4 INFLATIONARY DYNAMICS OF THE SPANISH ECONOMY IN THE CONTEXT OF THE EURO AREA

1 Introduction

The positive inflation differential vis-à-vis the euro area during the first decade of the single currency has been reversed in recent years, in a disinflationary context…

Consumer price dynamics in Spain during the first decade of monetary union were characterised by the build-up of a positive inflation differential vis-à-vis the euro area. This differential, which was notably sizeable and persistent for most of the decade, gave rise to a strong loss of competitiveness with respect to our euro area partners. However, this tendency reversed during the crisis and the inflation differential has turned favourable to the Spanish economy, showing – as in the previous upturn – a considerable degree of inertia.

The lesser, relative tempo of prices in Spain over the recent period has run in tandem with a very marked easing in the inflation rate. The annual rate of increase of prices has fallen from levels slightly over 5% at the previous cyclical peak to clearly negative figures during most of the current recovery phase, standing on occasion at negative rates of around -1%, a level unprecedented in the recent past. From a sectoral standpoint, the moderation of prices in services, a sector which has traditionally maintained a clear inflationary bias, has been the factor that has most contributed to narrowing the inflation differential with the euro area in the past two years.

… that has been the outcome of several demand- and supply-side factors

The recent disinflationary phase has been characterised by the conjunction of diverse factors, which are analysed in the following section of this chapter. On the demand side, the contraction in domestic private spending has given rise to a wide capacity utilisation gap (see Chapter 3 of this Report). The subsequent increase in cyclical slack has contributed to keeping inflation low throughout this entire episode. In parallel, the reforms to certain markets, most particularly to the labour market, have provided a further – and, foreseeably, more durable – fillip to the moderating path of inflation. This impulse has been reinforced by the negative course of prices in some of the more volatile components of the consumption basket and, especially, by the marked fall in oil prices.

Some of these factors may have lasting consequences on inflationary dynamics and improve the adaptability of the Spanish economy to cyclical fluctuations

The presence of certain new structural elements among the foregoing factors suggests that the relationship between inflation and economic activity, which had held relatively stable in the previous phase of the crisis, may have permanently altered. The entrenchment of a change of this nature in price-setting processes, on which the initial evidence is offered in the second section of this chapter, might entail considerable effects at the aggregate level. In particular, a greater degree of nominal flexibility, especially if this is extensive to wages, might enhance the responsiveness of the Spanish economy to adverse shocks, providing for the greater relative adjustment of prices and less volatility in the level of economic activity and in employment.

Disinflation has essentially been underpinned by the strong easing in labour costs

That said, the moderation in the path of producer prices has, in general, been less than that in the case of costs, on which much of the internal devaluation drive in recent years has turned. Indeed, the gross operating surplus of the economy as a whole has behaved countercyclically since the start of the crisis, which has contributed to partially softening the adverse impact of the easing in unit labour costs (ULCs) on prices. As regards this phenomenon, with which other European economies are not unfamiliar, the third section of this chapter offers evidence on some of the determinants of the recent behaviour of the operating surplus.

Inflation in the euro area and in Spain is expected to resume a level close to 2% in the medium term, but the risk of a low-inflation scenario over an extensive period persists

Looking ahead, the indicators available on inflation expectations, which are analysed in the fourth section of the chapter, are consistent with a relatively slow pick-up in inflation, both in Spain and the euro area as a whole, towards levels closer to the Eurosystem's price-stability benchmark (an inflation rate below, but close to, 2%). However, this pick-up is not free from certain risks, among which a hypothetical disanchoring of long-term inflation expectations would pose the biggest challenge. In fact, the core objective of some of the unconventional monetary policy measures recently adopted by the Eurosystem is to prevent low levels of inflation from ultimately affecting long-term expectations and to dispel the risks – albeit remote – of a deflationary spiral (see Chapter 2 of the original Spanish version of this Report).

The possibility of a low-inflation scenario over a prolonged period evokes matters pertinent to the macro-financial adjustment in which the Spanish economy is immersed. The need to maintain and build on the recent gains in competitiveness calls for a continuing improvement in relative prices vis-à-vis our main trading partners, and the euro area in particular. Hence the pick-up in activity and in the degree of euro area-wide inflation dynamism is a key factor of support for the Spanish economy. At the same time, the absorption of still-high Spanish household and corporate debt would be assisted by the greater dynamism of these agents' nominal income.

The joint application of structural reforms, countercyclical fiscal policies and accommodative monetary measures within the euro area can reduce these risks

The factors underlying low inflation and the attendant risks portray a complex scenario for the euro area as a whole, and especially for those economies such as Spain that are still absorbing the imbalances built up during the crisis and the preceding upturn. The scant leeway available for countercyclical fiscal policies in this latter group of economies and for further interest rate cuts by the ECB limits the number of levers available to reduce the risks of a scenario such as that described. Nonetheless, as analysed in the final section of this chapter, the joint application of structural reforms (in the countries still undergoing adjustment), of fiscal stimuli (in the euro area countries with the headroom to do so) and of monetary policy measures that induce expectations of lower interest rates over a prolonged period can play a very relevant role in this respect.

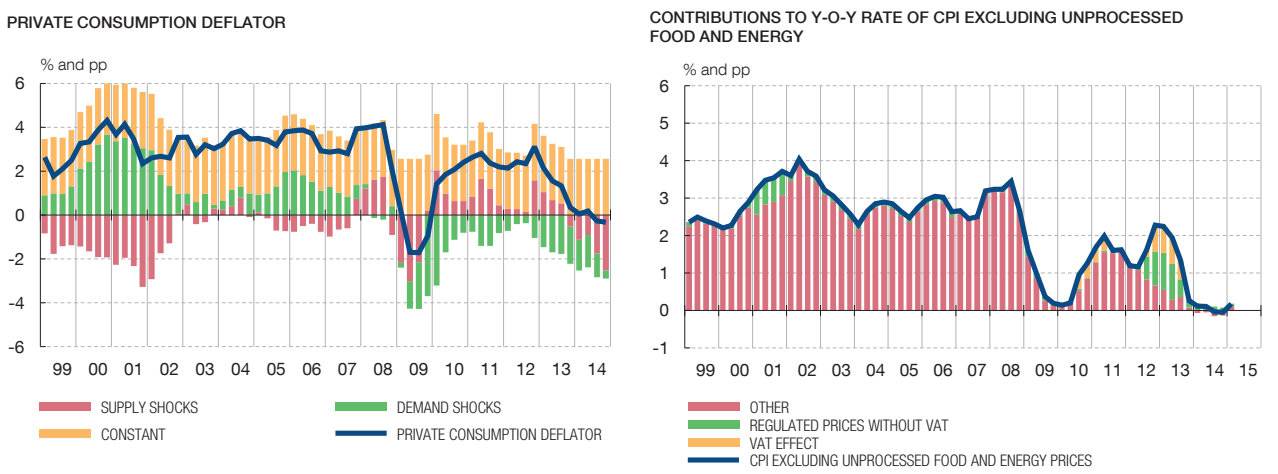
This chapter analyses the disinflation process observed in recent years in the Spanish economy, placing particular emphasis on its determinants, its potential effects on inflationary dynamics and the adjustment of relative prices, and the role of different policies in an environment in which inflation remains at very low levels over a prolonged period. In this connection, the chapter is structured as follows. The second section gives an overview of inflationary dynamics in the Spanish economy in recent years, highlighting the increase further to the crisis in the degree of price sensitivity to changes in aggregate demand. The third section analyses costs and mark-ups, and their influence on inflation in the most recent period. The fourth section presents various measures of agents' medium-term inflation expectations for the Spanish economy. The fifth section studies some of the main channels through which a hypothetical environment of very low inflation over a prolonged period might affect the process of adjustment in an economy such as Spain's, still immersed in the absorption of its macro-financial imbalances, and the role of different economic policies in that environment. The final section draws the main conclusions of the chapter.

2 Inflation in Spain in the context of the euro area

Since the introduction of the single currency, the behaviour of inflation in the Spanish economy has been clearly differentiated, according to the cyclical juncture prevailing. This section firstly analyses inflation developments in Spain in terms relative to the rest of the euro area, underscoring the dynamics of prices in services, a key sector when it comes to explaining the fluctuations in the inflation differential before and during the crisis period.

CHANGES IN INFLATION

CHART 4.1



SOURCES: INE and Banco de España.

a Contributions calculated using the BEMOD model [see J. Andrés, P. Burriel and Á. Estrada (2006), *BEMOD: A DSGE Model for the Spanish Economy and the Rest of the Euro Area,* Documentos de Trabajo, no. 0631, Banco de España]. Supply shocks added relate to productivity, mark-ups, salaries and oil prices and demand shocks to household preferences, interest rate, public expenditure, world demand and exchange rate.

An assessment is then made of the potential change in price sensitivity to the economy's cyclical position as a possible determinant, on top of the weakness of national demand, of the recent inflation moderation in our country.

During the upturn, Spanish inflation extensively outpaced that of the euro area…

During the expansion period that began in the mid-1990s, and which was interrupted by the onset of the crisis, the Spanish economy's output gap was persistently positive. Demand pressure then gave rise to inflation rates in Spain systematically above 2% (see left-hand panel of Chart 4.1), thereby continuously outpacing prices in the euro area as a whole.[1] In terms of the harmonised index of consumer prices (HICP), the average annual differential was 1.1 pp over the 1999-2008 period.

…but this trend was reversed over the course of the crisis and, recently, Spanish inflation has stood below that of the euro area as a whole

The recession that began in late 2008 prompted a more marked contraction in national demand in Spain than in the euro area, which translated into a lower relative rate of increase of consumer prices in our economy. This latter effect is particularly visible once the upward impact that the ongoing fiscal consolidation process in Spain has had on inflation in recent years is taken into account. Among other measures, this process has entailed increases, on two occasions, in VAT rates[2], along with several rises in regulated-price goods (see right-hand panel of Chart 4.1). Hence, from 2009, Eurostat's inflation differential in terms of the HICP at constant taxes turned negative, standing at -0.5 pp on average over the 2009-2014 period.

