics of the establishment of corporations are analysed within the policies applicable to the domestic market. However, given the difficulties involved in obtaining such information, the indicators are only available for 1998 and 2003.

4 Competitiveness and sectoral specialisation in manufacturing and market services

This section applies the approach used in the previous section to the analysis of the competitiveness of manufacturing and market services. Disaggregated analysis is important since these sectors have distinct features in relation to the degree of liberalisation and productivity performance, owing, among other reasons, to the fact that the impact of innovation and knowledge or the capacity to absorb new technologies differs significantly among the activities comprising both productive branches [see O'Mahony and Van Ark (2004)]. However, insufficient statistical information considerably limits the analysis of the structural determinants of the productivity of each of those sectors, and therefore must be conducted with recourse to the indicators used for the overall economy.

4.1 Competitiveness in manufacturing

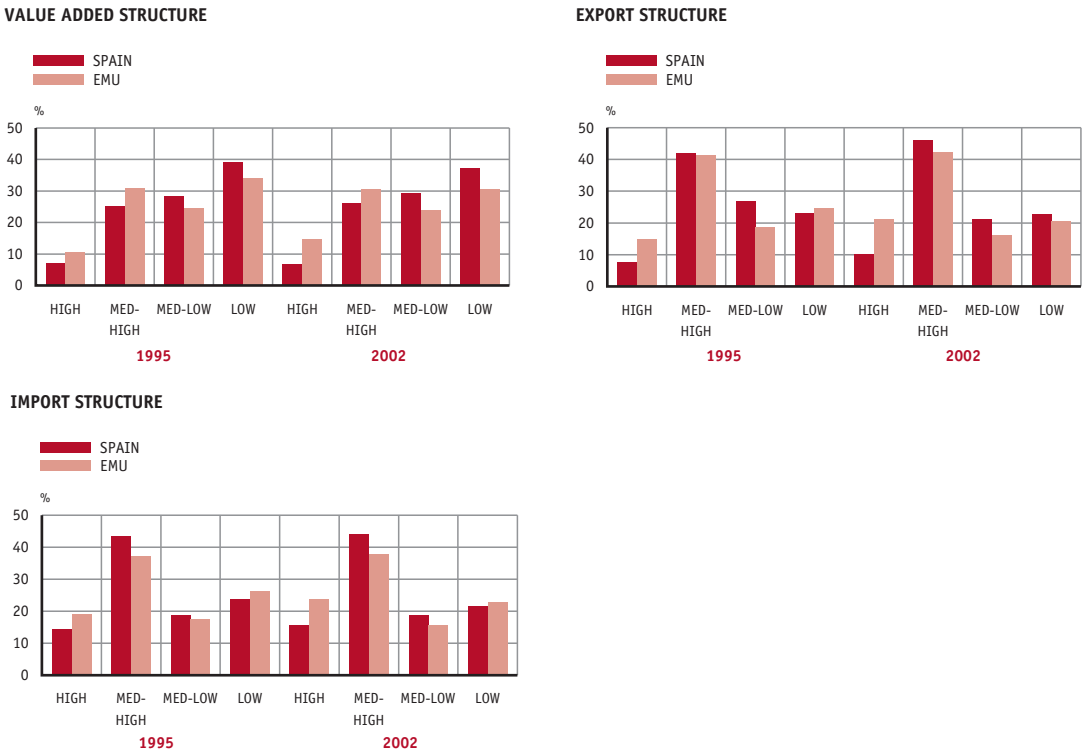
The relative importance of the production of manufactured goods in overall activity has tended to decline in the most advanced economies. However, analysis of the competitiveness of this productive branch is important not only because of its considerable influence on the balance of trade and because of its interdependence with the other sectors, but also because it is in this branch that many of the technological advances transmitted to the rest of the productive system take place.

The performance of the manufacturing sector in terms of external competitiveness is assessed with indicators similar to those described in the foregoing section for the overall economy, but calculated, in this case, for manufactured goods. On the other hand, given the importance of manufactured goods in the trade activities of the principal developed economies, aggregate trade results usually constitute a good reflection of what has happened in this sector.

As discussed above, a country's trade performance is not only dependent on the evolution of its relative prices and of external demand, but also on its capacity to gear production and exporting to more dynamic markets and sectors, which is ultimately reflected in the elasticities of its trade flows with respect to the changes in demand and relative prices [see Amable (2000)]. A more in-depth comparative analysis of the structure of the manufacturing sector is required in order to determine whether, in the pattern of productive and trade specialisation, there is a predominance of those low-technology and unqualified labour-intensive sectors which generally include products that are more mature and that therefore entail more moderate levels of international demand; or whether, on the contrary, specialisation is based on industries with greater technological content, which tend to generate greater value added, since these entail the concentration of a considerable share of the productivity advances that have occurred in the most recent years. This aspect is especially important in evaluating the competitiveness of developed economies and, in particular, of the Spanish economy, with its more limited advantages in terms of price and cost competition, as we have observed above.

Chart 3 summarises the pattern of productive and trade specialisation of the Spanish manufacturing industry, compared with that of the EU. As we observe, in both cases, changes in

CHART 3 COMPOSITION AND SPECIALISATION OF THE MANUFACTURING SECTOR BY TECHNOLOGY INTENSITY

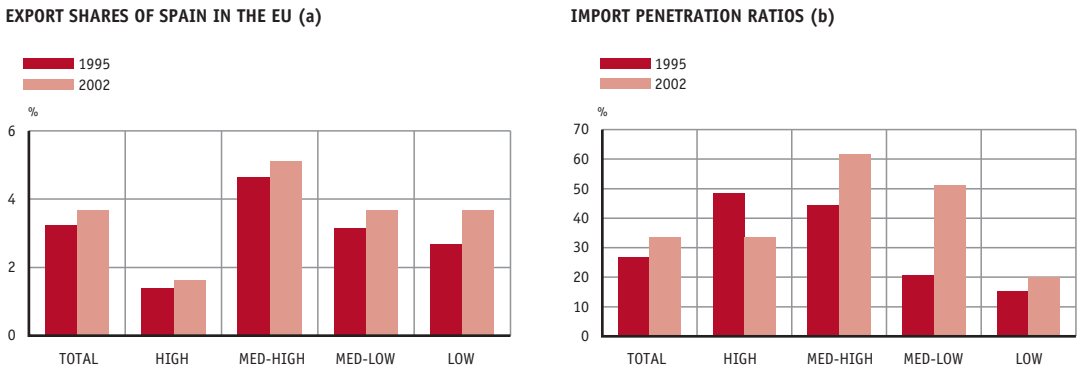


SOURCE: Banco de España, based on data from the customs authorities and STAN.

the productive and trading structures have tended to assign greater importance to the branches with greater technological content, to the detriment of the more traditional industries. The most important differences are specifically reflected in a greater share in Spain of lower-technology industries in production and exports, compared with the EU, while high-technology industries continue to be present on a smaller scale [see Gordo, Gil and Pérez (2003)]. Furthermore, in the case of imports, a lower relative share is seen of high-technology industries, which constitute the main transmission channel of technological advances for countries, such as Spain, that register shortcomings in the domestic generation of technology[8].

[8] Basic information on the production and foreign trade of these activities was obtained from the National Classification of Economic Activities, Rev. 1 of the European Union at a three-digit disaggregation level. For greater clarity in the presentation and discussion of the results, these activities are usually grouped into 20 major branches, which, in turn, are grouped into four categories, depending on whether their technological intensity is high, medium-high, medium-low, or low; an OECD classification is used for that purpose, considering the proportion that Research and Development expenditure in each sector represents in its value added or production.

CHART 4 EXPORT SHARES AND IMPORT PENETRATION



SOURCE: Banco de España, based on data from Comext, the customs authorities, STAN and the Ministry of Economy.

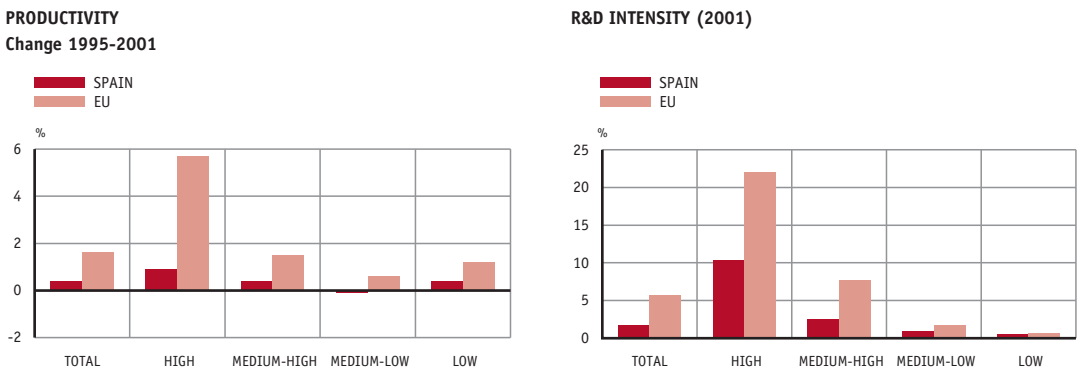
a. Share of Spanish exports to the EU in EU imports, by technology intensity group.
b. Imports/apparent consumption.

In any case, industry results depend not only on what is produced, but also on the efficiency and the capacity of each industry to differentiate its products and to improve the quality of its commercial supply. All these factors, combined with the evolution of price and cost competitiveness, are ultimately reflected in the export shares and in the ratios of import penetration of each branch of industry. The profile of these indicators reflects the difficulties registered by Spanish manufacturing in increasing its presence in European markets in higher-technology industries, while an increasing level of penetration is observed for imports into the Spanish market (see Chart 4).

In the case of export shares, the empirical literature provides an analytical tool – the shift-share analysis – that enables us to identify which part of the changes in this indicator is reflecting the pattern of export specialisation – i.e. the economy's capacity to adapt its profile of geographical and sectoral specialisation to more dynamic markets – and which part reflects genuine gains in competitiveness. Box 2 provides a detailed description of this technique and shows, by way of example, the breakdown of the factors that contributed to the performance of Spanish exports of manufactured goods during the period 1993-2003.

It should be emphasised, however, that these indicators of shares, based on the capacity to supply the markets, do not enable the causes or the determinants of the improvements in or losses of competitiveness to be identified. Although this task is limited by the insufficient detailed statistical information on the different industrial branches, analysis of productivity and innovative efforts can provide important information. Accordingly, Chart 5 shows that, during the latter half of the 1990s and the initial years of the present decade, productivity growth levels were lower in all branches of industry than in the EU 15. At the same time, intensity of expenditure on R&D was also significantly lower, especially in industries with greater technological requirements. Given that a lower level of research effort

CHART 5 PRODUCTIVITY AND INNOVATION IN MANUFACTURING



SOURCE: Banco de España, based on OECD data.

is usually associated with a specialisation of production in the lower quality segments within each industry, these results might indicate that, in Spanish industry, competitive mechanisms based on price and cost advantages have tended to predominate, with less emphasis on the product differentiation through quality.

4.2 Competitiveness in service activities

The growing importance of services in generating value added in most countries and their capacity to continue creating employment, offsetting the losses that generally occur in the manufacturing sector, justifies the increasing need for competitiveness analysis in this productive branch. Furthermore, there are some service activities – such as services related to the new information technologies – which decisively impact the economy's overall competitiveness since, through their use as intermediate input, they facilitate adaptation of the business fabric to new sources of economic growth.

However, competitiveness analysis in services is subject to certain limits and specific features. First, it should be emphasised that opportunities to market products abroad are inherently limited in many service activities[9]. Furthermore, for many years, services have been substantially protected from external competition by the respective national governments. This tendency, however, has changed substantially in recent years, owing to technological innovations and progress in the international liberalisation of trade in services. These changes are fostering increasing linkages between external competitiveness in devel-

[9] Traditionally, the internationalisation of services would require the supplier firm's commercial presence at the applicant's place of residence. The Foreign Affiliates Trade in Services (FATS) statistic provides information on the significance of such operations.

BOX 2 SHIFT-SHARE ANALYSIS: AN ANALYTICAL TECHNIQUE USED TO ASSESS DIFFERENTIAL GROWTH FACTORS IN SPANISH EXPORTS

The real share of Spanish exports in world trade is found to include two distinct performance periods between 1993-2003. During the period 1993-1997, the market share grew significantly as a result of dynamic performance in export flows; while during 1998-2003 it registered very moderate progress as a result of the significant slowdown in exports during that period (see left-hand panel). Although changes in competitiveness of sales prices abroad explains some of its less dynamic performance during the most recent period, there are other factors related to the pattern of trade specialisation and to the changes observed in international demand for different products, which may also help to explain this performance. The analysis of the importance of these factors can be approached with an analytical tool known as *shift-share analysis,* which, using a guideline or benchmark, enables increases in a regional and/or sectoral economic variable during a given period of time to be broken down into additive and economically interpretable factors.

This box illustrates the application of this technique to the disaggregated figures for Spanish exports of manufactured goods to the EU, in nominal terms, during the period 1993-2003, classified by groups of technological intensity, with reference to performance in nominal imports of manufactured goods from the EU. The formula is provided below[1]:

$$g - g^{ue} = \sum_i \omega_i \, (g^{ue}{}_i - g^{ue}) + \sum_i \omega^{ue}{}_i \, (g_i - g^{ue}{}_i) + \sum_i i \, (\omega_i - \omega^{ue}{}_i) \, (g_i - g^{ue}{}_i)$$

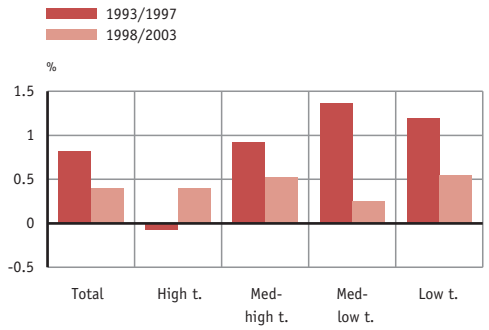
{Demand intensity factor} {Comparative advantage factor} {Interaction factor}

where subscript i denotes the branch according to its technological intensity; g_i is the annual growth in Spanish exports of branch i; $g^{ue}{}_i$ is the annual growth in branch i's imports from the EU; ω_i denotes the weight in Spanish exports of branch i, and $\omega^{ue}{}_i$ the weight in European exports of branch i.

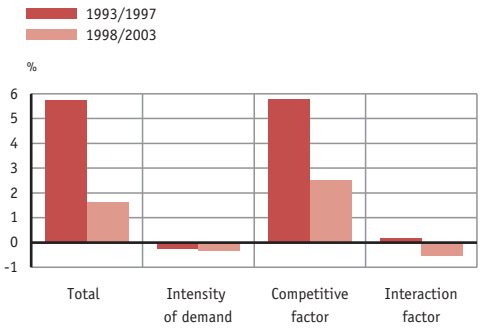
Thus, the factors that contribute to differential growth in Spanish exports with respect to the EU market can be broken down into: a *demand intensity factor,* which enables us to obtain the effect on the share that derives from maintaining an export structure geared to industries that register higher or lower levels of demand intensity in that market; a *competitive advantage factor* that evaluates the effect on the export share of the capacity or lack

[1] For a more detailed analysis of changes in Spain's export share using this technique, see Bravo and García (2004). Furthermore, this breakdown might also entail a function to estimate the impact of the geographical specialisation pattern of each country's exports, that can be used to assess whether the markets to which that country's products are sent are growing with above- or below-average intensity. Pérez (2004) provides an application to the Spanish case, from which we infer that the growth in Spanish exports has been limited by the geographical orientation of the country's sales to the European markets, which have not performed dynamically in recent years as compared with the more recently industrialised countries.

DIFFERENTIAL GROWTH: EXPLANATORY FACTORS



GAIN IN SHARE IN THE EU



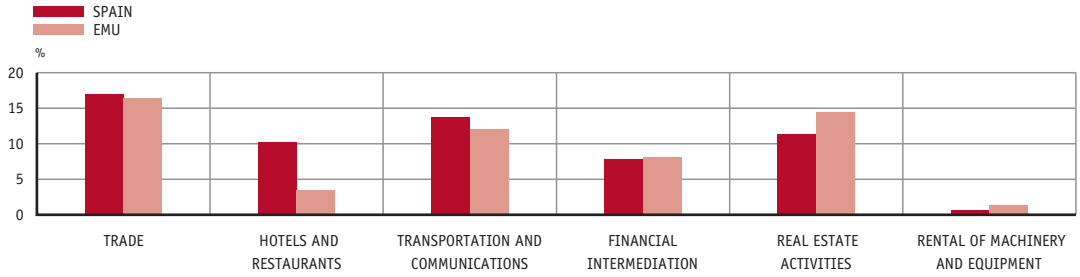
SOURCES: OECD and Ministry of Economy.

of capacity of the Spanish exports in each branch to grow above its demand levels; and, finally, an interaction factor, that is residual and that reflects the extent to which relative export specialisation matches its competitive advantages.

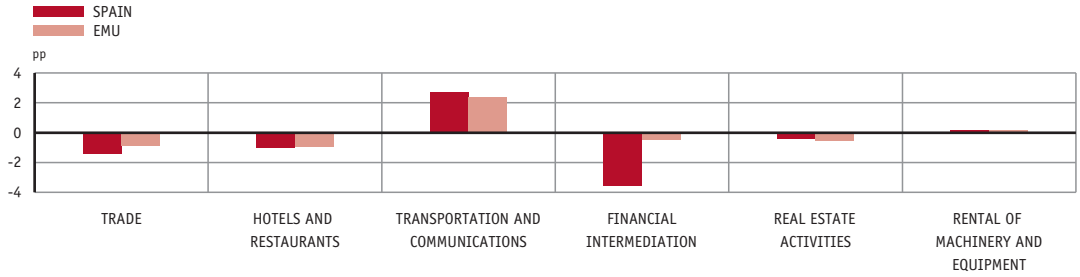
Before analysing the contribution of each of these factors, we should describe the key features of the pattern of specialisation of exports of Spanish manufactured goods, in comparison with imports from the EU during the period studied. We note that the relative specialisation of the Spanish economy was concentrated on medium-high technology branches and, to a lesser extent, on the medium-low technology branches, while the weight of the more traditional industries and of those entailing greater technological requirements was below the levels observed in purchases from the EU. We observe, however, that the share of low-technology branches in Spanish sales was approaching the weight of these products in imports from the EU, while in the high-technology branches the gap was tending to widen.
As the right-hand panel illustrates, the breakdown of export growth into the factors discussed above reveals that the demand intensity factor made a negative contribution, as Spanish exports are relatively specialised in branches registering the least dynamic demand in the entire EU. Although this factor was offset during 1993-1997 by the significant competitive advantage demonstrated by Spanish exports – reflecting a capacity to grow beyond their market – this advantage was significantly reduced during the period 1998-2003. This loss of competitive capacity in recent years explains the lower increase in the export share, which was more pronounced in medium-technology products. Last, the interaction effect became negative during the second period, since in those years the branches which relatively higher levels of trade specialisation – with medium-high technology – significantly reduced their competitive advantage. In summary, shift-share analysis underlines the importance of productive and trade specialisation in the Spanish economy, which should be geared toward the development of industries with a high technological content that benefit from higher levels of demand.

CHART 6 COMPETITIVENESS INDICATORS FOR MARKET SERVICES

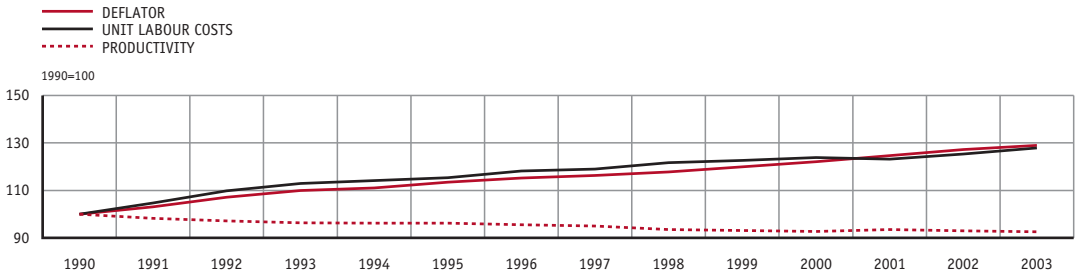
VALUE-ADDED STRUCTURE FOR THE SERVICE SECTOR (2002) (a)



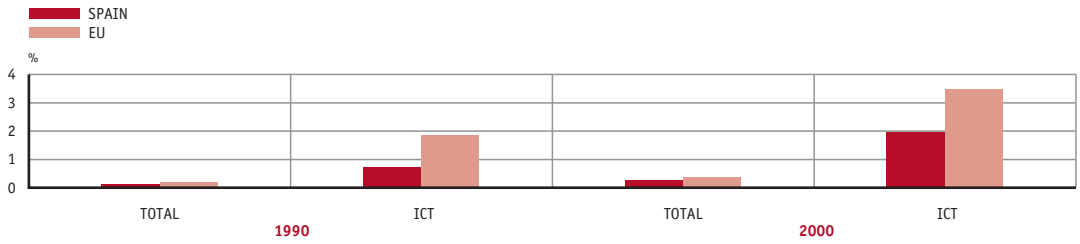
CHANGE IN WEIGHT OF EACH SECTOR IN TOTAL SERVICES (1990-2002)



DEFLATOR, UNIT LABOUR COSTS AND PRODUCTIVITY (b)



R&D expenditure (c)



SOURCE: Banco de España, based on data from Ameco and STAN.

a. Using constant GVA figures.
b. Relative index for Spain/EU. Data on the overall service sector.
c. Percentage of nominal GVA.

oped economies and tertiary activities, although much still remains to be done to harmonise the national legislations so that services can be fully integrated into the international markets. On the other hand, this sector includes highly diverse activities, with many specific features in terms of market structure, degree of regulation, etc., for which little internationally comparable information is available.

Consequently, competitiveness analysis of this sector is impacted by insufficient systematic, internationally comparable information. The indicators that can be compiled are limited, with a focus on those that provide information on the pattern of productive specialisation and on the evolution of costs, margins and prices. In the case of the Spanish economy, tourism activities should furthermore be analysed separately, given their weight in the pattern of productive specialisation and their importance in balance of payments equilibrium.

There are no systematic classifications available to enable the various activities included in market services to be differentiated according to any of their basic characteristics, such as technological intensity. Some studies attempt to classify the branches according to productivity growth, distinguishing between those that show productivity increases above average for the sector, in the overall OECD, which include activities that are more innovative and that have greater growth potential – in particular, transportation and communications, financial services and business services – and those branches in which productivity shows, as a rule, lower growth levels, principally trade and repairs and the hotel and catering industry.[10] In the light of this classification, in the case of the Spanish economy, the share of the more traditional activities is prominent, owing to the high degree of specialisation in the tourism industry, while the proportion of services most related to the new technologies continues to be lower (see Chart 6).

In general, the moderate growth in the productivity of services is related, in some studies, to low levels of technological progress exhibited by the sector, compared with industry. The statistical difficulties involved in the assessment of service activity in the national accounts may also introduce a downward bias in the measurement of their productivity. It should be emphasised, in any case, that, in the services activities, R&D expenditure is inappropriate in assessing the efficiency improvements introduced through knowledge and innovation, which in these branches depend substantially on the degree to which ICTs are used, and on organisational changes and improvements in human capital, a productive factor that is used very intensively in some of these activities.

In any case, the poor progress of productivity, in an environment characterised by the persistence of regulations that impede the establishment of a competitive environment conducive to efficient business performance, is ultimately reflected with higher prices, which not only affects the competitive capacity of tertiary activities themselves, but of the manufacturing industry, which increasingly incorporates services as intermediate inputs into its productive processes.

As far as trade results are concerned, the tourism sector's performance should be differentiated from other services. The latter are gaining increasing weight in most developed economies with the provision of business services, including a broad range of transactions,

[10] However, the latest studies on the U.S. economy indicate that the productivity gains in trading activities have been significant.

TABLE 4 BALANCE OF TECHNOLOGICAL SERVICES

	1999	2000	2001	2002	2003	2004
1. Royalties and income from intangible property						
Reported comparative advantage indices (a)	-68.9	-59.6	-64.3	-66.1	-64.5	-71.9
Indices of specialisation vis-à-vis the EU (b)	19.0	23.6	19.7	18.7	21.6	-
Indices of dependency vis-à-vis the EU (c)	112.5	102.4	95.4	97.9	104.0	-
2. New technology services (d)						
Reported comparative advantage indices (a)	4.7	-1.0	-2.5	-0.3	1.4	-0.0
Indices of specialisation vis-à-vis the EU (b)	86.2	83.6	74.4	80.7	77.3	-
Indices of dependency vis-à-vis the EU (c)	136.3	148.5	146.9	157.2	174.0	-

SOURCES: OECD, Customs Department, Ministry of Economy and Banco de España.

a. Balance of trade as a percentage of total exports and imports.
b. Structure of Spanish exports in relation to the structure of EU exports.
c. Structure of Spanish imports in relation to the structure of EU imports.
d. Includes communications, computer and audiovisual services, and related services.

standing out in particular. Among these services, we should mention, *inter alia,* advertising and market research, research and development; and legal, accountancy, consultancy, architecture, engineering, training, etc., services, whose development is closely linked to the increase in businesses specialising in the provision of such services, which previously were provided within the production unit itself. It is especially important to analyse the performance of services related to new technologies[11], and the royalties and income from intangible property, which include technology transfer activities (see Table 4).

4.2.1 Competitiveness in the tourism sector

Within the sectoral competitiveness analyses, tourism merits special attention owing to its importance in Spain's socioeconomic structure. According to the Spanish Tourism Satellite Account *[Cuenta Satélite de Turismo de España* (CSTE*)],* tourism was, during the early years of the present decade, directly or indirectly responsible for generating 11 percent of the output of the Spanish economy and 10 percent of the employment, making it the number one domestic productive sector. Foreign tourism contributes approximately 50 percent of the trade and represents 7 percent of international demand, placing Spain in the number two position in the international ranking of tourism recipient countries. Moreover,

[11] These include communications, computer and audiovisual services, and related services.

tourism's importance as a factor in offsetting trade imbalances is reflected in the fact that the tourism surplus, exceeding 4 percent of nominal GDP, covers, on average, 80 percent of the balance of goods deficit. For all these reasons, the analysis of the factors that determine the competitiveness of the Spanish tourism sector as an international destination is of utmost importance. Moreover, during the initial years of this decade, tourism showed signs of slowing down, raising doubts over its capacity to expand in an environment characterised by the opening of new tourism destinations specialising in a segment similar to the Spanish "sun and beach" sector, in which the cost and price levels are below those of the Spanish economy.

Both the theoretical approaches and the analytical tools used to evaluate tourism competitiveness have specific features that attempt to reflect the specific characteristics of this sector. These differential aspects centre around the transverse nature of the constituent industries and the specific nature of the product being marketed. Specifically, tourism activity is not identified with a single industry, but includes different branches of services, including the hotel and catering industry, transportation, travel and letting agencies, and recreational services. Moreover, the product marketed is essentially a "tourism experience", which does not only comprise the basket of heterogeneous goods and services that tourists consume, but also includes the degree to which the expectations consumers have when they choose a given destination are met.

The definitions of competitiveness for the tourism sector are formulated from this perspective and are associated with a destination's capacity to meet tourists' expectations while sustaining the welfare of its residents [see Ritchie and Crouch (1993)]. The determinants of tourism competitiveness therefore emphasise aspects relating both to comparative advantage (relative prices and natural resource endowment) and to competitive advantage (endowment with infrastructures, quality of management and human capital, as well as environmental and ecological factors). The complexity and the difficulty, however, of quantifying some of these aspects means there is a significant gap between the theoretical approaches regarding tourist competitiveness and the empirical work that has attempted to evaluate it. In fact, apart from the traditional indicators that measure tourism balances and flows and the evolution of prices, the set of measurements available to describe other aspects of competitiveness is relatively limited[12].

In line with the discussion in Section 2 of this chapter, the structure proposed for analysing tourism competitiveness centres around monitoring the results of this activity and the performance of its determinants. Results are usually assessed through the balance of trade and the market share of foreign tourism, measured both by tourism income and the number of tourists[13]. Analysing these indicators, we observe that, during the initial years of the present decade, the number of foreign visitors doubled the resident population. A declining

[12] Recently the World Tourism and Travel Council (WTTC) initiated the production and publication of a set of competitiveness indicators relating to tourism activity, which attempt to cover some of the aspects listed.

[13] Predominant use of receiving tourism as a variable for analysis, rather than domestic tourism (receiving tourism plus domestic tourism), results first of all from its economic importance (in 2003, the real revenue derived from this type of tourism amounted to 4.8 percent of real GDP) and also to the greater availability of statistical information. In this connection, we should mention that domestic tourism data are only available from 1999 on.

trend, however, has been registered in average expenditure per tourist, reflecting a shift in demand towards lower purchasing power segments.

Where the determinant factors that affect these results are concerned, special attention is devoted to price and cost developments, since the empirical evidence shows that international tourism demand is sensitive to price levels, inflation rates and exchange rate fluctuations, although this sensitivity varies according to the stage of development in tourist destinations and to the per-capita income level of the countries of origin of the tourism. Indicators that can be used to monitor price competitiveness include real effective exchange rates (REERs), which are produced from the tourism component of the Spanish Consumer Price Index (CPI), both in relation to the principal countries of origin of the tourism and in relation to competitor countries. Purchasing parity indices produced from consumer prices and from prices of accommodation and catering services are also monitored. Despite the fact that the different measurements of the REER showed significant appreciation from 1999 onwards, relative price levels in the Spanish economy in relation to the average for the EU 15 countries (measured, as indicated above, in terms of purchasing parity) were similar in 2000 to those of 1995. This favourable competitive position appears to have weakened, however, in comparison with the Mediterranean countries of Eastern Europe, which are developing a tourism sector specialising in a product similar to Spain's.

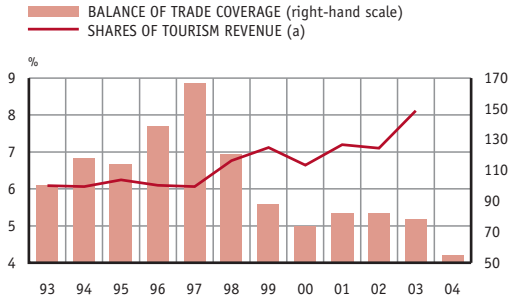
Margin indicators, that summarise the relative development of sector prices and costs, also contribute important information on the competitive capacity of tourism activities. Production of these indices requires sectoral accounts information, which is published with some delay. Measurements therefore use data from the Central Balance Sheet Data Office, supplemented with information from other international databases (primarily the harmonised annual accounts – BACH database for 11 European countries). These figures show that, in recent years, profitability in this sector has apparently softened in Spain, which lags behind levels achieved in France and Italy.

In order to complete the analysis of the tourism sector competitiveness, more structural aspects should be assessed, relating both to sector demand and activity. From the demand perspective, the surveys of tourism expenditure (EGATUR) and tourist movements (FRONTUR), produced by the Spanish Tourism Research Institute (IET), enable some of the most characteristic features of the Spanish model to be delimited. Prominent among such features is the high geographical concentration of the origin of foreign visitors, 95 percent of whom are from European countries, with the United Kingdom, France and Germany standing out in particular. We should also point out the low dispersion of the chosen destinations, which are concentrated in the communities of the Mediterranean coast and in the islands, the highly seasonal nature of tourism, which means that resources are underutilised in the months of low tourism inflows and last, the small share of visitors who come for work or business, which is the category that involves a greater daily average expenditure. These data can be used to prepare a number of tourism pressure indicators, such as the tourist load (number of tourists per inhabitant), which for some destinations show signs of congestion associated with substantial urbanisation of the coast.

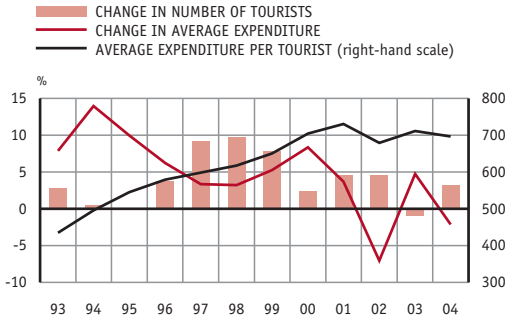
On the supply side, one of the features that affects the competitive capacity of the tourism sector is the high proportion of small and medium-sized corporations (SMEs). In 2002, the number of tourism corporations represented 20 percent of the number of corporations

CHART 7 COMPETITIVENESS OF THE TOURISM SECTOR

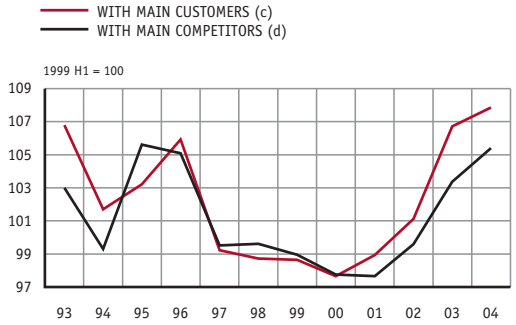
PERFORMANCE INDICATORS



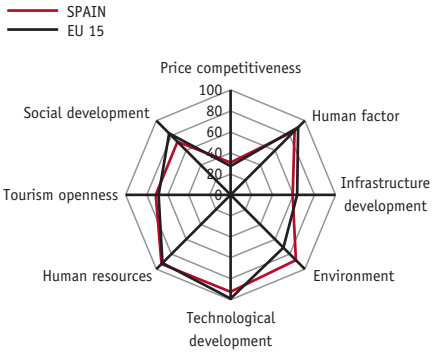
TOURISTS AND AVERAGE EXPENDITURE



COMPETITIVE INDICES FOR TOURISM (b)



SUMMARY INDICATORS (e)



SOURCES: Banco de España, IET, WTO, Eurostat and WTTC.

a. Spain's share of nominal tourism revenue in world tourism revenue, in current US$.
b. Prepared with consumer prices. An increase in the index represents a loss of competitiveness, and vice versa.
c. Includes all EU countries, Switzerland, U.S., Canada, Mexico and Japan weighted to reflect their share in total foreign travellers lodged in Spanish hotels.
d. Includes France, Greece, Italy, Portugal, Austria and Mexico weighted to reflect their share in total world tourism.
e. Indices prepared by the WTTC reflecting the multidimensional nature of the competitiveness of the tourism sector. Constructed from 23 indicators grouped into eight major areas: price competitiveness, development of the human factor in the tourism industry, development of infrastructures, environment, technological development, human development (quality of the labour factor), level of openness and social development. Each of the 23 indicators selected is standardised with the methodology adopted by the United Nations to valuate human development indices, and an aggregate index is calculated for each of the eight groups, obtained as an arithmetic mean of the indices selected.

listed in the Central Directory of Firms (DIRCE) of the Spanish National Statistics Institute (INE). This situation clearly impacts the degree of internationalisation and the negotiating capacity of these corporations. General government, which has functions of supervision, land management and tourism promotion, plays an important role of support for the sector's capacity for development. Its impact can be measured indirectly through indicators such as tax pressure and promotion expenditure per tourist.

Finally, we should discuss the indicators produced by the World Tourism and Travel Council (WTTC), which attempt to summarise the different dimensions of a country's competitiveness as an international tourist destination (see Chart 7).

5 Final considerations

Although improved competitiveness is one of the priority objectives of economic policies in many countries, there is some dispute over its conceptual content and determinant factors. In any case, against a backdrop of increasing integration and continuing technological advances, the most recent literature emphasises the need to adopt a multi-dimensional approach to competitiveness, which covers factors from trade performance and competitive mechanisms based on relative prices, to other more structural aspects linked to changes in productivity and to the population's overall welfare.

From this perspective, economic competitiveness analysis becomes more complex, given the many factors impacting it. The need arises therefore to improve the quality of the information available in many of these areas and, in particular, regarding changes in the competitiveness of services, which, as well as constituting the dominant activity in the productive structure of developed economies, are becoming increasing important in trade activities, at an international level, and as a determinant of the results of the rest of the productive fabric. Similarly, the recent extension of the EU has brought to light the need to extend the analysis to the new members, although complete results are still pending for these countries.

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18. Microeconomic policies

M.ª de los Llanos Matea and Eloísa Ortega

1 Introduction

In this chapter, we shall present the set of instruments and indicators used by the *Servicio de Estudios* to analyse microeconomic and supply policies affecting the functioning of markets for goods, services and productive factors. Their efficiency affects the economy's capacity for macroeconomic adjustment and the behaviour of certain very relevant variables, including inflation and unemployment.

The persistence of obstacles to competition and to adjustment in the labour market, and of price rigidity, have had adverse effects on investment, employment and productivity, which have limited the ability of the Spanish economy to grow for extended periods of time without succumbing to price pressures. A growing appreciation of this fact has led to interest in the analysis of factors determining the efficiency of macroeconomic adjustment and in understanding the elements underlying the structural inflationary bias and the persistence of unemployment. It has also highlighted the role that microeconomic policies may be able to play in areas where traditional aggregate demand management instruments are not available.

Analysis of the effects of microeconomic policies has also been triggered by the international integration of the Spanish economy. Progress towards the single market has involved the introduction of Community directives aiming to promote liberalisation of markets and activities – in particular, liberalisation of network industries and of financial services have been considered central to the achievement of a single market –. In addition, it has entailed the launch of initiatives such as the Cardiff and Lisbon processes, which aim to promote these liberalisation efforts, to simplify regulations and to foster innovation and the use of in-

formation and communication technologies in European economies. Moreover, Spain's participation in the EMU has also reinforced the importance of microeconomic policies, in a context where the irrevocable nature of the exchange rate, the implementation of the single monetary policy and the commitments concerning fiscal policy reduce the options for implementing independent demand policies to pursue stabilisation or to deal with a variety of shocks that may arise. In this new framework, microeconomic policies may contribute in the short term to improve the adaptation of supply to the requirements of demand, but more importantly, they enable a better utilisation of productive factors and the expansion of potential output over the long term and, ultimately, they are essential in promoting competitiveness.

This analysis was until very recently focused on the diagnosis of the functioning of the labour market – based on the analysis of its institutions and of the development of a suitable analytical framework – and on the development of proposals for reform and on evaluation of those reforms as they were progressively implemented. However, the considerations described above have led to a widening and deepening of the analysis by means of the study of the institutional features of other goods and services markets, the assessment of changes in the behaviour of sectors subject to liberalisation and the monitoring of changes in productive and commercial structures. Decentralisation of regulatory and spending powers to regional governments and local corporations, which has become important in certain sectors – such as land development and retail trade – has highlighted the importance of the geographic dimension in these studies.

Statistical information concerning this new area of analysis is very limited, however, and there is no specific analytical framework to address a very diverse group of policies and instruments. This makes the characterisation of microeconomic policies and the construction of indicators geared to reflecting the stance of the type of economic policies particularly difficult. Given these difficulties, the impact of reforms in product markets must be assessed through monitoring sectoral performance indicators (such as price changes and degree of concentration), which provide limited and partial information.

As a consequence of all the foregoing considerations, this chapter provides a selective presentation of the microeconomic policies that are considered most relevant for the Spanish economy and presents the analytical instruments used in evaluating their stance and results. The chapter is organised as follows: Section 2 discusses labour market reforms; Section 3 covers reforms related to the markets for goods and services (network industries, land and housing, and retail trade); and last, Section 4 considers those addressed towards promoting technological development.

2 Labour market reform policies

The functioning of the labour market, where wages and employment are determined, is fundamental to macroeconomic adjustment, although it also influences decisions by economic agents in matters highly relevant for long-term growth, such as utilisation of the labour factor and productivity growth.

The Spanish labour market has traditionally registered inefficiencies in its capacity to adjust wages and employment when faced with different shocks – which has im-

pacted negatively on the process of price and cost formation – and also very high levels of structural unemployment over extended periods. Diagnosing the reasons underlying this behaviour has required numerous analyses and a profound understanding of labour market institutions. At the same time, labour market reforms have been a central element in the economic policy debate, which has led to the implementation of numerous measures over the years, which have generally tried to impact specific aspects of the market.

It is beyond the scope of this chapter to list all the actions undertaken, although it is worth mentioning that the measures implemented in recent years have improved the economy's capacity to generate employment, creating conditions conducive to a substantial reduction in unemployment and in its structural component. They have also contributed to generating a gradual increase in labour force participation, which started from very low levels, particularly among women. Reforming efforts in the area of collective bargaining have proved considerably less effective. Despite all the progress made, a series of inefficiencies persist in the Spanish labour market which are reflected in the persistence of a high rate of structural unemployment, as shown by the stabilisation of the non-accelerating inflation rate of unemployment (NAIRU) at levels that remain high – above 10 percent in the most recent period – while the degree of labour factor utilisation remains low, particularly for women and older workers. In addition, the employment rate in Spain remains below the average for the EU countries (59.6 percent in 2003, as compared to 64.9 percent for the EU) and far off the targets set at the Lisbon Council.

In this context, monitoring of labour market institutions (collective bargaining, hiring and dismissal procedures, and intermediation mechanisms) and of indicators of imbalances are fundamental aspects of the studies conducted by the *Servicio de Estudios,* as described in the following sections.

2.1 Labour market institutions

The general principles of the collective bargaining system in Spain have remained unchanged, at least in terms of its main features, for the last twenty years, and have shaped a system characterised by substantial coverage among employees and by the predominance of agreements operating above the level of the firm and, in particular, by sectoral agreements negotiated at provincial level.

This system of bargaining tends to produce wage increases that are highly homogeneous for each type of activity and by region, and that are linked fundamentally to trends in the general price index. This situation causes difficulties in adjusting wages to specific labour market conditions and to the particular circumstances of corporations[1]. Further, the widespread inclusion in wage agreements of safeguard clauses, which attempt to protect the purchasing power of wages from unforeseen inflation effects, results in high nominal inertia in wages: temporary inflationary shocks are translated into wage increases (see Chart 1A).

[1] See Izquierdo and Urtasun (2005).

This wage-bargaining system, focused on an intermediate framework of negotiation, may have negative effects on the results achieved, generating an inflationary bias. In fact, empirical analysis carried out using the database of collective bargaining agreements of the Ministry of Labour and Social Affairs[2] shows that throughout the 1990s, the collective bargaining agreements at the sector and provincial levels produced wage increases exceeding those negotiated at other levels, even when the effect of a wide range of relevant characteristics of collective bargaining agreements was taken into account. Moreover, the collective bargaining system has significant effects on dispersion of wage levels, as sectoral agreements – which are the most frequent – tend to provide less wage dispersion than agreements executed at the company level. All the foregoing lead to a high degree of wage homogeneity, which does not help in correcting the differentials observed in unemployment rates between regions, as insufficient incentives to mobility are provided.

Recruitment and dismissal procedures are institutional features that also influence the functioning of the labour market. The coexistence of two basic hiring mechanisms – permanent contracts with high firing costs and fixed-term contracts with zero or very low severance payments – has created a dual labour market, in which the percentage of temporary workers is substantially higher than in other countries and where adjustment processes rely fundamentally on this type of worker. An additional feature of the hiring system is that turnover in temporary workers is quite high, as demonstrated by contract data from the National Employment Institute (INEM). The ratio between the total number of contracts in a year and the total number of employees has settled above unity in recent years, as a consequence of the very short duration of employment contracts (see Chart 1B). In 2004, for example, terms in 28 percent of the contracts executed were less than one month, with half of these contracts entailing terms of less than seven days. This extremely short duration no doubt affects decisions by firms concerning investment in human capital and training and, consequently, impacts on worker productivity.

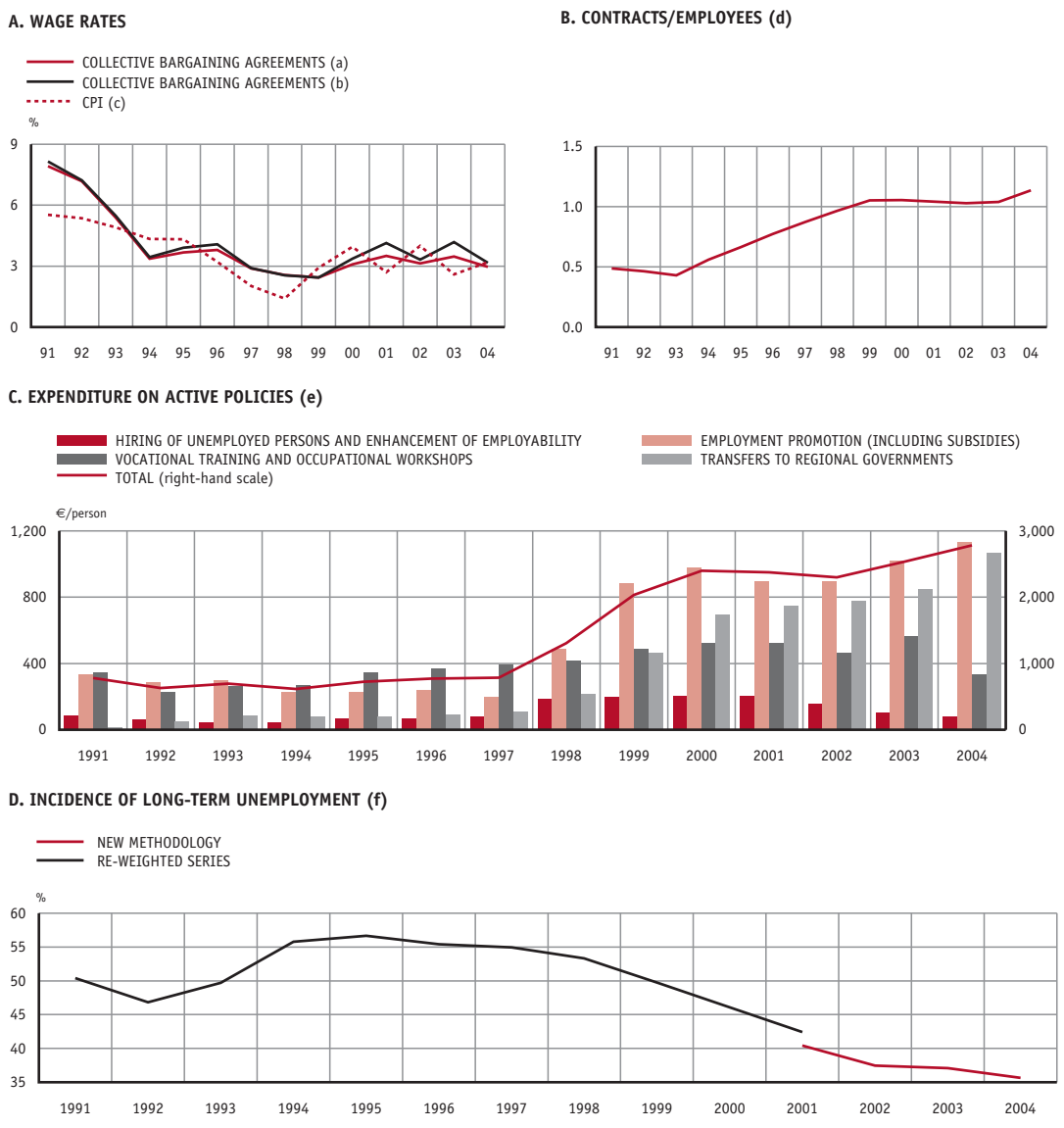
In terms of the market's dynamic response to different shocks, we observe labour flows into and out of the labour market of a similar magnitude to those we observe in countries whose labour markets are considered to be flexible (such as the U.S. and the U.K.)[3]. However, practically all of these flows are made up of workers with temporary contracts, while very few permanent workers are involved. This factor affects the results of wage bargaining, which are dominated by workers with greater job security, as well as on the productivity levels of temporary workers, who have insufficient experience in their jobs.

In terms of intermediation mechanisms in the labour market, the Public Employment Service is responsible for public policies aimed at improving employment opportunities for those groups with greatest difficulties. However, there are considerable imbalances between available vacancies and the unemployed, and the role of the Public Employment Service as an intermediary between supply and demand for labour is limited. In spite of recent reforms, which have increased the resources available for improving efficiency in carrying out this function, only fifteen percent of job placements are as a result of these arrangements. As we observe in Chart 1C, expenditure on active policies has increased considera-

[2] See Izquierdo, Moral, and Urtasun (2003).

[3] See Bover and Gómez (1999) and Estrada, Izquierdo and García-Perea (2002).

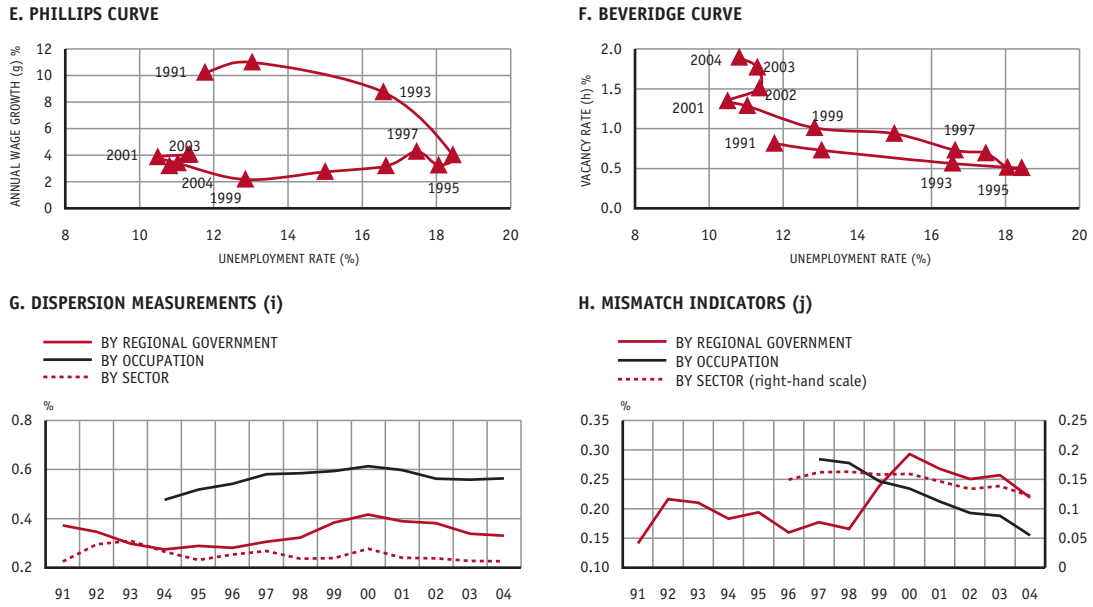
CHART 1 LABOUR MARKET INDICATORS



SOURCES: INEM, National Statistics Institute (INE) and Banco de España.

a. Without safeguard clause.
b. Including safeguard clause from the previous year.
c. Year-on-year rate, December.
d. Employment according to the Quarterly National Accounts. Year: 2004, estimates from January-June.
e. Expenditure in euro per unemployed person.
f. Persons unemployed for more than one year out of the total.

CHART 1 LABOUR MARKET INDICATORS (cont'd)



SOURCES: INEM, National Statistics Institute (INE) and Banco de España.

g. Average rate of change in compensation per employee in the market economy.
h. Vacancy series adjusted according to Antolín (1994).
i. Coefficients of variation, unemployment rates.
j. Indicators of mismatches between vacancies (positions pending at end of year) and EPA unemployment (annual average).

bly in recent years, although the current level is still below average expenditure levels in other European countries. Moreover, a substantial proportion of this increase can be accounted for by expenditure on policies encouraging permanent employment, rather than on training, supervision and guidance for the unemployed. Levels of long-term unemployment continue to be high (see Chart 1D).

2.2 Labour market indicators

A very useful indicator for assessing the functioning of the labour market and its response to shocks is the Phillips Curve, reflecting changes in the unemployment rate and wage increases. Chart 1E, which shows the changes in this curve during the last 15 years, shows that from the mid-1990s, the intense process of reducing unemployment, in which the rate of unemployment fell by approximately eight percentage points, was accompanied by moderate growth in nominal wages. This inward movement of the Phillips curve indicates a no-

table improvement in the functioning of the labour market, reflected in a reduction in the equilibrium rate of unemployment.

A further indicator is provided by the Beveridge Curve, which relates the unemployment rate with the number of vacant posts and provides an indicator of efficiency in the adjustment process between supply and demand for labour[4] (Chart 1F). Its analysis allows us to draw conclusions similar to those obtained from the Phillips Curve, given that since 1994 a major decline in the unemployment rate and a rise in vacancy rates can be observed.

Other indicators provide complementary information concerning possible imbalances in the labour market, such as differentials in unemployment rates by occupation, by sector, or by region. Analysis of these indicators shows that despite a significant reduction in the unemployment rate in recent years, the relative dispersion of unemployment rates has remained almost unchanged (see Chart 1G) at very high levels. This indicates inefficiencies in the functioning of intermediation mechanisms in the labour market. For example, regional mobility remains quite limited, despite the existence of substantial differentials in unemployment rates across regions. There are also substantial imbalances between vacancies and unemployment by region (see Chart 1H).

3 Reform policies for the goods and services markets

Microeconomic policies are applied through a wide range of policy actions, varying in terms of the type of available instruments used (setting taxes or subsidies, eliminating barriers to entry, setting restrictions on horizontal or vertical integration, regulating prices, regulating the labour market), in terms of the range of activity (company, sector, industry, or market) or in terms of geographic area (local, national, international). We should highlight at this point the numerous statistical problems which are encountered when considering the results of policies implemented, and the need to rely on a wide variety of sources in order to obtain the inputs necessary for conducting this type of analysis. In spite of these issues, which oblige us to conduct sectoral analyses and very often of a very partial nature, it is possible to find common patterns of reform to the various product and factor markets, which are summarised in the following section.

Policies implemented in recent decades have been designed with the main objective of favouring more competitive behaviours. To that end, independent regulatory bodies have been established at the sectoral level required (Competition Court, National Energy Commission and Telecommunication Market Commission). Their independence from political power limits the risk that their decisions could be affected by a variety of pressure mechanisms. In the same vein, markets and activities – mainly in the field of network industries – have been liberalised through the removal of barriers to entry and the deregulation of prices.

Reforms in product markets have included wide-ranging privatisation programmes for public corporations. In some cases, these privatisations have been a first step prior to the opening to competition of the industries involved. However, the criteria for privatisation have exceeded this objective and, as a result, the weight of public corporations in GDP has

[4] For further details on the Spanish case, see García-Perea (2001).

fallen significantly in recent years. But at the same time, the effects of privatisation policies depend, *inter alia,* on competition conditions in the sectors involved. In this context, the theoretical arguments that relate public ownership and business efficiency and the available empirical evidence suggest that public corporations score lower, in terms of the degree of efficiency, than private corporations in markets subject to competition, while the results of this comparison are not conclusive in non-competitive markets (Hernández, 2004). Privatisation may have generated improvements in efficiency in sectors where it has been accompanied by increases in competition.

Other aspects of the reforms implemented in recent years have been the introduction of market criteria in public tendering, the simplification of administrative procedures (such as creation of "one-stop shops" for business by the Ministry of General Government and the chambers of commerce, and the adoption of the system for limited liability companies and new firms), as well as the elimination of subsidies and public aid. All these reforms have required the adaptation of the legal framework to changing economic circumstances. The effort to simplify and streamline standards and regulations, however, appears to remain somewhat behind such developments, considering we are now in a context in which decentralisation of powers over certain activities has led to a confluence of a range of regulations covering the same activity.

In the remainder of the chapter, we shall describe the instruments of analysis used to evaluate the effectiveness of microeconomic policies in those areas of economic activity of most interest by the Banco de España. This entails the use of a wide range of statistical sources, from time to time involving indicators specifically designed for each of the situations concerned.

The rest of the section, following this introduction, is organised as follows: in Part 3.1, policies that open network industries to competition are analysed; Part 3.2 considers policies relating to the housing market and, last, Part 3.3 looks at policies concerning retail trade.

3.1 Network industries

A defining characteristic of network industries is the use of a network infrastructure that connects the supply of goods and services produced with consumers. These industries consequently include such diverse activities as power, gas, telecommunications, postal services, water and transport of goods and people. This type of industry has traditionally remained outside the competitive sphere, owing to substantial fixed costs of the network and consequent major economies of scale, and it exhibits some elements of natural monopoly. However, technological changes, the opportunity for unbundling activities in a single industry and increased demand have introduced competition into the network industries. The opening up of network industries in Spain has been presented as a gradual process, where the various segments of a particular industry have ceased to be natural monopolies and have been gradually incorporated into the process, following structured liberalisation programmes[5].

[5] For a description of how liberalisation of these industries has been conducted in Spain, see Matea (2001 and 2002).

From experiences in different countries in the liberalisation of a range of network industries, it can be concluded that the introduction of competition generally reduces prices, improves quality and opens up consumer choice. Meanwhile, firms operating in these sectors have had to deal with substantial restructuring processes, which have increased their incentive to innovate and, in the medium term, have improved their management and competitiveness. Furthermore, goods and services that are created by network industries normally have a direct impact on the costs of other economic activities and, consequently, liberalisation of network industries can lead to major synergies that result in efficiency improvements and price reductions in other sectors. Consequently, in order to analyse the effectiveness of the reforms implemented in Spain, we need to compare each of these aspects prior to and following reform. And finally, given that liberalisation of network industries has been promoted by the European Commission, within a framework of the creation of the Single Market, we should also place the Spanish results within an international context, insofar as the statistics allow us to do so[6].

The first aspect that needs to be examined is the increased level of effective competition that has occurred following regulatory change. This should be conducted at the most suitable level of disaggregation, depending on the circumstances of the industry under analysis. The degree of liberalisation tends to vary depending upon the activities of a single industry or sector, so analysis should be conducted at that level of detail[7]. On some occasions the relevant market is even more fragmented than suggested by any distinction between activities. So, for example, for some sectors, the geographic dimension has to be borne in mind, as there are many firms that function as monopolies or local quasi-monopolies (as could be the case in power distribution, water and some types of transport). Given the great degree of disaggregation required by this analysis, the publications produced by the regulatory organisations for some of these industries (the National Energy Commission and the Telecommunication Market Commission) are a relevant source of information. In general, however, practical limitations of the statistics often prevent analysis at the level of the relevant market.

Once the most suitable level of disaggregation has been established, there are a number of variables that provide significant information concerning degree of competition. One variable is, of course, changes in the number of firms operating in a particular sector. This measure may, however, be insufficient, given that it does not indicate the existence of firms with a dominant position in the market. To reveal this information, more appropriate indicators are changes in concentration ratios – defined as the market share of the largest corporations – or changes in concentration indices – which reflect both the number of existing firms and the uniformity/diversity in their size – providing summary information for the two preceding measurements. It is, however, difficult to

[6] In this connection, the European Commission's annual reports on the application of regulation in telecommunications and in the gas and power markets provide fairly detailed information.

[7] In this context, it should be borne in mind that the type of activities that make up the various network industries is very diverse, though in general they can be classified under two distinct models: first, those in which each activity reflects a different service (telecommunications, postal services, etc.); and second, those in which a distinction is made between production, network management and marketing (power, gas, rail transport, etc.).

obtain market shares for all corporations operating in the market segment under consideration[8].

Changes in the quality of goods and services supplied by sectors undergoing liberalisation processes are more difficult to analyse, given the lack of available statistics[9]. A consideration of the range of services supplied by these industries indicates that these generally increase in two ways: on the one hand, owing to the fact that liberalisation usually increases the total number of firms; and on the other, because the range of services on offer is widened, although the latter may be the result of technological innovation which may accompany the process of increased competition.

Opening up a sector to competition has, in some cases, involved restructuring of firms operating in the sectors involved, which has been reflected in business strategy and results. The database of the Central Balance Sheet Data Office of the Banco de España can be very useful in following these developments, as it provides economic and financial data for firms and effective coverage for certain industries (see Table 1). Among the variables that can be analysed using this source, and which are relevant to an analysis of the effects of liberalisation, are: value added, personnel expenditure, productivity, business results, margins and profitability[10]. This analysis does, however, need to be accompanied by data from other statistical sources, such as the Central Business Directory (DIRCE) of the National Statistics Institute (INE), which contains information on the number of firms and employment by branch of activity.

As indicated above, the introduction of competition in network industries is customarily accompanied by decreased prices for the products and services supplied, although this may not occur uniformly across different activities, owing, for example, to the existence of cross subsidies in periods prior to liberalisation (as is the case in telecommunications, for example). Consequently, price changes in these industries should also be assessed at a highly disaggregated level. In some cases, however, certain price indices can be used to obtain summary information concerning some specific market sector. So in relation to households, the consumer price index sub-indices corresponding to network industries can provide a starting point, although it should be borne in mind that these only include supplies since 2002, and that a certain amount of time is required to incorporate prices for new entrants. In the context of fixed-line telephony, the OECD has for some years been calculating baskets with prices from the incumbents, both in relation to households and to corporations, which can facilitate international comparisons. Last, we should point out that it can be a difficult matter to isolate the component of observed price fluctuations that arises from liberalisation, from the part derived from the other types of factors that could have had an impact in the same direction, such as technological progress.

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[8] In the area of telephony, the Telecommunication Market Commission provides these types of measures in its annual reports.

[9] At present, only Red Eléctrica de España provides information concerning energy not supplied and average service outages for the power distribution network, or for outages owing to breakdowns at power stations. This information can provide an approximate idea of the quality of the power supply.

[10] An illustration of how this statistical source is used in business analysis of the power sector can be found in Hernández, Matea and Menéndez (2004).

TABLE 1 CENTRAL BALANCE SHEET DATA OFFICE COVERAGE, 2001

SECTOR	Coverage by employment under DIRCE (%)
Power production and distribution	80.1
Water collection, purification and distribution	60.3
Retail sale of automobile fuel	27.2
Rail transport	99.9
Postal and mail activities	66.9
Telecommunications	83.5
Air transport	85.7

SOURCE: Central Balance Sheet Data Office, Banco de España.

To the extent that production by network industries is used as an input for other economic activities, the reduction in prices that occurs following liberalisation extends to other sectors. Input-output tables can be useful instruments in estimating the total effect on final prices of an initial fall in the production price of a network industry, given that they reflect all the interrelationships between the various areas of productive activities. It should however be pointed out that a limitation on the use of input-output tables arises from the delay involved in this information being published. This issue can be of particular importance at times of substantial changes in productive structure, such as may have occurred following the technological advances and price falls recorded by network industries following their liberalisation. An application of this analytical tool is provided in Box 1.

3.2 Land, housing and rentals

The operation of the housing market and the evolution of housing prices have major implications on economic growth, owing to both the importance of residential construction in investment and because of the wealth effects that housing price movements have on household spending. Further, inadequate operation of this market may have significant implications for labour mobility and on wage cost formation. These factors have put the housing market at the centre of the economic policy debate and have made it the target of many public policy actions.

The housing sector in Spain displays certain peculiarities, arising from rules and regulations, from the country's cultural heritage, from demographic changes that have occurred in recent years and from the fact that Spain is a tourist destination. In particular, more than 80 percent of households live in owner-occupied accommodation, while the percentage of homes in the rental sector is considerably lower than elsewhere in Europe. There is a relatively high proportion of second homes and the country also has a considerable number of vacant dwellings. Further, legislation in Spain provides for particular restrictions on the

BOX 1 POTENTIAL EFFECTS ON OUTPUT PRICES OF A 10 PERCENT DECLINE IN PRICES IN SOME NETWORK INDUSTRIES

As discussed in the main text, input-output tables make it possible to calculate the effects on output prices of an initial decline in the price of a good or service. In particular, they can be used to calculate both the direct effect (initial decline in the price of a particular product plus declines induced in final prices in branches that use this product as an input) and the indirect effect (which occurs because the direct effect in turn leads to a chain of declines in prices as goods and services produced by the other sectors, which have reduced their prices, use these, in turn, as productive inputs). The sum of the direct and indirect effects comprises the total effect. To calculate the indirect effect, an assumption must be introduced as to the reaction of prices for other intermediate consumption inputs. The simplest assumption is to consider that prices of other factors that do not constitute intermediate consumption (wages costs, surplus and taxes) remain constant. Alternatively, we can consider that these factors also react to the new situation.

We can assume that prices for factors that are not intermediate consumption adjust to maintain their proportions in the final price of the sector[1]. The effect that is estimated in

[1] In the case of a gross operating surplus, the assumption is equivalent to the profit margin not varying prior to and following the introduction of competition. In terms of employee compensation, the assumption can be justified that lowering prices in the economy would be reflected by reduced wage pressure. In terms of taxes, the assumption is in line with a sustained tax burden.

Activity sectors	Effects (percent)			
	Direct		Total (c)	Total with adjustment (d)
	Sector (a)	With other sectors (b)		
Air and space transport	-0.07	-0.08	-0.09	-0.18
Post and telecommunications	-0.30	-0.36	-0.47	-1.46
Power production and distribution	-0.27	-0.34	-0.41	-1.31
Production and distribution of gas fuels by urban pipeline, except for gas pipelines, and steam and hot water production and distribution.	-0.05	-0.06	-0.07	-0.19
Rail transport	-0.03	-0.04	-0.04	-0.12

SOURCE: Banco de España.

a. Direct effect on output prices of a 10 percent reduction in sector prices.
b. Direct effect on the sector itself plus the direct effect on the other productive sectors.
c. Total direct and indirect (second-round) effects.
d. Total direct and indirect (second-round) effects when the exercise is conducted with the assumption that the same proportion of unconsumed intermediate factor costs is retained in the final price.

this fashion can be considered an "effect with adjustment" and may be considered a higher level of the potential effect.

To illustrate this procedure, and using the input-output tables for the Spanish economy for 1998, direct and total effects have been simulated for output prices, with and without adjustment, that would derive from a 10 percent reduction in prices for domestic products from some network industries. As pointed out in the main text, one limit on the use of input-output tables is the lag with which this statistical information is published. As a result, these estimates could be underestimating the total effects, as the productive structure of the Spanish economy may have changed since 1998, reflecting a more intensive use of certain productive inputs of network industries, as a result of technological progress or of changes in relative prices. In any case, both power and telecommunications have an appreciable effect on the costs of other goods and services. Accordingly, a 10 percent reduction in prices in each of these sectors could independently produce a decline of almost one and one half percentage points in output prices in the Spanish economy (see table above). A decline in the price of air transport, rail transport, or natural gas could also lead to reductions, albeit smaller, in basic prices, of between one and two tenths.

supply of land and, as a result, housing prices can be affected in times of substantial demand pressure. Some figures will illustrate the relevance of this market in the efficient overall operation of the economy. In 2004, housing represented more than three quarters of the total net wealth of Spanish households, and lending associated with housing purchases accounted for just over 70 percent of total lending to households. Investment in residential property amounts to 7 percent of GDP.

This section presents indicators that are useful in assessing the effectiveness of regulatory policies, these being different to those applied in the mortgage market (analysed in Chapter 19), which are related to land, the supply of subsidised housing and rentals. The main source of statistical information is the Ministry of Housing[11].

Regulation of land, and subsidised housing developments, are mechanisms which have been used to influence the supply of housing and, ultimately, its price. In order to assess the effectiveness of these types of policies, we must bear in mind that powers in matters related to land management, urban development and housing fall to the regional (autonomous) and local governments, and that there are differences between the various regional government laws that may generate regional differences in land supply. There is no precise information concerning regional diversity in land supply arising from the effect of the regulations, although indirect and highly tentative information is available on the importance this issue may have, based on the data for housing starts per thousand inhabitants[12]. A review of these

[11] For all of these reasons, the Banco de España has included in these summary indicators compiled at its website a section for the housing market, which includes a compilation of a wide range of indicators that attempts to cover the different aspects of this market.

[12] This information should be used with the proviso that this variable also reflects regional differences in demand or in housing or building characteristics.

data demonstrates, for example, that the regional governments that incorporated into their legislation what has come to be known as a "land development agent", responsible for facilitating the release on the market of new building sites, were on average comparatively more active in housing starts during the period 2001-2003[13].

Changes in the regulations to increase the supply of land available for building[14], which were introduced in the last expansion cycle, should be reflected in the price of land, so the analysis of their effectiveness would need to be supported by the evolution of this variable. However, as statistical information on land prices is not available, we must use a proxy, such as price series for the impact of land costs produced by private institutions[15], which provide information concerning trends in this variable.

The effectiveness of public action related to subsidised housing can be assessed by looking at changes in the number of dwellings constructed within this category and also, in this case, by analysing the data at the regional government level. In order to illustrate a possible application of this information, Chart 2 shows the percentages of subsidised housing starts within total housing starts during the last two expansion phases in the construction sector, during the period 2001-2003 (top map) and during the period 1986-1988 (bottom map). As the chart shows, the importance of this economic policy tool has decreased over time (the map corresponding to the last expansion phase has lightened compared to the one reflecting the late 1980s). This chart does, however, also reveal substantial geographic differences. This information can be supplemented with information concerning the degree of compliance with successive housing plans.

The main source of information for assessing the effects of these policies on housing prices is the average price per square metre calculated by the Ministry of Housing, which is based on valuations conducted throughout Spanish territory[16]. Chart 3 shows the growth in prices between the fourth-quarter 1996 and fourth-quarter 2003. The substantial growth in housing prices during this period can be interpreted as a consequence of the limited effect of microeconomic policies applied to influence housing prices.

As far as analysing any effects of regulations applicable to rentals is concerned, and the impact of the variety of tax initiatives which have been implemented to stimulate the sup-

[13] The land development agent was introduced in 1994 by the regional government of Valencia and was later adopted by other regional governments (in 1998 by Castile-La Mancha and La Rioja; in 1999 by Aragon and the Canary Islands; and in 2001 by Madrid). In making use of this power, the local governments can adjudicate the development of third party land to these agents, for periods ranging from one to three years, depending on the regional government concerned. This approach facilitates marketing of new building sites by separating development from land ownership entitlements.

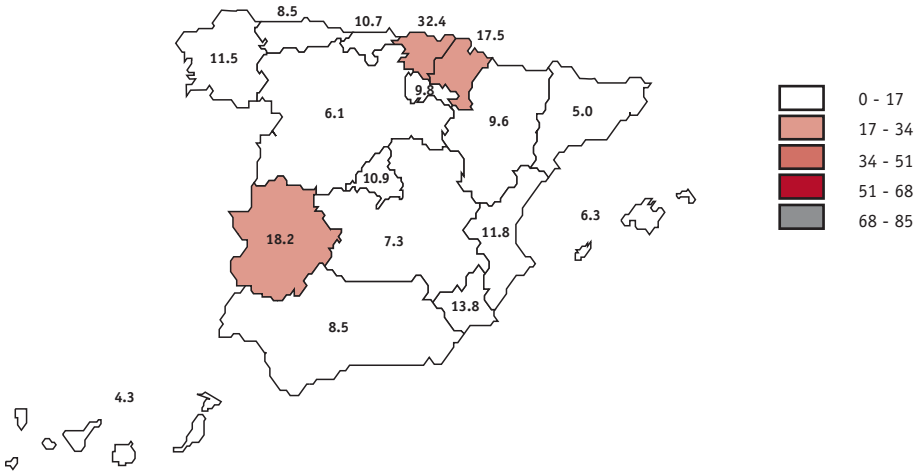
[14] Legislative changes concerning land can be reviewed in Martínez and Matea (2002 and 2003).

[15] BBVA and "Grupo i" estimate the maximum price that developers are willing to pay for land.

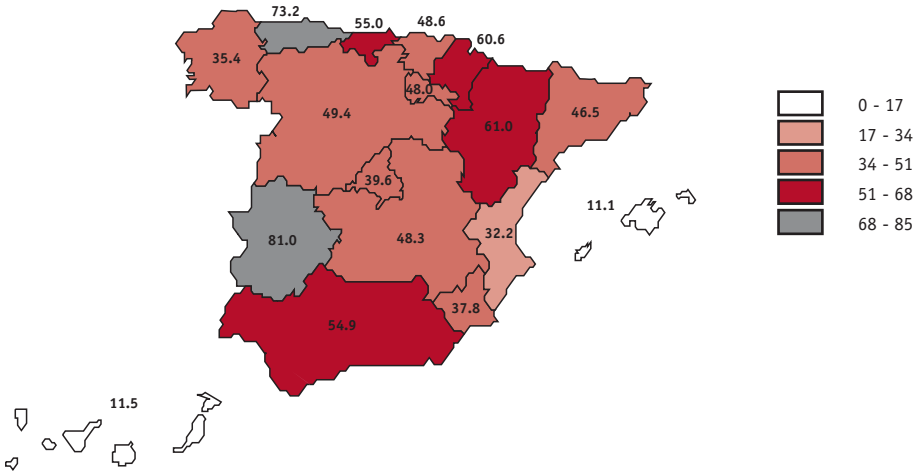
[16] This statistic provides information that, while being fairly detailed, is still insufficient to adjust the prices involved to reflect changes in characteristics. Even so, although changes in the average price of new or existing housing at each point in time incorporates certain biases associated with differences in the characteristics of the dwellings (other than size) which may affect their price, we can expect them to provide an approximate reflection of the main trends over time. Bover and Velilla (2001) provide an estimate of the impact of change in quality on price changes per square metre of new residential developments in Spain during the period 1993-1997, and the resulting figure is greater than 2 percent.

CHART 2 PERCENTAGE OF STATE-SUBSIDISED HOUSING STARTS BY REGIONAL GOVERNMENT

PERCENTAGE OF STATE-SUBSIDISED HOUSING STARTS. AVERAGE 2001-2003

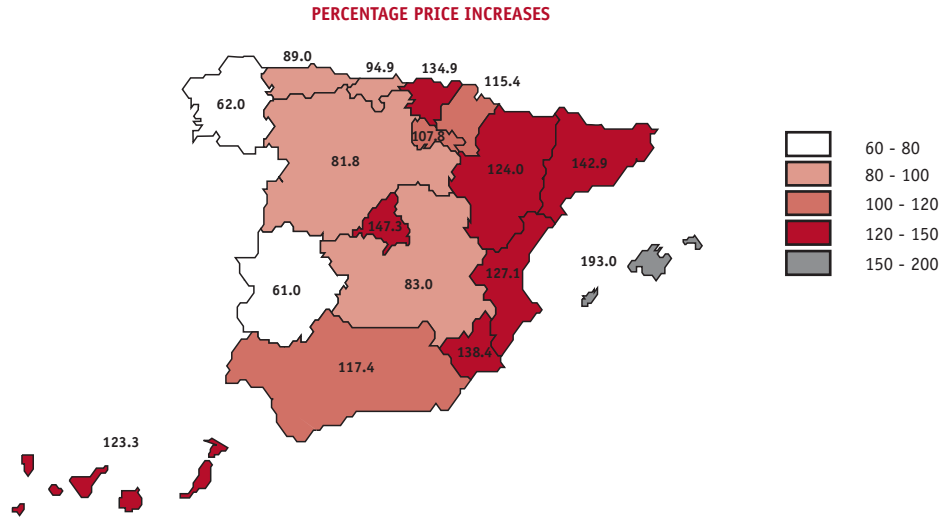


PERCENTAGE OF STATE-SUBSIDISED HOUSING STARTS. AVERAGE 1986-1988



SOURCE: Ministry of Housing.

CHART 3 HOUSING PRICE INCREASES FROM 1996 Q4 UNTIL 2003 Q4 BY REGIONAL GOVERNMENT



SOURCE: Ministry of Housing.

ply of this type of housing, we need to look to the censuses and the household expenditure survey. While each of these sources produces somewhat different figures, they register similar trends[17].

3.3 Retail trade

An analysis of the retail trade is of considerable relevance, given that this sector has a decisive influence on the process of cost and price formation, and serves to diffuse efficiency and productivity gains to the rest of the economy. In recent decades, the retail trade has undergone substantial modification, owing both to major socioeconomic changes and to progress in new information and communication technologies. At the same time, legislative changes have been introduced that have affected the degree of liberalisation in the sector, although these have not always been directed towards introducing competition, and in fact in some cases there has been some degree of slippage in this connection[18].