Services prices have eased substantially during the recession…

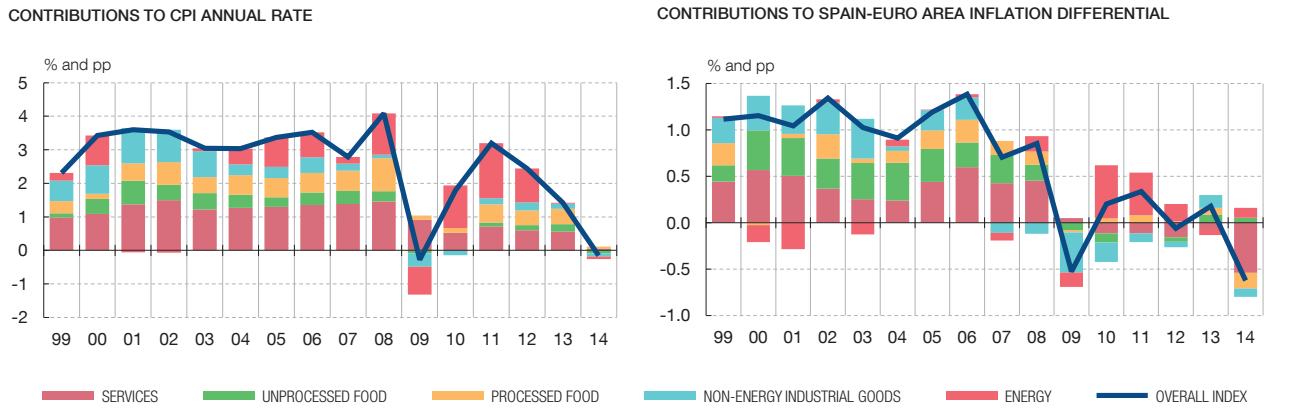
In the Spanish economy's recent process of relative disinflation vis-à-vis the euro area, there has been a notable change in services prices dynamics, clearly so since 2009. Indeed, in the pre-crisis period, services prices had posted increases of around 4%, while evidencing high stickiness and scant sensitivity to business cycle conditions. The

1 For a detailed analysis of the determinants of the Spanish economy's inflation differential during the early years of the Monetary Union, see, for example, J. D. López-Salido, F. Restoy and J. Vallés (2005), *Inflation differentials in EMU: the Spanish case,* Documentos de Trabajo, no. 0514, Banco de España.

2 However, the pass-through of these tax increases was relatively low (around 40%), in contrast to the practically full degree of pass-through observed in the 1990s.

CONTRIBUTIONS TO CHANGES IN INFLATION

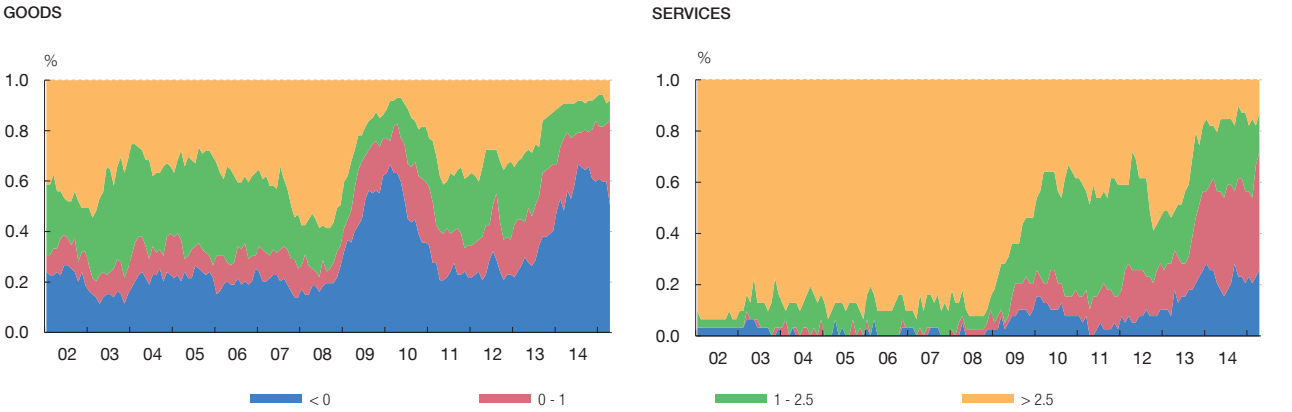
CHART 4.2



SOURCES: INE and Banco de España.

CPI: PROPORTION OF SUBCLASSES WITH YEAR-ON-YEAR RATES BY INTERVAL

CHART 4.3



SOURCES: INE and Banco de España.

dynamism of prices in this sector, along with their high weight in the household consumption basket (almost 40% of total spending), accounts for the fact that these articles made the biggest contribution to the increase in the CPI during the first decade of the single currency (see left-hand panel of Chart 4.2). This situation reversed over the course of the recessionary period, meaning that, since end-2009, increases close to zero have been observed in the prices of these items, once the effects of tax rises and administered prices are stripped out. The contraction in household spending and the reduction in unit labour costs, in a particularly labour-intensive sector, are likely to have prompted the sharp adjustment in the relative prices of services over the most recent period.

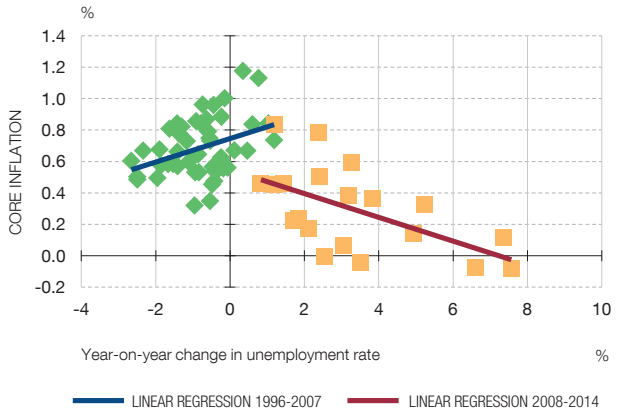
… as part of a widespread process affecting most items of spending on these articles

Chart 4.3 depicts the percentage of items (weighted by their weight in total household consumption spending) in respect of goods (left-hand panel) and of services (right-hand panel), in terms of the year-on-year rate of change in their prices. The chart clearly illustrates the recent process of relative disinflation in services. Specifically, it can be seen that in the pre-crisis years, the vast majority of services items were increasing at a rate of over 2.5% per annum, while practically none of them were becoming cheaper. Conversely, in the case of goods, the shares of articles showing high price rises (of over 2.5%) and those undergoing very moderate falls or rises (below 1%) were rather more balanced. Nonetheless, in the

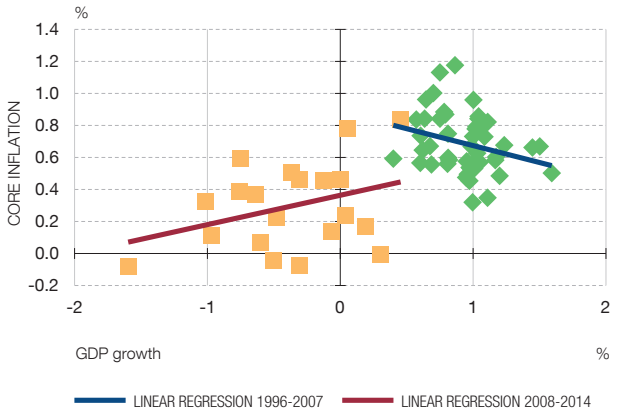
RELATIONSHIP BETWEEN INFLATION AND THE BUSINESS CYCLE

CHART 4.4

CPI EXCL. UNPROCESSED FOOD AND ENERGY PRICES AND YEAR-ON-YEAR CHANGE IN THE UNEMPLOYMENT RATE (a)



CPI EXCL. UNPROCESSED FOOD AND ENERGY PRICES AND GDP GROWTH (a)



SOURCES: INE and Banco de España.

a CPI excluding unprocessed food and energy prices, regulated prices and taxes.

recent period the weight of items of spending on services showing high price increases has diminished considerably. At the same time, the proportion of services whose prices are easing has ceased to be marginal, rising to over 20% at end-2014.

Various supply-side factors of a structural nature may have provided for an increase in the cyclical sensitivity of inflation…

The recent inflation moderation in the Spanish economy has been partly caused by the strong contraction in spending during the most acute phases of the crisis. Over the past three years, however, various supply-side factors, such as the heavy fall in oil prices throughout the second half of 2014 and the application of reforms to the labour market and to specific goods and services markets, have likewise contributed to tempering the path of prices (see left-hand panel of Chart 4.1). Insofar as some of these factors are structural in nature, their presence may have provided for lasting changes in the sensitivity of prices to changes in the degree of slack in the economy.[3]

Chart 4.4 offers initial evidence on a possible structural change in the relationship between inflation and economic slack. In each of the panels in the chart, a variable representing cyclical slack is related to a measure of inflation constructed drawing on the CPI excluding unprocessed food and energy prices (which are normally more directly affected by supply fluctuations) and adjusted for the effects arising from changes in indirect taxation and in regulated prices. As regards the measures of slack, the quarter-on-quarter rate of change of GDP is taken as one, and the year-on-year change in the unemployment rate as another. Each set of observations constructed in this way is divided into two periods, one running from 1996 to 2007, and another spanning the crisis, from 2008 to 2014.

Irrespective of the measure of slack used, the behaviour of the relationship between the variables proxying the cyclical moment and inflation is clearly differentiated from one period to another. Specifically, before the onset of the crisis, a higher level of activity or a lower increase in unemployment, in general, were not accompanied by higher inflation. Conversely, the sharp contraction in activity further to the crisis has prompted a change in

3 For an initial analysis of this matter, see L. J. Álvarez and A. Urtasun (2013), "Variation in the cyclical sensitivity of Spanish inflation: an initial approximation", *Economic Bulletin,* July-August , Banco de España.

the sign of this relationship, whereby increases in the unemployment rate or declines in activity have coincided, on the whole, with significant reductions in the inflation rate.