Competition in domestic trade is the responsibility of the regional governments and, as a result, there is no uniform legislation across the country. We observe substantial

[17] For information, see Martínez and Matea (2002 and 2003).

[18] For example, in 1993 a regulation was introduced concerning shop opening hours that was more stringent than the one that had been in force since 1985; while in 1996, a second licence was introduced for opening large retail outlets. More recently, in 2004, shop opening hours were further restricted.

TABLE 2 BARRIERS TO OPENING OF COMMERCIAL ESTABLISHMENTS (Status as at May 2004)

	Definition of large retail outlets			Other establishments subject to limits		Market feasibility plan required to obtain licence	Moratoriums on opening establishments	Specific tax	Index (no. of barriers)
	By location	Multiple criteria	Capital stakes criteria	Hard discount	Medium-sized				
Andalusia	1			1			1		3
Aragon	1						1		2
Canary Islands	1	1	1	1			1		5
Cantabria				1			1		2
Castile-La Mancha	1								1
Castile-Leon	1						1		2
Catalonia	1				1	1	1	1	5
Extremadura	1								1
Galicia									0
Balearic Islands	1	1	1				1		4
Madrid	1			1	1				3
Murcia	1			1					2
Navarre	1			1	1		1	1	5
Basque Country	1	1	1				1		4
Princ. of Asturias				1	1		1	1	4
La Rioja	1								1
Valencia	1								1

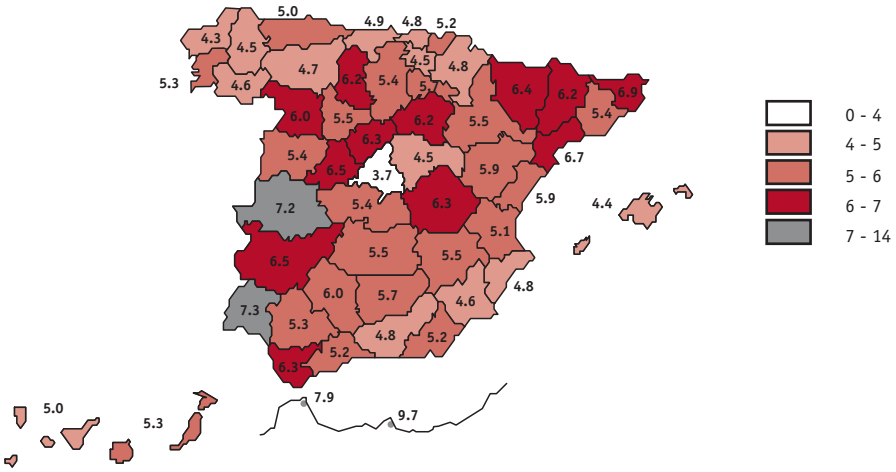
SOURCE: Banco de España.

differences between the various regional governments. In this context, it is useful to prepare indices measuring the degree of regulation that operates in each regional government. To illustrate this issue, Table 2 shows the indices that have been derived from information on barriers to the opening of new commercial establishments that existed in the various regional governments at May 2004. These indices should be considered as merely an approximation of the degree of actual regulation[19], although they appear to indicate that the degree of restriction varies considerably across the regional governments. This same type of index can be applied in conducting comparisons between sectors or countries. In fact, the OECD has made substantial efforts to devise structural in-

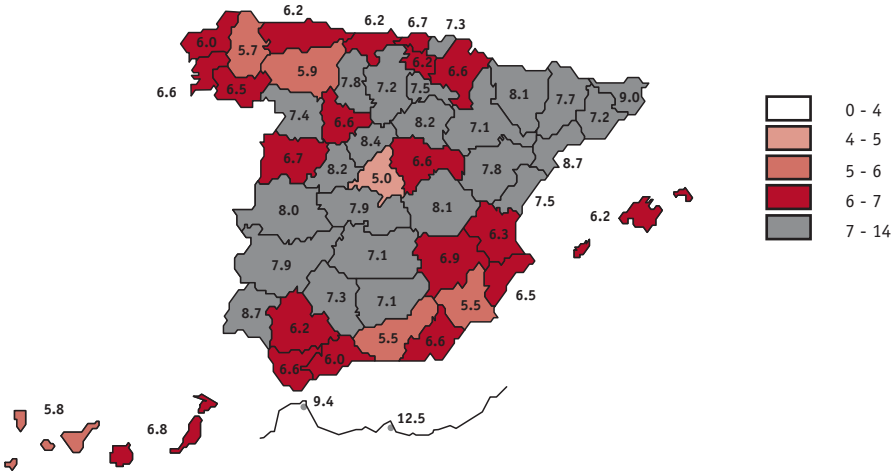
[19] In constructing these indices each regional government barrier is averaged in the same proportion, and it is not taken into account that the impact on competition may vary depending on the barrier involved.

CHART 4 COMMERCIAL DENSITY FOR THE RETAIL FOOD SECTOR

A. DATA AT 1.1.2002. NUMBER OF PREMISES PER 1,000 INHABITANTS



B. DATA AT 1.1.1995. NUMBER OF PREMISES PER 1,000 INHABITANTS

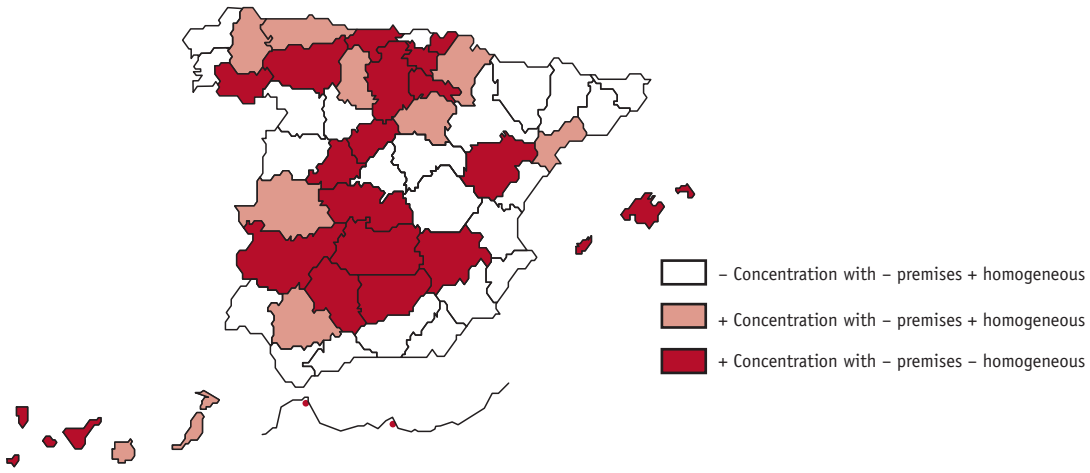


SOURCE: Banco de España.

dicators, in order to measure differences in the degree of regulation between countries in markets for products and in the labour market, although the information is, in some cases, somewhat delayed.

To a large extent, the restrictive practices that have been developed at the level of the regional governments are directed towards protecting traditional trade. Consequently, the degree of effectiveness of these policies should be reflected in the evolution of some variables such as commercial density, which relates the number of premises to popula-

CHART 5 CHANGE IN CONCENTRATION BETWEEN 1.1.2002 AND 1.1.1995 MEASURED WITH THE HERFINDAHL INDEX CALCULATED USING PREMISES



SOURCE: Banco de España.

tion. With the assistance of the DIRCE, we have presented in Chart 4 the commercial density for food retailing[20] (at provincial level) for the years 1995 (bottom figure) and 2002 (top figure). From a comparison of the two charts, we can see the major reduction in commercial density which took place during this period (the map for 2002 is lighter than the one for 1995). This may indicate that the numerous restrictions on the opening of large retail outlets in force during this period did not prevent the closure of many traditional establishments. We can also observe substantial differences in commercial density across provinces, although these may owe as much to different regulatory frameworks – we should expect that the harder it is to open large retail outlets, the greater will be the commercial density – as to differences in population distribution – for a given number of inhabitants, we can expect commercial density to increase in line with population dispersion –.

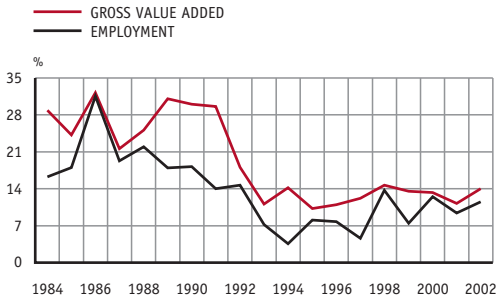
The reduction in commercial density described above has been accompanied by a process of concentration of activity. To describe this process, we can use various concentration indices, which weight in a variety of proportions the number of corporations and differences in firm size[21]. Among these indices, one that should be highlighted is the Herfindahl Index, which allows us to analyse the changes over time in the degree of concentration in terms of

[20] Commercial density has been calculated in terms of premises. This is because when it is calculated by corporation, since the DIRCE allocates the corporation to the province where its headquarters are located, there is a positive bias toward provinces where the head office of chains with outlets in various provinces are located, and a bias in the opposite direction for the others.

[21] For a description of the various concentration indices, see Núñez and Pérez (2001).

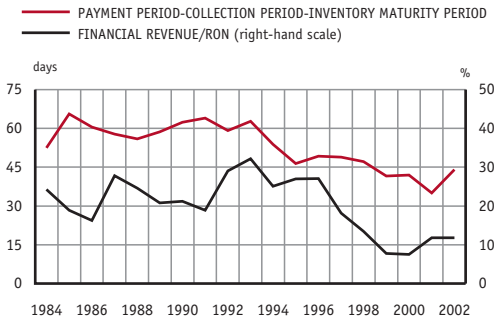
BOX 2 BUSINESS ANALYSIS OF LARGE RETAIL OUTLETS AND MAJOR SUPERMARKET CHAINS

A. ACTIVITY AND EMPLOYMENT
(Rates of change)

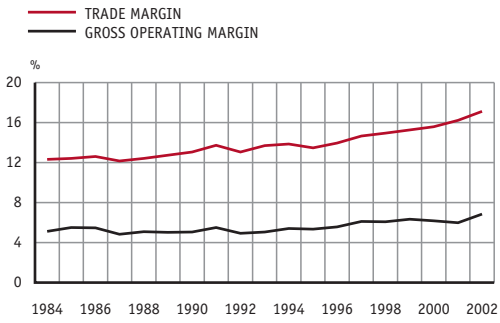


B. PRODUCTIVITY AND WAGES
(Rates of change)

C. COMMERCIAL DENSITY



D. MARGINS



SOURCE: Central Balance Sheet Data Office, Banco de España.

The Central Balance Sheet Data Office of the Banco de España provides useful information for studying business behaviour across a range of non-financial sectors in the Spanish economy. In this box, we shall use the example of large retail outlets and major supermarket chains to illustrate how this statistical source can be used[1].

Activity in this sector, measured using gross value added (GVA), underwent a notably dynamic period during 1984-2002 (see Section A in the chart above), although we also observe a gradual deceleration in the rate of progress, which is particularly marked during the last 10 years of the period. This mainly reflects the gradual moderation in the inflation rate during these years, as well as a slowdown in the expansion of these types of establishments. The dynamism in this distribution sector is also confirmed by changes in employment. Of particular importance within the context of employment were temporary employment and, in the most recent years under consideration, part-time employment. It is possible that the high level of temporary employment in this sector played a significant

[1] A more detailed analysis than that performed here can be found in Esteban and Matea (2003).

role in the evolution of personnel costs per worker, which generally grew at a very moderate rate (see Section B in the chart above). Productivity, measured using GVA per worker, maintained positive growth rates and demonstrated a marked link to changes in personnel costs per worker.

In order to analyse the commercial and financial policies of these firms, it is worthwhile calculating the difference between the ratio of average collection periods from clients and the ratios for stock holding and payments to suppliers. As we observe in Section C of the chart, these establishments had access to substantial liquid assets for long periods of time and benefited particularly from the differential between these terms. The gains made from these surpluses affected the composition of the net ordinary profit (RON)[2], as shown by the fact that in some of the years studied, more than 30 percent of RON is derived from financial revenue. In terms of margins, as we observe in Section D of the chart, both the trade margin (which in this sector can be approximated by the relationship between GVA and sales) and the gross operating margin (or gross economic result/sales) follow an upward trend. This result may reflect the fact that the administrative barriers to the opening of large retail outlets which existed during this period may have reduced the pressure that could be assumed would be caused by the entry of new competitors, so favouring an increase in margins.

[2] The RON is the variable that explains the results achieved from ordinary activities and so is the figure used to calculate profitability.

changes in the number of premises and in size differences among them[22]. Using the information provided by the DIRCE, Chart 5 shows the variation in the degree of concentration in the food retail sector between 1995 and 2002 at the provincial level and its breakdown. In most provinces, there was an increase in concentration, owing to a reduction in the number of premises, which in many cases was linked to an increase in the degree of diversity of those premises; in the rest of the provinces, there was also a decline in the number of premises, although the degree of concentration fell owing to a higher degree of homogeneity.

The many obstacles to the opening of large retail outlets that have been gradually introduced have undoubtedly affected business behaviour and commercial policy in the sector. As in the case of network industries, the information provided by the Central Balance Sheet Data Office is very useful in assessing this issue (see Box 2).

[22] This is defined as the sum of the square of the market shares of all corporations in a market. The index ranges from 1 (value when there is only one firm) and zero (value if there were an infinite number of identical firms). Following a short algebraic transformation, the index can be broken down as:

$$H = \sum_{i=1}^{N} s_i^2 = \frac{c^2 + 1}{N}$$

where N is the number of corporations, S_i is the market share of the i-th firm and C is the coefficient of variation of the market shares of the various corporations.

4 Policies for promoting technological development and innovation

Policies for technological innovation have preferably been conducted by means of tax incentives for investment in new information and communication technologies, training for employees to use these tools and investment in research and development. Since the end of the 1990s, a series of policies have been implemented that have been directed towards strengthening the information society and R&D&I, both in the European Union and in Spain. These policies are set within the framework of the Lisbon strategy aiming to make the European Union an economy based on the most competitive and dynamic knowledge, with advances in employment and social cohesion, by 2010. In order to monitor the progress achieved in these two areas, the European Commission has defined a group of indicators[23].

The *Servicio de Estudios* has conducted a series of analyses to assess the impact of information and communication technologies (ICTs) on productivity, arising from either its direct contribution or its use as productive inputs. This material is covered in detail in Chapter 16 of this book. To monitor this area more regularly, a group of indicators has been developed and synthesised to analyse the economic importance and evolution of ICTs. These indicators, which are published on the website of the Banco de España, have been divided into two main groups: the first provides information about the importance of the ICT sub-sectors in the economy in general, and about their contribution to the behaviour of the main macroeconomic aggregates; the second comprises indicators measuring the degree to which ICTs are used in Spanish society. To compare Spain's relative position in this connection, information, when available, is also provided for the European Union and the United States.

With the indicators in the first group, we attempt to assess the economic activity of the various ICT sub-sectors, the contribution of the various productive factors to economic activity and the profitability of the corporations involved. These indicators are calculated for each group of activities that, in accordance with the OECD definition, form part of ICTs (manufacture of information and communication products, telecommunication services and computer activity services) for all ICTs, and to serve as a point of reference for the total market economy, excluding health or education intended for sale, and agriculture[24]. In terms of the use of these indicators, there are two determinants that arise from the use of individual information to infer aggregate values. First, the Central Balance Sheet Data Office presents a certain degree of bias towards large, established companies. Changes in ICT branches of activity inferred from these data are consequently dominated to a large extent by this type of firm. Second, the economic variables derived from these individual pieces of data are in general substantially more volatile than those observed at the aggregate level, and it may therefore be more appropriate to conduct an analysis for a group of years.

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[23] In particular, in November 2000, 23 indicators were established in the area of the information society, although given the constant technological innovations occurring in this field, the list of indicators remains open. In fact, in November 2002, the Commission proposed a new list, with 14 indicators for policy and 22 supplementary indicators, while the Community plan for R&D&I published in 2003 defines 22 indicators.

[24] See Núñez (2001) for the derivation of these indicators.

The second group of indicators compiles, systematises and summarises information obtained from a variety of very different sources of statistical data (see Table 3), and only in certain cases does the *Servicio de Estudios* conduct any type of further processing. The indicators in the second group attempt to cover five different areas: ICT expenditure, the degree to which ICTs are used by the Spanish population, use of ICTs by corporations, the financial value that the market assigns to this sector and prices.

5 Conclusions

As we have indicated throughout this chapter, the set of analytical instruments available for the labour market is relatively well developed, although it will be necessary in future years to develop knowledge of certain recent developments and their repercussions on adjustment mechanisms. In this connection, an analysis of the impact of immigration on wage flexibility, the occupation rate and the unemployment rate should head the agenda of studies and research in the near future. Similarly, we must further explore incentives to participate in the labour market for groups that still present low participation rates (mainly women and older people), given their importance in preparing an adequate diagnosis to design measures to stimulate supply in the labour market, both from the perspective of long-term growth and in the light of population ageing.

In the framework of product markets the analytical challenges are greater, given the size and institutional complexity of the areas concerned, the lack of available statistical information and the relatively undeveloped nature of this area of study. We must continue to develop sectoral indicators, but also to make progress in terms of analysing the degree of regulation to which they are subject, focusing particular attention on the impact of the regulatory framework in price formation. The design of instruments that make it possible to assess the macroeconomic impact of reforms in the markets for goods and services is essential in developing this line of research, which will prove to be of increasing relevance in the current context of international economic integration and of participation in the EMU.

TABLE 3 INDICATORS OF THE LEVEL OF ICT PENETRATION

Indicator	Units	Source	Frequency	Publication lag	Comments
ICT expenditure	% GDP	EITO (European Information Technology Observatory)	Annual	Three months	Aggregate ICT and its two components are presented: information technologies and telecommunications. The EU information is obtained as a weighted average for current GDP in ppp
Per-capital expenditure on ICT	Euros in ppp	EITO	Annual	Three months	Aggregate ICT and its two components are presented: information and telecommunication technologies. The EU information is obtained as a weighted average for population
Penetration of mobile telephony	%	Telecommunication Market Commission (CMT)	Annual	Eight to nine months	
Population 14 years of age and older using the Internet	%	Estudio General de Medios (EGM)	See comments	One month	Data are available within the year for the following pairs of months: Feb/Mar, Apr/May, and Oct/Nov. Data for Spain only
Households with computer	%	National Statistics Institute (INE) and CMT	Annual	Three months	Only data for Spain are available
Firms with Internet connection	%	European Commission	Annual	Three months	Only for firms with > 10 employees and sections D, G, H & K of Spanish official nomencl. (CNAE). No data are available for the US
Firms in the retail sector that buy and sell on the Internet	%	INE	Annual	One and one half years	The indicator is broken down into companies that buy and companies that sell on the Internet. Only data for Spain are available
E-readiness score	Index 0-10	The Economist Intelligence Unit	Annual	Three months	EU data are calculated as a simple average of all countries, except Luxembourg, which is not included in the indicator
New Market stock index	10.4.2000 =100	Madrid Stock Exchange and Reuters	Daily	One day	The IBEX NM is represented for Spain; for the EU, the German NEMAX; and for the US, NASDAQ.
Telecommunications price	euro	European Commission	Annual	Three months	Represents local, national calls, and those made to the US. Call duration, 10 minutes.

SOURCE: Banco de España.

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19. The financial system

Roberto Blanco and Víctor García-Vaquero

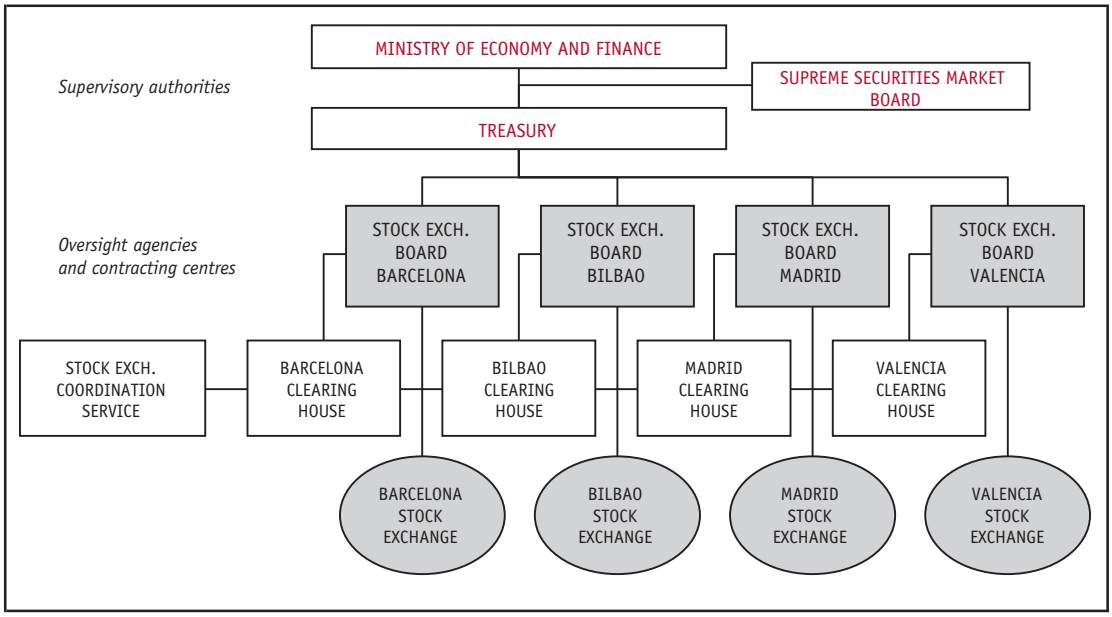
1 Introduction

The financial system as broadly defined, i.e. including all markets, intermediaries and flows associated with the creation and movement of financial instruments, plays a central role in the way an economy functions. In particular, the financial system provides agents with assets to generate returns on savings and liabilities to finance consumption and investment plans, in addition to managing payment mechanisms. Monetary policy is therefore largely transmitted through the financial system.

A financial system must meet two essential prerequisites if it is to be effective: first, it must be efficient, and second, it must be stable. Lack of efficiency and situations of financial fragility can impact economic growth by restricting economic agents' ability to distribute investment decisions over time, in the first case, because inefficiency tends to be reflected in higher intermediation and transaction costs; and in the second, because instability can make intermediaries reluctant to extend credit. A central focus of any analysis of the financial system will be the domestic financial services industry, not only because of the value added and employment the sector generates (approximately 5 percent and 2.5 percent of the total, respectively), but also because its pivotal role in the exchange of funds associated with commercial transactions and the transfer of resources over time means that the financial services sector provides inputs to the majority of productive processes.

In this chapter, we shall review the key analytical techniques and tools that Banco de España uses for the structural monitoring of Spain's financial system. We shall first look at the main changes registered over the past two decades, then move on to consider the main

DIAGRAM 1 ORGANISATION OF SPANISH SECURITIES MARKETS (JANUARY 1981)



SOURCE: Banco de España.

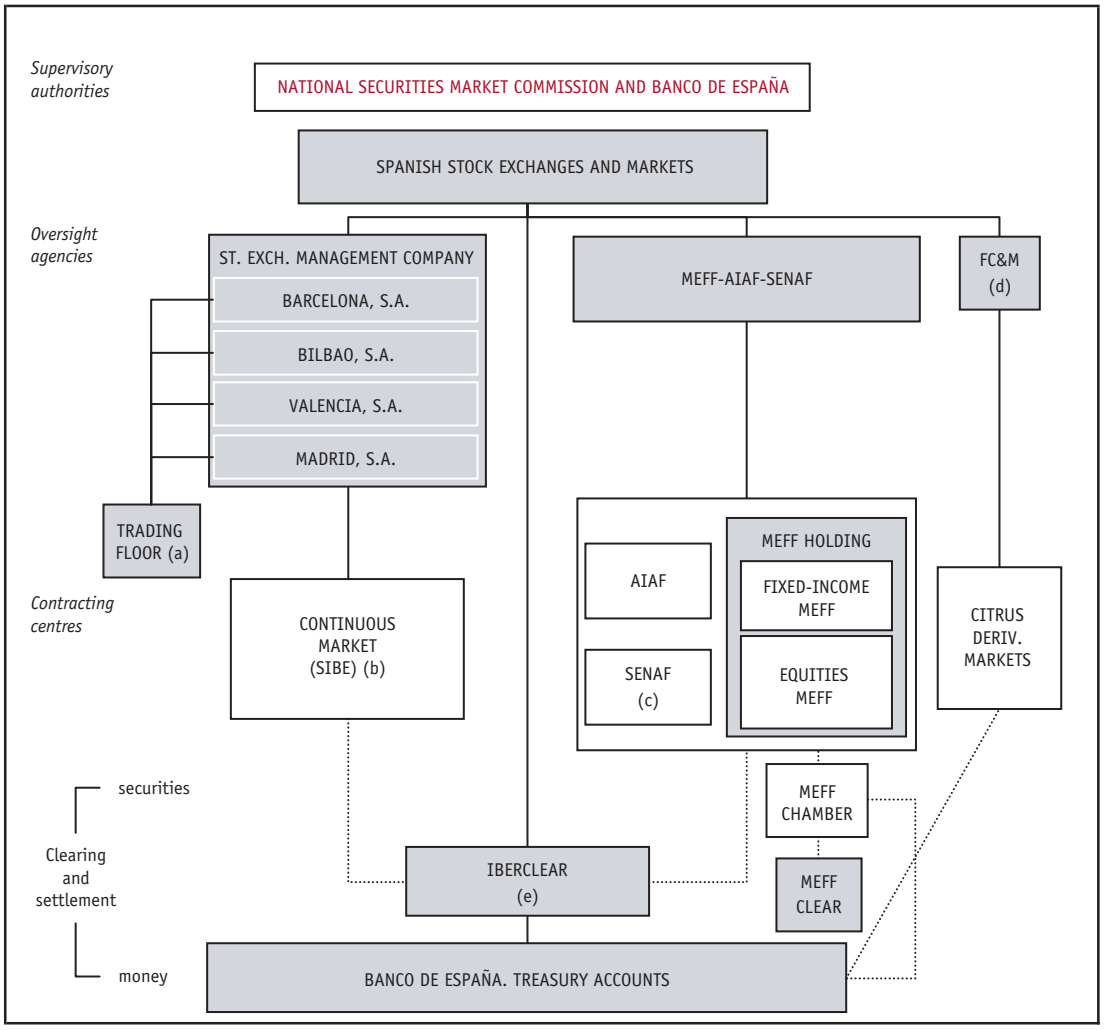
areas subject to regular analysis and the indicators available to support this analysis. We shall conclude with a few closing comments.

2 Recent developments in the Spanish financial system

International financial systems in general, and the Spanish financial system in particular, have experienced profound changes during the past 20 years. These changes have been driven by a range of factors, including financial liberalisation, introduction of the euro, technological progress, amendments to the tax system and the changing macroeconomic context. The conjunction of all of these factors has triggered a series of closely related processes, with the globalisation of financial flows and portfolios, increased concentration of markets and intermediaries, heightened financial disintermediation and rapid market expansion at the fore. These processes have in turn brought about substantial change in the structure, organisation and operation of Spain's financial markets (see Diagrams 1 and 2). In this section, we shall review these developments and the main catalysts of change[1].

[1] See Parejo et al. (2004) for further details on the structure of the Spanish financial system.

DIAGRAM 2 ORGANISATION OF THE SPANISH SECURITIES MARKETS. MARCH 2005



SOURCE: Banco de España.

a. Clearing and settlement of trading floor fixed-income securities are currenly done individualLy in each city´s clearing hous
b. SIBE trades shares, fixed-income securities and warrants.
c. Blind trading system for book-entry public debt.
d. Mercados de futuros y opciones sobre cítricos, S.A. (Citrus derivative markets, S.A.)
e. IBERCLEAR is the Spanish central securities depository responsible for book entry, clearing and settlement of securities. It includes the SCLV and CADE technical platforms.

2.1 Catalysts of change

Financial liberalisation, including the introduction of free movement of capital and the liberalisation of financial activity, has been a key driving force in the transformation of Spain's financial system.

Free movement of capital was introduced tentatively in Spain during the 1970s and did not gain significant momentum until the 1980s, as a result of the process of European economic integration. The gradual liberalisation of capital outflows began with outward foreign investment in 1986, was subsequently extended to lending and culminated in February 1992 when Spanish residents were finally authorised to hold peseta- and foreign currency-denominated deposits with non-resident entities. The process was also coincident with a progressive dismantling of the restrictions on capital inflows that was interrupted only by the temporary restrictions imposed in 1990 and 1991 to address conflicts between an exchange rate policy designed to maintain a stable exchange rate, and a restrictive monetary policy designed to curb inflation by keeping interest rates high.

Liberalisation of financial activity, which entails the abolition of restrictions on access to and the operation of the market for financial instruments and services, rested on at least four key processes that combined to shape the development of the Spanish capital markets: freedom of establishment, interest rate liberalisation, elimination of obligatory investment ratios and a simplified categorisation of financial entities.

Freedom of establishment was introduced during the early 1980s but, like free movement of capital, did not gain significant momentum until 1986, when Spain was admitted to the European Union, and became more important still in 1993, when the single market was launched. With the creation of the single financial market, a number of directives and regulations were introduced to ensure total freedom of establishment and to provide financial services (that is, without the need for permanent establishment, a move permitting remote access) and, thus, the elimination of national barriers to competition in the European Union.

Interest rate liberalisation, meanwhile, began with the liberalisation of all bank lending activities (except for those linked to minimum investment ratios) and was extended, a few years later, to all liabilities held with credit institutions. Full liberalisation was subsequently extended to all interest-generating activities, except those involving assets used to cover minimum investment ratios.

The reduction in and subsequent abolition of *minimum investment* ratios (except for the cash ratio) were central to the deregulation of banking operations. In effect, during the 1980s and early 1990s, these ratios were not only a source of privileged financing for certain competition-free sectors, but also a source of considerable expense for the credit institutions.

Finally, the *simplified classification of financial institutions* consisted, first and foremost, of a process of ongoing legal and operational harmonisation, upon conclusion of which all financial institutions were permitted to engage in all types of lending and borrowing activity, irrespective of their legal form or commercial orientation. Thus, in the early 1980s, Spain's savings banks *(cajas de ahorro)* became operationally equivalent to banks and were henceforth permitted to discount commercial paper and act as delegated agencies in foreign trade

transactions. In fact, there is now little, if any, difference in the activities that each of the two types of institution are legally permitted to carry out. Although certain restrictions concerning the beneficiaries of credit co-operatives' lending activities remain in place, in 1989 the percentage of funds that co-operatives were required by law to use to provide credit to co-operative members was reduced significantly. This legal standardisation has intensified competition, by permitting all deposit banks to engage in the same banking activities. Similarly, in 1996, all remaining differences between financial institutions, mortgage credit companies and financial leasing companies were harmonised and all of these institutions became known as specialised lending institutions *(establecimientos financieros de crédito* – EFC).

Financial liberalisation ultimately meant the abolition of the numerous regulations and restrictions on price setting and investment and financing positions in certain instruments, and thus resulted in substantial structural change. These changes were necessarily accompanied by the introduction of a series of regulatory measures governing the solvency and supervision of the institutions and designed to ensure that the new, more liberal regulatory framework would not undermine the profitability and stability of the financial system.

The introduction of the euro in 1999 meanwhile meant the elimination of foreign exchange charges and exchange rate risk on intra-EU financial transactions, as well as the definitive liberalisation of capital flows and removal of barriers to EU investments[2]. In effect, in a scenario where investments in foreign currency-denominated assets were subject to certain legal restrictions and hedging against the associated risk, though possible, was costly, the euro was a catalyst for greater international diversification of agent portfolios, that resulted in heightened financial integration and fiercer competition between intermediaries and markets.

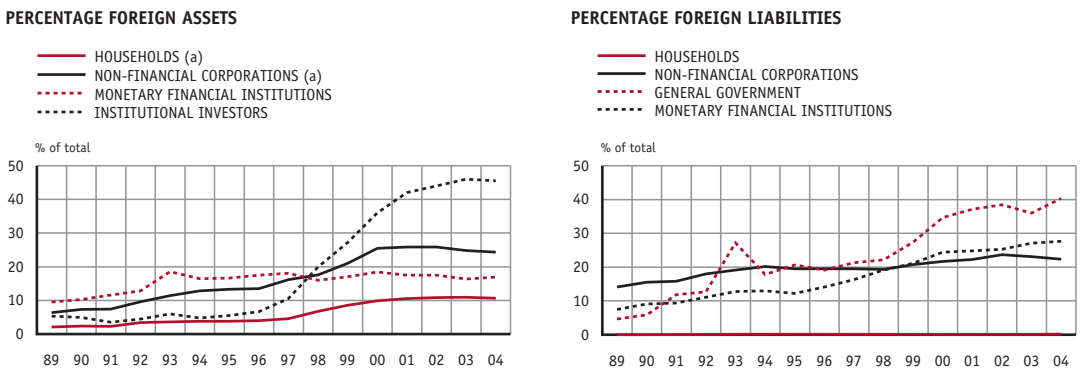
Another driving force of the transformation of Spain's financial system was the ever more intensive use of *information technologies*, both telecommunications and computer services. Increasingly sophisticated database management, greater connectivity between operating systems, more advanced data transfer tools and development of the Internet have provided opportunities to operate in the markets and helped enhance settlement and clearing systems. In short, all of these factors brought about an increase in competition and a reduction in transaction costs that stimulated market growth and the possibility of risk diversification.

Changes in the *taxation of financial transactions* were also an important factor in the development of Spain's financial markets. The introduction of more favourable tax regimes for certain types of instrument has generally been reflected in investor portfolio shifts in favour of these instruments at the expense of other similar assets, in some cases fostering development of the more tax-favourable assets. Developments in investment funds provide some of the most evident examples. The favourable tax regime for these instruments was a key factor in their development during the early 1990s[3], although, following improvements in the tax treatment of deposits mid-way through the decade, the rise in their popularity stalled. More recently, the abolition of capital gains taxes applied to changes between in-

[2] See Restoy (1999) for a discussion of the impact of the introduction of the euro on Spain's financial markets.

[3] Specifically, in 1991, investment transfers were exempted from withholding tax, corporate income tax was reduced, and long-term investments were exempted from capital gains tax.

CHART 1 INTERNATIONALISATION OF FINANCIAL ASSETS AND LIABILITIES



SOURCES: CNMV (National Securities Market Commission) and Banco de España.

a. Includes foreign assets in sector investment fund portfolios.

vestment funds has rejuvenated the mutual fund industry. Also beneficial to the industry's expansion has been the gradual introduction of income tax exemptions for non-resident investors in a bid to attract financing and, at the same time, contribute to the development of Spain's financial industry. In particular, the tax-free status of non-resident investment income initially helped fuel growth in the book-entry public debt market and, subsequently, in listed equities.

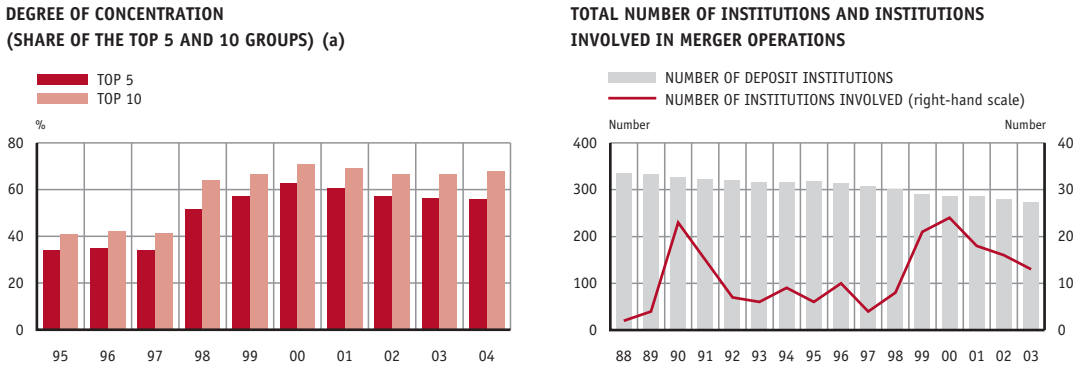
A final key influence on the development of the financial system has been the macroeconomic environment. For example, substantial growth in general government borrowing requirements, in a context where traditional financing instruments were used, was a major force in the expansion of the public sector debt market during the 1980s.

2.2 Internationalisation of financial flows and portfolios

Without a doubt the most significant and pronounced trend in the recent development of Spain's financial system has been the increased *internationalisation* of financial flows and investment portfolios for domestic economic agents. This trend has been fuelled by three key factors: abolition of legal obstacles, introduction of the euro and technological progress.

This increased internationalisation, which, as we observe in Chart 1, is visible on both the asset and liability sides of the agent balance sheet, has been a gradual process, although the launch of the euro triggered a marked acceleration from 1999 onwards. However, degrees of international diversification vary significantly from one sector to another. The process has been less intense for household investment portfolios, for example, which have been limited to assets, largely entailing indirect investments in the form of participation in investment funds. The increase in the proportion of foreign assets held by non-financial

CHART 2 CONCENTRATION OF THE SPANISH BANKING SYSTEM



SOURCE: Banco de España.

a. The share refers to total consolidated balance sheet assets out of total assets of deposit institutions.