… which Phillips curve model estimates confirm

One strategy for analysing this phenomenon more accurately involves estimating Phillips curve-type relationships between inflation and activity, in which current inflation depends on expected inflation and on the degree of cyclical slack in the economy.[4] Table 4.1 shows the results of the estimates of two alternative specifications of a model of these characteristics, using as the inflation measure the CPI excluding unprocessed food and energy prices (with the effect of tax changes and regulated prices stripped out) and proxying the degree of slack by means of the year-on-year change in the unemployment rate, in one case, and the quarter-on-quarter rate of change of GDP, in the other. According to these estimates for the period 1995-2007, a higher level of activity or a lower rate of unemployment would have translated into higher inflation rates, although the effect is not statistically significant. Also for this period, a sizeable backward-looking component is estimated in the dynamics of prices, whereby inflation would be characterised by notable inertia. For the most recent period (2008-2014), the estimates reveal an increase in the cyclical sensitivity of inflation. Indeed, the coefficient of the cyclical slackness variable under the two specifications increases notably in scale and becomes statistically significant.

The increase in the cyclical sensitivity of inflation is in step with a lesser degree of nominal rigidity

This latter result is consistent with the reduction in the degree of nominal rigidity in the economy during the crisis period, possibly caused by a more frequent adjustment of prices during that period than in the past. Information from the recently conducted Banco de España wage- and price-setting survey points in this direction. Thus, weighted by the level of employment, more than 40% of firms indicate that they have raised the frequency of price changes compared with the pre-2010 period, while fewer than 10% say they have lowered it. The remaining firms would not have altered the frequency of change.

A greater cyclical sensitivity of inflation has also been detected in other European countries, although it is not a global phenomenon

The increase in cyclical sensitivity can also be observed in other countries. Thus, focusing likewise on the latest crisis, Oinonen *et al.* (2013) find an increase in the cyclical sensitivity of inflation across the euro area as a whole.[5] However, there is also evidence to the contrary, which points to some easing in the responsiveness of prices to cyclical conditions in the US economy [Matheson and Stavrev (2013)] and in the advanced economies as a whole [IMF (2013)][6], which might be indicative of the fact that the increase in the cyclical

4 Specifically, following the specification proposed by L. Ball and S. Mazumder (2011), "Inflation Dynamics and the Great Recession", *Brookings Papers on Economic Activity,* Phillips curves of the following type are estimated:

$$\pi_t = \gamma\pi^0 + (1-\gamma)\ \frac{1}{4}(\pi_{(t-1)} + \pi_{(t-2)} + \pi_{(t-3)} + \pi_{(t-4)}) + \alpha h_{(t-1)} + e_t$$

where π_t is inflation in quarter t, π^0 is the central bank's medium-term inflation reference or target, h^t is a measure of slackness, e^t reflects the impact that other explicitly non-modelled factors may have on current inflation (i.e. the error term) and γ and α are the parameters that have to be estimated. According to this specification, inflation expectations are a combination of a forward-looking component, which is normally linked to the reference or target that the monetary authority follows for medium-term inflation, and another, backward-looking component, proxied in this case by average inflation over the past four months.

5 See S. Oinonen, M. Paloviita and L. Vilmi (2013), *How have inflation dynamics changed over time? Evidence from the euro area and the USA,* Bank of Finland Research Discussion Papers. M. Riggi and F. Venditti (2014), *Surprise! Euro area inflation has fallen,* Occasional Papers, no. 237, Banca d'Italia, offers similar results for the cases of Italy, France and Spain; and S. Fabiani and M. Porqueddu (2013), "La flessibilitá dei prezzi in Italia: evidenze per il período 2006-2012", mimeo, Banca d'Italia, find evidence of some increase in the degree of flexibility of prices in the Italian economy during the crisis, which they associate, in part, with business demography dynamics.

6 See T. Matheson and E. Stavrev (2013), "The Great Recession and the Inflation Puzzle", *Economics Letters,* 120 (3), pp. 468-472, and IMF (2013), "The dog that didn't bark: Has Inflation been muzzled or was it just sleeping?", *World Economic Outlook,* April.

PHILLIPS CURVE ESTIMATE (a)

TABLE 4.1

	GDP growth		Changes in unemployment rate	
	1996-2007	2008-2014	1996-2007	2008-2014
Degree of cyclical slack	0.06	0.35	-0.10	-0.22
	(0.20)	(0.0)	(0.38)	(0.0)
Expected inflation	0.42	0.34	0.28	0.51
	(0.02)	(0.0)	(0.02)	(0.0)

SOURCE: Banco de España.

a The estimated model is $\pi_t = \gamma\pi\text{^}o + (1-\gamma)\ 1/4\ (\pi_{(t-1)} + \pi_{(t-2)} + \pi_{(t-3)} + \pi_{(t-4)}) + \alpha h_{(t-1)} + e_t$, where π_t is inflation in quarter t, $\pi\text{^}o$ is the central bank's medium-term inflation reference or target, h_t is a measure of slackness, e_t reflects the impact that other explicitly non-modelled factors may have on current inflation (i.e. the error term), and γ (expected inflation) and α (degree of cyclical slack) are the parameters that have to be estimated. The p-value is shown in brackets.

sensitivity of inflation in the recent period may be a phenomenon relatively confined to the case of certain European economies.

Greater cyclical sensitivity is a result that is very robust to different measures of prices and of the cycle

That said, comparing different papers in this area is subject to certain limitations, as a result of the use of different measures of inflation and of expectations, and also of different ways of proxying the degree of cyclical slackness. To verify the robustness of the previous results for the case of the Spanish economy (and in particular, that relating to the increase in the cyclical sensitivity of inflation during the crisis), different specifications of the foregoing general Phillips curve model have been estimated in which alternative variables are used to proxy inflation, inflation expectations and the degree of slackness, along with various combinations of these three groups of variables. Specifically, combinations of 10 alternative measures of inflation, inflation expectations and degree of slackness are considered, which gives rise to a thousand possible configurations of the base model.

Chart 4.5 depicts the distribution of all the estimates of the cyclical sensitivity parameter in the pre-crisis period, along with the related estimates for the subsequent period. On the basis of these results, it is evident that, during the most recent period, there has been a considerable increase in the proportion of base model specifications for which an increase in the cyclical sensitivity of inflation in our economy is detected. Specifically, in 73% of the estimated specifications, elasticity in the post-crisis period is higher than that identified in the prior period.

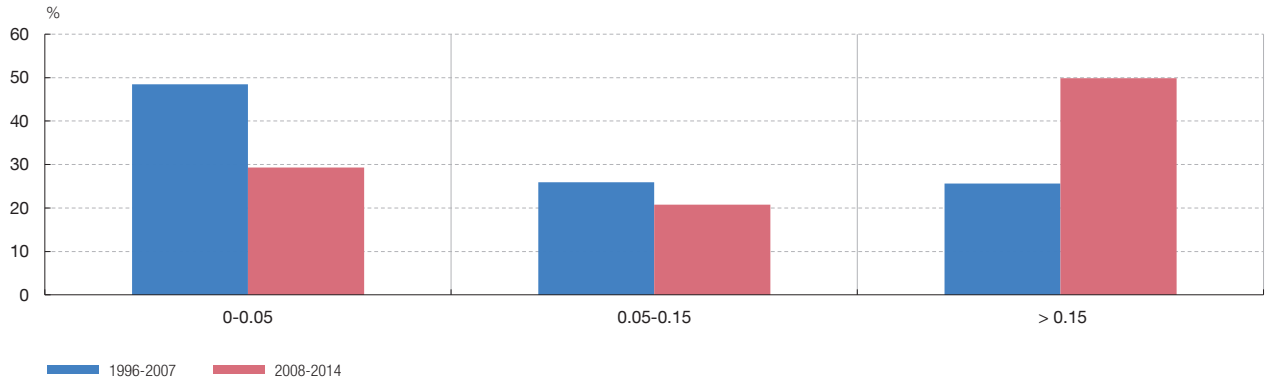
A greater degree of price responsiveness to cyclical fluctuations should improve the Spanish economy's adaptability...

Consolidation of the greater degree of responsiveness of prices to the cyclical moment identified in the foregoing analysis would, looking ahead, entail a clear improvement in the Spanish economy's capacity to adjust to demand shocks. That would enable the effects of the shocks on prices to be better deflected and thus reduce the extent of the fluctuations in activity and employment, and the associated costs in terms of welfare. In this respect, some of the regulatory developments in recent years (such as the greater internal flexibility of firms following the entry into force of the labour market reform and the recently approved de-indexation legislation) should contribute to reducing the incidence of nominal rigidities, which have traditionally limited the Spanish economy's capacity to adapt in recessionary phrases.

... although evidence of this phenomenon in expansionary phases is still very limited

Nonetheless, the evidence to date about the recent increase in the cyclical sensitivity of inflation is still limited, insofar as most of the sample period after 2008 corresponds to periods marked by a strong contraction in activity; a note of caution is thus required when projecting this phenomenon forward. In particular, it is necessary to be able to analyse

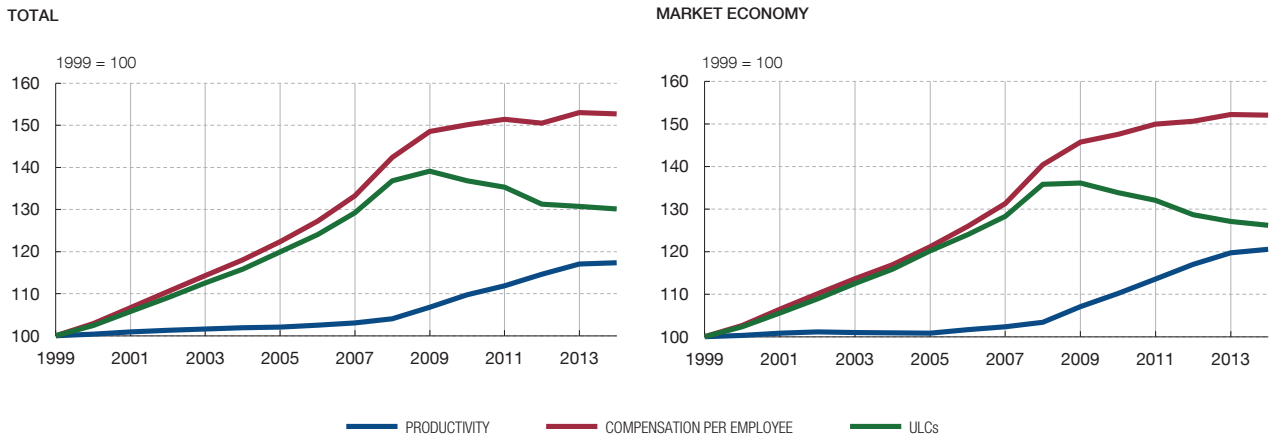
DISTRIBUTION OF THE COEFFICIENT OF CYCLICAL SENSITIVITY (a) CHART 4.5



SOURCE: Banco de España.

a Histogram showing the coefficient of cyclical slackness in a thousand different configurations of the base model for the pre-crisis period and another thousand configurations for the post-crisis period. Specifically, it is based on combinations of 10 alternative measures of inflation (CPI, CPI excluding administered prices and taxes, CPI excluding unprocessed food and energy prices, CPI excluding unprocessed food and energy prices, administered prices and taxes, CPI excluding energy and food, CPI excluding energy, food, administered prices and taxes, GDP deflator, value added deflator, value added deflator of the market economy and private consumption deflator), 10 different ways of proxying inflation expectations (Eurosystem target, expected inflation according to *Consensus Forecasts,* European Commission consumer survey, survey measures of manufacturing PMI and services PMI expectations, inflation implicit in swap transactions at 1, 2, 3, 4 and 5 years) and 10 ways of proxying the degree of cyclical slackness (GDP growth, change in consumption, capacity utilisation, output gap as per the Banco de España and European Commission estimates, year-on-year change in the unemployment rate, unemployment rate, recession gap, cyclical unemployment and employee compensation as a percentage of nominal GDP.