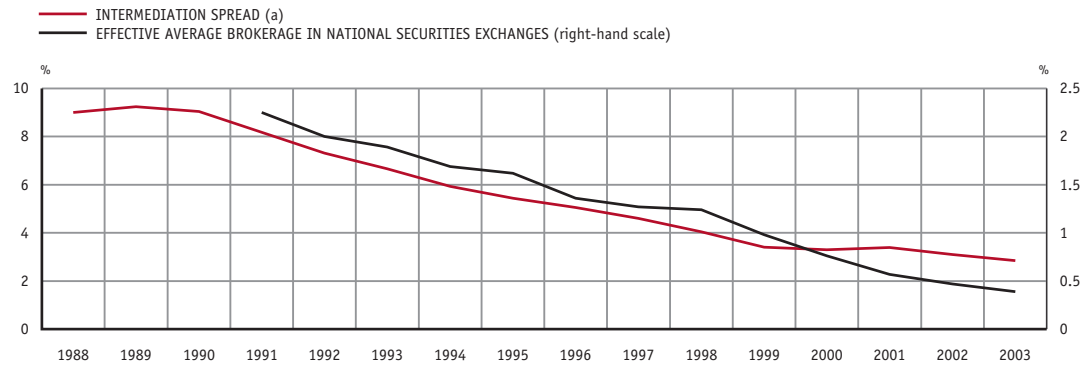
corporations and credit institutions, on the other hand, is a reflection of the ongoing international expansion of these entities, especially in Latin America. However, it is institutional investors that are the most advanced in terms of international portfolio diversification. At end-2004, foreign assets accounted for almost half of their holdings. The increase in the proportion of public debt outstanding held by non-resident investors is also noteworthy, accounting for approximately 40 percent of the total outstandings at end-2004.

The greater geographic diversification of investment portfolios has had a number of important implications. First, it has brought improved risk-return combinations. Second, it has made the financial wealth of economic agents more sensitive to exchange rate fluctuations and changes in the market price of international securities. Accordingly, the mechanism by which financial market shocks are transmitted from one market to another has gained importance, making analysis of the macroeconomic and financial developments in the rest of the world increasingly important in monitoring the Spanish economy (see Chapter 2).

2.3 Concentration of financial intermediaries and markets

The gradual *concentration* of institutions and markets in response to increased international competition has also had a significant impact on the development of Spain's financial system. As we observe in Chart 2, the number of credit institutions in operation has tended to fall in recent years, while the larger institutions have extended their market shares. As a result, between 1995 and 2004, the share, in terms of assets, held by the top five credit institutions rose by more than 20 percentage points. The main drivers of concentration in this sector, which has been more intense for banks than savings banks, have generally been associated with the strategy to optimise economies of scale, scope and network.

CHART 3 INTERMEDIATION SPREAD AND BROKERAGE FEES



SOURCES: CNMV and Banco de España.

a. Average euro credit yield less average cost of credit balances and loans in euro.

On the financial markets, 2002 and 2003 saw the integration of the main listing and trading centres and existing clearing and settlement systems. 2002 also marked the establishment of Bolsas y Mercados Españoles (BME), a financial markets and systems holding company that directly and indirectly owns shares and holdings in the companies that manage the secondary fixed-income, equity and derivative markets, including the Valencia commodities market and IBERCLEAR (see Diagram 2). In the operational area, meanwhile, Sociedad de Gestión de los Sistemas de Registro, Compensación y Liquidación de Valores (operating under the commercial name IBERCLEAR) was created followed the merger of SCLV, CADE and other settlement systems operating in Spain, including the financial derivatives settlement system.

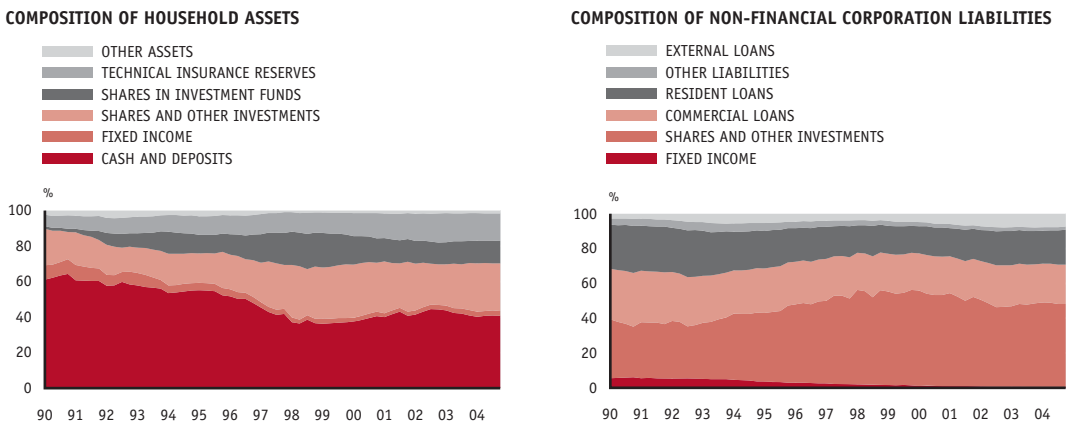
The rationale underpinning the vertical integration of Spain's financial markets, which was coincident with a series of horizontal integration initiatives in the euro area, such as the creation of Euronext from the merger of the securities exchanges of Paris, Brussels, Amsterdam and Lisbon, was to integrate listing and contracting platforms, whilst assigning settlement and clearing operations to another independent company.

The greater concentration of institutions and markets has not, however, prevented an increase in competition in the financial services sector, which is manifest, for example, in the declining intermediation spreads generated by deposit institutions and the reduction in the fees and commissions they charge (see Chart 3).

2.4 Financial disintermediation

Increased *financial disintermediation* – essentially the reduced involvement of credit institutions in channelling financial flows through the securities markets and other related inter-

CHART 4 COMPOSITION BY INSTRUMENT OF HOUSEHOLD ASSETS AND CORPORATE LIABILITIES



SOURCE: Banco de España.

mediaries – has been fairly widespread in the international financial systems over the past 20 years. In Spain, the process was initially fuelled by changes in the mechanisms used to finance public sector deficits, by no longer relying solely on the central bank or the private banking system though minimum investment ratios; and subsequently through changes in the taxation applied to financial instruments, privatisation of public corporations and, more recently, increased asset securitisation.

In Spain a number of distinct features have been apparent in the disintermediation process. First, it has been more pronounced in the savings and deposits business than in lending. As we observe in Chart 4, the weighting of cash and deposits in overall household financial portfolios has been gradually falling, whilst the weighting of insurance and, to an even greater extent, shares in investment funds, has been rising. By contrast, the weighting of bank loans in the total debt of non-financial corporations has remained relatively stable, whilst issues of fixed-income securities has fallen progressively, although the latter trend partially reflects the fact that some large corporations have been executing this type of operation through foreign subsidiairies[4], and listing them as external loans on the balance sheet.

Secondly, Spanish banks have taken an active role in the disintermediation process, establishing subsidiaries specialised in each segment, in mutual funds as well as insurance, to gain a foothold in various areas of financial services and optimise economies of scale. As a result, whether directly, or indirectly through specialised subsidiaries, Spain's banks and savings banks continue to be the main providers of savings and investment instruments to non-financial corporations and households. The main change that the expansion of the industry had engendered is therefore the change in the type of income generated and in the related risks. In the case of traditional savings and investment instruments, the

[4] For further details on this process, see Nieto (2004).

financial institution assumed the risk and charged a commensurate margin, while in marketing instruments such as insurance or investment funds, intermediaries pass the risk on to a third party and generate their earnings from fees and commissions levied on the services they provide.

Third, financial disintermediation became more prevalent during the 1990s as a consequence of two mutually supporting processes, i.e. asset securitisation and the institutionalisation of savings. Asset securitisation describes the process by which financial (and non-financial) institutions convert their credit and/or asset entitlements into marketable securities. In Spain, the most common form has been the securitisation of off-balance sheet bank loans, a process that entails removing instruments (such as loans) from the asset side of the balance sheet and transferring them to a fund that then issues fixed-income securities[5]. Until 1998, the proportion of securitised assets was negligible, but from this point onward securitisation activities acquired such buoyancy that by end-2004 approximately 8.5 percent of all bank loans had been securitised. One of the most visible consequences of more widespread securitisation was the development of Spain's private fixed-income market, which had in the past been relatively small. By end-2004, securitisation assets accounted for 41 percent of the balance outstanding of fixed-income securities issued in Spain. More recently, development of the securitisation industry has helped finance a rapid expansion in bank lending activities. In the second process, the institutionalisation of savings, has entailed investors assigning an increasing proportion of their portfolios to acquisition of holdings in mutual fund institutions as broadly defined, that is, including not only traditional investment funds but also pension and hedge funds that invest mainly in marketable securities.

However, despite the progress in disintermediation, most financial flows in Spain, as in most European countries, continue to be intermediated by credit institutions. The situation in the U.K. and U.S. is somewhat different, in that, in these countries, a substantial proportion of flows between investors and agents requiring financing are channelled directly through the markets. The prevalence of one model over the other is attributable to various factors, including culture, the regulatory backdrop, the typical relationship between banks and their customers, and the type of companies that predominate in the economy [see Rajan and Zingales (2002)]. For example, in Spain and other countries with a preponderance of small and medium-sized companies that find it difficult, owing to their size, to raise money directly on the markets, bank credit remains the main source of business financing.

2.5 Development of the markets

In terms of scale and activity, Spain's securities markets enjoyed a substantial boom during the 1980s and 1990s. However, as we observe in Table 1, not all segments of the market developed at the same pace. The markets registering the highest growth levels, in both value of outstandings and trading volumes, were the markets for public debt, debt securities issued by financial institutions and shares. At the close of 2004, total outstandings on these

[5] For further details of this process, see Ayuso (1998).

TABLE 1 CHANGES IN SIZE OF NATIONAL FINANCIAL MARKETS

% GDP

	1990	1995	2000	2004
1. Balances outstanding				
Fixed income	44.8	58.4	65.6	83.6
General government	*34.1*	*49.4*	*51.8*	*42.4*
Financial institutions	*5.2*	*5.1*	*11.5*	*39.8*
Non-financial corporations	*5.5*	*3.9*	*2.3*	*1.4*
Equities (market capitalisation)	20.8	25.5	69.0	61.9
2. Trading on secondary markets				
Book-entry government debt	571.2	1,393.1	2,274.2	2,859.0
Simultaneous and repo transactions	*536.3*	*1,128.8*	*2,001.7*	*2,577.3*
Other operations	*34.9*	*264.2*	*272.4*	*281.6*
AIAF	0.0	3.6	16.4	70.9
Fixed-income stock exchange	1.1	7.3	6.5	10.4
Equities	8.6	11.0	80.7	80.6
3. Trading on derivatives markets				
Fixed income	0.0	294.3	18.0	0.0
Equities	0.0	15.1	94.0	49.3

SOURCE: Banco de España.

markets were equivalent to 42.4 percent, 39.8 percent and 61.9 percent of GDP, respectively. In addition, all three markets have expanded dramatically since 1990. In contrast, the non-financials segment of the debt market has been shrinking steadily since 1990, in part because of the greater preponderance of bank credit in this sector but also, as mentioned previously, because in recent years larger-scale corporations have tended to raise a substantial share of their borrowings by issuing bonds on the international markets via overseas subsidiaries. However, because of certain regulatory amendments introduced in 2003 to encourage issues in Spain, this situation could be set to change.

The derivatives market has grown rapidly since its launch in the early 1990s (see Table 1). Since the launch of the euro, however, trading in these instruments has generally shifted to other euro area markets. As a result, trading in futures and options with fixed-income underlyings has now all but disappeared from the Spanish exchanges. Trading in equity futures and options has also fallen considerably, reflecting, firstly, an increasing lack of differentiation between Spanish instruments and those traded elsewhere in the euro area and, secondly, a growing preference for global investment strategies.

Measured in terms of total outstandings as a percentage of GDP, the Spanish equity market is slightly larger than the euro area average but far smaller than the U.S. stock market

TABLE 2 SIZE OF DOMESTIC VIS-A-VIS INTERNATIONAL FINANCIAL MARKETS (a)

% GDP

	Spain	EMU	U.S.
Market capitalisation, equities	61.9	53.5	146.6
Outstanding debt of general government	42.4	57.8	54.6
Outstanding debt of financial institutions	39.8	57.8	95.5
Outstanding debt of non-financial corporations	1.4	8.0	27.4
Derivative market volumes (b) (c)			
Fixed income	0.0	3,711.2	3,177.2
Equities	49.3	178.0	211.6

SOURCE: Banco de España.

a. 2004 data.
b. The EMU data include GDP for the UK as they reflect trading carried out in that country through Euronext.
c. 2003 data for the U.S. The Chicago Board of Trade (CBOT) includes only the key fixed-income contracts.

(see Table 2). By the same measure, Spain's public debt market is slightly smaller than both the euro area and U.S. debt market averages, a situation indicative of a greater degree of fiscal consolidation in Spain. In the case of private fixed-income activity, the Spanish market is much less developed than both the euro area average and, still more so, the U.S. market. Spain's derivative markets, measured by trading volume as a percentage of GDP, are also considerably smaller than their U.S. counterparts and the euro area average.

3 Monitoring key structural developments

The importance of the financial system in the distribution of resources between the various sectors of the economy, management of payment mechanisms and monetary policy transmission justifies a study of its key structural developments. Issues of efficiency and stability are central to this analysis, since both affect agents' ability to spread their expenditure decisions effectively over time and, consequently, on potential economic growth. With this in mind, Banco de España regularly monitors the regulatory and institutional framework for activity in the financial sector, levels of competition and efficiency, and degrees of liberalisation, integration and financial stability.

3.1 Regulatory, tax and institutional framework

Financial regulation, taxation of financial instruments and the institutional framework all play an important part in the development and structure of the financial system. As men-

tioned in the previous section of this chapter, throughout the 1980s and 1990s, changes in financial legislation and, more recently, in the 1990s, changes in tax regulations, have clearly engendered change in the institutions, practices, instruments and operation of Spain's financial system. Regular monitoring of the regulatory, tax and institutional framework provides context for the analysis of these structural developments.

In respect of *financial regulation,* for example, Banco de España regularly monitors changes in Spanish and EU legislation affecting Spain's financial system. The main focus of this tracking exercise includes changes that impact Banco de España, the European Central Bank and the European System of Central Banks, credit and other financial institutions, the securities and insurance markets, transparency of financial transactions and protection of consumers of financial services. The detailed study of EU legislation is in fact becoming increasingly central to the Bank's analysis of changes in the Spanish financial system. More specifically, in light of the as yet insufficient progress in the level of harmonisation and integration of the securities markets, the European Commission decided in 2000 to stimulate this process with the approval of the Financial Services Action Plan. The Plan, which consists of 43 measures, has generated copious directives and recommendations, in due course requiring publication of new national legislation aimed at developing and implementing the EU directives.

As part of its regulatory monitoring exercise, Banco de España also assesses the likely implications of such changes on the activities, organisation and development of markets and intermediaries.

In the case of tax regulations, the purpose of such assessments is, *inter alia,* to determine the degree of tax neutrality of specific savings and investment instruments and the effects of regulatory changes on the composition of financial assets and flows and the development of financial institutions and markets. This entails reviewing the legislative changes most relevant to both direct and indirect taxation and their impact on personal taxation (in particular personal income tax – IRPF) and company taxation (specifically corporate income tax). Changes to the rules governing tax withholdings and estimated payments are also reviewed, since these can also impact the development of the financial system.

One of the indicators used to assess the impact of tax changes is the concept commonly referred to as the "tax wedge", i.e. the difference between the gross real return on a given financial instrument and the real return on the instrument after tax[6], and represents the annual effective tax investors must pay in respect of each additional unit invested in the asset. This analysis is usually supplemented by a comparative study of the taxation of similar financial instruments in which the taxable return on the assets in question is simulated before and after the changes in tax legislation. In some cases, these simulation exercises[7] reveal that changes in tax legislation have had quite considerable impacts on taxation of portfolios, flows and development of Spain's financial institutions and markets.

A final element important in contextualising developments in the financial industry is institutional change. To that end, in recognition of its potential influence on the functioning and structure of financial institutions and markets, Banco de España monitors institutional

[6] For further details, see González-Páramo and Badenes (2000).

[7] García-Vaquero (1995); García-Vaquero and Maza (2001), and García-Vaquero and Hernández de Cos (2003).

change, preferably at the national and European levels. For example, Banco de España recently conducted an extensive analysis of the process of mergers and acquisitions (not only in the banking sector but also stock exchanges and insurance) and of the degree of integration achieved by financial centres, to assess the possible implications on competition, competitiveness and efficiency in Spain's financial sector.

3.2 Industry activity

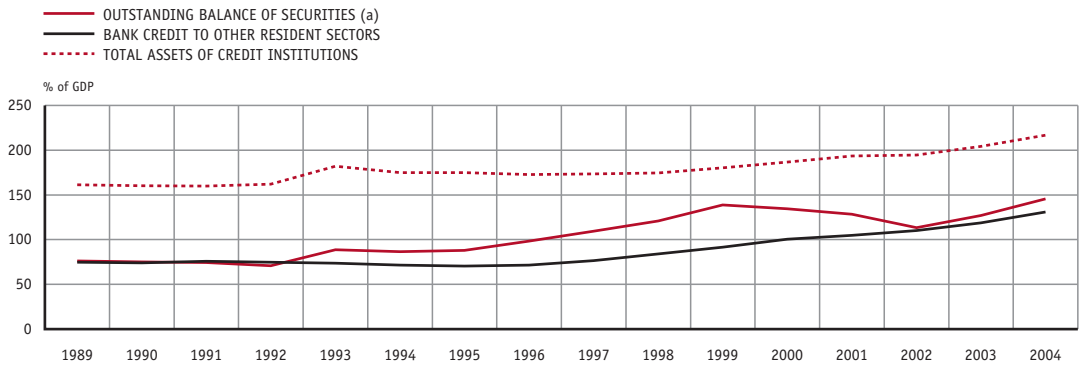
The activities of the different players in Spain's financial services industry are also monitored by Banco de España, in this case with a two-fold objective: first, to gain a measure of the economic importance of this sector; and second, to provide context for the various structural developments under review.

The weighting of the financial sector's gross value added (GVA) provides a direct measure of the sector's contribution to GDP. However, since this variable is quite difficult to measure in the case of this particular branch of activity, the data issued by Spanish National Accounts (CNE) are considered as a provisional estimate only. Data relating to employment in the sector are also useful, although increasingly widespread use of outsourcing and other similar practices, means that the sector's real contribution to employment can be underestimated.

Because of these limits, other indicators that more accurately reflect the economic importance of the financial sector are also used. These include indicators that measure *levels of financial development,* such as the volume of financial flows, as a percentage of GDP, that are channelled through Spanish markets and intermediaries. Since optimal benchmarks for such variables do not exist, comparisons with other European countries and with past data series are used. The distinction between the proportion of flows channelled directly through the markets and those channelled through intermediaries, and the breakdown, within the latter category, between credit entities and other financial institutions, is also useful, in that it helps identify significant structural developments, such as the degree of financial disintermediation in the economy and current extension of banking services. The main source of information for this analysis is the Financial Accounts of the Spanish Economy.

The size of financial intermediaries' balance sheets and the value of marketable securities outstanding on the Spanish markets, in both cases as a percentage of GDP, are also useful when attempting to approximate levels of financial development, and are therefore also the subject of regular analysis. This analysis draws on two types of information: value statistics compiled internally from various sources, and data submitted to the supervisory authorities by financial intermediaries. Once again, the benchmarks used are past data in the series and the value of similar variables tracked in other EU states. As we observe in Chart 5, the total value of both intermediaries' assets and marketable securities outstanding as a proportion of GDP has been rising steadily since the early 1990s, a trend indicative of the financial sector's increasing weighting in the Spanish economy as a whole. However, when these measures are broken down by type of instrument, certain markets, such as, for example, the market for private fixed-income issues by non-financial corporations, are found to be in a somewhat less advanced stage of development.

CHART 5 DEGREE OF FINANCIAL DEVELOPMENT



SOURCE: Banco de España.

a. Includes fixed-income securities and shares issued by residents.

Monitoring the structure of intermediaries' balance sheets provides an insight into, for example, levels of diversification by instrument and by geographic area and risk profiles. Analysis of how deposit institutions fund their lending activities can also be revealing. The gap between lending and deposits, for example, is a measure that has been a particular focus of attention in recent years. Since it is generally more costly to finance credit using instruments other than deposits, any broadening of this gap could ultimately impede further expansion in the concession of credit and thus put an end to rises in expenditure and investment.

Tracking the number of intermediaries in operation and the different types of intermediary entities and, in the case of credit institutions, the number of branches each has is an important part of the ongoing analysis of sector consolidation processes.

Another significant variable tracked by Banco de España as part of its financial markets analysis is the volume of trading on secondary markets. Comparisons between trading volumes in Spain and the counterpart indicators for other international markets, along with comparisons of the total value of marketable securities outstanding, provide a measure of the relative size of Spanish markets and, as mentioned above, are also used as an indicator of liquidity.

3.3 Competition and cost efficiency

The concept of competition is closely linked to firms' ability to generate extraordinary profits. In a situation of perfect competition, such profits are cancelled out and individual corporations cannot influence prices. In the financial industry, the price of intermediation services is determined by all costs that service users must bear and includes fees, commissions, intermediation spreads and other expenses. Logically, an increase in competition would normally have the effect of reducing such costs.

Cost efficiency, meanwhile, is a measure of firms' ability to optimise use of available productive resources and is closely linked to the concept of competition. Accordingly, an increase in competition will generally drive less efficient companies out of the market and stimulate cost rationalisation that will ultimately result in enhanced efficiency.

Monitoring competition and efficiency in the financial system is therefore an important element of economic analysis. Situations of imperfect or inadequate competition could, for example, result in excessive intermediation costs that could hinder financial development and thereby impede economic growth and, by extension, welfare. The recent process of consolidation in Spain's financial sector has made analysis of competition an even more important element of Banco de España's monitoring activities[8].

3.3.1 Competition and efficiency among credit institutions

In analysing competition and efficiency in the financial industry, Banco de España faces a number of serious measurement problems in a sector where the nature of its activities mean it is a difficult matter to determine how to measure output, and in which corporations tend to offer a wide range of products, and this heterogeneity makes comparative studies difficult. Owing to these limits, Banco de España uses a broad range of indicators that provide information on different aspects of the concepts it aims to measure.

The first set of indicators used to monitor levels of competition in the credit institution sector measure levels of *concentration.* These indices track the number of credit institutions in operation, their branches and staff, the market share of a certain number of institutions and the size of the balance sheet or certain asset or liability items. Since there is no generally-accepted benchmark for these variables, the analysis is based on comparisons with past data and data and with other neighbouring banking systems. As we observe in Table 3, indicators of this type generally point to increased concentration in the banking sector in recent years, such that the level of sector concentration is now slightly above the EU average (see Table 4).

It should, however, be noted that any implications on competition that may be drawn from aggregate concentration indicators are subject to certain limits. First, the correlation between concentration and competition is probably a non-linear one, as the adverse effects of increased concentration are only appreciable beyond a certain threshold (i.e. if the level of concentration becomes "excessive"). Second, aggregate concentration indicators can give a misleading measure of the current level of competition; accordingly, concentration must be studied by geographic area and product.

The second set of variables used to analyse competition in the banking sector pertain to *margins,* which reflect the spread between price and marginal cost. Once again, the benchmarks used to assess these indicators are past data series and data for other relevant geographic areas. The main drawbacks to this type of analysis involve the substantial changes in the activities of financial institutions over time and their substantial heterogeneity, and these factors complicate temporal and cross-industry comparisons. Probably the most ho-

[8] See Fuentes and Sastre (1999) and Fuentes (2003).

TABLE 3 COMPETITION AND EFFICIENCY INDICATORS IN SPAIN'S FINANCIAL INDUSTRY

	1990	1995	2000	2004
1. Indicators of competition levels in the banking system (a)				
A) Concentration indicators				
Number of deposit institutions	327	318	281	266
Number of branches, deposit institutions	35,234	36,251	38,967	40,230
Number of employees, deposit institutions (b)	251,587	244,908	238,587	239,103
Market share [% avg. total assets (ATA) of total deposit institutions]				
Top 5	*30.6*	*34.9*	*48.6*	*44.9*
Top 10	*44.2*	*49.1*	*57.5*	*57.7*
B) Spread indicators				
Net interest income (as % ATA)	4.0	2.8	2.2	1.9
Gross income (as % ATA)	4.5	3.5	3.1	2.7
Net income (as % ATA)	1.7	1.2	1.1	1.2
Profit before tax (as % ATA)	1.3	0.8	1.0	0.8
Return on equity (result before taxes/equity; as %)	19.4	13.6	16.0	14.1
C) Interest rate spread indicators (%)				
Yield on credit inv. in euro - cost of cred. bal. and loans in euro	9.0	5.4	3.3	2.5
Yield on credit investment in euro - interbank market rate	1.6	1.9	1.2	1.4
Interbank market rate - cost of credit balances and loans in euro	7.4	3.5	2.1	1.1
2. Indicators of efficiency and productivity in the banking system (a)				
Operating expenditure (as % of ATA)	2.8	2.3	1.9	1.5
Efficiency ratio (Operating expenditure/gross income)	62.1	65.6	63.1	54.7
Productivity per employee (b) (ATA/no. of employees)	1.6	2.8	4.2	5.7
Productivity per branch (ATA/no. of branches)	11.3	18.9	25.7	38.6
3. Indicators of the level of competition in investment funds (c)				
Total expenditure (d) (as % of total ATA of investment funds)	—	—	1.6	1.2
Custody commission (as % of total ATA of investment funds)	—	—	*0.1*	*0.1*
Management fee (as % of total ATA of investment funds)	—	—	*1.5*	*1.1*

SOURCES: CNMV and Banco de España.

a. Based on individual data from deposit institutions.
b. The 2004 data correspond to 2003.
c. The 2004 data corresponds to September 2004.
d. Including fees for management, deposits and other operating costs.

TABLE 4 COMPETITION AND EFFICIENCY INDICATORS IN SPAIN'S CREDIT INSTITUTIONS. COMPARISON BETWEEN SPAIN AND THE EU (a). 2003

	Spain	EU 15
Number of credit institutions	348	7,444
Number of credit institution employees per 100,000 inhabitants	597	725
Number of credit institution branches per 100,000 inhabitants	97	49
Market share of the top 5 (% assets) (b)	44	40
Net interest income	2.4	1.4
Gross income	3.4	2.4
Net income	1.4	0.9
Profit before tax	1.2	0.6
Efficiency ratio	58.5	60.4

SOURCES: ECB and Banco de España.

a. Margin indicators and the efficiency ratio were calculated based on consolidated information. The other indicators were calculated based on individual information from credit institutions.
b. Weighted average with GDP.

mogeneous margin concept is the *net interest income,* which is defined as the difference between revenue and financial costs. The net interest income, however, does not reflect some relevant revenue and expenditure items, such as fee income and provisions. Accordingly, a downturn in the net interest income variable could be linked, for example, to institutions' policy changes designed to reduce their investment risk profile, or to the adoption of different mechanisms for remunerating services, in which fees are given greater weighting. Other measures therefore must be incorporated into the analysis. These include the gross income (obtained by adding commissions and profits from financial operations to the net interest income); the *net income* (obtained by subtracting operating expenditure from the foregoing); and *profit before tax* (obtained by subtracting write-downs and provisions from and adding other income to the latter item).

Table 3 shows that margins have registered a decreasing trend since 1990, indicative of increased competition in the banking sector. Even so, these variables for Spain remain above the average for other EU countries (see Table 4).

The third group of indicators used track borrowing and lending *interest rates.* These figures are used to calculate a number of margins, such as *intermediation spread,* which reflects the difference between the average returns on total loans in euro less the average cost of deposits and borrowing in the same currency. This indicator is broken down into the *lending spread,* computed as the average return on loans less the interbank interest rate, and the *borrowing spread,* obtained as that interest rate less the average cost of borrowing and deposits. As in the case of margins, changes in the intermediation spread during recent

years point to an increase in the level of competition. The breakdown suggests that this pattern is essentially attributable to the behaviour of the borrowing spread. It should, however, be noted that disparities in the terms of lending and borrowing transactions can in some cases limit the information content of such indicators. Fortunately, new interest rate statistics applied by monetary and financial institutions (MFIs), available since January 2003, can be used for a more detailed analysis of these issues. The new statistics include data on the average interest rates applied on the balance sheet and those applied to new transactions, with a breakdown by instrument, rate fixation term (for new transactions), original maturity (for balances) and institutional sector. An added advantage of this new source of information is that, in addition to the NDER[9], which does not include fees, it provides annual equivalent rates (AER), which do include fees, and therefore constitute a reasonably homogeneous basis for comparison with other EMU states[10].

In addition to the foregoing spreads, interest rate trends and, more specifically, the transmission rate of changes in official rates, provide a further useful indicator of the level of competition.

An additional source of information useful to analysis of competition in the sector is the Spanish Bank Lending Survey (EPB), although it involves qualitative indicators. The survey makes a clearer distinction between changes in loans from institutions reflecting changes in their supply and those reflecting changes in demand. The survey also includes some questions on financial institutions' perceptions of the competitive scenario.

In light of the relationships between the two concepts, analysis of *banking sector efficiency* is carried out in conjunction with analysis of the competitive situation. These analyses are based on cost and productivity indicators such as the *efficiency ratio,* which is defined as the quotient between operating expenses and the gross income. Although reductions in this variable are generally interpreted as a sign of increased efficiency, a separate analysis of the behaviour of each of its components is required if movement in the overall ratio is to be correctly interpreted, since the implications of a decline in operating expenses can be very different from the implications of a rise in the gross income. Productivity indicators tracked include *productivity per employee,* defined as the ratio between average total assets and employment, and *productivity per branch,* which measures average total assets in relation to the number of branches. Both indicators provide measures of the output of credit institutions over a given period per production unit. Available information indicates that the Spanish banking sector has not only become more efficient in recent years (see Table 3) but is also currently more efficient than the average for credit institutions across the EU (see Table 4).

3.3.2 Competition and efficiency of other intermediaries and the financial markets

In its analysis of competition and efficiency among *other non-bank financial intermediaries*, owing to their relative importance, Banco de España's main focus is mutual funds as

[9] Narrowly defined effective rate.

[10] See Maza and Sanchis (2004) for a more detailed analysis of the new statistics and a comparison of interest rates in Spain and in the EMU.

broadly defined, i.e. including investment companies, investment funds and pension funds[11]. As in its analysis of the banking sector, Banco de España tracks various measurements of concentration in its analysis of asset management companies. The fees, commissions and other charges, including management fees, deposit fees, subscription and redemption fees, and transaction costs, that are passed on to investors in the form of reduced returns are also studied. As in the banking sector, these indicators register an increase in competition over the past few years (see Table 3).

Efficiency analyses of other non-bank intermediaries are supplemented with the monitoring of the gross returns accruing to shareholders and investors on a benchmark portfolio. In this analysis, the return on money-market investment funds (FIAMM) is compared with money market interest rates, the return on pure fixed-income funds (FIM – more than 90 percent invested in medium- and long-term bonds) is compared with the yield on medium- and long-term public debt, while the benchmarks for equity funds are the relevant national and/or international stock market indices.

In the case of other *financial markets,* efficiency and competition are measured in terms of the transaction charges associated with the various stages of a purchase or sale (trading, clearing and settlement). These charges include both explicit expenses, such as brokerage charges, intermediaries' commissions and settlement fees, and implicit expenses that are factored into the agreed price of the trade. In practice, the price of a trade is ultimately determined by whether the transaction involves buying or selling and the volume involved. Thus, the fact that buying (selling) prices tend to be higher (lower) is indicative of an implicit cost for the agent executing the transaction. The amount of such costs is directly correlated with market liquidity. A market is considered to be most liquid when the impact of transaction costs on price is lowest.

Measuring levels of market liquidity is by no means a straightforward exercise, although various indicators have been devised in the literature to provide an accurate measurement. The most direct methodologies are based on available pre-orders and orders, which reflect the supply and demand prices and volumes set by market participants. The characteristics of pre-orders are determined by the structure of the market studied. In order-driven markets, such as the continuous market of the Spanish stock exchanges, pre-orders are recorded centrally in a single order book. On these markets, pre-orders generally tend to be highly visible. In the specific case of the equity markets, both price and quantity information is available for the pre-orders offering the top five purchase and sale prices. By contrast, in price-driven markets, which include most fixed-return markets, pre-orders are not recorded centrally, price rather than quantity information is available, in reference only to the first level. Given this scenario, the most commonly used indicator of liquidity is the *bid-ask spread.* This measure, however, entails the drawback that it does not reflect the impact of volume on the price of large-scale transactions. Other variables have been proposed to overcome this limit, such as the volume of best-price orders (known as *market depth)* and indicators that combine the two determinants of liquidity (price and quantity)[12].

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[11] García-Vaquero (1999 and 1991).

[12] See Blanco (2000) for a discussion of a measure of liquidity that draws on the information contained in order books.

Other less direct measures of liquidity include measurements of trading activity such as transaction volume, both in absolute terms and as a percentage of the total value of securities outstanding (this measure is commonly referred to as turnover). The main advantage of indicators of this type is that relevant data are more widely available.

In its analysis of efficiency and competition on the securities markets, Banco de España looks at both indicators of explicit costs (brokerage fees and commissions) and measures of liquidity, including volume turnover in absolute and relative terms, broken down by type of transaction. This information is supplemented by data on bid-ask spreads and market depth, where such information is available.

3.4 Market openness and financial integration

Market openness and financial integration are closely related concepts. Openness is determined by the relative scale of the financial transactions of a given economic area with the rest of the world. Full financial integration describes a situation in which there are no legal barriers (capital controls, taxes, etc.) or any other type of barrier to cross-border financial transactions. Logically, an increase in the degree of financial integration would normally be coincident with an increase in the level of openness.

Monitoring these concepts is important given the benefits generally associated with financial integration. These include the increased risk diversification possibilities open to financial agents, which can result in a better allocation of resources and enhanced financial development and, ultimately, higher levels of economic growth and thus better standards of living. For this reason, it is important to identify markets where full integration has yet to be achieved, and to regularly review progress towards this goal.

The literature of financial integration basically considers two types of measurements, based respectively on prices or returns and on quantities[13]. Texts focusing on prices or returns take as their point of departure the assumption that, if markets are fully integrated, two identical assets traded on two different markets should be identically priced, irrespective of the domicile of the issuer or the market where they are traded (the law of one price). Quantity-based measures, in contrast, are indirect indicators built on the assumption that any progress towards full integration is coincident with an increase in financial openness and the attendant increase in cross-border flows and holdings of financial assets. The main drawback to using this type of indicator is that theory provides no benchmarks for them. Accordingly, price-based indicators, although they also entail their own limits, would seem to be more useful from the theoretical perspective. The main drawback to their use is that, in practice, identical assets are difficult to find.

Banco de España's periodical reviews of levels of financial integration therefore draw on a range of different indicators. In the case of the euro area money markets, the relative homogeneity of instruments that are traded means that *yield spreads* are a reasonably accurate indicator of the level of integration. Yield spreads have been very narrow since the

[13] See Adam et al. (2002) and Baele et al. (2004) for an application of the different measurements of integration within the European Union and the euro area, respectively.

launch of the euro in 1999, suggesting that these markets are now fully integrated. Yield spreads are also used to measure the degree of integration achieved in euro area government debt markets. However, in the case of this market, differences in issuer credit risk and the liquidity of benchmark securities introduce a degree of uncertainty into the analysis. Accordingly, Banco de España supplements the information provided by this indicator with other measurements.

In the case of the private fixed-return and equity markets, price-based indicators are not easy to construct since it is extremely difficult to find similar assets issued in different countries. Levels of integration are therefore monitored using quantity-based data. Because of the lack of benchmarks, valuation is based on comparisons with past data and counterpart indicators in neighbouring countries or regions.

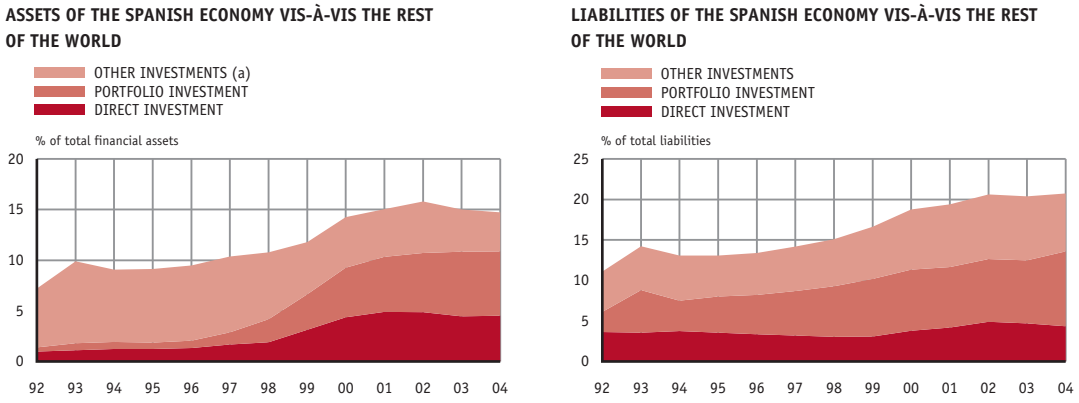
Quantity-based indicators generally draw on two sources of information: the financial accounts of the Spanish economy on the one hand, and the balance of payments and international investment position on the other. Financial accounts provide information on stocks and flows of financial assets and liabilities for the various institutional sectors broken down by instrument and counterpart sector (including the rest of the world). This information is used to construct various measurements of financial openness, such as the relative weighting of financial flows with the rest of the world in total financial flows and the proportion of foreign financial assets and liabilities on the balance sheets of the various institutional sectors. Different aggregates can be tracked using the breakdown of the financial accounts by sector and by instrument. However, the information drawn from these sources is also subject to the proviso that it makes no distinction between permanent and other investments. Additionally, no geographic breakdown is available. To analyse these factors, Banco de España uses the financial accounts of the balance of payments and international investment position, which provide measurements, respectively, of flows and stocks, valuated at market prices, of the financial assets and liabilities of the Spanish economy vis-à-vis the rest of the world. The accounts distinguish between three types of investment: direct investment, which includes permanent investments; portfolio investment, which consists of non-controlling interest and investments in fixed-return securities; and other investments, consisting essentially of loans and deposits.

As discussed in Section 2, indicators of the level of financial openness achieved in the Spanish economy register a marked increase in recent years, in terms of both the relative size of net investment outside Spain and the proportion of assets and liabilities vis-à-vis the rest of the world (once again, see Chart 1). Furthermore, the breakdown of the accounts by type of investment reveals progress in all areas, albeit with particularly pronounced increases in the balance of Spanish portfolio investments in the rest of the world and vice versa (see Chart 6).

3.5 Financial stability

Monitoring financial stability is an especially important and significant element of Banco de España's analysis of the financial system, since a crisis of the financial system can destabilise the entire economy. When such crises occur, intermediaries become less inclined to

CHART 6 BREAKDOWN OF THE INTERNATIONAL INVESTMENT POSITION OF THE SPANISH ECONOMY



SOURCE: Banco de España.

a. Includes Banco de España's reserves.

grant credit, even to agents with high credit ratings, and credit shortages of this kind have an adverse effect not only on investment decisions, but also, ultimately, on economic activity. Indeed, past experience in many countries reveals that the costs of resolving financial crises have often been extremely high.

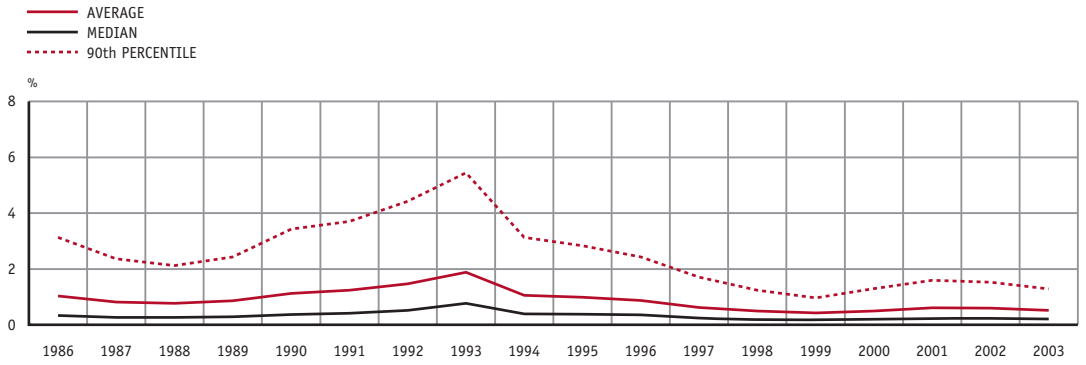
Analysing financial stability requires a multi-disciplinary approach that draws from many sources, including micro- and macroeconomic indicators. The factors most closely related to the macroeconomic context under review include identification and assessment of risks associated with the growth outlook, the stability of the financial position of firms and households, and market developments.

The analysis of macroeconomic risk factors encompasses not only those affecting the Spanish economy but also other important areas, including the U.S., the rest of the euro area and Latin America, that are significant because of their commercial ties with Spain and the exposure of Spain's financial intermediaries in connection with these areas.

In its assessment of the stability of household financial position, the main indicators monitored by Banco de España are *financial pressure indicators* described in Section 4.1. of Chapter 6, the foremost examples of which are debt and debt burden ratios. Delinquency ratios are also useful, although their backward-looking nature does entail certain limitations. Since property constitutes a considerable proportion of total household net wealth, the outlook for the housing market is also analysed. In this analysis, Banco de España draws on supply- and demand-side indicators, as well as various models that help determine whether or not this asset is currently overvalued[14].

[14] See Chapter 6 for further details on supply and demand indicators, and Chapter 14 for a description of house pricing models.

CHART 7 DEFAULT PROBABILITY DISTRIBUTION



Analysis of the stability of the financial position of non-financial corporations also draws heavily on the indicators of financial pressure described in Chapter 6, which include indebtedness, debt burden, profitability and liquidity ratios. The data presented by Benito et al. (2004) suggest that all these variables contribute to explain the likelihood of a firm defaulting on its debts. Using the microeconomic data published regularly by the Banco de España Central Balance Sheet Data Office (CBBE), a disaggregated analysis that can identify situations of vulnerability that a macro approach would be unlikely to uncover is possible.

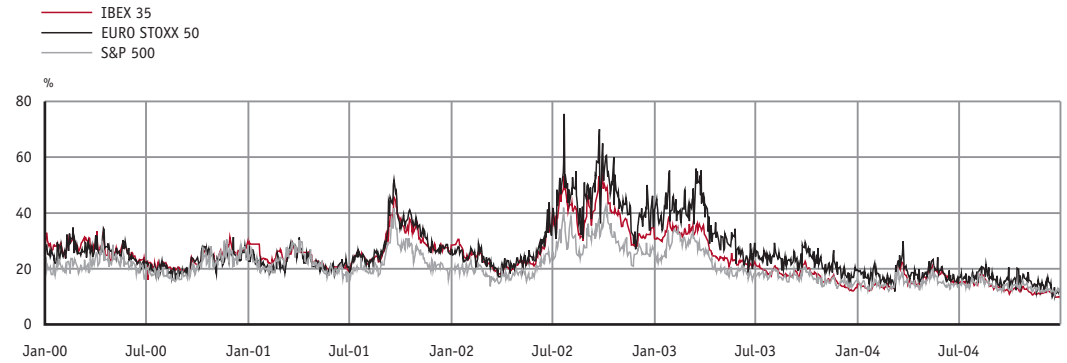
These ratios are supplemented with a *composite indicator of the likelihood of default* constructed using the results of a probit model estimate based on data provided by companies that work with the CBBE that includes both microeconomic and macroeconomic variables (e.g. profitability, indebtedness, debt burden and sales growth, in the case of the first group; and GDP growth and median cost of financing, in nominal terms, in the case of the second group)[15]. The estimated coefficients are of the expected sign, that is, the variables indicative of increased financial pressure are positively correlated with the likelihood of default. An increase in GDP growth, meanwhile, is associated with a reduction in the likelihood of default, whereas a rise in the cost of credit increases this probability.

The composite indicator of the likelihood of default is constructed using the model's explanatory variables and the coefficient estimates. It therefore encapsulates all the information included in the variables that approximate the financial position of firms, a characteristic particularly useful in cases where the messages inherent in the various individual ratios are contradictory. In addition, since it measures the likelihood of default, the indicator can be interpreted directly.

The composite indicator is first constructed at the individual level, and the individual measures are then used to build aggregate measures. A study of the extreme distribution deciles can be particularly revealing. As Chart 7 shows, the distribution of the indicator is

[15] See Benito et al. (2004) for further details of this model and other alternatives.

CHART 8 IMPLIED VOLATILITY



SOURCE: Bloomberg.

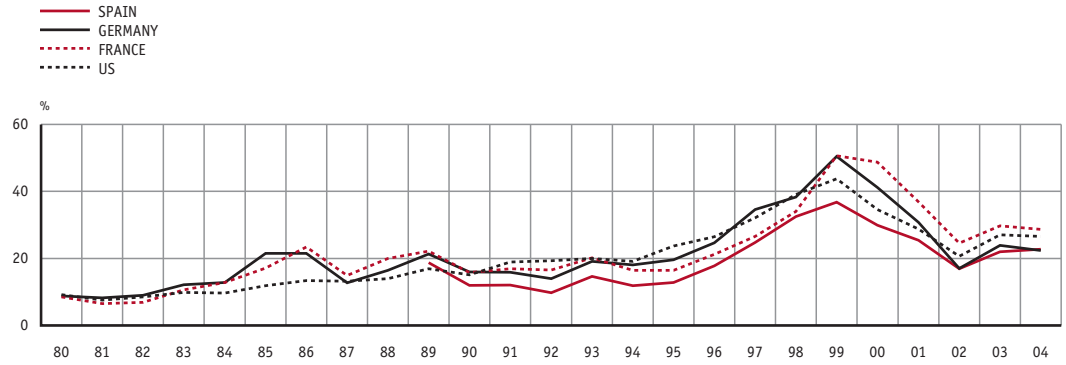
extremely asymmetrical, as the 90th percentile is quite far from the mean. Furthermore, in times of tension, the distance between the two tends to increase.

To assess corporate credit risk, Banco de España uses two additional indicators: first, delinquency ratios, which, as noted above, are by nature backward-looking; and second, credit default swap (CDS) spreads, which reflect the market's assessment of the likelihood of a default occurring whilst an insurance policy remains in force[16]. However, CDS spreads are also influenced by other factors, including changes in the price of risk and liquidity, and those instruments are only available to relatively few firms (albeit a group consisting mainly of large corporations).

In the case of *market risk,* equities are the main focus of analysis, since this type of instrument is the most prone to sudden correction. In this analysis, recent equity price trends (and the price of Spanish equities in particular) are accorded special attention, since these instruments account for the bulk of investment by Spanish intermediaries. Two indicators underpin the analysis. First, implied volatility on the options markets and, second, the ratio between the price of a stock market index and the earnings of the firms included in the index, otherwise known as the price/earnings (P/E) ratio. The first of these indicators, which is based on equity option premiums, reflects market expectations of fluctuations in the price of the underlying asset (which may be an index or individual equity) over the life of the option and therefore reflects the likelihood of corrections in this price. The indicator is used to assess risks on the short-term horizon and cannot be used to assess medium- and long-term risk, since trading on the options markets is concentrated on very short maturities (between one and three months). Chart 8 plots implied volatility in the main stock market indices monitored in the Bank's analysis of financial stability, i.e. the Ibex 35, Euro Stoxx 50 for the euro area stock exchanges and the S&P 500

[16] See Blanco et al. (2005) for a description of how the CDS market functions and some of the properties of these indicators.

CHART 9 P/E RATIO (a)



SOURCES: Morgan Stanley and Banco de España.

a. The P/E ratio is calculated using the moving average of profits from the past 10 years expressed in constant monetary units.

for the U.S. As we observe in the table, this variable tends to rise dramatically during times of instability, as in the period immediately following the 9/11 terrorist attacks in the U.S.

The P/E ratio, by contrast, is used to evaluate risks on a medium- to long-term horizon. The information drawn from this indicator is referenced to available data for the U.S. market, which indicates that P/Es tend to revert to mean over the long term and that, whenever a disequilibrium arises, prices, rather than earnings, are most likely to adjust to restore equilibrium. Thus, periods of above historical average P/Es are generally indicative of overvalued equity markets and the more excessive the overvaluation, the greater the likelihood of future price correction. Campbell and Shiller (2001) show that the information value of the market P/E ratio is enhanced when current earnings are replaced with a moving average of earnings reported over the past 10 years. The P/E ratios monitored as part of Banco de España's financial stability analysis are calculated using this method, and include P/Es for some of the main indices of the stock markets most relevant to the Spanish economy: the Spanish, U.S., German, French and Italian stock markets.

As Chart 9 shows, during the years leading up to the millennium, these P/Es were above their historical average and thus indicative of equity overvaluation and an attendant risk of downward correction, a risk that became reality during the period 2000-2002. In fact, by end-2002, the dramatic drop in market prices had taken equities back to levels very close to the historical average. The chart also shows that the indicator cannot be used to identify the precise moment at which an adjustment will take place. Instead, it shows that for a relatively long period of time above-average P/Es were not incompatible with further rises.

A final tool used in the analysis of financial stability, in addition to the indicators described above, are the *stress tests,* which simulate the impact on results and solvency of the financial system of an extreme and improbable shock to a given macroeconomic or finan-

cial variable. Financial institutions, particularly large-scale ones, have been carrying out simulation exercises of this kind for many years, but their use has recently become more widespread and they now constitute one of the main tools of the IMF's Financial Sector Assessment Programme (FSAP). These tests serve to quantify the impact of a given shock, but do no help identify the likelihood of its occurrence.

Stress tests fall into two different categories: sensitivity exercises and scenario analysis. Sensitivity exercises measure the direct impact of a shock on a given type of risk (usually credit or market risk) without reflecting the macroeconomic implications of the shock. Scenario analysis, on the other hand, involves projection exercises for key macroeconomic and financial variables. Macroeconomic variables are simulated on the basis of the quarterly macroeconomic model, and financial variables on the basis of specific models[17].

In either case, the choice and size of the variable subject to the shock are determined on the basis of an overall risk assessment. For example, a scenario in which equities appear to be overpriced would indicate that a scenario of stock market correction should be considered.

4 Final comments

In this chapter we have considered the significance in Banco de España's economic analysis of monitoring structural developments in the financial system. We have also reviewed the main analytical tools used for this purpose. As part of the exercise we have highlighted the difficulties in the measurement of certain key variables, including the degree of integration, competition and efficiency in the financial sector. Although the techniques used to assess financial stability have become far more sophisticated over the past few years, because some of the tools used, including stress tests, have been introduced only recently, they still require considerable further development. These limits underline the need to continue improving and fine-tuning the analysis techniques. Expertise acquired and future research in these areas will both contribute to these improvements.

[17] For example, the housing price and credit models presented in Chapter 14 are used in this connection.

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Annexes

Annex 1. Notes on statistical sources

Rafael Álvarez

Introduction

This annex supplements Chapter 4 on statistical sources for the study of the Spanish economy. As indicated in Chapter 4, the 13 notes that comprise the Annex aim to reflect the characteristics of the main statistical sources, including their availability, framework, what they achieve and their weaknesses, with references to the methodology they use and any other aspects considered relevant. Among other factors, the organisations responsible for statistics context, period of origin and availability of the different statistics, as well as how they fit into the current European requirements and the National Statistical Plan (PEN) are discussed. These references make it possible to assess recent progress, gaps remaining to be filled and the future outlook. The aim has been to avoid excessively detailed references, as interested readers can find them in the official publications by the institutions that produce the statistics, as well as in the bibliography provided at the end of Chapter 4.

Note 1. Spanish National Accounts (non-financial)

1.1 General characteristics. Analytical utility

The first Spanish National Accounts (base 1958, series 1954-1964) were prepared under the auspices of the Fiscal Research Institute *(Instituto de Estudios Fiscales)*. The National

Statistics Institute (INE) took over the task of preparing the National Accounts during the latter half of the 1960s, and extended the base 1958 to 1982. Since then, four bases have been published (1970, 1980, 1986 and 1995). The base 1970 was the first to include accounts of all sectors, and base 1995, which continues to be updated as this book is written, includes quarterly series [Spanish Quarterly National Accounts (QNA)] and Annual National Accounts beginning in 1995. In July 2001, the authorities began to publish the Spanish Regional National Accounts *[Contabilidad Nacional Regional de España* (RNA)], also base 1995, that began with the series for that year. The institutional sector accounts are only available in annual series. Generally speaking, analysts expect the National Accounts to provide a complete, detailed description, with quarterly periodicity, of the process of production, generation and distribution of income and accumulation (the study of which requires, in addition to the capital accounts, support from the financial accounts, which are an essential component of the integrated system of national accounts). Ideally, the process is completed with integration of the accumulation accounts (reflecting capital and financial account operations and the other net wealth changes attributable to revaluation and other changes) with the changes in the net worth statements from the beginning and end of the period. As a result of gaps in the quarterly accounts of the institutional sectors and branches of activity with a minimum level of detail and the capital stock accounts (non-financial balance sheets), among others, the analysis must be limited to the framework of the available information, although ultimately with reference to this conceptual framework. Despite these limits, that are common in the euro area countries, the QNA and basically the National Accounts contain sufficiently rich, accurate information to be used as a basis for comprehensive analysis of the general economic situation.

1.2 Spanish National Accounts (quarterly)

The utility of the QNA derives from their quarterly availability, according to a predetermined timetable. These statistics have become the key reference for short-term economic analysts as the complete National Accounts (annual) are disseminated with a lag of one year, although a less detailed preview is published with a lag of approximately six months. The QNA can be used to study developments in GDP from the standpoints of supply and demand, in absolute values and year-on-year (as well as quarter-on-quarter) rates at constant and current prices. They can also be used to study developments in implicit deflators. The available series include detailed data on employment [the European System of Accounts (ESA 1995)] reflects for the first time in the framework of a system of this type, definitions of employment consistent with the measurement of activity; and the QNA calculate these variables), both for persons in employment *(ocupados)* and employees *(asalariados)*. In addition to measuring trends in these variables, these series also allow other variables in the System to be measured (including compensation of employees, for which detailed information by sector is available), and apparent productivity of labour and unit costs of labour to be calculated[1]. The System also incorporates the capital and income ac-

[1] See Notes 9 and 10 on employment and wage statistics, respectively.

counts of the national economy and current and capital accounts of the rest of the world. The former register national aggregates (including GDP, compensation of employees, social security contributions and benefits, property income, final consumption expenditure and gross capital formation) that determine national disposable income, savings and the national financing capacity or gap). The latter reflect operations *(inter alia,* exports, income and transfers paid to the rest of the world and received from it) that determine the balances of trade in goods and services and current operations with the rest of the world, and the rest of the world's financing capacity or gap in respect of the national economy. These accounting balances and aggregates are the basis for any analysis of the process of income generation and distribution and expenditure of disposable income, determination of savings and investment, sustainability of the external position, etc. Unfortunately, however, this analysis must be limited to aggregate magnitudes, because, as indicated above, the QNA currently do not include a complete system of accounts for the institutional sectors that comprise the national economy with quarterly periodicity, to enable the study of developments in the key variables of these sectors (household disposable income and consumption, investment of non-financial companies, etc.) and to supplement the analyses already in progress with data from the quarterly financial accounts of each one, disseminated in the Financial Accounts of the Spanish Economy (FASE). The QNA currently published, i.e. not including the complete sector accounts but incorporating the key accounting relationships and aggregates, partially meet the availability and timeliness criteria of the *Principal European Economic Indicators (PEEI)* established by the Commission and Council of the European Union (EU) in spring 2003. In mid-2004, in fact, a flash estimator was introduced on GDP trends with a lag of 45 days after the end of the reference quarter, and the authorities began to submit the quarterly non-financial accounts of general government to Eurostat (although they are not published) with a lag of 90 days. However, at the end of 2004, INE did not meet the requirement to submit the quarterly non-financial accounts of households and non-financial corporations within a lag of 90 days.

1.3 Spanish National Accounts (annual)

The Spanish National Accounts complete, expand and detail annually the data from the quarterly series, including a number of tables in the input-output framework, current and capital accounts of the institutional sectors, output and operations accounts of the economic branches of activity, consumption expenditure by function, data on employment and many additional details on operations. In addition to the production of the dissemination timetables for these accounts, analysts normally require a more frequent revision of the base year and, for that purpose, the series may incorporate improvements as they are made, thereby avoiding possible biases in the calculation of indices on developments in the key aggregates owing to the use of inadequate weightings. Analysts also require incorporation, into the block of accounts prepared with annual periodicity, of capital stock estimates (non-financial assets) for the various economic sectors, with the details provided in ESA 95. Owing to the gaps in this framework, the amount of non-financial wealth, for example, of households and the estimated volume of real property equity and its developments are not

available, nor can studies be conducted on productivity and replacement of capital goods, etc. Accordingly, those who monitor such matters must work with estimates prepared at the margin of a system that affords them the necessary consistency, such as the system adopted in connection with the National Accounts. Fortunately, publication of the survey of household finances (EFF) at end-2004 sheds some light on real property equity and other matters with reference to 2002[2]. Foreseeably, the results of these efforts may help to stimulate the preparation of non-financial asset series in the National Accounts.

Note 2. Quarterly Financial Accounts of the Spanish Economy (FASE)[3]

2.1 General characteristics. Analytical utility

Banco de España has been preparing the financial accounts since the early 1980s. The available annual series cover the periods 1970-1980 (ESA 79) and 1980-1990 (ESA 95). The series that now continue to be updated is a single quarterly series derived from the corresponding annual series beginning in 1990 (1989 for the financial balance sheets). Although they are designated generically as "financial accounts", the accounts prepared by Banco de España comprise the four accounting approaches to stocks and flows included in the system (financial balance sheets, financial transactions accounts, revaluation accounts and accounts reflecting other changes in volume). Although it might be said that the base year for the current FASE is 1995, in light of the specialised features of the measurement of financial instruments; this means that 1995 is the starting year for the preparation of the new quarterly accounts (although the series was subsequently shifted back to 1990). Unlike the procedure in the National Accounts, this year is not the base year for calculating indices of change, as the FASE aggregates are estimated in absolute values and are revised every year for the most recent period. The FASE are included in the National Statistical Plan (PEN) and, along with the National Accounts (non-financial), form an integrated system of national accounts. The FASE provide analysts with an integrated synthesis in a uniform scheme of information on financial instruments exchanged by a variety of resident institutional groups [non-financial companies, financial institutions, general government units and households and non-profit institutions serving households (NPISHs)], among themselves and with the rest of the world. The data are disseminated in substantial detail, with quarterly periodicity, and are published regularly in accordance with a predetermined timetable. The available options in connection with this information include the following:

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[2] See Note 8 on the Survey of Household Finances.

[3] Banco de España's publication on the Financial Accounts of the Spanish economy *(Cuentas Financieras de la Economía Española)* includes the financial accounts *per se* in Chapter II, and Chapter I comprises a summary of the Spanish National Accounts prepared by INE. These accounts are included in the publication for analysis of the non-financial counterparts of the financial accounts. Chapter III, devoted to supplementary statistics, is a sort of statistical yearbook, providing information with annual, quarterly and monthly periodicity to supplement the information provided in Chapters I and II.

- Information available on financial stocks and flows from a number of different sources (Central Balance Sheet Data Office, Financial institutions, Balance of Payments and International Investment Position, statistics on General government, among others, some related to the Excessive Deficit Procedure, etc.) can be provided in integrated form, which substantially facilitates analysts' work.
- The financial counterpart of transactions carried out in the framework of the non-financial accounts of different institutional groupings can be analysed, which permits vertical integration of all operating accounts of each of these groups, from production to capital accounts (the last non-financial operations account) and finally, the financial account. This approach provides not only complete, integrated information for analysis of the activity of each institutional unit from the real and financial standpoints; it also makes it possible to compare the different measurements obtained for the same variable with each of these approaches (comparison of the capital account balance item, i.e. net lending or net borrowing, with that of the financial accounts balance item, i.e. net financial operations), calculated based on alternative information sources.
- The financial position (financial balance sheet or accounts of financial assets and liabilities) of different institutional groups and revaluations and other changes in volume of financial assets and liabilities can be analysed.
- All financial accounts can be horizontally integrated. The financial balance sheet at the end of the period can be obtained based on the net financial balance sheet at the beginning of the period (opening financial balance sheet), incorporating the financial transactions and financial revaluations, completed and pending, that occurred during the period, as well as other changes in the net wealth position.

2.2 Further features of the Financial Accounts of the Spanish Economy

National accountants of the National Statistics Institute (INE) and Banco de España are working to enhance integration between the non-financial accounts (in practice, the capital account) and the financial accounts of the sector of non-financial companies and households and NPISHs. Those who prepare the National Accounts and FASE maintain the same balances in both accounts for the rest of the world sectors (and accordingly for the overall national economy), General government and Financial institutions, which, in light of the accounting restrictions, also entail identities of balances for the group of other resident sectors (comprised of the sectors of non-financial corporations and households and NPISHs), with the exception of transient periods resulting from different production timetables. Until these improvements are completed, it should be borne in mind that the discrepancies between the balance items of the capital account and of the financial account of the three sectors mentioned above have been reduced substantially and that the trend profile of the series in both balances has remained homogenous. Last, the FASE fully meet all Eurostat and European Central Bank (ECB) requirements, *inter alia,* those included in the Action Plan of the Economic and Monetary Union (EMU).

Note 3. External statistics (Balance of Payments, International Investment Position and foreign trade statistics)

3.1 Introduction

From 1954 until 1992, the Spanish Balance of Payments was prepared by the Ministry of Trade, using, *inter alia,* sources from the Directorate General of Customs and those derived from the register of transactions with the rest of the world in connection with the foreign exchange controls in effect at the time. Abolition of foreign exchange controls in February 1992 required the use of other sources to prepare Balance of Payments statistics, to reflect the requirements and to observe the standards imposed by international organisations. This task was assigned to Banco de España, which later became responsible for preparing the International Investment Position (IIP). Both statistics are included in the National Statistical Plan. The Balance of Payments and IIP include two statistics also prepared by Banco de España, namely, International Reserves and Foreign Currency Liquidity, and External Debt. In addition, foreign trade statistics are prepared by the State Tax Revenue Service (Agencia Estatal de la Administración Tributaria) based on foreign trade declarations and provide the base for merchandise transactions of the Balance of Payments.

3.2 The Balance of Payments and International Investment Position vis-à-vis the rest of the world account in the National Accounts

The Balance of Payments and IIP (BOP/IIP), prepared according to the standards established in the *Balance of Payments Manual* (Fifth Edition, 1993), International Monetary Fund (IMF), comprising a compendium of all of the above-mentioned statistics, have the same conceptual framework as the rest of the world account of the National Accounts (including accounts of financial transactions, financial stocks, revaluations and other changes in volume, for this sector included in the FASE). In fact, with the publication of SNA 93 (from which ESA 95 was derived), that reflects the methodology used to prepare the rest of the world account, the differences between the two blocks of statistics were essentially reduced to the use of different classifications, or different levels of detail, owing to the different analytical requirements that the different statistics aim to meet. Further, each register of the rest of the world account in National Accounts corresponds with another in the resident counterpart sector, and this requirement is not present in the BOP/IIP, the statistics referring to the accounts of only one group (the rest of the world), for which the registers do not need to reconcile with those of the counterpart sectors. Where the classifications are concerned, the financial assets under the National Accounts system (FASE) are classified first of all by instruments arranged in highly detailed and precisely defined institutional groupings accounts. In the BOP/IIP, the financial assets are classified first of all by function (distinguishing direct investment and reserves from the rest, depending on the purpose of the transactions) and by groups of instruments (classifying the rest of financial transactions and stocks as portfolio investment, derivative financial instruments and other investments, in-

cluding under the latter caption those in the form of loans and credits, depending on the instruments used). The breakdown by sector of these instruments is more aggregated than in the National Accounts system.

3.3 Analytical utility. Other references

The BOP/IIP statistics provide a functional classification (direct investment, portfolio investment, reserves, etc.) that show not only the net worth position (what is being held) but its purpose (why it is being held), particularly when the important factor is, for example, to know the extent to which inward investments in the economy being studied, or outward investments by the economy exercise controlling positions or if they simply aim to be profitable. Direct investment makes it possible to analyse events such as the shift in corporate activity and the growing importance of multinational corporations. The quantity of and developments in reserves may bring to light problems with the exchange rate, a question that, where the Spanish economy is concerned, has become irrelevant since the establishment of economic and monetary union (EMU). Other non-comprehensive references to the analytical validity of these statistics are: *(a)* the overall balance of current and capital accounts of the Balance of Payments that reflects, along with income and transfers received/delivered from/to the rest of the world, fundamental macroeconomic relationships in the aggregate operation of the economy; *(b)* the International Investment Position and financial account of the Balance of Payments that make it possible to analyse the dependency of an economy on external financing and its vulnerability to changes in the economic variables (productivity shocks) and financial ones (exchange rate and interest rates) at the domestic and international levels, that determine the direction, scope and features (transient or permanent) of capital flows in a globalised world; *(c)* the monetary presentation of the Balance of Payments that the European Central Bank (ECB) began to distribute in its *Monthly Bulletin*, in reference to the overall euro area, reflecting the external counterparts of the monetary aggregate M3 based on the identity that should exist between, on the one hand, the balance of the rest of the world account less the balance of external operations of resident sectors other than monetary financial institutions and, on the other hand, the external counterparts of M3; *(d)* foreign trade statistics that provide detailed data by type of product, counterpart country, and price and volume of imports and exports, and Balance of Payments service categories that make it possible to analyse the structure of trade with the rest of the world and to assess the exposure of a country's output to changes in international consumption patterns and to the emergence of new competitors; and *(e)* the combined analysis of the financial account of the Balance of Payments and International Investment Position that makes it possible to assess the financial situation of the different resident institutional sectors vis-à-vis the rest of the world, and the impact of revaluations and other changes in the volume of financial assets and liabilities, and therefore the sensitivity of a country's credit or debit position in respect of changes in financial variables and its savings and investment decisions. The same type of analysis can be carried out with the Financial Accounts of the Rest of the World included in the FASE.

Note 4. Monetary and financial statistics

4.1 Introduction

This heading includes a broad set of statistics that cover different user requirements and that have always been Banco de España's responsibility. The systematic recording of these series in the database began in 1962, coinciding with the promulgation of the Decree-Law on Nationalisation and Reorganisation of Banco de España (DL 7/6/1962). Thereafter, it was situated in the framework of the functions incumbent on Banco de España pursuant to the Law on Autonomy[4]. Prior to 1962, Banco de España already played a very active role in preparing this type of statistics, as shown in the historical studies in this connection. Most of these statistics are prepared based on an *ad hoc* use of information that the Bank compiles from credit institutions for supervision purposes, although it also compiles information for exclusively statistical purposes. The latter data acquired a new dimension in the wake of the establishment of the European System of Central Banks (ESCB), within which the National Central Banks (NCBs) execute, on a decentralised basis, the statistical functions of the European Central Bank (ECB). The interest of the ECB and of the NCBs themselves (including Banco de España) in these statistics is that they constitute the fundamental basis for the design, implementation, monitoring and assessment of monetary policy, and permit the study of different aspects of the activities of credit institutions and, in particular, identifying capitalisation and stability of the institutions, their specialisation in different areas of banking and their international scope. Monetary and financial statistics also make it possible to analyse the level of integration of different financial markets and their essential characteristics such as liquidity, scope and depth; and trends in interest rates that credit institutions charge their customers. The latter are fundamental for the study both of institutions' net interest income and of the degree of monetary policy transmission to credit and deposit markets, the situation of which largely depends on the consumption, investment and saving decisions by economic agents.

4.2 Monetary statistics on financial stability and interest rates prior to establishment of Economic and Monetary Union

Banco de España's adoption of an active monetary policy during the first half of the 1970s, based on control of a monetary aggregate as an intermediate objective, meant that production of

[4] Law 13/1994 of June 1, 1994, as amended by Law 66/1997 of 30 December 1997 and by Law 12/1998 of 28 April 1998. Article 7.5. (f) of the Law on Autonomy establishes as a function of Banco de España to "compile and publish statistics related to its functions and assist the ECB in the compilation of the statistical information needed for fulfilment of the ESCB's functions." This is the legal basis of the statistics provided by Banco de España, except for those included in the National Statistical Plans (Financial Accounts of the Spanish Economy, Balance of Payments, International Investment Position, Survey of Household Finances and Public Debt in the context of the Excessive Deficit Procedure) and statistics produced with voluntary collaboration from the reporting units (Central Balance Sheet Data Office).

monetary statistics, with adequate quality and periodicity, was inevitable. The first step consisted in preparing the monetary aggregates required to establish and monitor the intermediate monetary objective [initially M3 and, since the mid-1980s, liquid assets held by the public (ALP)] and other supplementary monetary aggregates (M1, M2 and ALP2). The requirements that Banco de España imposed from the beginning on the money creating sector (limited to credit institutions), such as coverage of the minimum reserve ratio in terms of the decennial average of daily data, provided data with a daily frequency for monetary aggregates as well as assets used to cover the reserve requirement. Furthermore, the settlement system for transactions between Banco de España and credit institutions, derived from monetary policy implementation operations and those carried out between the institutions themselves to adjust their liquidity surpluses or requirements, were carried out through the Money Market Telephone Service *(Servicio Telefónico del Mercado de Dinero),* established by Banco de España in 1976 and converted in 1997 into the SLBE, or Banco de España Settlement Service. This provided analysts with high-quality, daily statistics on the interbank markets, on interest rates as well as quantities transacted. The study of capitalisation, solvency and other important questions in banking has been possible since the early 1970s, through confidential monthly balance sheets and other supplementary statements (monthly, quarterly, half-yearly or annual) that credit institutions must submit to Banco de España in the framework of its supervisory responsibilities. The utility of these statements in monetary analysis derives from their potential use for comparing monetary statistics *per se,* and also because they provide information that supplements strictly monetary information such as, for example, the level of substitutability in the public among the different bank liabilities (short- and long-term) or between different credit instruments. Statistics on interest rates applied by credit institutions to their customers in lending and credit operations, as well as deposits, were not developed until the early 1980s as the Spanish financial system was highly regulated. As a result, the interest rate data on these operations were of little use to analysts. As the liberalisation of prices of transactions carried out by credit institutions with their retail customers progressed, Banco de España expanded its reporting requirements, so that, beginning in the mid-1980s, it had access to interest rate data quite useful in analysis of monetary policy transmission. As observed below, this culminated in 2003 with the preparation of interest rate statistics harmonised with those prepared by the remaining NCBs in the ESCB.

4.3 Statistics following establishment of Economic and Monetary Union and Banco de España's integration into the European System of Central Banks

Development of monetary and banking statistics, first of all, to enable, and subsequently to underpin, establishment of monetary policy of the European Union (EU) has been governed by guidelines issued by the working groups in the framework of the ECB and its predecessor, the European Monetary Institute (EMI). As a result, since mid-1998, establishment of homogeneous requirements for all area member countries was reflected in substantial changes to the legal base and in the methods for compiling monetary and financial statistics. On the one hand, application of a harmonised definition of the components of the money creating sector in the euro area [monetary financial institutions sector (MFI)] has entailed the requirement to include in this sector, along with Banco de España and credit institutions (a

group referred to in the past as the credit system), money market funds, which in Spain's case were included in the category of money market funds (FIAMM) until the new Law on Mutual Funds *(Ley de Instituciones de Inversión Colectiva)* of November 2003. Specific requirements had to be established for Spanish MFIs in the area of EMU monetary statistics. The periodicity of these requirements was being reduced, so that beginning in 2003 most data were produced with monthly frequency. The new reporting model implemented by the European Central Bank became the basis to determine Spain's contribution to the EMU monetary aggregates and their credit counterparts, and currently coexists with the earlier model established for supervision purposes. The latter continues to be published owing to its level of detail, which is quite valuable to analysts, in addition to its utility for other purposes, such as estimating monetary time series for Spanish MFIs, since 1970.

The establishment of EMU required each NCB in the euro area to harmonise their monetary and financial statistics, as in the case of statistics on interest rates that credit institutions charge households and non-financial corporations in connection with credit and deposit transactions, for which preparation began in 2003. These figures, although they entail a break from the earlier series, are quite useful to analysts as they include a battery of up to 43 interest rates (29 on new operations and 14 on outstanding balances). These statistics are highly uniform in terms of concepts and methodology. Another requirement for analysts is to develop a block of statistics for non-monetary financial institutions (mutual funds other than money market funds, securitisation funds, and securities agencies and companies), with features comparable to those already available on MFIs. In this connection, the ESCB expects to obtain results in the medium term. Similarly, implementation of a quarterly survey on the bank credit market since 2003 constitutes another recent effort highly appreciated by economic analysts. As is true for the remaining statistics, the ECB publishes the results of this survey in reference to the euro area in its *Monthly Bulletin,* and Banco de España publishes those relating to Spain in its monthly *Boletín Económico.* The remaining monetary and financial statistics are disseminated in the monthly *Boletín Estadístico,* economic indicators are provided in an appendix to the *Boletín Económico,* as well as the summary of indicators, all of which are available at the Banco de España's website, updated with the latest available information.

Note 5. Statistics on non-financial corporations prepared by the Central Balance Sheet Data Office

5.1 General features

Banco de España established the Central Balance Sheet Data Office *[Central de Balances (CB)]* during the early 1980s, to provide data on the financial and net worth position and on the performance of non-financial corporations resident in Spain, based on the information available in its accounting records. Since then, information from the CB has been used increasingly for more forward-looking analysis and as a source for preparing key macroeconomic statistics such as the National Accounts, FASE, Balance of Payments and IIP. The CB's publications provide a detailed reflection of the scope and limits of its databases, namely, the

annual database (CBA) (produced on an annual basis with the voluntary collaboration of more than 8,000 corporations that complete a highly detailed questionnaire), the quarterly database (CBT) (produced on a quarterly basis with the voluntary collaboration of more than 800 large companies that complete a substantially shorter questionnaire) and the database established from the mandatory accounts filed by Spanish companies with the Mercantile Registers of Spain (CBBE-RM). Integration of the three databases enables the CB to prepare statistics and studies based on data from more than 250,000 companies per year (just over one-third of the total non-financial companies existing in Spain, with a coverage of approximately 50 percent of gross value added for the sector). It also provides analysts with an important source for their research (the CBA and CBT), with a sample that, although not established for statistical purposes, as the CBA and CBT are compiled with information from companies that voluntarily collaborate with these Banco de España projects, has demonstrated its validity from the onset[5]. The content of these databases is not identical, as the CBA requests up to 678 pieces of information in the extended standard questionnaire (221 in the shorter version) for each of the two years included in each questionnaire. The questionnaires mostly require accounting information (balance sheet, profit and loss account and statement of changes in financial position, with a high level of detail). In addition, however, they include memorandum items (on employment, identification, location, legal regime, ownership structure, etc.), relevant to economic analysis. Many of these details are consistent with supplementing the traditional analysis of business performance based on the conventional accounting statements (the current chart of accounts) with the analysis of the process of production, income generation and distribution, investment and financing specific to the national accounts, and linking balance sheet changes with flows for the period, considering alternative valuations in both approaches. The CBT clearly provides fewer details (the questionnaire includes about 40 information items) and refers to companies' estimates of their performance and financial situation at the end of each calendar quarter. Despite the limited number of companies and information items available from the CBT, in the 11 years of experience since its sample was established, as observed in the article disseminated quarterly in Banco de España's *Boletín Económico*, the aggregate results are consistent with those derived from the QNA estimates and anticipate those obtained by the CBA and the annual National Accounts, subject to uniform frameworks of comparison. Last, it should be borne in mind that the dissemination of CB data does have its own limits (individual data cannot be disseminated on companies from the CBBE-RM, and individual data on CBA companies may be disseminated only with specific authorisation).