UNIT LABOUR COSTS AND COMPONENTS CHART 4.6



SOURCE: INE.

inflationary dynamics over a sufficiently prolonged expansionary phase so as to be able to draw firm conclusions not only about the persistence of the change in price-setting patterns, but also on their potentially differentiated nature in economic recessions and expansions.

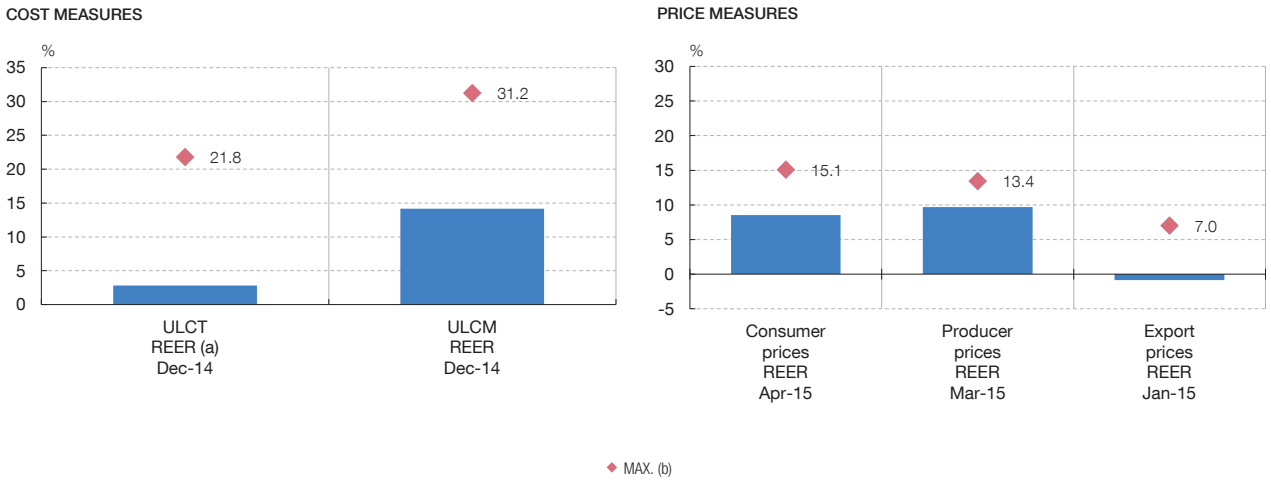
3 Prices, costs and mark-ups

The gains in competitiveness observed during the crisis have been essentially underpinned by the moderation of unit labour costs…

The moderation in the rate of increase of consumer prices experienced by the Spanish economy – both in absolute terms and in relation to the euro area – in recent years has largely rested on the strong reduction in labour costs recorded practically throughout the crisis period. Following a phase of continuous growth, ULCs slowed sharply in 2009, posting sustained declines thereafter. The increase in apparent labour productivity, linked to the high rate of job destruction, is the factor that most explains the disinflation in labour costs during the initial phases of the crisis (see Chart 4.6). Subsequently, the moderation

INDICES OF SPANISH COMPETITIVENESS VIS-À-VIS THE EURO AREA
Cumulative rates of change from December 1998

CHART 4.7



SOURCE: Banco de España.

a REER: Real effective exchange rate.
b Maximum loss of competitiveness since 1998.

in wage growth, which has become more patent in recent years, has contributed to prolonging the squeeze on labour costs to date.

The pass-through of the reduction in labour costs to prices has, however, been partial and, indeed, competitive gains during the recent period are significantly greater when estimated via cost measures, instead of price measures. In fact, while measures constructed on the basis of cost indicators show how the Spanish economy's cumulative loss in competitiveness during the past expansion has been notably corrected, the related price-based indices reveal that this correction is less marked, although, in this latter case, the misalignment of relative prices during the expansionary phase was far lower (see Chart 4.7). As indicated in the previous section, the successive rises in indirect taxes and in certain regulated prices, linked to the fiscal consolidation process, have partly countered the adverse impact of the reduction in labour costs on final prices. In addition, the behaviour of business mark-ups also plays a key role in price-setting, reflecting as it does the capacity or readiness of producers to pass through changes in costs and taxes to their selling prices.

… while the unit surplus has behaved countercyclically

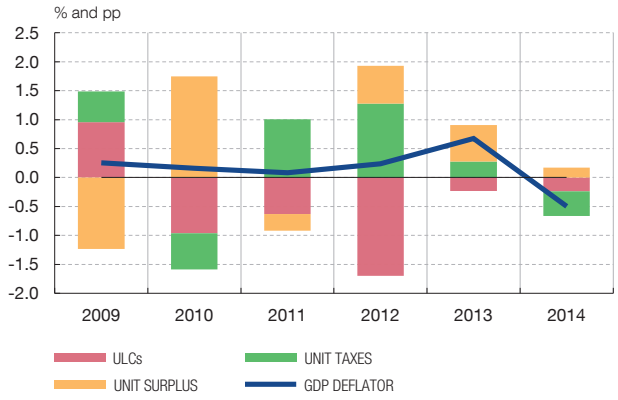
Chart 4.8 shows the components of the GDP deflator (costs, indirect taxes and gross operating surplus per unit of output)[7] over the past five years. In addition to the contraction in ULCs and the positive impact that the indirect tax rises made in 2010 and 2012 had, the chart highlights the marked countercyclical behaviour of the unit surplus, which essentially reflects the course of business mark-ups[8], a variable which, however, is difficult to directly estimate. According to the information in Table 4.2, the GVA deflator in Spain in the period 2008-2013 grew less than in the euro area as a whole, as a result of the negative contribution of relative ULCs. Conversely, the unit surplus maintained its positive contribution to the differential. An analysis by sector of activity reveals that in all of them, to a greater or lesser

7 For a description of how the deflators are broken down into their different components, see Servicio de Estudios del Banco de España (2005), *El análisis de la economía española.*
8 The gross operating surplus further includes, among other factors, the return on capital and depreciation costs.

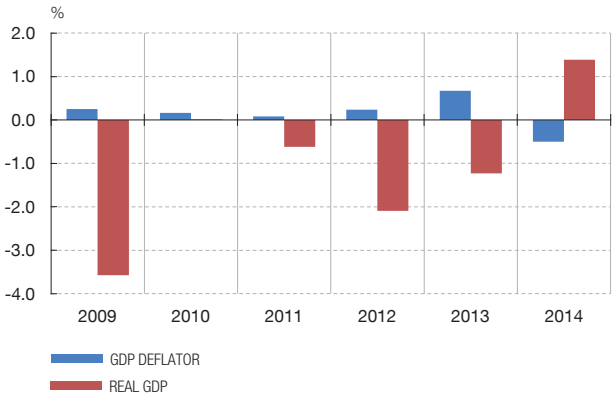
GDP DEFLATOR AND ITS COMPONENTS

CHART 4.8

CONTRIBUTIONS TO THE CHANGE IN THE GDP DEFLATOR



GDP DEFLATOR AND REAL GDP. Year-on-year rates



SOURCE: INE.

extent, ULCs contributed negatively to the inflation differential with the euro area in the period 2008-2103, while the gross surplus per unit of output, in all instances, operated in the opposite direction, which contributed to lessening the intensity of the relative adjustment of prices in our economy.[9]

Changes in the surplus appear to be related to the financial conditioning factors prevailing during the crisis…

The countercyclical behaviour of the surplus, which is extensive to practically all the productive sectors, even in those most exposed to foreign competition, suggests the possible presence of some common factor having led Spanish companies on the whole to increase their mark-ups, irrespective of the sector of activity in question. Among the possible determinants of this behaviour, financial constraints appear to have played a key role. Indeed, the tightening of financing conditions at the onset of the crisis, along with the high indebtedness of the business sector as a whole at the start of this episode, may have exerted some upward pressure on the prices set by companies, with the aim of achieving higher mark-ups with which to offset the higher costs and possible shortage of foreign financing sources. Along these lines, some previous papers focusing on the US economy, such as Chevallier and Scharfstein (1996) and Gilchrist, Schoenle, Sim and Zakrajsek (2013)[10], find evidence that, in recessions in which business financing conditions worsen, companies tend to increase mark-ups to strengthen their cash flow-generating capacity in the short term, even at the risk of incurring durable losses in their market share.

The financial source of the crisis that began in 2008 and its strongly adverse impact on credit markets substantiates, in principle, the foregoing hypothesis, which positively links

9 It should be borne in mind that the measurement of the gross operating surplus may differ from one statistical source to another, which reflects the methodological discrepancies in how it is compiled. For example, in the context of the Spanish economy's statistics, whereas National Accounts data are compiled following National Accounts accounting criteria (harmonised in keeping with the ESA-2010 accounting standard), other sources, such as the Central Balance Sheet Data Office or the Tax Authorities, are governed by business accounting rules. This means that, beyond sample differences, the treatment of inputs and of tax payments may differ in the respective databases, altering thereby the calculation of the different approaches to the surplus.