5.2 Analytical utility

On this basis, we can conduct the types of studies described below:

(a) Detailed studies in reference to aggregates for activities or sectors in which highly detailed variables such as production activity, size, (measured by em-

[5] This voluntary nature of collaboration from reporting firms explains why Central Balance Sheet Data Office statistics are not included in the National Statistical Plan.

ployment, for example) type, territory, etc., designed to describe the economic and financial performance of corporations included in the CB sample, are cross checked. The data available support the overall analysis of the economic structure of the sectors studied, making it possible to situate the history of and developments in some production sectors in the context of the net worth position, performance, margins and returns of corporations in the economic sector. An example of this type of study is published in Banco de España's *Boletín Económico* on the power sector and on the retail food industry.

(b) Aggregate studies on subsets of corporations, such as major Spanish corporate groups and multinationals. This category also includes preparation of indicators for sectors whose activity focuses on information and communication technology (ICT sectors) [6].

(c) Panel data studies, fundamentally using individual data on the same corporations during a specific period of time, to design corporate performance models in different areas: analysis of investment and financing decisions; corporate finance policies in limited credit conditions; transmission of monetary policy measures; analysis of job creation decisions; policy on remuneration of company owners; as well as comparative analysis with companies from other countries.

(d) Studies using statistical distributions of ratios to determine financial solvency conditions from a microeconomic standpoint. Comparative analysis of aggregate corporate information, for example, total corporate debt or returns on investment, encompasses a wide variety of different situations within companies comprising the aggregate, basically because the information on large companies introduces a bias in the aggregate results, which, as a rule, are comprised of smaller companies with specific situations in terms of risk, return on investment, access to financial markets, employment, etc. In this context, analysis should be made not only of the average data, but also of the information derived from the statistical distributions. Studies of this type can be a very useful supplement to the conclusions derived from models based on aggregate data.

(e) The information from the Central Balance Sheet Data Office makes it possible to conduct studies in which financial variables from Spanish companies are compared with those from other countries. Analysts also have access to the work of the European Central Balance Sheet Data Offices, including Spain's, to permit international comparisons, disseminated in publications provided at the end of this note.

Last, the Central Balance Sheet Data Office disseminates an annual publication on the annual results of non-financial corporations *(Resultados Anuales de las Empresas no Financieras),* updated at the end of November. It also publishes quarterly articles from Banco de España's *Boletín Económico* in March, June, September and November. In addition to these publications, the annual monography includes a report on the studies disseminated (on re-

[6] See Note 13 on Banco de España's publications on economic indicators.

quest to the corporations contributing to the international databases with explicit prices). The conditions for access to the information are also defined.

Note 6. General government and public corporation statistics

6.1 Introduction

The National Audit Office *[Intervención General de la Administración del Estado (IGAE)],* which reports to the Ministry of Economy and Finance, prepares and publishes the annual accounts of the different institutional groupings that constitute the public sector. This work began in 1968 with the accounts of general government (provided in the National Accounts prepared by INE), in 1973 with public corporations and in 1982 with the regional (autonomous) governments *(Comunidades Autónomas)* and local governments *(Corporaciones Locales)*. All of these accounts are highly detailed and generally meet the requirements of analysts who aim to study annual developments in the sector. Unfortunately, however, they are disseminated with a lag of 1-3 years after the period covered by the latest information they contain, which prevents them from being used by those responsible for monitoring the fiscal policy stance and its contribution to macroeconomic stabilisation during the most recent period. Analysts overcome these and other limits through specialised monitoring and processing of publications by IGAE itself and by other units of government (primarily the central government) with less than annual periodicity. In most cases, this information is prepared for administrative and/or management purposes, with clear dissemination calendars in most cases, and with changing or nonexistent ones in others. They also can entail information gaps in areas of great importance in analysis. Accordingly, a synthesis effort, to eliminate the gaps[7] and to adapt the dissemination calendars would be very helpful to analysts. Where public corporations are concerned, the delays discussed above cannot be offset with advance information, as indicated in the case of general government. Where financial information is concerned, no shortcomings of note have been detected for general government, as the note on the financial accounts of the Spanish economy indicates; although there are shortcomings in the area of public corporations.

6.2 Analytical requirements

Ideally, what analysts need as a general reference framework to conduct their diagnoses is complete national accounts, including the institutional approach, in the framework of the current ESA, although with quarterly periodicity and disseminated with a lag of three months. In this connection, recent ECOFIN and ECB initiatives have led to legal provisions that establish preparation of the quarterly financial and non-financial accounts of general government. Where the latter are concerned, a pre-implementation trial period will be completed in 2005.

[7] Information on the regional (autonomous) communities *[Comunidades Autónomas (CCAA)]* and local corporations *[Corporaciones Locales (CCLL)]* and expenditure by function.

During that period, most EU countries (including Spain) will submit this information to the Commission (Eurostat) for construction of the European aggregates. It would be desirable to disseminate Spain's contribution to this project, including during this transitional period. Otherwise, analysts will be required to prepare their own estimates, which might not be as well founded as those obtained through official statistics. Further, those who prepare user comments on analytical utility would not have the required information during this comparison phase. In addition, Spanish analysts have the quarterly financial accounts in a series that begins in 1990 (1989 for the financial balance sheets), disseminated with a maximum lag of 4 months and including financial balance accounts (financial balance sheets) and financial transactions accounts. It must be borne in mind that these European initiatives are derived from the Excessive Deficit Procedure (EDP) appended to the EU treaty that defined, in terms of ESA 95, the concepts of "General Government", "public deficit" and "public debt", for the purposes of convergence criteria. Giving legal status to some of the statistical measurements in connection with requirements of the EDP has entailed a great challenge for the statistical system responsible for these tasks as well as for analysts.

6.3 Promulgation of the Excessive Deficit Procedure

Although ESA references to the general government deficit were essentially clear prior to promulgation of the EDP, in the wake of its promulgation, supplementary texts had to be created for ESA 95 (namely the ESA 95 Manual on government deficit and debt) to harmonise treatment of specific operations, as the new scrutiny introduced also led to increased complexity. The problems in this process in terms of assessing the public deficit (as measuring the public debt does not entail obstacles of note) have also entailed a challenge for analysts, as their economic interpretation is complicated by the technical accounting peculiarities of certain records in the EDP framework. By contrast, it is clear that the requirements of the EDP resulted in progress in government financial statistics unimaginable only a few years ago, as: (1) they helped to bring forward the production calendars in order to meet the requirements of the two notifications with annual data to be submitted to the Commission by the countries (the first by 1 March and the second by 1 September); (2) they promoted a multilateral supervision process that has enhanced the transparency of this work; and (3) these requirements have helped develop national statistics systems to meet these requirements[8]. All these factors are brought to light in the provisions discussed on the quarterly accounts and other similar mechanisms, such as the Regulation approved in 2004 that requires the quarterly dissemination of data on public debt. Where Spain is concerned, these statistics have been disseminated with substantial detail in the *Boletín Estadístico* of Banco de España, before the approval of the EDP, and are available, in terms of the EDP, in a quarterly series beginning in 1990.

[8] This configuration was tested during the second half of 2004 owing to the limits observed in the data reported to the Commission by a country in the euro area. Of the initiatives adopted by the Commission and ECOFIN Council to avoid this type of problem, changes can be expected in compilation and supervision of data provided by the Member States in the context of the EDP.

6.4 Analytical utility of information on the public sector

The analytical utility of information on the public sector is generally acknowledged, as its activity affects developments in general economic activity as a result of the impact of its expenditure on consumption and investment on aggregate demand, and owing to its influence on the income distribution process and a broad number of economic variables. From the financial standpoint, questions such as public debt analysis (amount, developments and breakdown of its explanatory effects, namely flow/fund linkage, structure, etc.), the composition of the sector portfolio and movements that affect it (privatisation process, for example) and the operations that define collaboration of the sector with non-financial companies (fundamentally private, but public as well) in the execution of major public infrastructures implemented by concessions and Public Private Partnerships (PPP) are fundamentally intended for diagnosis of the general economic situation. However, without listing other uses in detail, that are included in other chapters of this publication, we should point out, from the standpoint of the short-term economic analyst, that general government predictions are based largely on the budgets of these institutions and their preliminary budget outturns in various stages, rather than on indicators, as in other sectors. The advantage is clear as expenditure included in the budget is considered authorised expenditure, that tends to be executed with relatively well-known lags. Revenue budgets do not have the same legal status (and less in cases such as limits established for debt issues, where revenue headings are only estimates). However, they do not lack statistical utility, particularly as information on execution monitoring is available in most cases. This access implies, therefore, that statisticians and/or analysts who employ these administrative sources to prepare statistics useful in economic analysis (which is equivalent to presentations, in terms of the National Accounts) must be familiar with the legal basis (finance laws, general law on budget stability and stability programme, as they must know the pluriannual objectives of budget stability, etc.) as well as with public accounting. Access by external analysts to the latest fiscal accounting details is a difficult matter,and the remaining problems can only be resolved by generalising, in terms of the National Accounts the budget settlement presentations to all tiers of government. Meanwhile, these challenges should be settled with the methods described in Box 1, Chapter 9 of this publication. There are also some problems resulting from information gaps in budget outturns for the regional (autonomous) communities, local corporations, transferred social security, employment data and expenditure by function. Concerning the regional (autonomous) communities, the lack of uniformity in the budget information among them should be pointed out. Owing to the importance of the expenses that have been transferred, this situation undermines the quality of projections for the overall sector. Unfortunately, some quite positive initiatives have yet to be completed. This is true for the initiative adopted by the Fiscal and Financial Policy Council (CPFF), that, in two annexes to the Resolution on Independent Financing 1992-1996 *(Acuerdo sobre Financiación Autonómica* 1992- 1996) of 29 January 1992, established some budget outturn models for all units in its framework, with detailed listings and a number of compilation and dissemination deadlines compatible with analysts' requirements.

6.5 Public corporation accounts

The available information on public corporations is disseminated with the lag mentioned at the beginning of this note, which constitutes a serious impediment for analysts. The information also lacks currentness in terms of public corporations provided as counterpart information in the general government accounts (capital transfers, subsidies, etc., when they are included in detail from corporation to corporation), in light of the lag to which the complete accounts of general government are accessed. The problem, however, is aggravated in terms of availability of information on some matters discussed above (privatisations and PPPs for infrastructure financing and execution) and in respect of public corporations dependent on the regional (autonomous) communities, including local corporations. Fortunately, analysts have access to information on the debt of public corporations controlled by the various units of government, published quarterly by Banco de España and prepared according to the EDP methodology. These units, however, are not subject to this methodology.

6.6 Bibliographic references

In addition to the monographic publications cited above, IGAE disseminates the following: (1) Preview of state budget outturns *(Avance de la Actuación Presupuestaria del Estado),* with a lag of approximately five months; this publication contains an initial preview of activity in the overall sector, although not in great detail; (2) Preview of economic and financial activity of General government *(Avance de la Actuación Económica y Financiera de las Administraciones Públicas)* (with a lag of approximately nine months), providing more detailed information on operations of the sector and its components; (3) Economic and financial activities of General government *(Actuación Económica y Financiera de las AAPP)* (with a lag of at least two years); and (4) other useful information in forecasting exercises from the standpoint of the major revenue and expenditure categories such as the tax agency's monthly revenue report, State budget outturn (IGAE) and the Tax Agency's annual tax revenue reports. Chapters 11-14 of the monthly *Boletín Estadístico* of Banco de España are devoted to general government statistics prepared by Banco de España and other sources.

Note 7. Securities market statistics

7.1 Introduction

Unlike conventional financial instruments such as loans, credits and deposits, granted or received, for an institutional sector (in this case, financial institutions), securities basically constitute assets and liabilities of all sectors, making it a difficult matter to integrate them into the overall Financial Accounts of the Spanish Economy (FASE). In addition, securities are traded on specific markets that determine prices of special interest in the analysis of monetary policy transmission or financial intermediation in general. All of this requires isolated consideration

of these instruments that, owing to their diversity and the specialised features of their valuation, will be aimed at constructing security-by-security databases. This task is backed by a number of different international organisations, including the ECB, as the only way to harmonise the records that countries keep on these instruments. "Securities" are generally defined as shares and other equity and securities, securities other than shares or debt securities, the framework of which is specified in the Methodological Notes of the FASE. Information on securities prepared and/or compiled by Banco de España derives primarily from the National Securities Market Commission (CNMV) and refers to monthly data on the primary market (where different sectors obtain financing through securities issues) as well as on the secondary markets (where securities are traded: this process requires instruments to be more liquid and their valuation to be more transparent in connection with transfers of ownership between the securities holders). All of these operations involve financing flows between sectors that issue securities on the primary market and those that subscribe them, and between buyers and sellers of securities in circulation on the secondary markets.

7.2 General features

A summary presentation of securities operations that, along with the remaining financial instruments (loans, deposits, etc.) configure the financing flows exchanged by resident sectors, among themselves and with the rest of the world, is disseminated in integrated form, with quarterly periodicity, in the FASE. In addition to this summary, the available information on securities is presented to analysts with a substantial level of detail on the instruments included in each category and on the institutional groups for which they constitute financial assets or liabilities, when they appear separately (Chapters 21 and 22 of the *Boletín Estadístico,* Banco de España) and when they are included in the FASE. In addition to analysing the securities traded in the national economy, and between the latter and the rest of the world, facilitating the channelling of financing flows from the sectors that save to the sectors that demand funds, the available information on securities permits analysts to: (1) assess the monetary policy transmission mechanisms through developments in interest rates on the secondary securities markets; (2) construct a yield curve that shows the term structure of interest rates and expectations of economic agents; (3) identify financing costs involved in resorting to the securities markets and comparing them with other alternative financing mechanisms; (4) determine the effects of fluctuations in prices of securities on financial wealth (total net financial assets) of different economic sectors; and (5) contribute to preparation of income accounts of the various sectors, while the available information on securities includes data that can be used to derive accrued interest, or data on dividends collected and paid.

7.3 Aggregations based on security-by-security statistics. Centralised securities database

In assessing the quality of these statistics, analysts must know that, although the aggregates discussed above may be constructed in blocks (for example, based on accounting data), the

flexibility and consistency required for their integration into information systems (as is true with the FASE) require access to security-by-security data, from the standpoint of both securities issuers and holders. To that end, security-by-security data should be available on issues carried out by residents and, for preparation of the Balance of Payments and International Investment Position, on issues by non-residents acquired by resident sectors. Preparation of these statistics entails a number of different problems such as unavailability of this type of information (or in some cases, the available information is incomplete), for some issues of very short-term securities, for private securities placements and for issues launched abroad. It can also be a difficult matter to identify the sectors in which the securities are held. Specifically, not all the information required to calculate security-by-security portfolios for non-financial corporations, households and NPISHs, is available, although incomplete data of this kind exists for most groups of financial institutions and for the rest of the world. To solve these problems and, in particular, to facilitate obtaining aggregate Balance of Payments and International Investment Position data, the European Central Bank has initiated a project to prepare a Centralised Securities Database (CSDB) in which Banco de España participates actively. In the first phase, the CSDB aims to reflect security-by-security issues and placements for different institutional groups, with indication of the key features (basically the quantities issued, dates of placement and redemption, coupons and dividends). Once the securities have been identified through the International Securities Identification Number (ISIN), and the issuers have been identified through an issuer code, it is expected that valid aggregate figures can be constructed for economic analysis (by sector and type of instrument), and other statistics can be obtained (accrued interest, interest rate curve, financial transactions and outstanding amounts at market prices). A second phase of the project will refer to availability of security-by-security data by holding sector. Banco de España contributes to the first phase of this project by providing information from its own database, and by conducting quality controls on information from the CSDB on resident sectors in Spain.

Note 8. Survey of Household Finances

8.1 General features

At end-November 2004, Banco de España presented the preliminary results of the first survey of household finances (EFF), with reference to 2002, which to date is the only source for relating revenue, assets, debt and expenditure of each household unit. This survey also fills the gap in the available information on non-financial assets of the sector, and presents detailed information at the household level for non-financial assets and financial assets and liabilities[9]. Until now, the abundant information available on household financial assets and li-

[9] Banco de España published, in its Boletín Económico of November 2004, a brief description of this survey and some preliminary results. The survey description and methods were published in Banco de España's Occasional Paper No. 0409 *"The Spanish Survey of Household Finances (EFF): description and methods of the 2002 wave",* Olympia Bover.

abilities (debts) reflected in the FASE is aggregate information that cannot be used to make inferences on asset and debt distribution among households. The EFF presents data on households, in terms of income and net wealth, real assets, financial assets, debts, durable goods, expenditure on non-durable goods and on the socio-demographic characteristics of the household. The results presented to date classify households in six income percentiles and five net wealth percentiles, a number of characteristics of the head of household (six age brackets, four job situations and three levels of education), two tenure regimes for the main residence and details on the number of members comprising the household and those who are working. The results of the survey are expressed in averages, medians (in light of the income and wealth dispersion, this alternative reflects the reference values better than the average), percentages and ratios. In addition to presenting results for income, assets and debts, assessments of the debt burden are also calculated in relation to income and wealth.

8.2. Technical references and other considerations

This survey, similar to those carried out by Bank of Italy and the U.S. Federal Reserve[10], have had to solve the problem of designing a sample that was not only representative of the entire population, but also of aggregate economic wealth, to facilitate the study of financial behaviour in the upper wealth distribution bracket. This question was resolved with a blind system of collaboration between INE and the Tax Agency. Basic elements of this work are the oversampling of households with a higher level of wealth, as the distribution is quite asymmetric; and processing of non-responses to some questions with what is known as the multiple imputation method. These questions, and the calculation of the grossing up factors, are described in the annotated bibliography. The results of the survey, which will be repeated with reference to 2005, are quite important, among other reasons, in addition to those discussed, because we have every reason to believe that the survey provides an accurate image of the variables studied, as the checks carried out with homogeneous levels of comparison with alternative statistics (National Accounts, FASE, etc.), have demonstrated a high level of consistency.

Note 9. Employment statistics

9.1 Employment, jobs and full-time equivalent jobs

Chapter 11 of ESA 95, in reference to the concepts of "population" and "employment", indicates that specific comparisons between the National Accounts aggregates (basically GDP, household final consumption, gross value added (GVA) and compensation of em-

[10] Survey on Household Income and Wealth (Banco de Italia) and Survey of Consumer Finances (U.S. Federal Reserve).

ployees by economic sector) have greater analytical value when related to the number of inhabitants (population) and other variables representative of the quantity of work incorporated into the production process, i.e. the labour input variables. The important matter for analysts is therefore to work with employment data that can be compared with results from activities of production units. In principle, this comparison can only be established if the concept of *employment* (occupation) includes residents and non-residents who contribute to resident (domestic) output or, in other words, who work for resident production units. When we aim to establish a relationship between the labour input and output, the concept of *jobs* is more important than the concept of *employment* since, unlike the latter, the first incorporates the second, third, etc. jobs occupied by a person who declares being employed or occupied during the reference period, and excludes cases of temporary suspension of employment for training or other reasons. Owing, however, to the disparity between hours worked during the work schedule in different jobs, the ESA recommends that, for appropriate measurement of productivity calculations, *total hours worked* should be used rather than the number of jobs. Total hours worked is the sum of hours effectively worked (during a normal day, partial day, overtime, etc.) during the accounting period, in workers' jobs performed by both employees and self-employed workers, within the economic territory of the country. This is the departing concept to determine the *number of full-time equivalent jobs (or part-time equivalent jobs)* during the period (year or quarter). The latter concept is determined by dividing the total number of hours worked in all jobs by the average number of hours worked in full-time jobs. We observe that *full-time equivalent jobs* does not reflect a directly observable variable, but is a conventional measurement that attempts to assess the true input, or quantity, of labour incorporated into the production process, expressed in a homogeneous concept.

9.2 Estimation of employment in the National Accounts system based on available statistics

Chapter 11 of ESA 95 precisely defines the concepts of employment, jobs and total hours worked, used to determine full-time equivalent jobs and other related concepts (for example, total population and unemployment). The problem is that it is not always possible to adequately quantify these concepts based on statistical information available in each country on the labour market. In the Spanish case, statistics on this market are available. They are derived from surveys and prepared based on the administrative registers, which are the basis from which the National Accounts/QNA assess jobs and full-time equivalent jobs, for total employment as well as for total employment of employees (and implicitly for employment of self-employed workers). Among these surveys and registers, we note the Labour Force Survey *[Encuesta de Población Activa (EPA)],* by INE; the Labour Market Survey *[Encuesta de Coyuntura Laboral (ECL)]* by the Ministry of Labour and Social Affairs (MTAS); the register of social security participants (MTAS); the central personnel register, Ministry of General Government; the Population Census and Agricultural Census; and many sectoral statistics. The preparers of National Accounts/QNA determine *data on employment or occupation,* for the total and by branch of activity, based fundamentally on the

number of persons employed with a main job under the EPA, and the *total number of jobs,* and by branch of activity, considering, in the *same source, persons employed with main and secondary jobs,* in both cases identifying those who are employees. *Full-time equivalent jobs* for total persons employed and for persons employed who also are employees, are determined for each sector by the *quotient between the total number of hours worked according to the ECL*[11] *and the average number of hours worked in the reference weeks according to the EPA.* To assess the importance of these successive filtering operations of the employment data, to obtain a better measurement of productivity, we can observe that, according to the EPA, in 2003 there was an average of at least 16,700,000 jobs. The foregoing procedure was used to determine approximately 16,905,000 jobs and 16,150,000 full-time equivalent jobs. Of course, the productivity figures obtained by dividing total output, or gross value added, of the total aggregate, or of the different branches of activity, by the number of employees or persons employed, the number of jobs, or the number of full-time equivalent jobs are different in all cases. The figure calculated in relation to the number of full-time equivalent jobs will be the one that is truly relevant in the analysis.

9.3 Labour Force Survey (EPA)

The utility of the Labour Force Survey (EPA) as well as the remaining statistics cited is not merely as a source of these estimates. They are published at preannounced dates with quite a short lag from the reference period, and they present details of great analytical interest, such as data by regional (autonomous) community (CCAA) and even by province. Further, as a result of their relationship of their variables with those appearing in the National Accounts/QNA, these statistics make it possible to anticipate trends in the employment data included in these publications using modelling techniques. The EPA is clearly the most interesting statistic in this framework for many reasons, all of which can be derived from the technical information published by the INE, to which it is submitted. These reasons include, *inter alia,* its tradition (preparation began in 1964, decades before implementation of its equivalent in Europe, i.e. the EU labour force survey), the size of its sample (approximately 65,000 households and more than 200,000 persons), its coverage (it includes the entire national territory), its budget, which is among the highest statistics budget in the INE (more than €10 million in 2005, according to the National Statistical Plan (PEN) and particularly the available details. The survey calculates, on a quarterly basis, a series of characteristics on the average number of persons, 16 years of age and over, residing for most of the year in housing used as a permanent residence. Survey staff investigate the situation of persons living in housing of this type included in the sample during the calendar week prior to the date on which the survey is conducted. They conduct their interviews uniformly throughout the 13 weeks of each quarter, so that the results obtained for a given quarter refer to the average of the weeks of the quarter in question. We note, in relation to the foregoing comments, that the EPA does not measure the resident population that lives in collective residences and other group establishments,

[11] With the required adjustments, as the ECL does not cover all activity sectors.

although this population contributes to resident output. We also note an underestimation of immigrant workers established in Spain for a period exceeding one year, as the distribution of this group is not included in the design of the survey. Nor does it cover non-resident workers, who contribute to resident output (cross-border workers who do not live in Spain but who work on the Spanish economic territory); it does include resident workers who contribute to non-resident output (cross-border workers who live in Spain and who work on the economic territory of other countries). In practice, these deviations from what should be the ideal framework of the survey are inevitable and do not pose an obstacle in analysis, save for insufficient coverage of the resident immigrant population, that is a matter remaining to be resolved in the EPA and therefore in the National Accounts/QNA and that, it would seem, the authorities intend to undertake in connection with preparation of the 2000 base for the National Accounts[12]. Where the details, as discussed above, are concerned, the EPA calculates, for the population of 16 years of age and older obtained as indicated above, the totals for the labour force and inactive population, making the distinction between *active persons* depending on whether they are *employed* or occupied (both employees and non-employees) or *unemployed,* concepts adapted to the definitions of the International Labour Organisation and to Regulation (CE) 577/98 in respect of the Community Labour Force Survey (ECFT) to be carried out by member countries of the European Union (EU), to ensure homogeneity in this type of survey. These concepts are available by activity sector, by regional (autonomous) community, age bracket (15 levels from 16-24 to over 64), by average number of hours worked, etc. These details make it possible to calculate the economic activity rates, employment, unemployment and total, and by age sector that, for purposes of international comparison, should be calculated uniformly, which is not always the case[13].

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[12] The problem is substantial, and INE is expected to address it during the first half of 2005. It derives from the fact that the current Labour Force Survey (EPA) sample at end-2004 is based on the General Population Survey derived from the 1991 Census and subsequent population projections, which entailed reduced weighting for immigrants. The new 2005 EPA (whose data will affect preparation of the 2000 base of the Spanish National Accounts, that will also be produced during the first half of 2005) will be based on a new General Population Survey *(Encuesta General de Población)* that in addition to being derived from the 2001 census, should incorporate a number of population projections that obviate administrative involvement in ad hoc regularisation of immigrants occurring in recent years. For economic analysis, the aim is to determine the extent to which these immigrants have been incorporated into the production process, rather than when their regularisation occurred.

[13] The OECD publication *Main Economic Indicators* (MEI) calculates economic activity and employment rates by dividing the total population in question (active or employed), including the population over 64 years of age, by the total population 16-64 years of age, that is, without including the population over 64 years of age in the denominator. On the other hand, INE prepares and publishes economic activity and occupation rates by dividing the total population over 16 year of age (active or employed), by the total population exceeding 16 years of age. This different method for calculating rates by the same name introduces an element of confusion, basically because the differences between them exceed 10 points, as shown in Table III.24 of the Financial Accounts of the Spanish Economy published by Banco de España. There are no differences in the calculation of unemployment rates that both MEI and INE obtain as the quotient of the unemployed population 16 years of age and over and the active population over 16 years of age. We observe that, as the unemployed population over 64 years of age is inactive, it is not significant, in the case of the indicators calculated by MEI, to include unemployed persons over 64 years of age in the numerator.

9.4 Community labour force survey

In the preceding sections, we discussed the Community labour force survey (ECFT), a coordinated survey in the framework of the EU as provided under Regulation (EC) 577/98 on organisation of a quarterly community labour force survey and subsequent texts on specific aspects of the ECFT. The EPA was adapted to this Regulation following its implementation, and therefore it can be affirmed that the EPA is the Spanish version of the European ECFT. The ECFT establishes that, during the second quarter of each year, countries must include in their national surveys a number of additional questionnaires (modules) on specific aspects of the labour market. Where Spain is concerned, these modules, which are disseminated at the INE website, have been conducted since 1999. Modules have been published on transmission of education to the labour market, special labour relations, conditions and working hours, disability and employment, and training courses, among others. In respect of the survey itself, this Regulation establishes the general framework, while the countries decide the questionnaire, organisation of field work and design of the survey. There are other specialised features by country derived from legal questions (the EPA investigates the population 16 years of age and older, that is, from the end of obligatory education, and the ECFT recommends the study of the population 15 years of age and older). Last, for purposes of integration into Community statistics, INE submits to Eurostat the equivalency between EPA and the ECFT during the quarter following that to which the data refer.

9.5 Labour Market Survey

The Labour Market Survey *[Encuesta de Coyuntura Laboral (ECL)]* prepared by the Ministry of Labour and Social Affairs (MTAS) has quarterly periodicity and its sample is comprised of 12,000 establishments that are investigated based on social security contribution accounts for workers operating in one or more labour centres in connection with the same corporation and based in the same province. Its framework covers the entire national territory (except Ceuta and Melilla), although it only includes the population participating in the general social security system *(Régimen General de la Seguridad Social)* and the special coal mining system *(Régimen Especial de la Minería del Carbón) a*nd activities comprising the sectors of industry, construction and services (except in the latter case for workers in general government and religious organisations). The main variables investigated in the survey are the: (a) *number of labour personnel or jobs,* i.e. workers for third parties who, on the last day of the reference quarter, maintained a labour relationship with the corporation, i.e. they worked in one of its centres; (b) *average effective number of hours in the work schedule during the quarter per worker,* which is the average number of hours effectively worked during the quarter per worker, obtained as a weighted average of average effective work schedules per full-time and part-time worker, determined independently. Effective work schedules are determined based on annual hours agreed, overtime hours and hours not worked. This process can be used to determine *total hours worked*, which, as indicated above, is used as the numerator to determine

full-time equivalent jobs under National Accounts/QNA[14]; and (c) *opinions of employers in respect of the future trends in staffing*. These variables are available by activity sector, regional (autonomous) community, size of labour centre, gender, type of work schedule, etc. Further details on these statistics can be found by consulting the Ministry of Labour and Social Affairs (MTAS) statistics.

9.6 INEM registered labour movement and further statistics derived from the administrative registers

The main employment statistics derived from the administrative registers are from the Registered Labour Movement *(Movimiento Laboral Registrado)* statistics from the National Employment Institute (INEM) and worker participation in the Social Security System *(Afiliación de Trabajadores al Sistema de Seguridad Social)* prepared by the Ministry of Labour and Social Affairs (MTAS)[15]. Registered labour movement (MLR) statistics by INEM, with monthly periodicity, are derived from exploitation of a centralised database with information from INEM itself, the Marine Social Institute *[Instituto Social de la Marina (ISM)] a*nd employment services of the regional (autonomous) communities. The relevant items in these statistics include *job vacancies* and *jobs sought*. The first include jobs offered by employers and registered in public employment offices for the latter to manage coverage with job seekers. Job vacancy statistics are part of the Principal European Economic Indicators (PEEI), which establish that they should be published with a lag of 60 days from the data reference period. Spain has recently published them with a lag of 80 days, which evidences, in addition to non-compliance with the rules established by the EU Commission and Council, their reduced utility in short-term analysis. Job vacancies are classified as new positions *(altas),* positions taken up *(bajas)* and effective or pending positions. Employment applications are considered applications for jobs submitted during the reference month to public employment offices by persons who, willing or able to work, wish to do so for third parties. These applications are classified as new, job openings and "effective or pending", which in turn are divided into *registered unemployment,* the most relevant concept in these statistics; and *other pending employment applications not included in registered unemployment* (the case of applicants for more than one job, those seeking to change jobs, applicants

[14] See Note 1 on the Spanish National Accounts. The estimation process implies making specific adjustments to reflect hours worked in sectors not covered by the ECL (basically the general government sector).

[15] Employment institute (INEM), Social Security Institute (INSS), Health Management Institute (INGESA, formerly INSALUD) and Migrations Institute and Social Services (IMSERSO) comprise, along with the Occupational Accident and Professional Illness Mutuals *(Mutuas de Accidentes de Trabajo y Enfermedades Profesionales)* and the Marine Social Institute *[Instituto Social de la Marina (ISM)],* the group of Social Security management institutions. The social security system is comprised of general treasury and management agencies *(Entidades Gestoras y la Tesorería General).* The Social Security administration sector of National Accounts is comprised of the following autonomous agencies: National Employment Institute *[Instituto Nacional de Empleo (INEM)],* Wage Guarantee Fund *(Fondo de Garantía Salarial),* State Civil Servants' Mutual *[Mutualidad de Funcionarios Civiles del Estado (MUFACE)],* Armed Forces Social Institute *[Instituto Social de las Fuerzas Armadas (ISFAS)] a*nd the General Judicial Mutual *(Mutualidad General Judicial).*

who are casual farm workers, part-time workers, students, those seeking jobs of less than 20 hours per week and others). Further, statistics on Worker Participation in the Social Security System (Afiliación de trabajadores al Sistema de Seguridad Social) reflect the *number of workers registered in the different social security systems at the end of the month*. These workers do not include unemployed persons or students, although the register does includes participants in the general system, for coverage of at least situations of retirement, disability and death. For various reasons, these participants do not engage in a labour activity properly speaking. Information on participations, entries and exclusions are available by programme and, depending on the case, by economic sector and labour office (own account or third party). Registration is subject to legal regulations outside the economic area and can include contributing parties who currently do not work but who claim to be eligible for a retirement pension or to collect an unemployment subsidy. In addition, there are persons who, according to the EPA, are employed but who are not listed in the register of participants because they are not required to make contributions (family assistance), and persons who are required to participate and who do not. Participants do not include general government workers covered by the social security scheme for state civil servants (MUFACE), the Armed Services Welfare Institute (ISFAS) and the Social Security scheme for the legal sector (MUGEJU). Casual workers in the Special Agricultural System *[Régimen Especial Agrario de la Seguridad Social (REASS)],* appear as participants regardless of whether or not they have worked during the month in question (if they have not worked, they are not persons employed under EPA). The papal clergy are included as participants although they are not included as persons employed under the EPA as they live in collective establishments. For further details, these statistics are submitted to the MTAS website.

9.7 Comparison of 1998 data on the concepts of "employment" and "unemployment" under the EPA and "social security participants" and "INEM registered unemployment"

Significantly, here, the concepts of "employment" and "unemployment" under the EPA, on one hand, and the concepts of "Social Security participants" and "INEM registered unemployment", on the other, are – as expressed in a document from the INE Press Office of 27 June 2000 – consistent with one another, once their methodological and operational differences have been resolved[16]. This document identifies three differential elements between the EPA and the cited registers of the MTAS: (1) the *nature* of these two types of information, as the EPA is a survey and as such it is subject to a process of grossing up; while the MTAS registers reflect administrative data not subject to extrapolation. Clearly the differences between the two types of concepts originating from this different nature cannot be measured or reconciled; (2) *reference periods:* EPA results refer to the average of the 13 weeks of each quarter, derived from interviews conducted throughout this period; MTAS registers reflect

[16] This note relates to a study referring to 1998, carried out by a working group of the Superior Council on Statistics, comprised of representatives from entities responsible for preparing both statistics, unions and universities.

participations and registered unemployment at the last day of the month. Both periods can be reconciled, at least on a preliminary basis, by referring both statistics to annual averages, which is the case in the above-mentioned INE document; and (3) *definitions,* as some population groups are included in one of the sources and not in the other. The reconciliation established by the CSE Group entails two approaches, namely: (3.1) coherency checks of the *variables "persons employed, EPA versus Social Security participants",* which consists in obtaining a number of "corrected persons employed, EPA" (by adding to "persons employed, EPA" an estimate of persons employed living in collective establishments) and a number of "corrected Social Security participants" (by subtracting from "Social Security participations" duplicate participations, workers in the special agricultural programme who have not worked and others; and by adding workers who are members of MUFACE, ISFAS and MUGEJU). The reconciliation, or comparison, between "corrected persons employed, EPA" and "corrected Social Security participants" in the exercise carried out by the CSE Group with 1998 data shows a 2 percent undervaluation in the first concept as compared with the second, and this undervaluation increased to 2.6 percent prior to the adjustments. This reduced correction shows that the causes of the main discrepancies are different than those that the corrections aimed to adjust, and the CSE Group points out, among other possible causes, the presence of foreign immigrant workers participating in Social Security not detected by the EPA, as its design did not reflect the distribution of the foreign population, an issue that is pending resolution and that limits the analytical utility of this survey (see item 4 of this note). Another possible cause of these differences, smaller in scope than the preceding one, is the case of persons who should be removed from the registers of participants but who remain in the system pending resolution of an administrative or legal matter; and (3.2) the contrast that attracts the most interest is established between the concepts of *"EPA unemployment"* and *"unemployment registered by INEM".* The document cited establishes that, for 1998, the period of the exercise covered in the INE press document as cited above, the number of unemployed persons according to the EPA was approximately 62 percent higher than the number of unemployed persons included in the registered unemployment data. When, to compare these two concepts, we calculate a "corrected registered unemployment" figure (that incorporates into registered unemployment other pending employment applications not considered in registered unemployment but considered in EPA unemployment, as is the case for casual farm workers who have not worked, students, those seeking a part-time schedule, employment applications from retired persons and those seeking short-term employment) and a "corrected EPA unemployment" figure (reflecting only those who are truly unemployed and who declared in the EPA to be registered with employment offices[17]), the differences substantially cancel out for the year of the exercise, as "corrected EPA unemployment" is approximately 0.7 percent lower than "corrected registered unemployment" on which the conclusion of the CSE Study Group is clearly based. As indicated, the Group made these comparisons in 2000 with data in respect of 1998.

[17] We observe that: (1) the EPA does not consider persons who are not actively seeking work as unemployed persons, even though they are registered with an employment office (as we shall observe below, these active search criteria became more stringent beginning in 2001); and (2) the EPA can register persons who declare that they are not registered with employment offices among the unemployed.

9.8 Unemployment statistics: levels and trends. Active job search. EPA "new definition" of unemployment effective in 2001. Comparison with 2001 data between EPA and Social Security concepts with the "new definition" of unemployment

Relationships between the two above-mentioned concepts of unemployment call for at least two further comments: (1) for analytical purposes, comparisons between the aggregates mentioned above normally refer to their developments over time and not to different quantities, as discussed above. This is the most problematic matter that arises when comparing variables with approximately the same name, such as the two concepts of unemployment, as trends having conflicting signs or intensities in the variables may coincide in time. This normally creates some degree of confusion in the non-specialised media; (2) the definition of unemployment according to EPA (persons 16 or more years of age who, during the reference week, have been without work, available to work and *actively seeking employment)* has not changed in recent years, but following promulgation of Regulation (EC) 1897/2000 of 7 September, 2000, with effect from 2001, the job search methods to which the definition refers are more restrictively specified. As a result, and as published by INE at its website, with the search criteria applied until the effective date of this Regulation, the EPA calculated 2,352.5 thousand unemployed persons for 2001 and, with the criteria applied thereafter, calculated 1,869.1 thousand unemployed persons. This technical correction ultimately amounted to reducing the measurement of EPA unemployment by approximately 20 percent. If we then compare the "new" EPA unemployment figure in 2001 and registered employment at the same date (1,530 thousand registered unemployed persons in 2001), we find that the first is approximately 22.2 percent higher than the second (62 percent in 1998, as indicated above) owing simply to the misnamed "new definition" of EPA unemployment. It in fact involves a stricter application of what is considered a job search. The persons involved are now required to engage in specific activities actively seeking employment. If we reconcile "corrected EPA unemployment" and "corrected registered unemployment" for 2001, we find that the first is lower than the second, but in this case by approximately 10.3 percent (in 1998, before clearing EPA of persons not actively seeking work, "corrected EPA unemployment" was approximately 0.7 percent lower than "corrected registered unemployment").