10 J. A. Chevallier and D. S. Scharfstein (1996), "Capital-Market Imperfections and Countercyclical Markups: Theory and Evidence", *American Economic Review,* American Economic Association, vol. 86 (4), and S. Gilchrist, R. Schoenle, J. W. Sim and E. Zakrajsek (2013), *Inflation Dynamics During the Financial Crisis,* Working Papers, no. 78, Brandeis University, Department of Economics and International Business School.

VALUE ADDED DEFLATOR: CONTRIBUTIONS TO THE SPAIN-EURO AREA DIFFERENTIAL

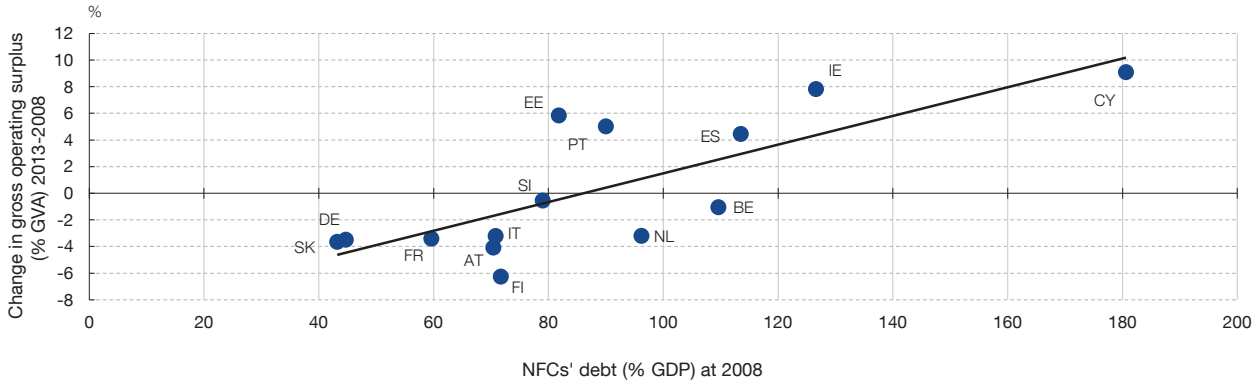
TABLE 4.2

	2001-2007	2008-2013
1 Whole economy		
Unit labour cost	1.2	-1.0
Gross operating surplus per unit, including taxes	0.6	0.6
VA deflator	1.7	-0.4
2 Agriculture		
Unit labour cost	-0.3	-0.5
Gross operating surplus per unit, including taxes	0.8	0.5
VA deflator	0.5	-0.1
3 Industry and energy		
Unit labour cost	1.4	-1.0
Gross operating surplus per unit, including taxes	1.1	1.5
VA deflator	2.5	0.6
4 Construction		
Unit labour cost	2.1	-3.4
Gross operating surplus per unit, including taxes	0.3	0.3
VA deflator	2.4	-3.1
5 Total services		
Unit labour cost	0.8	-0.8
Gross operating surplus per unit, including taxes	0.5	0.4
VA deflator	1.3	-0.4

SOURCES: Eurostat, INE and Banco de España.

RELATIONSHIP BETWEEN SURPLUS AND DEBT

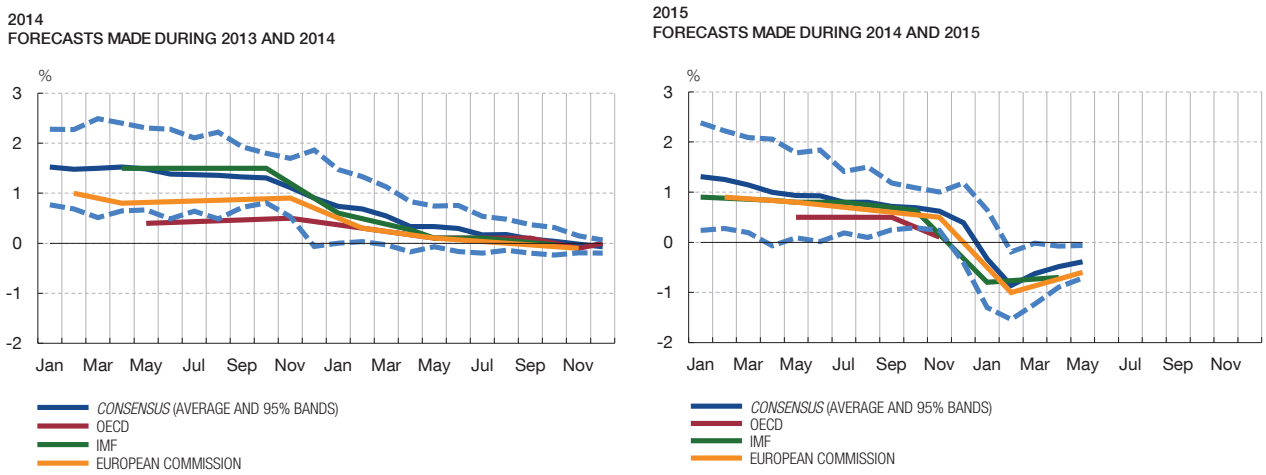
CHART 4.9



SOURCE: Eurostat.

the degree of financial tightening and business mark-ups. The evidence at the international level would likewise be along these lines. In particular, in European countries – Ireland, Portugal and Spain – where the corporate sector evidenced a higher level of debt at the onset of the crisis and which have witnessed with particular intensity the tightening of credit conditions during the crisis, the increase in the operating surplus as a proportion of GVA has been particularly marked (see Chart 4.9).

CPI INFLATION FORECASTS FOR SPAIN CHART 4.10



SOURCES: OECD, IMF, European Commission and *Consensus Forecasts*.

… and with the presence of competition constraints in some sectors

Based on disaggregated firm-level information from the Banco de España Central Balance Sheet Data Office, Montero and Urtasun (2014)[11] find evidence in favour both of the financial hypothesis and of the presence of certain constraints on the degree of competition in certain sectors. In particular, in those sectors whose level of debt was higher in 2007, firms would have set relatively higher mark-ups. This latter effect is also identified in the case of those sectors where the degree of concentration is higher and, presumably, competitive forces are weaker. In this respect, the application of reforms aimed at increasing the degree of competition should provide for a greater pass-through of fluctuations in costs to selling prices (and a lesser impact on the volume of activity) in those activities with a more limited level of competition.

4 Medium-term inflation scenario

In 2014 and the opening months of 2015 the inflation forecasts were revised progressively downward, particularly following the fall in oil prices

The process of disinflation which began in 2013 has not only continued since then, but has intensified in the most recent period, largely owing to the marked decline in oil prices. Indeed, since summer last year, inflation has posted systematically negative rates and most of the forecasts by private analysts and the main international institutions are for prices to continue decreasing in the short term. Chart 4.10 shows that the inflation forecasts for Spain in 2014 and 2015, published by the main public bodies and by private analysts over the last few quarters,[12] have been revised downwards, particularly as a result of the abrupt adjustment in oil prices in the international markets throughout the second half of 2014.

The indicators of inflation expectations point to a very low inflation scenario in the coming months

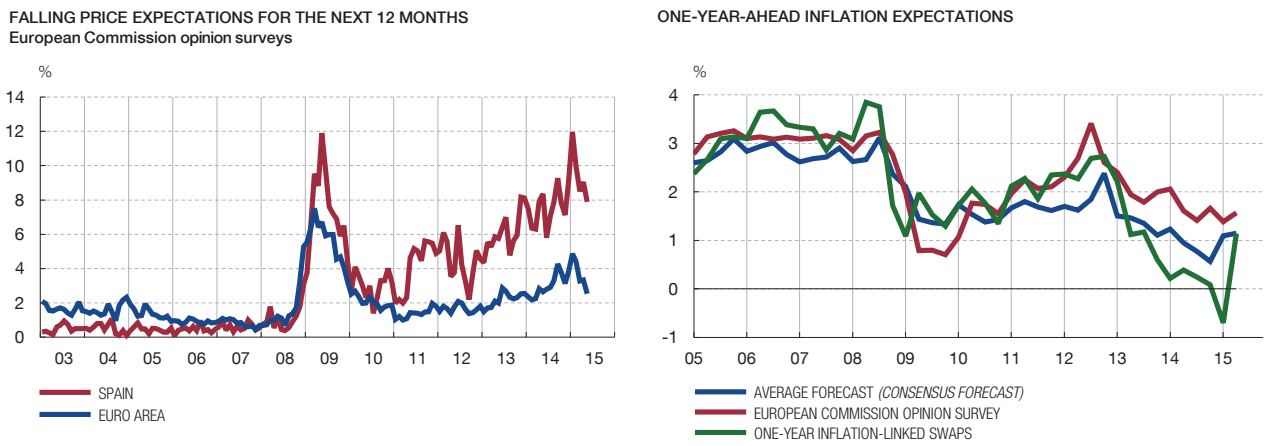
The available survey-based indicators also point to a very low inflation scenario in the coming months. For example, the European Commission's consumer survey (left-hand panel of Chart 4.11) shows that the percentage of households –in Spain and in the euro area as a whole– which expect prices to fall in the next twelve months continued to be relatively high in the opening months of 2015. The right-hand panel of Chart 4.11 shows

11 J. M. Montero and A. Urtasun (2014), *Price-Cost Mark-ups in the Spanish Economy: a Microeconomic Perspective,* Documentos de Trabajo, no. 1407, Banco de España.

12 Specifically, the inflation forecasts for Spain include those regularly published by the OECD, the European Commission and the IMF, as well as the average and the 95% bands of the distribution of forecasts published monthly by Consensus Forecast, which are based on those issued by about twenty private Spanish and foreign analysts.

INFLATION EXPECTATIONS FOR SPAIN AND THE EURO AREA

CHART 4.11



SOURCES: European Commission, *Consensus Forecasts* and Bloomberg.

the one-year-ahead inflation forecast obtained from the various available sources: the average of the one-year-ahead forecasts of Consensus Forecast, the implied expected rate of the aforementioned European Commission survey and the information based on one-year inflation-linked swaps. Although there is some discrepancy between these sources, it seems clear that in all cases the one-year-ahead inflation expectations for the Spanish economy began to fall at the end of 2012 and are for low rates in 2015.

In the medium and long term, the expectations are consistent with a low-inflation scenario

At longer-dated horizons, the information from inflation swaps[13] indicates that the expected annual average rates in Spain trended downward from 2012 Q4, coinciding with the sharp disinflation in the euro area as a whole in that period. For example, as shown in Chart 4.12, the expected inflation in these markets in the next five and ten years has been systematically below 2% since 2013.

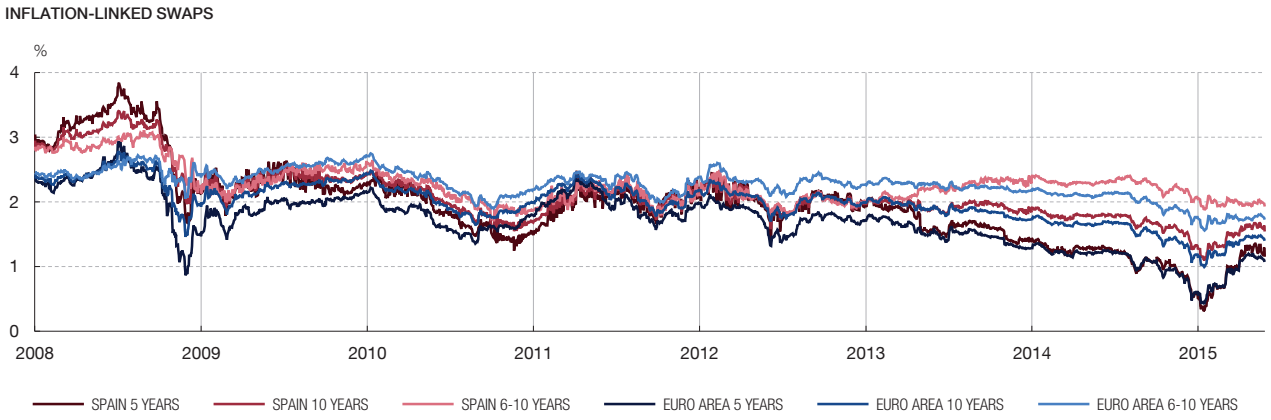
To isolate the impact of short-term price fluctuations on longer-term inflation, a commonly used metric is the five-year expected average inflation rate five years ahead. This measure for the Spanish economy has hovered between 2.5% and 2% for most of the crisis period except in temporary episodes, but in the final stretch of last year it also fell below 2%. As in the euro area as a whole (see Chapter 2 in the Spanish original of this Report), this downward trend was not interrupted virtually until the beginning of 2015, coinciding with the announcement and implementation of the extension of the ECB's asset purchase programme.

In short, the various sources of information on the envisaged behaviour of consumer prices suggest that agents expect the recent low inflation will continue in the near future. Also, despite the economic recovery currently under way and projected to continue in the coming years both in Spain and in the euro area as a whole,[14] the evidence for the most

13 The expected inflation rates reflected by these data should be viewed with caution, particularly in the longer term, since they incorporate the markets' assessment of various risks (particularly inflation risk, although also counterparty and liquidity risk) and their relative weight may increase with increasing contract term and, therefore, greater uncertainty.

14 The Banco de España's most recent macroeconomic projections for the Spanish economy are published in the April 2015 Economic Bulletin, while those for the euro area, prepared by ECB staff, are available in the March 2015 *ECB staff macroeconomic projections for the euro area*.

INFLATION EXPECTATIONS FOR SPAIN AND THE EURO AREA CHART 4.12



SOURCE: Bloomberg.

recent period is consistent with a certain gap between medium-term inflation expectations and the ECB's price stability target.

5 Macro-financial adjustment in a low inflation scenario: conditioning factors, risks and policies

In an environment characterised by very low inflation expectations over a prolonged period, such as that described in the previous section, it is necessary to analyse the mechanisms through which the scant dynamism of prices might affect the macro-financial adjustment process in which the Spanish economy is currently immersed, and the role that various policies may play to mitigate the adverse effects of a hypothetical entrenchment of inflation expectations at levels which are inconsistent with price stability. The purpose of this section is to analyse these issues.

There are very few direct historical references to a scenario of very low inflation over a relatively long period in the context of a monetary union. In the Spanish economy, this inflation scenario runs in tandem with a highly complex and intense process of adjustment of the imbalances built up during the previous expansionary phase, and with the adoption of far-reaching structural reforms which have had a far from negligible impact on economy activity and prices. In combination, these factors pose considerable challenges when analysing how a low level of inflation, depending on its source, affects the correction of the main imbalances and the capacity of the Spanish economy to bring about a lasting recovery. Likewise, it is important to examine how the ongoing macro-financial adjustment process and the factors conditioning monetary policy might, in turn, influence inflation dynamics.

This section analyses all these aspects, focusing, on one hand, on the factors which currently determine monetary policy in the euro area, and on the role that various economic policies may play in the current context of the Spanish economy, on the other. Chart 4.1 offers a qualitative approach to the different mechanisms and effects described below, using a macroeconomic model based on a monetary union comprising two regions with varying degrees of macro-financial vulnerability.

The persistently low inflation rates reflect -and have an effect on- the inertia of the private-sector deleveraging process

The financial nature of the recent crisis, which was partly caused by the over-accumulation of debt by the private sector in the expansionary phase, has accentuated and entrenched the downward trend of inflation in the Spanish economy over the recent period. Thus, mirroring the gradual deleveraging currently under way in households and firms and the consequent reduction in the spending capacity of these sectors, domestic demand

remained notably weak in recent years and only started to pick up with the onset of recovery halfway through 2013. However, the sharp contraction of domestic demand since the start of the crisis has had a marked and lasting impact on price developments.[15]

A particularly important aspect of this is the possible feedback effect on inflation and on the level of economic activity of private-sector deleveraging and its negative consequences. In an environment of high indebtedness, falling inflation could give rise to a further contractionary effect through the positive impact on the real value of outstanding debt, which would in turn exert greater downward pressure on prices. Specifically, a fall in the rate of inflation caused by a moderation of nominal income, in a scenario of contracting demand, tends to lead to a longer, more acute and more costly deleveraging process.[16]

In normal circumstances, a reduction of nominal interest rates softens the adverse effects of contracting demand in an environment of high indebtedness...

In such a situation, monetary policy can play an important role in mitigating a negative dynamic of sharp falls in prices, income, production levels and employment. In normal circumstances, in which the central bank is able to accommodate its nominal interest rates to a negative demand shock, the ensuing positive effect on inflation lessens the costs of the recession through a number of channels. Specifically, a sufficiently firm response on the part of the monetary authority can be effective in reducing real interest rates, thus supporting private-sector consumer spending and investment. Moreover, monetary stimuli generally promote exchange rate depreciation and, therefore, the more expansionary behaviour of net exports. Also, a higher pace of price growth alleviates the real debt burden and contributes to a less costly clean-up of the balance-sheet position of indebted sectors. This could have marked expansionary effects on aggregate spending capacity, especially in an economy like Spain's, which has a sizeable negative external position.

...but, if interest rates are kept at their effective lower bound, the disanchoring of expectations could adversely affect the macro-financial adjustment process

However, the fact there is practically no leeway for additional cuts in the interest rates on the main refinancing operations in the current euro area context substantially limits the stabilisation capacity of this monetary policy instrument. In such circumstances, and in the absence of alternative measures such as those recently adopted by the ECB, a negative demand shock could clearly amplify its negative effects on economic activity and prices. Specifically, in the absence of a reduction of nominal interest rates, the initial disinflationary effect translates into a direct increase in real rates, with the ensuing contractionary impact on aggregate demand and prices, added to that produced by the initial shock.

A protracted period of abnormally low inflation rates could eventually trigger adverse effects on agents' inflation expectations. In this event, the possible disanchoring of inflation expectations would prompt an additional and lasting adverse shock to aggregate demand.

The possibility of such a risk scenario poses major economic policy challenges

The possibility of a risk scenario which includes these adverse factors - weak internal demand and very low inflation over an extensive period, with possible disanchoring of inflation expectations and effective interest rates at their lower bound- poses major challenges for the economic authorities. Among the measures proposed to reduce the

15 At the lowest point of the cycle, reached in 2013 Q2, private-sector domestic demand had fallen by 18% from its peak before the crisis. By the end of 2014, this decline had moderated and stood at slightly over 12% from the aforementioned peak.

16 This Fisher or debt-deflation effect is examined in detail in J. Andrés, Ó. Arce and C. Thomas (2014), *Structural reforms in a debt overhang*, Documentos de Trabajo, no. 1421, Banco de España. The authors show, however, how the presence of long-term debt (which is the case of most Spanish household mortgages) tends to mitigate the intensity of this effect.

likelihood of such a scenario, two have attracted much attention among economic authorities: unconventional monetary policy measures and structural reforms in product and labour markets.[17]

Unconventional monetary policy measures which reduce expected interest rates help stimulate short-term demand

The restriction that the existence of a lower bound on short-term nominal interest rates entails can be partly overcome by the central bank taking action on longer-term interest rates, in the form of unconventional monetary policy measures (see Chapter 2 in the Spanish original of this Report). The different tools available to the monetary authority (forward guidance, asset purchases, etc.) have a common, overarching objective to reduce real interest rates over long time horizons, consistent with the relevant time period for agents' decisions on consumer spending and investment. The negative impact of this type of unconventional measure on real interest rates usually resides in contrary (downward) nominal interest rate movements and (upward) inflation expectations in the reference periods. Box 4.2 analyses how a measure designed to keep nominal interest rates at their lower bound over a longer period than that required by standard monetary measures (based on current inflation) can also be used effectively to mitigate the possible short-term adverse effects triggered by certain disinflationary developments, such as recent fall in oil prices.

Structural reforms may play a major role in a context in which the central bank applies an expansionary monetary policy through unconventional measures.