9.9 Other employment statistics

In addition to the above-mentioned employment statistics, the Ministry of Labour and Social Affairs disseminates, in its labour statistics bulletin, *Boletín de Estadísticas Laborales,* other statistics derived from its own registers. This is true for further statistics on employment, other than Registered Labour Movement data (statistics on beneficiaries of unemployment benefits, current pensions and average amount of pensions, that supplement the Social Security System participation figures, and last, collective bargaining agreements, labour conflicts, employment regulation and opening of labour centres). As in the cases discussed above, Banco de España disseminates these statistics in its publications, with indication of the source, in Chapter 24 of the *Boletín Estadístico,* economic indicators and summary indi-

cators in daily summary updates. In addition, most of these statistics appear cited in the different chapters of this publication and its appendices, in the framework of the analyses for which they have been used, and with reference to their utility and limits, to supplement those included in the general reference notes. A feature common to most of these employment statistics and those cited in the preceding points derives from the use of social security registers for these purposes. This approach constitutes recognisable progress, owing to the substantial savings this exploitation entails as compared with its alternative of conducting conventional surveys, as is the case for the EPA. The limited public dissemination of similar resources derived from the personnel registers of general government (a work force of approximately 2,400,000 at the beginning of 2004), a group with a specific labour relationship, of obvious interest to analyse and monitor, is surprising. This is true, *inter alia,* because, for National Accounts purposes, developments and composition in this connection are essential in determining the quantity component, of gross value added of general government and public consumption. We should expect the statistical bulletin on personnel in general government service *(Boletín Estadístico del Personal al Servicio de las Administraciones Públicas),* published half-yearly by the Central Personnel Register of the Ministry of General Government to supplement the abundant information now disseminated, classified by administrative criteria, with information classified according to other criteria (compensation levels, composition of the wage bill, etc.), to enhance its analytical validity. This issue is also related to the frequency of the series (analysts require quarterly series) and shorter time lags between the publication date and the intended reference period. This work must be undertaken owing to the importance of employment in general government, in which some 2,400,000 employees worked at the beginning of 2004, of whom 1,250,000 in the Regional (Autonomous) Government *(Administración Autonómica)* and approximately 550,000 in central government and local units of government.

Note 10. Wage statistics

10.1 Labour cost surveys

Among the statistics that measure wage trends and, in most cases, also the amount and structure, there are in Spain a set of labour cost statistics prepared by INE that includes the quarterly labour cost survey *[Encuesta Trimestral de Costes Laborales (ETCL)],* which is the base for all of them; the annual labour cost survey *[Encuesta Annual de Coste Laboral (EACL)]* and the quadrennial labour cost survey *[Encuesta Cuatrienal de Coste Laboral (ECCL)]*. All of these surveys share the common factor that the population framework from which the sample is taken for the survey is the Directory of Social Security Contribution Accounts *(Directorio de Cuentas de Cotización a la Seguridad Social).* The ETCL calculates, with quarterly periodicity, the average labour cost variables per worker and month, average effective cost per hour of labour, and time worked and not worked. Since first-quarter 2001, the ETCL has replaced the industry and services wage survey, which was discontinued from fourth-quarter 2000. The wage survey calculated variables referring to workers' earnings rather

than total labour costs borne by corporations, and classified wage earners as blue and white collar workers. The ETCL measures the labour cost of workers employed by third parties (without distinction of categories) included in the contribution accounts to the General Social Security System and the Special Coal Mining System. Labour cost is defined as the total cost to the employer (in addition to the wage cost for regular compensation and special pay, which could be considered workers' earnings in the eliminated wage survey. This concept includes mandatory social security contributions paid by employers and other non-wage expenditure; and excludes subsidies and premiums that employers may receive from social security in support of specific employment policies). The ETCL provides details on all labour costs, by type of cost (wage and other costs, making the distinction between different types of contributions, indemnifications and subsidies), for some, but not all, branches of activity covered, by regional (autonomous) community and type of work schedule, and distinguishes between hours agreed, paid, effective and not worked. It also provides information on the cost per extra hour and the cost of indemnification per dismissed worker. The sectors not covered by the survey are agriculture and non-commercial services. Analysts must use alternative indicators to fill this gap. The most relevant variables are published in levels and in base 2000 indices. Wage cost series that could be linked using the discontinued wage survey are available since 1981, and the rest, since 2000. The EACL supplements the results of the ETCL with an annual perspective, with a series of cost categories not recorded monthly in the payroll, as the term extends beyond the month[18]. The objective of the EACL is therefore to reflect the share of non-labour costs not recorded in the quarterly questionnaires for the immediately preceding year; that is, to determine the annual labour cost. The EACL is prepared based on a questionnaire appended to the ETCL during the third quarter of the year (data collection from September to December of the year following the reference year). The variables in the annual questionnaire not included in the quarterly questionnaire are: voluntary contributions, annual transportation expenditure, annual social expenditure and annual expenditure on occupational training. In addition, per diems and travel expenditure are not included in labour cost, as they are derived from requirements of the production process. They therefore constitute intermediate consumption. It is customary, however, for the monthly registers to include this category since it cannot be eliminated from the ETCL. Until end-2004, the results were published for 2001 and 2002. Last, the ECCL is a structural statistical operation carried out in the framework of the Regulations on structural statistics (530/99 and 1916/00), with common criteria in terms of methodology and content, in order to obtain some comparable results on the labour cost level and structure between the Member States. To that end, the same reference period, coverage and information requested are used according to the EU regulations on required compliance for all Member States. The ECCL results corresponding to 1996 and 2000 were published by end-2004, and the next edition will refer to 2004. Owing to the dissemination lag, these data are of little use to short-term economic analysts. Owing to their structural nature, they are in fact more suitable as a supplement to the quarterly survey and as a source in preparing the Spanish National, Quarterly and Regional Accounts, among other macroeconomic statistics.

[18] In the ETCL, the reference period for results is the calendar quarter and the reference period for information requested in the questionnaire is the calendar month.

10.2 Labour cost index. Unit labour costs

The ETCL is also the basis for calculation of the Labour Cost Index *[Índice de Costes Laborales (ICL)],* which is included in the *Principal Economic Indicators* (PEEI) report defined by the European Commission and ECOFIN for economic monitoring in countries of the Monetary Union. Among other variables, the ICL includes developments in average labour cost per effective hour of work in industry, construction and services, and for total activities, and is prepared in the framework of Regulations 450/03 and 1216 /03. It is also of great interest to analysts to monitor unit labour costs (ULCs), i.e. the indicator that measures labour costs per unit of output, some of which are disseminated in Indicator 4.8 of the monthly *Boletín Económico* of Banco de España. ULCs are summary indicators obtained from information already reported in these notes. Specifically, they are the results of dividing compensation per employee (which, with reference to the QNA, would be the quotient of compensation of employees and employees in full time equivalent jobs), between productivity or output obtained per person employed (assessed as the quotient of GDP and persons employed in full-time equivalent jobs). The result of this quotient, i.e. ULCs, show developments in compensation per employee, in relation to productivity, and alerts analysts to competitiveness risks when the former registers a higher growth rate than the latter.

10.3 Quadrennial wage structure survey

The quadrennial wage structure survey *[Encuesta Cuatrienal de Estructura Salarial (ECES)]* conducted by the INE also fits in the framework of the cited Regulations on structural statistics. Although a survey of this type was already disseminated in reference to 1995, following promulgation of the above-mentioned Regulation that established the four-year periodicity of the Survey, only the 2002 survey was conducted and published in November 2004. Unlike the three ECLs, the ECES: (1) measures wages *collected by workers* rather than wages paid by employers, in terms of gross wages (base wages, special pay, overtime and wage supplements) as well as net wages (gross wages less social contributions and tax withholdings); (2) reflects wages in the questionnaire on an individual basis plus many variables related to the worker, making it possible to establish relationships between wages and some variables that can help determine the levels involved (such as education level, seniority, type of contract, or position). In other labour cost statistics, information is provided on aggregate wages per corporation, establishment, or the total, and substantially homogeneous groups within an establishment, although without any individual information; (3) the wage level is compared with some other variables that collectively affect the workers in an establishment or corporation, and these relationships had not been considered before: the target market for the company's output; whether or not of a collective bargaining agreement exists and its framework, if applicable; (4) this survey not only includes average earnings, but also their distribution; and as a result, it can be used to study wage inequalities. The ECES publishes wages according to a series of characteristics (regional communities, activity sectors, jobs, type of work schedule, gender, type of contract, level of education, age, seniority in the firm, nationality of the workers, etc.). As in the case of the EACL and ECCL, with which it

has redundant elements, the ECES contains extremely useful data in studies of the wage structure and price setting, particularly because INE provides individual data from these surveys, at the analyst's request. We can wonder, in any case, why these three surveys (EACL, ECCL and ECES), and even the four (including the ETCL), all established under European regulations, are not being combined into a single quarterly survey more detailed than the present one, with occasional supplementary modules during some prefixed quarters to obtain further details. The current effort to maintain four surveys that are complementary but not totally uniform is costly and the output, which is of great analytical value, might be more useful with shorter publication lags from the reference period (to date, the publication lags have been approximately two years). Fortunately, the National Statistical Plan 2005-2008 includes in its operational objectives the integration of these structural surveys into the ETCL, which will help solve the problem.

10.4 Collective bargaining agreement statistics

Exploitation of the administrative registers for which the MTAS is responsible makes it possible to prepare other statistics in which employment and wage variables are closely related. Perhaps the most interesting factor is the collective bargaining agreement statistic *(Estadística de Convenios Colectivos),* with monthly periodicity, which is derived from the statistical statement that must be completed by the collective bargaining committees and filed with the Official Register of Collective Bargaining Agreements managed by a unit of the MTAS. In addition to other details, this statistic provides the number of agreements, the number of agreements that have revision clauses, the number of workers affected, and the wage increase and average work schedule agreed in its framework, as well as a breakdown by economic branch and other parameters. Clearly, this information constitutes flash estimators on trends in the wage bill and, *a posteriori,* makes it possible to assess the effects of safeguard clauses when the agreements are referenced to inflation. Other statistics similar in nature, origin and periodicity are disseminated, along with figures on conflicts, in the MTAS labour statistics bulletin *(Boletín de Estadísticas Laborales).* They are also provided in summary form in Chapter 24 of the *Boletín Estadístico,* Banco de España. These summary statistics include statistics on strikes, employment regulation, opening of job centres, etc.

Note 11. Price statistics

11.1 Consumer price index (CPI)

As we learn from Chapter 13 of this publication, in respect of price dynamics, there is no question as to the importance of consumer price indices from the central bank's standpoint, as their trends show whether or not price stability, which is the main objectives of these institutions, is being maintained. Chapter 13 shows other uses of these indices (wage bar-

gaining; revision of pensions, rents; etc.; establishment of inflation targets; monetary policy benchmarks; as occurs in the framework of the euro area; calculation of the private consumption deflator in the National Accounts, etc.), that justify providing information here on the key characteristics of the Spanish consumer price index prepared by INE. The latter in fact publishes two indices of this type, namely the consumer price index *(Indice de Precios de Consumo)* properly speaking, and the index of harmonised consumer prices *(Indice Armonizado de Precios de Consumo),* which is Spain's contribution to the consumer price indices of the euro area (CPI-EUR or HICP-EUR) and of the European Union (CPI-EU or HICP-EU), prepared by Eurostat. The 2001 base system of consumer price indices (*Sistema de Índices de Precios de Consumo Base 2001)* has been in effect since January 2003, when it replaced the base 1992 consumer price index *(Índice de Precios de Consumo Base 1992).* With the term "system", INE alludes to the fact that, unlike prior bases in which the CPI was calculated from a fixed purchase basket that reflected household consumption at a given point in time (1992, for example), the CPI began to be calculated based on a basket to be renewed over time, and to reflect other new information, making the current CPI a more dynamic indicator, as the weightings are updated on an annual basis[19], and new products can be incorporated when their consumption is significant. It also includes prices of offers, reductions and promotions, and permits introduction of methodological improvements without making a base change. Other characteristics of the CPI that has been in effect since January 2002 are: (1) information on household expenditure on consumer goods and services comes from the Spanish quarterly survey of household expenditure (ECPF); (2) consumption expenditure of the population residing in family dwellings is investigated; (3) consumption is measured in terms of effective expenditure on consumer goods, which implies not including capital goods (such as housing purchases, a detail that is relevant, as some analysts prefer to include in these indices developments in prices of owner-occupied housing) or imputed or similar expenditure (imputed rents on own housing, home consumption, self-supply, allowances in kind and subsidised consumption in education and health are not reflected); (4) to calculate the index for a period t, a chained Laspeyres index is used, that consists in referring prices for the current month to prices for December of the previous year, weighted to reflect the expenditure structure as indicated in the footnote, which makes it possible to avoid the weighting updates causing breaks in the CPI series; (5) weightings refer to 12 expenditure groups according to the *Classification of Individual Consumption by Purpose* (COICOP), derived from the grouping of the 484 items considered, on which more than 2,000 prices are taken in more than 90 municipalities and as many as 140 for food price readings. The territorial details for publication of the CPI are the regional (autonomous) communities, provinces, Ceuta and Melilla, and partial indices are prepared for the 12 expenditure groups, which are partial indices of special analytical interest (non-energy goods, services and non-energy manufactured goods, etc.) and in respect of underlying inflation, which measures developments in the general index without

[19] At the beginning of each year, a new weighting structure is established based on household expenditure according to the household continuing budget survey (ECPF) during a period of eight quarters in the three previous years. Accordingly, from January of year n, the weighting structure is established based on expenditure during quarters II-IV of year (n-3), quarters I-IV of year (n-2) and quarter I of year (n-1).

the influence of unprocessed food products (subject to seasonal price fluctuations) and energy (for which the prices are affected by movements beyond any possible internal control); and (6) the CPI is distributed in the middle of the month following the data reference month, according to a preannounced timetable, which constitutes one of its key advantages from the analytical standpoint and lends transparency to this work.

11.2 Harmonised index of consumer prices (HICP)

The Harmonised Index of Consumer Prices *[Índice Armonizado de Precios de Consumo (IAPC)]* aims to measure inflation in Spain uniformly with the other countries of the European Union, so that comparisons can be established between them. The process of harmonisation that has been carried out over the years in the framework of Regulation 2494/95 et seq. has meant that conceptual differences between the HICP and CPI, where Spain is concerned, are being phased out (treatment of education and health expenditure, *inter alia)*. Some minor issues remain in operations to be considered (the CPI includes specific insurance and used-car dealing operations not include in the HICP) and in the coverage of the population whose expenditure is being studied, which is slightly different, as the HICP includes expenditure of the entire population living in individual homes or in collective establishments (the latter are not included in the CPI), and of foreign tourists in Spain, and excludes expenditure of Spanish tourists in other countries. These two differences explain why total expenditure reflected in the HICP exceeded, by approximately 5 percent (–3 percent in the first case and +8 percent in the second), total expenditure reflected in the CPI, which does not prevent trends in the HICP and CPI from coinciding in practice, owing to the great similarities between the two indices and the fact that they share the same production process. Further, the HICP, like the IPC, includes consumption items classified at a specific level of the COICOP, that exceed one per thousand of total purchase basket expenditure, as derived from the household expenditure survey *(Encuesta Continua de Presupuestos Familiares)*. The Spanish contribution to the European Union's HICP is published jointly with the CPI in the middle of each month and, a few days later, Eurostat disseminates the harmonised European indices into which the Spanish contribution is integrated, including details to supplement those included in the INE press release. The European indices are prepared as a weighted average of the HICPs of the constituent countries, using private consumption expenditure in the National Accounts as a weighting factor. In addition, since November 2004, INE, in compliance with the commitments undertaken in the framework of PEEI preparation, at the request of the Commission and Council of the EU in 2003, began to publish, in the last few days of each month, a flash estimator on trends in the Spanish HICP referring to that month, also according to a preannounced timetable, which is very useful to analysts owing to the practical identification of developments in the HICP and CPI. Last, with relation to the CPI and other price indicators (fundamentally IRPI discussed below) it is appropriate to quote here a sentence from the National Statistical Plan (PEN) 2005-2008, approved by the Standing Committee of the Superior Statistics Council, which reads: "in this connection (improving the representativeness of price indices), the advantages of different available methodologies should be

optimised to avoid biases derived from insufficient consideration of product quality changes, including, *inter alia,* [...] the possible estimation of hedonic prices, particularly in products potentially most affected by these problems, such as computers and other related products, automobiles, housing and electrical household appliances. The results obtained in this connection should be reflected in better quality and adaptation of the estimation methodologies of the indices in question. This effort will enhance reliability of the key macro-magnitudes in the Spanish economy." This recommendation has not led to any explicit projects in the PEN for 2005-2008.

11.3 Producer price index (IPRI)

As in the case of consumer price indices, the analytical utility of the Producer Price Index (IPRI) is evident, if we consider that the components of the IPRI corresponding to capital goods are used as investment demand deflators, subject to the appropriate adjustments[20], and non-energy and energy IPRIs are used as deflators for output and value-added for industry and energy, respectively. Availability of IPRI data with substantial detail in activities, and by economic purpose of goods enables us to analyse inflation in different processes and stages of production of industrial goods. The current IPRI is a monthly 2000 base index prepared by INE in the framework of Council Regulation (EC) 1165/98 concerning short-term statistics[21] published beginning in January 2003 with data for that month and the 12 months of 2002. For the preceding years, INE established an official link with the 1990 base. Prices measured with the IPRI are the basic prices from the producer's perspective not including transportation and marketing and billed VAT, but including the remaining taxes related to production, net of subsidies. These prices are effectively applied to products manufactured and sold (not consumer materials) in the domestic Spanish market (not exported), on a given day (not average prices during a period). Accordingly, the INE calculates the index on prices of industrial goods intended for the domestic market (domestic IPRI). Coverage of the index extends to all industrial sectors except construction. In other words, it includes industries in mining, manufacturing and production and distribution of gas and power, in accordance with the Spanish Official Nomenclature (CNAE 93), which makes it possible to calculate indices by branch of activity with a three-digit level of detail. At the more disaggregated level of CNAE 93,

[20] The basic IPRI information considers automobiles in the index to be capital goods (durable consumption goods) while the National Accounts system considers them current household consumption, which requires adjustment in the IPRI data to calculate capital goods deflators. Further, to calculate these investment demand deflators, Unit Value Indices (UVI) must also be used for imported capital goods, as the IPRI only reflects developments in prices for industrial goods manufactured and sold in the Spanish domestic market (i.e. it is a domestic IPRI). UVIs are prepared by the Ministry of Economy and Finance and disseminated, *inter alia,* in Economic Indicator 5.4 in the indicators distributed as an appendix to the Banco de España's monthly *Boletín Económico.*

[21] The Regulation establishes a common framework for production of community statistics for analysis of short-term trends in supply and demand, production factors and prices. As will be observed with many indicators discussed below, Regulation 1165/98 is the main European reference for short-term economic statistics.

the class *(clase)* of each activity is represented by a "basket of products" according to the PRODCOM classification, which is the same as is used in calculation of the Industrial Production Index (IPI). Products in each basket are comprised of varieties *(variedades)* that are goods having uniform physical features, that, in turn, are comprised of subvarieties *(subvariedades)* of products that are the specific models of each variety produced by a given establishment comprising the units whose prices are reflected in the calculation of the index. Simple indices are calculated (the quotient of the price in t and the price in the base year) for the subvarieties. Price indices for varieties are calculated as the simple arithmetic mean of the subvarieties indices. This basis is used to calculate the IPRIs for the products (baskets), the IPRIs for the branches and the general IPRI, using the weighted arithmetic mean of the simple indices comprising the group with the weightings established for the base year (Laspeyres formula). In the case of product indices, the average for the variety indices is weighted to reflect the value of output during the base year of the Industrial Survey of Products for 2000 (EIP 2000) conducted by INE. In the branches (CNAE 93), the average of the product indices is weighted with the turnover from the Industrial Survey of Corporations for 2000 (EIE 2000) conducted by INE, cleared of sales to the external market. Turnover under EIE 2000 is also the weighting factor used to obtain the general index as the average of the sector index. In addition to the IPRI by branch of activity, IPRIs are published by regional (autonomous)ommunity and by major industrial sector (GSI), which is a classification based on the economic purpose of goods and products. The GSI classifies these under: consumer goods (durable and non-durable), capital goods; intermediate goods and energy. PEEIs and the European legislation on short-term statistics include, in addition to the *domestic IPRI,* the price index on imported industrial goods *(non-domestic IPRI)* and the price index for industrial goods, intended for the domestic market and for export *(total IPRI)*. The latter two estimates are still pending preparation by INE, which uses, to approximate the non-domestic IPRI, the unit value indices of imported goods prepared by the Ministry of Economy and Finance. The *domestic IPRI* is disseminated by INE according to a preannounced calendar, and the PEN 2005-2008 has provided for implementation of import price indices, making the distinction between import prices from the EU, the euro area and others.

11.4 Unit value indices

As indicated in the footnote of the foregoing section, unit value indices (UVI) are prepared by the Ministry of Economy and Finance, which disseminates them, *inter alia,* in statistical publications of Banco de España (indicator 5.4 in the *Boletín Económico* and Tables 17.6 and 17.7 of the *Boletín Estadístico)*. The available details, for both imports (entries, in the case of those from the EU) and exports (dispatches, in the case of those to the EU) are 1995 base indices, or rates of change calculated on that basis, for consumer goods UVIs (food and non-food items), capital and intermediate goods, energy and non-energy (industrial or agricultural). Unit values are the quotient of the value of goods and the measurement unit (quantity, weight, number) and applied to the case of foreign trade goods, are used as price trend indicators. Without addressing the complexities of the preparation of these indices in

this note, based on the customs statistics[22], we can easily understand the difficulty in measuring true price developments when the baseline information, even the most detailed, is available in such an aggregated form that it is difficult to guarantee uniform composition over time, which may explain the volatility observed in these indicators. In any case, the available UVI series, that refer to a base that is very remote in time, are the only series of deflators that analysts can use pending preparation of *non-domestic IPRIs* as discussed above and in the Regulation on short-term statistics. The advantage of *non-domestic IPRIs* derives from the fact that all EU countries are required to follow a uniform methodology in their preparation. Further, it would seem clear that the Regulation does not promote use of customs statistics to compute prices, as "economic activity units" (equivalent to establishments) are set as the trend observation units. It is also provided that the unit value index can only be accepted as an approximation of this variable if basic prices in the non-domestic market are not available. We can expect that the development by INE of import price indices *(non-domestic IPRI),* in the framework of the PEN 2005-2008, will help provide analysts with some deflators that can be used to adequately determine the contribution of foreign trade to trends in demand and, therefore GDP at constant prices. While these new indicators are being prepared, analysts require a more current base for the UVIs than are being published.

11.5 Input and output prices of farmers and stockbreeders

The index of output prices of farmers and stockbreeders functions similarly to the IPRI in the calculation of deflators, in this case for output, and value added of the agricultural branches (among other publications, it is disseminated in Table 25.8 of the *Boletín Estadístico* of Banco de España). The available index, prepared by the Ministry of Agriculture and Agricultural Products (MAPA), is monthly in periodicity, base 2000. The index distinguishes between prices for plant products, both agricultural (cereals, vegetables, fruits, etc.) and forestry products, and prices of animal products (cattle for local consumption and cattle products). The prices monitored are for a series of products, with certain specifications, through commercial operations in which farmers participate as sellers, collected directly from sellers or through cooperatives and marketing associations. Valuation uses ex farm prices, not including transportation and marketing costs. In the methodology corresponding to base 1995 (the base 2000 methodology had not been published at end 2004), the indices are calculated using the Laspeyres formula with weightings based on the average quantities consumed during the period 1994-1996 for certain specifications of products that, in the case of agricultural products, as they are subject to seasonal fluctuations, are referenced to each month of the year. In respect of the *index of input and output prices of farmers and stockbreeders (Indice de Precios Pagados a los Agricultores y Ganaderos),* price trends are calculated in prices for a series of inputs in the current account (stock feed, fertiliser, energy, fuel, etc.) and the capital account (machinery and other goods, and investments in con-

[22] See *Metodología de los índices de valor unitario de comercio exterior. Base 1995,* (Methodology of unit value indices for foreign trade. Base 1995) DG de Política Económica, Ministerio de Economía, December 2001.

struction). Like the index of output prices, the index of input prices is monthly in periodicity and is prepared by MAPA through the use of a specific survey. It is disseminated, inter alia, in Table 25.8 of the monthly *Boletín Estadístico* of Banco de España. Its base is 1995 and it is calculated using the Laspeyres formula, that applies a number of fixed weightings for all of 1995. The available information cannot be used to determine how the weighting table was calculated. Last, MAPA also publishes a number of weekly indicators of *average national agricultural product prices* that are more relevant at the national level (known as control prices). They are average weighted prices obtained from listings registered on the most relevant markets and that permit a detailed monitoring of the cyclical position of the market for each of the products specified, throughout the marketing season. Along with the average agricultural output price indices, they are also the indicators used in calculation of developments in agricultural income.

11.6 Unsubsidised housing price index

Housing price trend indicators are essential in the calculation of specific output deflators and value added in construction. Along with other construction cost indicators, they are part of the summary indicators that analysts use for that purpose. Further, developments in housing prices are affected in part by debt in many households. In addition, housing is the most important component of household wealth, as evidenced by the survey of household finances *[Encuesta Financiera de las Familias (EFF)]*[23]. Banco de España's analysts monitor the dispersed and incomplete statistical information available in this connection. Specifically, among other housing market indicators that Banco de España includes in the Summary of Economic Indicators *(Síntesis de Indicadores Económicos)* and disseminates at its website, we find the growth rate in the unsubsidised housing price index [*Índice de Precios de la Vivienda Libre* (IPVL)], determined through assessments of unsubsidised housing, in reference to the national total, related to new and used housing, situated in municipalities in certain population brackets, which are series with quarterly periodicity. These indicators also reflect the price in euro per square metre of housing in reference to the national total. The IPVL is prepared by the Ministry of Housing (and was prepared until mid-2004 by the Ministry of Development), based on data from unsubsidised housing mortgage assessments prepared by the major assessment firms, including TINSA, the company that processes the largest volume of assessments and that disseminates its own data on housing prices, that is more timely than the data from the Ministry of Housing. This information can be used to constitute a flash estimator for the IPVL. The series by the Ministry of Development are base 1987 and those of the Ministry of Housing are base 2001. Banco de España has formulated a link between the two series for its own analysis. The amount of data used to generate the IPVL has been quite uneven over time, which inevitably affects the reliability of different observations. Accordingly, assessments used increased from approximately 20,000 in 1987 to more than 750,000 in 2003. Assessments are grouped from the lowest level (postal districts), cities, provinces, regional (autonomous) communities and the national to-

[23] See Note 8 on the survey of household finances.

tal, and simple indices are weighted to reflect the number of housing units in the different groups (population figures were used until January 2004).

11.7 Statistics on the new housing supply in urban areas

A possible alternative to an assessment based index is to prepare price indices based on trends in prices of new housing developments. Since 1990, the Ministry of Development has been preparing an annual survey on the supply of new housing in urban areas, based on the monitoring of housing developments on sale in different Spanish cities, involving unsubsidised income, official protection, or adjusted prices (although an under-representation is acknowledged of the latter two owing to the special features of their marketing; this information is accordingly not disseminated in the statistics). Survey staff visit thee developments and show interest in purchasing housing. They collect information on the following variables, among others: total price and price per square metre, size, number of bedrooms and bathrooms, kitchen equipment, type of housing, whether unsubsidised, subsidised, officially protected *[Viviendas de Protección Oficial (VPO)]* or appraised value, the type of building, whether a block or semidetached, existence of garage and its price, mortgage, etc.). The information, with annual periodicity, is disseminated in the *Anuario Estadístico* of the Ministry of Development, which reflects, among other details, the price of unsubsidised housing per square metre and the number of bedrooms in selected urban areas. The interest of price indices derived from an effort of this kind is clear, owing to the substantial weight of new housing in gross fixed capital formation, in residential construction output and, ultimately, in GDP[24]. Perhaps the most interesting factors in this survey is that it offers an alternative for estimating quality adjusted new housing prices. Prices are taken from the same development, or from different phases of a development, over time, which implies that the qualities of housing, and their location, should not be expected to vary, and price fluctuations should not include biases in this connection. Bover and Velilla propose a methodology for calculation of hedonic prices, and this is applied for the period 1993-1997. This proposal is being considered in the works in progress cited below.

11.8 Housing statistics prepared by colleges of notaries and registrars

In October 2004, the Superior Notarial Council *[Consejo Superior del Notariado (CSN)]* and the National College of Registrars *[Colegio Nacional de Registradores (CNR)]* each prepared reports on developments in housing prices during the first half of 2004 (CSN) and during the first two quarters of 2004 (CNR). These reports do not indicate very disparate developments, although they are less pronounced than those indicated by the IPVL prepared by the Ministry of Housing, which they supplement. Accordingly, the latter continues

[24] This importance is documented in *"Hedonic house prices without characteristics: the case of new multiunit housing"* by Olympia Bover and Pilar Velilla, Economic Studies No. 73, Servicio de Estudios, Banco de España, 2001.

to be the main statistical base for monitoring these prices, pending preparation of a standardised index co-ordinated by Eurostat, which is not expected to be available until 2007, as discussed below. For the reports cited by CSN and CNR, for which the continuity in time series preparation has yet to be verified, information is obtained from the administrative registers for which they are responsible, with breakdowns by regional (autonomous) community, number of housing units and average price per square metre subject to transfer (for new housing, whether unsubsidised or subsidised, and for used housing). Apart from its evident interest in determining whether housing demand is accelerating or decelerating, it is a better weighting factor than those (number of housing units) now used to prepare the IPVL. Reporting by CSN and CNR also reflects details on mortgage credit related to housing purchases (amount per square metre, by housing price and by housing unit, interest rate, average duration and average payment, among other factors). This information is of great interest as it entails real data per housing unit, which makes it possible, *inter alia,* to calculate housing purchase effort indices (payments due on loans/wage expenditure) which are not based on inferences on average mortgages, interest rates and terms; unlike before these reports were introduced. This constitutes a further argument in support of making these reports periodical publications. In addition, these data on mortgage loans supplement those disseminated by Banco de España (statistics on interest rates applied by credit institutions, Chapter 18 of the *Boletín Estadístico),* INE (mortgage credit statistics) and the Spanish Mortgage Association *(Asociación Hipotecaria Española).*

11.9 Some pending challenges in connection with housing statistics

Eurostat has begun work to prepare a harmonised housing price index with reference to Europe (euro area, EU 15 and EU 25) and to each individual member country. This work is not expected to be completed until 2007. This index, which should be included in the European requirements, with priority similar to the current priority of the statistics included in the 2000 Action Plan, PEEI for 2003, etc., aims to meet demand for a price index for owner-occupied housing that, depending on the results obtained, might be included in the HICP. The work in progress began with pilot surveys that, at least in INE's efforts to complete it in Spain by mid-2004, considered the two alternatives in reference here: an index based on valuations and index based on new housing development prices. The latter index is potentially useful in preparing quality-adjusted indices. Although it is premature to promote the methodology to be adopted ultimately by Eurostat, the credibility of the index will clearly depend on how the correction for biases owing to quality changes is resolved. Last, we should also mention that the proposed objectives of the PEN 2005-2008 in this area refer to the study (rather than preparation of statistics) of potential and effective demand for housing and the possibilities of obtaining information from real property sectors other than housing. The PEN also provides for the Ministry of Housing to continue preparing the IPVL. In the interim it is important to improve housing expenditure weighting factors and the calculation of housing purchase effort indices. In this connection, it would be quite helpful to ensure continuous preparation and timely dissemination for new statistics by the colleges of notaries and registrars.

11.10 Service price index. Hotel price index

Perhaps the most interesting gap to be filled for correct monitoring of prices would be met by a *summary or overall price index for services,* which is currently not available. Such an index would provide details for each of its main constituent groups of activities. The listing of PEEIs requires this index, that, like all indicators included on this list, must be available by 2005. According to the *Status Report on Information Requirements in EMU,* approved by the Economic and Finance Committee (EFC) in May 2004, INE agreed to begin in 2004 to compile prices of some, but not all, activities in the services branch (post and telecommunications, and heavy road transportation). It would be quite useful for analysts to have this index when work has begun to prepare service sector activity indices (See Note 12). Until this indicator is available, we should point out in the overview of partial information available on service prices the hotel price index *[Indice de Precios Hoteleros (IPH)],* base 2001, that since January 2003 has been prepared by INE. The IPH is a statistical measurement of monthly trends in the overall set of key tariffs and prices that corporations charge their customers. Unlike, for example, the CPI, the IPH is a supply price indicator, rather than an indicator of prices paid by households. Nor does it reflect the official tariff applied by hotels; but prices effectively invoiced to different types of customers (households, corporations, travel agencies and tour operators). To obtain the data, the survey on hotel occupancy *[Encuesta de Ocupación Hotelera (EOH)],* also prepared by INE, is used. In this connection, it is used to collect information on tariffs applied to groups for which information is obtained in a specific questionnaire to which approximately 8,500 or 6,500 hotels contribute per month, depending on whether in winter or summer. To calculate the IPH, a chained Laspeyres index is used, and the weighting factor is the average price in each tariff for the occupancies to which each tariff has been applied. The INE disseminates the total index for each month with the details by regional (autonomous) community, tariff (regular, weekend, tour operator, corporate, or group) and by hotel category.

Note 12. Production activity statistics

12.1 Industrial production index

Analysts use short-term economic indicators that permit monitoring of gross value added (GVA) in different branches of activity to supplement and compare information provided by the CNET, and to prepare short-term projections of these aggregates. The key indicator among of these is the industrial production index (IPI), base 2000, prepared by INE with a process similar to one used for the IPRI, as described above. Like the latter, it is prepared in the framework of European legislation on short-term statistics. Like the IPRI, the IPI covers sections C (mining industries), D (manufacturing industries) and E (power production and distribution) of the Spanish National Classification of Economic Activities (CNAE-93), therefore excluding construction and calculated according to the origin of the goods and product. In other words, for each of the different CNAE-93 activity groups up to

the class (clase) level, by purpose of goods and products, according to the classification by major industrial sector (consumer goods, durable and non-durable goods, capital goods, intermediate goods and energy) and by regional (autonomous) community. Preparation of the IPI does not make it possible to isolate variations in quality and quantity in the goods produced. Accordingly, it measures the overall developments in both areas in connection with these goods. The IPI product basket comprises all products in connection with the definition of different activities at the class level according to the PRODCOM classification. The investigation covers 1,100 basic products and 13,200 establishments. The basic indices of the different products and those of each of the remaining activity groups, regional (autonomous) communities and the national total are prepared based on the weightings derived from the industrial survey of corporations *[Encuesta Industrial de Empresas (EIE)]* and the industrial survey of products *[Encuesta Industrial de Productos (EIP)]* corresponding to 2000. The weighting factor for the different activity groups is gross value added from EIE-2000 and, in the case of the products comprising the basket, the output values from EIP-2000 are used. The IPI is included in the PEEIs and, as in the case of the IPRI, is released according to a pre-announced calendar.

12.2 Index of incoming orders in industry and industry turnover index

The index of incoming orders in industry *[Índice de Entrada de Pedidos en la Industria (IEPI)]* and the industry turnover index *[Índice de Cifra de Negocios en la Industria (ICNI)]* are monthly in periodicity and have been prepared by INE since January 2002, with reference to the base year 2000, and are established in the framework of the statistics under the Regulation on short-term statistics. The former is included in the PEEIs. Its interest, in addition to its analytical value, derives from its innovation, as it is not being used to replace similar existing indicators. It is instead an example of the advantages of harmonisation introduced under the above-mentioned Regulation, which requests, in addition to these indices on *total* incoming orders and turnover, *partial* indices that reflect trends in incoming orders from domestic and external sources and the turnover generated by sales on the domestic and external market, none of which are now being prepared by INE. The IEPI and ICNI are compiled with a continuous survey that investigates approximately 13,000 industrial establishments. The IEPI's objective is to provide information on future demand for industrial goods. It is therefore a flash estimator that supplements the IPI, and also the ICNI. The variable to be measured is quantities invoiced, or pending invoicing, in relation to incoming orders received and confirmed by industrial companies during the reference period. The ICNI's objective is to provide information on monthly trends in demand targeting industrial sectors. The objects of measurement are quantities invoiced by industrial corporations during the reference month, in connection with sales of products and industrial services, defined and assessed in the same way that the General Chart of Accounts defines the concept of "net turnover". The information the INE disseminates on both indicators refers, as indicated, to the industry total and to each "major industrial sector", and stresses the economic purpose of goods and products (consumer goods; durable and non-durable goods, capital goods, intermediate goods and energy).