As a natural outcome of the higher degree of competition and efficiency of the product and labour markets, structural reforms normally lead to some wage moderation and lower short-term inflation rates. These two effects may initially have a partly negative impact on aggregate demand, mainly as a result of the effect on household income of lower wages per hour worked and the increase in the real value of debts produced by the disinflationary effect of the reforms. To counter these adverse effects, which are described in the related literature as mostly transitory and short-lived following application of the measures, the reforms will have a lasting and positive impact through various relevant channels. Most notably, they will have a galvanising effect on competitiveness (which will help to improve the external balance), on employment (which will rise as a result of wage moderation and the increase in external demand) and on future growth expectations. The latter, which reflects the fact that the activity and long-term employment of an economy depend inversely on the inefficiencies of its product and factor markets, also has a positive impact on agents' permanent income. Expectations of a higher growth pace for output and income in the future usually have a favourable effect on spending and activity in the short term, proving conducive to a faster recovery of asset prices, of firms' financial capacity and of credit and investment. Thus, the galvanising effect of structural reforms may even supersede the transitory short-term contractionary effects mentioned earlier.[18]

The joint implementation of structural reforms and unconventional monetary policy measures can generate considerable positive synergies in the short term

The above arguments highlight the fact that, even when standard monetary policy is restricted, the two types of policies considered -structural reforms and unconventional monetary policy measures- may potentially lessen the costs associated with real and financial negative shocks. It should be noted that each of these measures delivers its effects through different channels, with potentially asymmetrical repercussions on certain

17 See, for example, M. Draghi (2014), "Unemployment in the euro area", speech delivered at the Annual Central Bank Symposium in Jackson Hole, 22 August 2014; B. Coeuré (2014), "Structural reforms: learning the right lessons from the crisis", speech delivered at the Central Bank of Latvia, 17 October 2014, and European Commission (2014), *Annual Growth Survey 2015.*

18 J. Andrés, Ó. Arce and C. Thomas (2014) provide a detailed analysis of the mechanisms through which this type of reforms can influence economic activity and prices in the short term, in an economy undergoing a deleveraging process. Other recent studies have highlighted that, under certain circumstances, the lack of leeway for further interest rate cuts can lead to such reforms having a slightly contractionary, but not lasting, effect in the short term (see, for example, G. Eggertsson, A. Ferrero and A. Raffo (2014), "Can structural reforms help Europe?" *Journal of Monetary Economics*, vol. 61, p. 2-22].

relevant variables, such as short-term inflation, and a duration which will vary depending on the measure implemented. In this context, the *joint* application of these two types of policies, and the existence of possible synergies between them[19], are of particular interest.

Box 4.1 offers evidence of how the joint application of these measures can give rise to positive synergies between them, using the aforementioned macroeconomic model of a monetary union. The logic behind this outcome is intuitive. Structural reforms deliver most of their positive effects in the medium and long term, when the efficiency improvements achieved by these measures in the various markets fully materialise, on one hand, and when the aforementioned short-term contractionary effects are dispelled, on the other. Unconventional monetary policies may also be conducive to a reduction of real interest rates in the short and medium term (as also occurs with temporary fiscal expansion in a context of constant nominal interest rates). Thus, the short-term expansionary effects of expected growth in activity and income in the medium and long term, resulting from the efficiency gains produced by the structural reforms, are amplified by the application of monetary policies aimed at moderating the path of real interest rates. This last effect operates through the ensuing reduction in the economic agents' discount factor brought about by the downward trend in interest rates which, for example, may lead to an increase in the expected net yield on investments and thus encourage current decisions on spending, activity and employment.

6 Conclusions

The crisis has prompted an ongoing correction of the main imbalances built up by the Spanish economy during the pre-crisis expansion period. Thanks to the moderation in price growth, the loss of competitiveness which characterised most of the first decade of the single currency has largely been recouped. This disinflationary process, which is still under way, is the outcome of the conjunction of various factors. Some of these are linked to weak domestic demand and others to various supply-side developments, including some of the structural reforms recently applied to the labour market and to specific goods and services markets, but also to other, less durable factors, such as the fall in oil prices over the past year. This chapter provides evidence on how inflation in the Spanish economy, which had traditionally shown a high degree of downward stickiness, has become increasingly sensitive to changes in the economic cycle. This may reflect a change in cost and price-setting processes resulting from the presence of the structural factors mentioned earlier. Maintaining a high degree of price responsiveness to economic fluctuations is vital to ensure that markets adjust more efficiently, and to avoid a situation where, as has occurred in the past, activity and employment levels are disproportionately affected by the adjustments as a result of excessive price rigidities.

Furthermore, the disinflationary process experienced by the Spanish economy in recent years has allowed for the reversal of the positive inflation differential of the initial years of the single currency. However, the low inflation levels recently observed in the euro area add more complexity to the need to combine the continued recovery of competitiveness, on one hand, with the deleveraging of households and firms, on the other. In this connection, it is worth noting that the joint application of unconventional monetary policy measures and structural reforms would lessen the risk of disa nchoring inflation expectations and could have expansionary effects, even in the short term.

19 The possibility of synergies arising between these two types of measures has been stressed, for example, by Draghi (2014).

This box analyses the potential macroeconomic impact of a persistently very low-inflation environment arising from a contraction of aggregate demand aggravated by a possible disanchoring of long-term inflation expectations. Similarly, the role that various economic policies may play to mitigate the contractionary effects of this environment is assessed. To this end, several scenarios are presented which are constructed from a general equilibrium model developed by Arce, Hurtado and Thomas (2015)[1] and designed to include certain key features of the Spanish economy as it is at present. This model includes two regions within a monetary union with the aim of showing some of the most significant differences between the macroeconomic environment of those countries in the euro area which have experienced greater financial strains during the crisis (region A, in terms of the model), compared with other countries which were less affected in this episode (region B)[2]. An essential differentiating feature between the two regions is that in region A there is a financial shock which gives rise to a gradual and lasting private-sector deleveraging process.

The first of the following scenarios illustrates the contractionary effect which may be produced by some disanchoring of long-term inflation expectations in a setting in which interest rates have reached their effective lower bound. Taking this as a starting point, in the second scenario, the individual effects of the following are analysed: using non-standard monetary policy measures aimed at reducing expected medium-term interest rates; structural reforms in product and labour markets; and an expansionary fiscal policy in the region of the monetary union which is not undergoing private-sector deleveraging (region B).[3] Finally, the effects of applying these policies simultaneously and possible synergies between them are analysed[4].

Panel 1 shows a scenario in which the deleveraging process in region A occurs in tandem with a sharp contraction of aggregate demand across the area, triggered by a fall in households' propensity to consume, which is similar to that which would be prompted, for example, by an increase in aggregate uncertainty. This shock is sufficiently intense for the central bank to hold its interest rates at the lower bound for a year, from which the recovery in inflation in the area as a whole leads it to set positive rates again (blue line). A disanchoring of long-term inflation expectations, which under normal circumstances would involve a very moderate real impact – insofar as the central bank would reduce nominal interest rates in order to avoid an increase in real rates – may be particularly contractionary when it occurs once interest rates are already at their lower bound. Specifically, the restriction imposed by the lower bound of nominal interest rates, together with abnormally low inflation expectations, results in the short term in lower inflation and in higher real interest rates in relation to the scenario without the *disanchoring* of expectations. The combination of these two factors triggers additional negative effects on economic activity which are particularly intense in the region which is reducing its indebtedness (red line).

Panel 2 includes the marginal effect (with respect to the previous scenario and with the disanchoring of expectations) produced by the implementation of: (i) non-standard monetary policy which induces a decline in the expected path of future interest rates (green line); (ii) structural reforms in product and labour markets in region A (blue line), and (iii) temporary fiscal expansion in region B (red line)[5]. First, a monetary policy measure which puts downward pressure on the path of expected nominal interest rates triggers an increase in GDP in the area as a whole[6], due to a reduction in expected real interest rates. Second, as a natural outcome of the higher degree of competition and efficiency of the product and labour markets, structural reforms in region A generate a positive impact on the competitiveness of these markets which prompts a significant increase in this region's exports, in employment (which grows as a result of wage moderation and the increase in external demand) and in future growth expectations. The foregoing gives rise to more buoyant activity in the short term. Finally, a fiscal stimulus in the region least affected by the crisis (region B) produces, albeit with a certain lag, clearly positive effects on the activity elsewhere in the area through exports and also through the consequent positive effect on inflation, which reduces real interest rates and erodes the real value of the debt.

1 O. Arce, S. Hurtado and C. Thomas (2015), *Policies for a low-inflation environment in a monetary union,* Documentos de Trabajo de Banco de España (forthcoming). See also J. Andrés, O. Arce and C. Thomas (2014), *Structural reforms in a debt overhang,* Documentos de Trabajo, No. 1421, Banco de España.

2 Although the model incorporates a broad set of realistic elements, its calibration is not designed to reproduce quantitative responses by the variables that may be interpreted from an empirical perspective. Accordingly, the magnitudes in the exercises presented below are merely illustrative of the qualitative behaviour of the key channels and variables in the model.

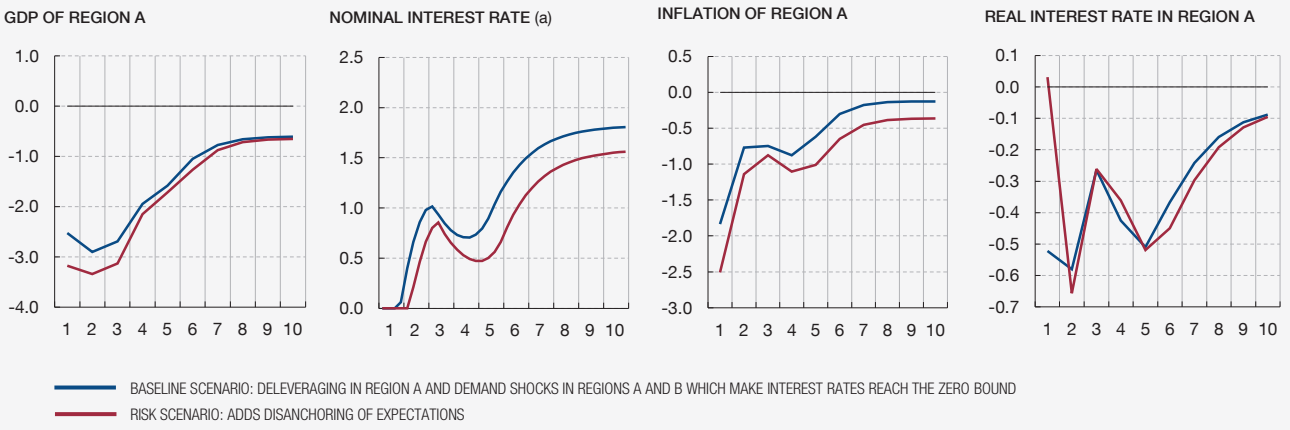
3 The aim of using expansionary fiscal policy is to illustrate the theoretical effect of measures such as those recommended recently in different circles to attempt to stimulate activity in the euro area as a whole, using in this connection the fiscal capacity of those economies in a more comfortable public finances position. See, for example, International Monetary Fund (2014), "Is it time for an infrastructure push? The macroeconomic effects of public investment", *World Economic Outlook,* Chapter 3, October.