12.3 Short-term industrial survey

The last indicators discussed here that provide information on industrial activities are those derived from the short-term industrial survey *[Encuesta de Coyuntura Industrial (ECI)]* prepared by the Ministry of Industry, Trade and Tourism (MITC). The ECI is a qualitative survey that reflects corporate opinions on a series of variables of total industry (excluding energy, gas, and water production and distribution), construction and major industrial sectors. The variables subject to analysis are developments in production in the past three months (possible opinions are: increase, stabilise, or decrease); expected trends in the next three months (possible responses as above); and other matters such as order book, inventories of finished products, employment and prices; for which similar opinions are requested. These qualitative replies are reduced after the "net percentages" are obtained from the balances of replies for each item, using a special quantification process[25]. The MITC, prepared by ECI in the framework of work under the auspices of the Directorate-General for Economic and Financial Affairs (DG ECFIN) for analysis of the economic cycle[26], updated its weightings in April 2004, moving to the basis of gross value added figures for 2001 estimated with the industrial survey of corporations prepared by INE. The MITC publishes a summary indicator derived from the ECI, known as the industrial climate indicator *[Indicator de Clima Industria (ICI)],* which, since April 2004, has been prepared as an arithmetic mean of seasonally adjusted opinion indicators on the order book, inventories of finished goods (with change of sign) and production trends. The *Boletín Estadístico* of Banco de España provides, with indication of the source that prepared the information, other useful statistics for monitoring of output and related applications in industry, including output and apparent consumption of steel and cement *(Producción y Consumo Aparente de Acero y Cemento)* by the Union of Iron and Steel Corporations and the Association of Cement Manufacturers of Spain; disposable resources and uses for automobiles, commercial vehicles, buses and motor coaches *(Disponibilidades y Utilizaciones de Automóviles, Vehículos de Carga, Autobuses y Autocares),* Directorate General of Transportation (DGT) and Spanish Association of Automobile Manufacturers; gross domestic primary energy consumption and output *(Producción y Consumo Interior Bruto de Energía Primaria)* by MITC; and power output and consumption *(Producción y Consumo de Electricidad),* Red Eléctrica and Unidad Eléctrica SA (UNESA). Use by analysts in most cases is referenced in the appropriate chapters of this publication.

12.4 Construction statistics

Monitoring of activity in the construction sector is fundamentally based on three statistics: the short-term construction sector survey *[Encuesta Coyuntural de la Industria de la Cons-*

[25] See *Las Encuestas de Opiniones Empresariales. Un instrumento útil para conocer la Coyuntura Industrial* [Corporate opinion surveys: a useful instrument in learning about the short-term situation in industry] by Desiderio Aranda, Arturo González and Amadeo Petitbó, *Revista de Economía Industrial,* September-October 1994.

[26] See, for example, the Decision by the Commission on the *Business and Consumer Survey* of 15.6.1997.

trucción (ECIC)], construction sector cost indices *(Índices de Costes del Sector de la Construcción)* and public tendering statistics in construction *[Estadística de Licitación Oficial en Construcción (ELOC)],* all of which are prepared by the Ministry of Development (Ministerio de Fomento). The ECIC methodology was revised to adapt it to Regulation 1165/98 and, since 2002, it has followed the harmonised regulations in the European framework. This revision, however, has yet to be completed. Accordingly, as we will observe below, its full analytical potential has yet to be developed. The ECIC is a quarterly survey that aims to investigate activity of corporations engaged in construction as the main or only activity. The frame of reference is the directory of construction corporations maintained by the Ministry of Development. The research framework focuses only on activities included in Division 45 of CNAE-93 (preparation of works, construction of buildings and civil works, installation of buildings and works, finishing of buildings and works, and rental of machinery with operator). Variables to be investigated are: persons employed, revenue from operations, intermediate consumption and personnel expenditure. These variables in turn are classified by type of works: building (family homes, non-residential and multiple-unit buildings, isolating multiple-unit establishments from the rest of non-residential buildings) and civil engineering. Theoretically, these variables should make it possible to prepare a production account for different types of works defined in the survey. However, publication lags and missing details in reference to family housing and non-residential and multi-unit buildings from 2002, as a result of the above-mentioned revision process, affect their analytical utility[27]. The construction cost index *(Índice de Costes de la Construcción)* is a statistic with monthly periodicity that reflects developments in prices of labour and miscellaneous consumption costs of the total construction, building and civil engineering groups combined. The weightings are obtained from the ECIC registers. The statistics on official tendering procedures in construction *[Estadística de Licitación Oficial en Construcción (ELOC)]* are monthly in periodicity and provide a clear example of the use of administrative data for economic analysis. Tendering procedures are public offers of works disseminated by different administrations and other government institutions (the latter are classified as non-financial corporations in the National Accounts). The tendering register includes the detailed listing of corporations and organisations that engage in tendering procures, inter alia, those that report to the Ministry of Development [Spanish airports and air navigation agency (AENA)]; private railway FEVE; rail infrastructure operator GIF; national railway RENFE; and the state post, telegraph and ports *(Correos y Telégrafos y Puertos del Estado)* among others). The amount of tendering procedures is listed according to the normal type, under building (family housing and non-residential and multiple-unit buildings, isolating multi-unit establishments from the rest of non-residential buildings) and civil engineering, and can also provide the number of months allowed to execute works tendered. This indicator is only of interest in the study of how impetus from governments and related units in this framework pass through to construction activity. With the variables prepared in connection with this set of statistics, the requirements of European legislation on short-term statistics are generally met and, in particular, those of the *PEEIs* with regard to the construction output index *(Índice de Producción de la Construcción)*. This index, quarterly in periodicity, is prepared

[27] The sample elevation process can be found in the methodology disseminated by the Ministry of Development.

based on the value of works carried out by corporations (one of the variables of the ECIC), deflated with the construction cost index (another of the statistics mentioned above). Last, performance indicators in this sector can also include production of some inputs used in construction, such as apparent cement consumption, steel consumption, or production of materials for construction according to the IPI as discussed in the preceding point.

12.5 Retail trade index

Last, in the area of service activity indicators, among others, the retail trade index *[Índice de Comercio al por Menor (ICM)], base 2001,* and the service sector activity indicators *[Indicadores de Actividad del Sector Servicio (IASS)],* base 2000, both prepared by INE in the framework of the Regulation on short-term statistics, are important. The ICM is included among the PEEIs required by the EU and is monthly in periodicity; publication of the results of the new base, linked with the previous one, began in January 2002. The units to be investigated with a sampling process are retail trade corporations whose activity is included in Division 52 of CNAE-93, with the exception of those that repair personal effects. The variables investigated are the turnover of a specific aggregation of CPI groups (food and restaurant, that in turn is divided into personal equipment, household equipment and other goods) and data on employment, which, unlike turnover, are quarterly in periodicity. The results published refer to the general index and the groups described, for total retail trade and trade in department stores. Indices in reference to each regional (autonomous) community are also calculated. To obtain indices on turnover during a specific period, simple indices are weighted with the monthly average sales volume (turnover) during the base year obtained from the annual trade survey *(Encuesta Anual de Comercio)* prepared by INE.

12.6 Service sector activity indicators

Service sector activity indicators *[Indicadores de Actividad del Sector Servicios (IASS)] base 2000,* aim to cover repeated demand for a complete indicator on trends in activity in this sector. Its value added entails 50 percent of GDP, and its persons employed amount to 43 percent of the total. The objective of these monthly statistics is to measure short-term trends in activities of service corporations and, as in the case of the retail trade index *(índice del comercio al por menor),* it is prepared in the framework of European legislation on short-term statistics. The indicators reflect activities of corporations in the following five sectors, with the number of activities investigated following in parentheses: trade (3), tourism (2), transportation (5), information and communication technologies (2) and business services (8). The same variables in the case of ICM (turnover and persons employed) are studied; in fact, the data from retail trade, which is one of the three activities included in this survey, are derived from the retail trade index. The indicators are prepared with a continuous survey that investigates more than 10,000 corporations every month. Also, as occurs with the annual trade survey in respect of the ICM, IASS weightings have been calculated based on structural information provided by the annual services survey prepared by

INE, from which independent weightings were obtained for turnover and persons employed. Monthly indices are published on turnover and persons employed for the five major sectors, although further details are available for 20 activity groups. In short, this summary activity indicator for the services sector, with details for five major services groups, fills a major gap in Spanish statistics that has existed for a number of years. This innovation explains that, unlike other indicators prepared in the framework of Regulation 1165/98, those broadly referred to here begin in January 2002, and it has not been possible to establish instrumental linkages with the previous series. This situation reduces the number of observations available and explains why analysts have not broadly used these indicators. We can expect, however, that they will in fact ultimately constitute a mandatory reference on monthly developments in services. However, we should point out that there are still important service sectors, such as real property and finance service activities, that are not covered by employment and output statistics harmonised with those of the IASS. Last, we should refer to a series of service indicators derived from the administrative registers, that have been available for substantial periods of time and that are important to mention here along with the source. This includes passenger and merchandise transportation statistics *(Estadísticas de Transporte de Pasajeros y Mercancías)* (INE), fuel consumption *(Consumo de Carburantes)* (MITC), related to transportation services; and travellers entering at the borders *(Viajeros Entrados por las Fronteras)* from the Tourism Research Institute. All of these statistics are produced with monthly periodicity, and a summary of each is disseminated, *inter alia,* in Table 23.15 of the Banco de España's monthly *Boletín Estadístico*.

Note 13. Banco de España's publications on economic indicators

13.1 Economic Indicators in the monthly *Boletín Económico*

Banco de España disseminates in its monthly *Boletín Estadístico* more than 6,000 series that, save for exceptional cases, are not subject to specific treatment. In other words, the *Boletín* reflects gross or original series not subject to seasonal adjustment, and without calculation of growth rates, ratios, averages, charts, etc. The exceptions refer to Chapters 1, "Main economic indicators of the euro area" and Chapter 2, "Main economic indicators" for Spain, which are summary chapters; and some other cases in which the statistics in question are specifically a rate or ratio. The objective of the Boletín is to present series, prepared by the Bank itself, the INE, or other organizations, for which the sources are always indicated, so that analysts may apply the techniques they deem most appropriate. Banco de España itself disseminates two publications in which these treatments are used, namely, *Indicadores Económicos* (Economic Indicators) and *Síntesis de Indicadores* (Summary of Indicators). *Indicadores Económicos* are published as an appendix to the monthly *Boletín Económico*, i.e. in the format of a conventional publication. They include a selection of key indicators monitored by analysts at Banco de España, with treatment (calculation of rates, percentages, ratios, trends and, basically, charts) that they consider valid to facilitate their work. Although the indicators are disseminated along with the *Boletín*

Económico, both on the website and in the print version, the website can be consulted as an independent publication, with the further advantage that it is updated as the information becomes available. There are approximately 60 indicators, arranged in 9 chapters.

13.2 Summary indicators. Real convergence indicators for Spain and the EU. ICT indicators. Housing market indicators

The *Summary Indicators* that Banco de España disseminates exclusively at its website reflect substantially more indicators than those included in the monthly *Boletín Económico* and, like many of them, have been covered in these notes. There are indicators disseminated in the *Economic Indicators* and the *Summary Indicators* as the objective, in addition to providing a supplement, is to make them available to analysts quickly and in an easy to manage format, with the placement of many indicators together on one page. Therefore the formal presentation of the *Summary Indicators* is much different from that of the *Economic Indicators.* The indicators reflected in the *Summary Indicators* are largely all available, updated daily with the latest published information and aim to combine the *easiest availability* with the *most timely updating.* These features are applicable to the indicators prepared by Banco de España and to those produced by INE or other organisations that are reproduced in the *Summary Indicators* with indication of the source. Like the remaining Banco de España statistics publications, Summary Indicators is distributed in Spanish and English. Each indicator reflects a minimum treatment with rates of change, percentages, levels, etc., as required by analysts, and a series of observations grouped from shorter periods (there are many indicators with daily periodicity, although most are monthly) to longer ones (weekly, monthly, quarterly and annual). However, in addition to the presentation of indicators in conventional tables in PDF format, the individual time series for each of them, that cannot be published in the cited tables owing to space limitations, are provided in CSV format.

In addition to the objectives discussed in the preceding point, it has been learned from experience acquired since the Bank began preparing this *Summary* that this publication should be used to disseminate some blocks of summary indicators of special analytical interest, in most cases, prepared by Banco de España. This is true for the blocks of indicators on real convergence between Spain and the EU, information and communication technologies, and the housing market. The *Summary* is comprised of three major groups of indicator tables referring respectively to (1) Spain; (2) The euro area; and (3) The international economy. The first block of indicators in reference to Spain, "general economic indicators", comprises more than 100 monthly indicators (also in aggregate form in monthly, quarterly and annual series) and quarterly indicators (also in aggregate form in annual series). The same type of aggregation is presented for the block of financial indicators, which comprises approximately 40 daily series indicators and some 60 monthly and quarterly ones. The block of real convergence indicators between Spain and the EU includes an *ad hoc* preparation of more than 50 indicators that compare Spain with the EU 15 and with the EU 25, including a number of methodological notes that explain how they are prepared. Indicators on information and communication technology and housing market indicators include more than 40 in each case, and there is broad documentation for those included in each block.

Last, the euro area indicators and international economic indicators respectively reflect more than 50 indicators referring to the euro area as a whole and more than 20 indicators on each of the following countries, U.K., U.S., Japan, Brazil, Mexico, Argentina and Chile, and two indicators for each of six emerging economies in Southeast Asia and four transitional economies in Eastern Europe.

Annex 2. Selection of tables and accounts in connection with aggregates projected in forecasting exercises

TABLE 1 MAIN MACROECONOMIC AGGREGATES. CONSTANT PRICES (a)

IN PERCENT

	1999	2000	2001	2002	2003	2004
1. National final consumption expenditure	4.5	4.4	3.0	3.1	3.1	3.8
1.1. National final consumption, households and NPISHs	4.7	4.1	2.8	2.9	2.9	3.5
1.2. Final consumption expenditure, general government	4.2	5.6	3.5	4.1	3.9	4.9
2. Gross capital formation	9.0	5.3	2.7	1.8	3.4	5.4
2.1. Fixed capital	8.8	5.7	3.0	1.7	3.2	4.6
Capital goods	*7.8*	*4.7*	*-1.2*	*-5.4*	*1.0*	*5.8*
Construction	*9.0*	*6.2*	*5.3*	*5.2*	*4.3*	*4.4*
Other output	*10.3*	*6.1*	*3.7*	*3.0*	*3.0*	*3.2*
2.2. Change in inventories (b)	0.1	-0.1	-0.1	0.0	0.1	0.2
3. National demand (1+2)	5.6	4.6	2.9	2.8	3.2	4.2
4. Exports of goods and services	7.7	10.1	3.6	1.2	2.6	4.5
4.1. Goods	6.5	10.0	2.4	3.0	3.9	6.9
4.2. Services	10.7	10.3	6.5	-2.6	-0.4	-1.5
Tourism	*9.4*	*5.4*	*3.3*	*-7.3*	*-0.3*	*-1.8*
5. Final demand (3+4)	6.1	5.8	3.1	2.4	3.1	4.3
6. Imports of goods and services	12.6	10.5	3.9	3.1	4.8	9.0
6.1. Goods	12.3	10.5	3.3	3.4	5.2	9.9
6.2. Services	13.9	10.9	7.3	1.6	2.8	4.5
Tourism	*12.3*	*9.3*	*9.2*	*4.9*	*5.0*	*21.8*
7. Gross domestic product (5–6)	4.2	4.4	2.8	2.2	2.5	2.7
MEMORANDUM ITEMS						
National demand (not including change in inventories)	5.6	4.7	3.0	2.8	3.1	4.0
Contribution of net external demand	-1.4	-0.3	-0.2	-0.6	-0.8	-1.7

SOURCES: INE (National Statistics Institute) and Banco de España.

a. Rates of change.
b. Contributions to GDP growth.

TABLE 2 GDP AND DEMAND COMPONENTS. DEFLATORS (a)

IN PERCENT

	1999	2000	2001	2002	2003	2004
1. National final consumption	2.5	3.2	3.3	3.4	3.2	3.4
1.1. National final consumption, households and NPISHs	2.4	3.1	3.3	3.4	3.1	3.0
1.2. Final consumption expenditure, general government	2.7	3.5	3.2	3.4	3.4	4.7
2. Gross capital formation	3.7	7.0	4.0	4.5	5.0	9.4
2.1. Fixed capital	3.8	7.1	4.0	4.5	5.0	6.3
Capital goods	*1.7*	*4.3*	*1.0*	*1.6*	*1.9*	*2.1*
Construction	*4.5*	*8.8*	*5.5*	*5.3*	*6.0*	*7.9*
Other output	*5.2*	*6.8*	*3.7*	*4.7*	*5.4*	*7.1*
2.2. Change in inventories	2.6	3.1	2.6	2.1	4.2	154.2
3. National demand (1+2)	2.8	4.2	3.4	3.6	3.6	5.0
4. Exports of goods and services	0.4	7.3	2.7	1.1	0.7	-0.2
4.1. Goods	-1.0	8.4	2.1	0.0	-0.4	-1.1
4.2. Services	3.4	5.0	4.0	4.0	3.3	2.8
Tourism	*3.8*	*5.3*	*5.0*	*4.9*	*3.9*	*3.1*
5. Final demand (3+4)	2.2	4.8	3.3	3.1	3.0	3.9
6. Imports of goods and services	0.7	9.7	0.5	-1.3	-0.2	2.7
6.1. Goods	0.4	10.4	-0.2	-1.9	-0.3	2.9
6.2. Services	2.1	6.6	3.7	1.6	0.8	2.5
Tourism	*2.1*	*5.4*	*2.1*	*0.4*	*-0.8*	*1.2*
7. Gross domestic product (5-6)	2.8	3.4	4.2	4.5	4.0	4.4
MEMORANDUM ITEMS						
Real terms of trade	-0.3	-2.1	2.2	2.5	0.8	-2.8

SOURCES: INE and Banco de España.

a. Rates of change.

TABLE 3 COMPOSITION OF FINAL DEMAND AND VALUE-ADDED DEFLATORS (a)

IN PERCENT

	1999	2000	2001	2002	2003	2004
1. Final demand deflator	2.2	4.8	3.3	3.1	3.0	3.9
1.1. External component	6.9	14.6	1.3	-0.7	1.5	7.4
Imports per unit of final demand	*6.1*	*4.4*	*0.8*	*0.6*	*1.7*	*4.5*
Import deflator	*0.7*	*9.7*	*0.5*	*-1.3*	*-0.2*	*2.7*
1.2. Domestic component	1.0	2.0	3.9	4.3	3.4	2.8
GDP per unit of final demand	*-1.7*	*-1.4*	*-0.3*	*-0.2*	*-0.5*	*-1.5*
GDP deflator	*2.8*	*3.4*	*4.2*	*4.5*	*4.0*	*4.4*
Net taxes per unit of output (b)	*10.2*	*4.1*	*1.3*	*6.0*	*9.1*	*9.0*
VA deflator (c)	*2.3*	*3.4*	*4.4*	*4.4*	*3.9*	*4.1*
2. VA deflator (c)	2.3	3.4	4.4	4.4	3.9	4.1
2.1. Labour cost per unit of value added	2.4	2.8	3.4	3.5	3.9	3.6
Compensation per person employed (d)	*2.7*	*3.5*	*3.8*	*4.3*	*4.3*	*4.0*
Value added per person employed	*0.2*	*0.6*	*0.4*	*0.8*	*0.4*	*0.4*
Real value added	*3.9*	*4.4*	*2.9*	*2.2*	*2.1*	*2.6*
Persons employed	*3.7*	*3.7*	*2.5*	*1.4*	*1.7*	*2.1*
2.2. Gross operating surplus per unit of VA (e)	2.0	4.5	6.4	6.2	3.8	5.0
3. VA deflator, market economy (c)	2.1	3.4	4.6	4.5	3.9	4.2
3.1. Labour cost per unit of value added	2.2	2.8	3.5	3.4	3.9	3.3
Compensation per person employed (d)	*2.2*	*3.4*	*3.9*	*4.0*	*4.0*	*3.2*
Value added per person employed	*0.0*	*0.6*	*0.4*	*0.6*	*0.2*	*-0.1*
Real value added	*4.1*	*4.4*	*2.9*	*2.1*	*1.9*	*2.4*
Persons employed	*4.1*	*3.8*	*2.5*	*1.5*	*1.7*	*2.5*
3.2. Gross operating surplus per unit of VA (e)	2.1	4.3	6.5	6.4	3.9	5.7
MEMORANDUM ITEMS						
Compensation of employees	7.3	8.2	6.9	6.2	6.7	6.2
Compensation of persons employed	6.5	7.3	6.4	5.7	6.1	6.2
Real ULCs (level)	67.0	66.6	66.0	65.4	65.5	65.2
Real ULCs, market economy (level)	63.3	62.9	62.3	61.6	61.6	61.0

SOURCES: INE and Banco de España.

a. Year-on-year rates of change, seasonally adjusted data.
b. Taxes on output net of subsidies.
c. Basic prices.
d. Computed with compensation per employee.
e. Includes other taxes on output net of subsidies.

TABLE 4 COMPOSITION OF VALUE-ADDED DEFLATORS: BRANCHES OF ACTIVITY (a)

IN PERCENT

	1999	2000	2001	2002	2003	2004
MARKET ECONOMY						
1. Unit labour cost	2.2	2.8	3.5	3.4	3.9	3.3
1.1. Compensation per person employed (b)	2.2	3.4	3.9	4.0	4.0	3.2
1.2. Output per person employed	0.0	0.6	0.4	0.6	0.2	-0.1
Real value added	*4.1*	*4.4*	*2.9*	*2.1*	*1.9*	*2.4*
Persons employed	*4.1*	*3.8*	*2.5*	*1.5*	*1.7*	*2.5*
2. Gross operating surplus, with taxes	2.1	4.3	6.5	6.4	3.9	5.7
3. VA deflator	2.1	3.4	4.6	4.5	3.9	4.2
MEMORANDUM ITEMS: Real ULCs (c)	63.3	62.9	62.3	61.6	61.6	61.0
AGRICULTURE						
1. Unit labour cost	4.0	-3.4	7.7	-1.1	1.7	0.7
1.1. Compensation per person employed (b)	2.0	3.3	3.4	4.9	2.8	2.3
1.2. Output per person employed	-2.0	6.9	-4.0	6.0	1.0	1.6
Real value added	*-5.1*	*2.7*	*-2.9*	*1.7*	*-1.4*	*-0.6*
Persons employed	*-3.2*	*-3.9*	*1.1*	*-4.1*	*-2.4*	*-2.1*
2. Gross operating surplus, with taxes	-5.3	1.6	7.0	-0.1	6.5	3.7
3. VA deflator	-0.9	-0.8	7.3	-0.6	4.2	2.3
MEMORANDUM ITEMS: Real ULCs (c)	49.3	48.0	48.2	48.0	46.9	46.1
INDUSTRY AND ENERGY						
1. Unit labour cost	1.0	1.8	3.2	2.8	1.1	0.7
1.1. Compensation per person employed (b)	1.8	3.0	4.3	3.6	4.3	3.7
1.2. Output per person employed	0.7	1.1	1.1	0.8	3.2	3.0
Real value added	*3.9*	*3.9*	*2.5*	*0.7*	*1.3*	*2.1*
Persons employed	*3.1*	*2.8*	*1.4*	*-0.1*	*-1.9*	*-0.9*
2. Gross operating surplus, with taxes	-4.0	2.0	-0.7	0.1	1.7	6.7
3. VA deflator	-0.8	1.9	1.8	1.9	1.3	2.7
MEMORANDUM ITEMS: Real ULCs (c)	64.5	64.4	65.3	65.9	65.8	64.5
CONSTRUCTION						
1. Unit labour cost	3.9	5.5	4.7	1.6	4.1	4.6
1.1. Compensation per person employed (b)	2.2	3.7	3.9	3.9	4.6	4.3
1.2. Output per person employed	-1.6	-1.8	-0.7	2.3	0.4	-0.2
Real value added	*8.5*	*6.1*	*5.3*	*5.2*	*4.3*	*3.7*
Persons employed	*10.4*	*8.0*	*6.1*	*2.8*	*3.8*	*3.9*
2. Gross operating surplus, with taxes	5.0	17.6	12.4	21.0	12.1	16.2
3. VA deflator	4.2	8.6	6.8	7.1	6.7	8.5
MEMORANDUM ITEMS: Real ULCs (c)	75.0	72.9	71.5	67.8	66.1	63.7
MARKET-RELATED SERVICES						
1. Unit labour cost	2.1	3.3	3.1	4.4	5.2	4.2
1.1. Compensation per person employed (b)	2.1	3.3	4.0	4.0	3.9	2.7
1.2. Output per person employed	0.0	0.0	0.8	-0.4	-1.2	-1.5
Real value added	*4.4*	*4.5*	*3.2*	*2.2*	*2.1*	*2.5*
Persons employed	*4.4*	*4.6*	*2.4*	*2.7*	*3.4*	*4.1*
2. Gross operating surplus, with taxes	5.0	3.5	8.0	6.7	2.9	3.6
3. VA deflator	3.3	3.4	5.1	5.4	4.2	4.0
MEMORANDUM ITEMS: Real ULCs (c)	59.4	59.4	58.2	57.7	58.3	58.4
NON-MARKET-RELATED SERVICES						
Compensation per employee	4.2	3.6	3.6	5.2	5.1	6.7
VA deflator	3.1	3.6	3.2	3.6	3.7	3.1

SOURCES: INE and Banco de España.

a. Rates of change.

b. Computed with compensation per employee.

c. Levels.

TABLE 5 INSTITUTIONAL SECTOR ACCOUNTS: GENERAL GOVERNMENT

% of GDP

	1999	2000	2001	2002	2003	2004
1. Total revenue	39.4	39.4	39.5	40.2	40.4	40.5
1.1. Current revenue	38.6	38.8	38.9	39.4	39.6	39.8
Taxes on output and imports	*11.7*	*11.7*	*11.4*	*11.6*	*12.0*	*12.4*
Current taxes on income, net wealth, etc.	*10.2*	*10.5*	*10.4*	*10.9*	*10.6*	*10.7*
Social security contributions	*13.1*	*13.3*	*13.5*	*13.5*	*13.7*	*13.6*
Other current revenue (a)	*3.6*	*3.4*	*3.6*	*3.4*	*3.3*	*3.1*
1.2. Revenue from capital	0.7	0.6	0.6	0.7	0.8	0.8
Of which: Tax on capital	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*
2. Total expenditure	40.5	40.3	39.9	40.3	40.0	40.8
2.1. Primary current expenditure	32.2	32.4	32.0	32.5	32.7	33.0
Final consumption expenditure	*17.4*	*17.7*	*17.6*	*17.7*	*17.9*	*18.3*
Of which: Compensation of employees	*10.6*	*10.5*	*10.4*	*10.3*	*10.3*	*10.4*
Social benefits in kind	*12.4*	*12.3*	*12.2*	*12.3*	*12.2*	*12.2*
Subsidies	*1.2*	*1.2*	*1.1*	*1.2*	*1.2*	*1.0*
Other current transfers	*1.2*	*1.2*	*1.2*	*1.3*	*1.4*	*1.5*
2.2. Effective interest paid	3.5	3.3	3.1	2.8	2.5	2.2
2.3. Capital expenditure	4.8	4.6	4.8	5.0	4.8	5.6
Gross capital formation (b)	*3.5*	*3.1*	*3.3*	*3.5*	*3.5*	*3.7*
Other capital expenditure	*1.3*	*1.4*	*1.4*	*1.4*	*1.3*	*1.9*
3. Net lending (+)/borrowing (–) (c) (1–2)	-1.2	-0.9	-0.4	-0.1	0.4	-0.3
MEMORANDUM ITEMS						
Primary balance	2.4	2.4	2.8	2.7	2.9	1.9
Gross debt	63.1	61.3	57.9	55.0	51.4	48.9
Total fiscal revenue	35.3	35.8	35.7	36.4	36.6	37.1

SOURCES: INE and Banco de España.

a. Includes fixed capital consumption (equal to gross operating surplus).
b. Includes net acquisition of non-financial non-produced assets (K2).
c. Definition according to the Excessive Deficit Protocol.

TABLE 6 INSTITUTIONAL SECTOR ACCOUNTS: HOUSEHOLDS AND NPISHs

% OF GDP

	1999	2000	2001	2002	2003	2004
ACCOUNTS FOR ALLOCATION, DISTRIBUTION AND USE OF INCOME AND CAPITAL ACCOUNT						
1. Compensation of employees	50.0	50.1	50.0	49.8	49.8	49.3
1.1 Wages and salaries net of contributions	35.4	35.2	34.9	34.6	34.9	34.4
2. Gross operating surplus and mixed revenue	21.0	20.7	21.0	21.3	21.1	20.9
3. General government effect	-7.8	-8.1	-8.7	-8.6	-8.6	-8.3
3.1. Social security contributions	-13.1	-13.3	-13.5	-13.5	-13.7	-13.6
3.2. Social benefits other than social benefits in kind	12.4	12.3	12.2	12.3	12.2	12.2
3.3. Current taxes on income, net wealth, etc.	-7.1	-7.2	-7.3	-7.4	-7.2	-6.9
4. Other	3.0	3.0	2.4	2.4	2.2	2.1
4.1. Net interest	0.4	0.2	-0.2	-0.4	-0.6	-0.7
4.2. Dividend and other net income	2.2	2.0	2.1	2.1	2.3	2.5
4.3. Other net current transfers	0.8	0.9	0.8	0.8	0.6	0.5
4.4. Rest of social security contributions	-1.6	-1.6	-1.6	-1.6	-1.3	-1.3
4.5. Rest of social benefits other than social transfers in kind	1.2	1.4	1.3	1.5	1.1	1.1
5. Gross disposable income (1+2+3+4)	66.3	65.7	64.8	64.9	64.5	64.0
6. Final consumption expenditure	59.2	58.9	58.4	58.1	57.8	57.5
7. Adjustment for change in net share of households in pension fund reserves	0.4	0.2	0.3	0.1	0.2	0.2
8. Gross saving (5–6+7)	7.4	7.0	6.7	6.9	6.8	6.7
9. Gross fixed capital formation	6.1	6.7	6.8	7.0	7.4	7.7
10. Rest of capital account (a)	0.8	1.0	0.8	0.9	0.8	0.9
11. Net lending (+)/borrowing (–) (8–9+10)	2.0	1.3	0.8	0.8	0.3	-0.1
MEMORANDUM ITEMS						
Gross disposable income (constant prices) (b)	66.4	66.0	65.7	66.5	66.7	67.1
General government effect (constant prices) (b)	-7.0	-7.1	-7.3	-7.1	-6.8	-6.4
Saving rate (c)	11.2	10.7	10.4	10.6	10.6	10.5

SOURCES: INE and Banco de España.

a. Includes net capital transfers, change in inventories and net purchases of valuable objects and non-produced financial assets.
b. Deflated with the private consumption deflator.
c. Levels.

TABLE 7 INSTITUTIONAL SECTOR ACCOUNTS: NON-FINANCIAL CORPORATIONS

% OF GDP

	1999	2000	2001	2002	2003	2004
ACCOUNTS FOR ALLOCATION, DISTRIBUTION AND USE OF INCOME AND CAPITAL ACCOUNT						
1. Gross operating surplus and mixed revenue	18.6	18.5	18.5	18.3	17.9	18.1
2. Current taxes on income, net wealth, etc.	2.5	2.7	2.6	2.9	3.0	3.3
3. Social security contributions - benefits	0.0	0.0	0.0	0.0	0.0	0.0
4. Other net current transfers	-0.3	-0.4	-0.4	-0.4	-0.4	-0.2
5. Net income from property	-4.5	-4.7	-5.7	-5.3	-5.2	-5.0
Net interest paid	*-2.8*	*-2.9*	*-3.5*	*-3.4*	*-3.5*	*-3.4*
Dividends and other net revenue outlays	*-1.8*	*-1.8*	*-2.1*	*-1.8*	*-1.7*	*-1.7*
6. Gross disposable income (1–2+3+4+5)	11.2	10.6	9.9	9.7	9.4	9.6
7. Final consumption expenditure	0.0	0.0	0.0	0.0	0.0	0.0
8. Adjustment for change in net share of households in pension fund reserves	0.0	0.0	0.0	0.0	0.0	0.0
9. Gross saving (6–7+8)	11.2	10.7	9.9	9.8	9.4	9.6
10. Gross fixed capital formation	14.2	15.0	14.7	14.3	14.2	14.5
11. Net capital transfers, changes in inventories and net purchases of valuable objects and non-produced financial assets	0.7	0.6	0.7	0.8	0.7	0.3
Net capital transfers	*1.1*	*1.0*	*1.0*	*1.2*	*1.1*	*1.5*
Change in inventories and net acquisitions of valuable objects and non-produced financial assets	*0.5*	*0.4*	*0.3*	*0.4*	*0.4*	*1.3*
12. Net lending (+)/borrowing (–) (9–10+11)	-2.3	-3.7	-4.2	-3.7	-4.2	-4.7

SOURCES: INE and Banco de España.

TABLE 8 INSTITUTIONAL SECTOR ACCOUNTS: FINANCIAL INSTITUTIONS

% OF GDP

	1999	2000	2001	2002	2003	2004
ACCOUNTS FOR ALLOCATION, DISTRIBUTION AND USE OF INCOME AND CAPITAL ACCOUNT						
1. Gross operating surplus and mixed revenue	2.0	2.3	2.9	2.7	2.5	2.5
2. Current taxes on income, net wealth, etc.	0.5	0.5	0.4	0.6	0.4	0.5
3. Social security contributions - benefits	0.4	0.3	0.3	0.1	0.2	0.2
4. Other net current transfers	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
5. Net income from property	3.0	3.3	3.9	3.7	3.4	3.1
Net interest paid	*4.9*	*4.7*	*4.9*	*4.7*	*4.5*	*4.3*
Dividends and other net income outlays	*-1.8*	*-1.4*	*-1.0*	*-1.1*	*-1.1*	*-1.2*
6. Adjustment for financial intermediation services indirectly measured	3.4	3.5	4.0	3.6	3.4	3.2
7. Gross disposable income (1–2+3+4+5–6)	1.4	1.8	2.5	2.1	2.3	2.0
8. Final consumption expenditure	0.0	0.0	0.0	0.0	0.0	0.0
9. Adjustment for change in net share of households in pension fund reserves	-0.4	-0.3	-0.3	-0.1	-0.2	-0.2
10. Gross saving (7–8+9)	1.0	1.5	2.2	2.0	2.0	1.8
11. Gross fixed capital formation	0.4	0.4	0.5	0.4	0.5	0.6
12. Net capital transfers, change in inventories and net acquisitions of valuable objects and non-produced financial assets	-0.1	-0.3	-0.1	-0.2	-0.1	-0.3
Net capital transfers	*-0.1*	*-0.3*	*-0.1*	*-0.2*	*-0.1*	*-0.3*
Change in inventories and net acquisitions of valuable objects and non-produced financial assets	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
13. Net lending (+)/ borrowing (–) (10–11+12)	0.5	0.8	1.5	1.5	1.5	0.8

SOURCES: INE and Banco de España.

TABLE 9 REST OF THE WORLD ACCOUNT

% OF GDP

	1999	2000	2001	2002	2003	2004
1. Trade balance, goods	-5.1	-6.2	-5.7	-5.1	-5.2	-6.8
Exports, goods (f.o.b.)	*18.8*	*20.7*	*20.2*	*19.5*	*18.9*	*18.7*
Imports, goods (f.o.b.)	*23.8*	*26.9*	*25.9*	*24.6*	*24.2*	*25.5*
2. Tourism balance	4.5	4.6	4.6	4.1	4.0	3.6
Revenue	*5.4*	*5.6*	*5.6*	*5.1*	*5.0*	*4.7*
Payments	*0.9*	*1.0*	*1.0*	*1.0*	*1.0*	*1.1*
3. Balance, non-tourism services	-0.7	-0.6	-0.5	-0.4	-0.4	-0.5
Revenue	*3.3*	*3.8*	*4.1*	*4.1*	*3.9*	*3.7*
Payments	*4.0*	*4.4*	*4.6*	*4.4*	*4.3*	*4.1*
4. Balance, foreign trade in goods and services (1+2+3)	-1.3	-2.2	-1.6	-1.3	-1.6	-3.7
5. Net current transfers	0.5	0.3	0.2	0.4	0.0	0.0
6. Net income from factors	-1.4	-1.4	-1.7	-1.8	-1.7	-1.6
7. Balance of current operations with the rest of the world (4+5+6)	-2.1	-3.3	-3.1	-2.7	-3.3	-5.3
8. Net capital transfers	1.1	0.9	0.9	1.2	1.3	1.1
9. Changes in net assets owing to saving and net capital transfers (7+8)	-0.9	-2.5	-2.2	-1.5	-2.1	-4.2
10. Purch. less transfers, non-financial non-prod. financial assets	0.0	0.0	0.1	0.0	0.0	0.0
11. Net lending (+)/borrowing (–) of the nation (7+8–10)	-1.0	-2.5	-2.2	-1.6	-2.1	-4.2

SOURCES: INE and Banco de España.

TABLE 10 CAPITAL ACCOUNT OF THE ECONOMY

% OF GDP

	1999	2000	2001	2002	2003	2004
1. Gross national savings (a)	23.6	23.2	23.4	23.9	23.9	23.7
General government	2.3	2.2	2.9	3.4	3.9	3.4
Households	8.0	8.0	7.5	7.7	7.6	7.7
Corporations	13.3	12.9	13.0	12.8	12.4	12.5
2. Gross capital formation (b)	24.6	25.6	25.6	25.5	26.0	27.9
General government	3.5	3.1	3.3	3.5	3.5	3.7
Households	6.0	6.7	6.7	6.9	7.3	7.8
Corporations	15.1	15.8	15.6	15.0	15.1	16.4
3. Net lending (+) or borrowing (-) of the nation (1–2)	-1.0	-2.5	-2.2	-1.6	-2.1	-4.2
General government	-1.2	-0.9	-0.4	-0.1	0.4	-0.3
Households	2.0	1.3	0.8	0.8	0.3	-0.1
Corporations	-1.8	-2.9	-2.6	-2.3	-2.8	-3.9

SOURCES: INE and Banco de España.

a. Includes net capital transfers.
b. Includes net purchases of non-produced non-financial assets.