4 The idea about the possible existence of synergies between the types of policies analysed here is implicit, for example, in President Draghi's introductory statement following the ECB Governing Council meeting of 15 April 2015.

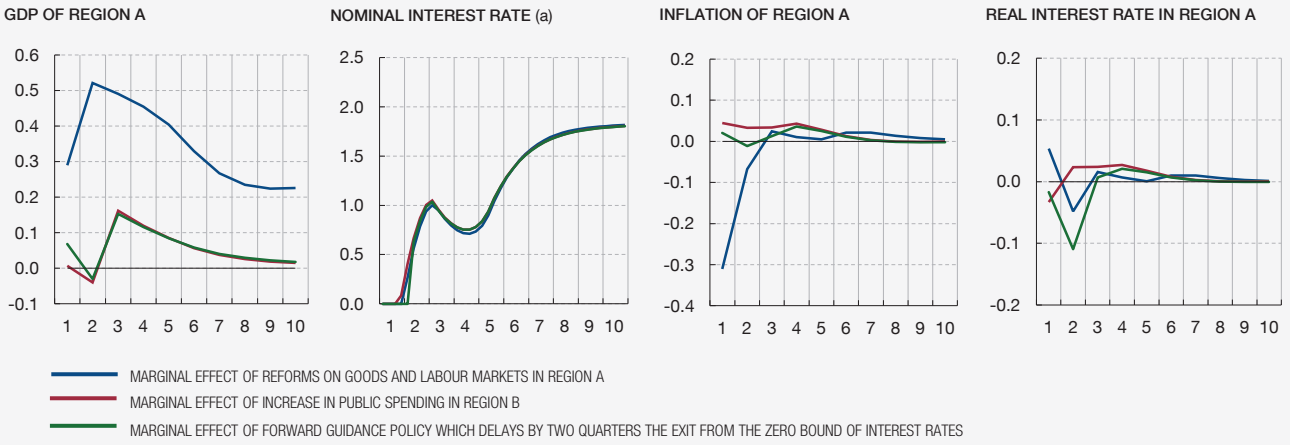
5 In the context of the model, the product market reform comprises a permanent reduction in mark-ups set by companies. In a symmetrical manner, the labour market reform involves a decrease in the margin between the wage earned by employees and their reservation wage, together with a greater degree of flexibility in the adjustment of nominal wages. The fiscal expansion in region B is instrumented by increasing the level of public spending, which will gradually decrease in terms of size following the implementation of the fiscal expansion.

6 For a recent analysis of the impact of this type of policies in the context of a closed economy (with an independent monetary policy), see P. Benigno, G. Eggertsson and F. Romei (2014), *Dynamic debt deleveraging and optimal monetary policy,* NBER Working Paper No. 20556.

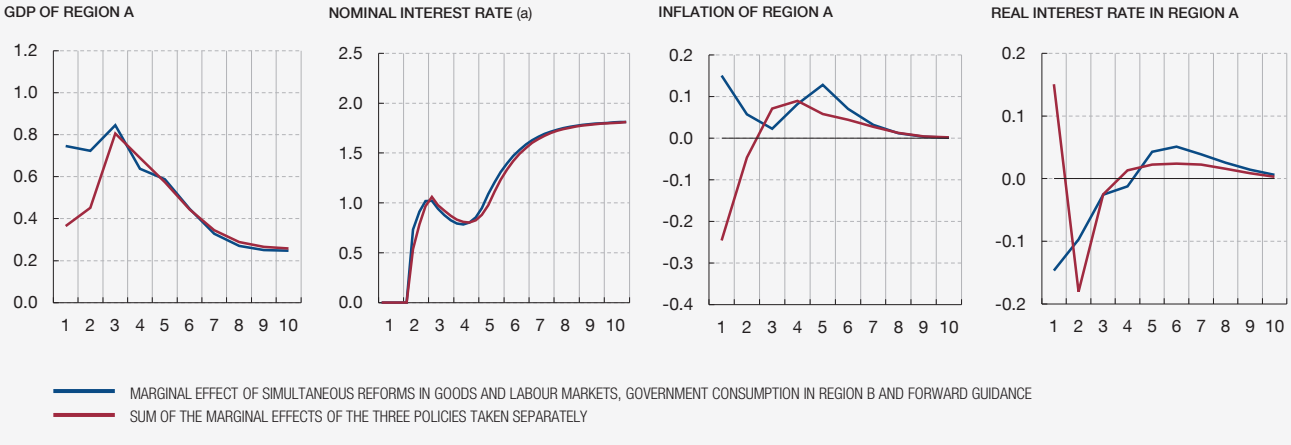
1 SIMULATIONS WITH INTEREST RATES LIMITED BY THE ZERO BOUND
Deviations from initial state. % difference (vertical axis), year (horizontal axis)



2 MARGINAL IMPACT OF ECONOMIC POLICIES ON THE ZERO BOUND OF INTEREST RATES
Deviations from scenario with shocks but without policies. % difference (vertical axis), year (horizontal axis)



3 IMAPCT OF THE THREE ECONOMIC POLICY MEASURES TAKEN JOINTLY OR SEPARATELY
Deviation from shock scenario but without policies. % difference (vertical axis), year (horizontal axis)



SOURCE: Banco de España.

a Variable presented as a level (not as a deviation from initial scenario).

With the aim of analysing the possible synergies between the three measures above, Panel 3 represents their marginal effects in two alternative scenarios. In the first scenario (red line), the marginal effects described in the previous paragraph are added together, that is to say, those effects arising from implementing each measure *separately*. In the second scenario (blue line), the marginal effects of applying *jointly* structural reforms in region A and temporary fiscal expansion in region B are calculated, in a setting in which the central bank also applies non-standard monetary policy such as that considered in this box. The main result of this exercise is that the joint implementation of structural reforms (in the region that suffers the crisis more directly), counter-cyclical fiscal policies (in the region with margin to do so) and non-standard monetary policy measures produces considerably higher expansionary effects in the short term than those which could be obtained if these policies were applied separately.

In the second half of 2014, oil prices decreased considerably from levels of more than $110 (€80) per barrel in June 2014 to lows in January 2015 of slightly more than $45 (€40) per barrel, and have risen moderately since then. This box quantifies, first, the impact of these changes in oil prices on some of the main macro magnitudes of the Spanish economy, using the Quarterly Macroeconometric Model of the Banco de España (MTBE by its Spanish abbreviation)[1]. Second, it analyses in depth the interplay between a persistent decrease in oil prices and some of the specific conditioning factors of the Spanish economy at present, such as the current situation of monetary policy, for which purpose the general dynamic equilibrium model of Arce, Hurtado and Thomas (2015)[2] is used.

The direct impact of the fall in oil prices on consumer prices was felt rapidly, mainly via its pass-through to heating and vehicle fuel prices. As indicated in the main text of this report, the negative year-on-year rates of the CPI since July 2014 are essentially explained by the behaviour of fuel prices. Accordingly, it should be noted that, in Spain, the rate of indirect taxation levied on heating and vehicle fuels has a high fixed component, which amplifies the impact of changes in oil prices on the CPI when the starting point for these prices is a high level[3].

According to the MTBE, which estimates both direct and indirect effects via their pass-through to the economy as a whole, a permanent unanticipated reduction in crude oil prices of 10%, at the beginning of a three-year projection horizon (2015-2017)[4], would rapidly pass through to the inflation rate, prompting a fall of 0.4 pp in the HICP in the first year, which would continue in subsequent years (see accompanying table). In terms of activity, the greatest effects would be felt in household spending (consumption and residential investment) as a result of the positive impact on their disposable income and wealth in real terms. In turn, higher spending would encourage private productive investment and employment. An increase in domestic demand would have an expansionary effect on imports, which would trigger a fall in the external sector's contribution to GDP growth. Nevertheless, the decline in the energy bill would, in net terms, improve the economy's net lending position. The second-round effects on prices and wages, according to this model's estimates, are very moderate, owing, on one hand, to the degree of nominal rigidity inherent in the model and, on the other, to the effect of higher employment, which causes the decrease in inflation to have a small impact on wages. Overall, for this fall of 10% in oil prices, the model estimates that GDP would increase by 0.15 pp in the first year and by a further 0.04 pp in the second and third year, making for a cumulative increase of 0.23 pp over three years.

The above estimated impacts are of the sign expected under normal circumstances, considering that the Spanish economy is highly dependent on imported crude oil. However, these estimates should be interpreted with a degree of caution, insofar as the MTBE does not consider certain factors specific to the current economic situation which, might otherwise condition the sign of the effect of lower oil prices on economic activity. One of these specific factors is the role of the monetary policy of the ECB, which is currently deploying several non-standard measures in a setting where benchmark interest rates have reached levels close to their lower bound (see Chapter 2 of this report).

1 See S. Hurtado, P. Manzano, E. Ortega and A. Urtasun (2014), *Update and re-estimation of the quarterly model of Banco de España (MTBE),* Documentos Ocasionales, No 1403, Banco de España.

2 See O. Arce, S. Hurtado and C. Thomas (2015), *Policies for a low-inflation environment in a monetary union,* Documentos de Trabajo, Banco de España (forthcoming). See Box 4.1 of this chapter for a description of the main features of this model.

3 Thus, for example, the estimated direct effect on the overall HICP of a reduction of 10% in oil prices when oil is trading at €80/barrel is –0.4% (–3.4% on the energy component of the HICP), whereas if the starting level is €40/barrel the impact is –0.3% on the overall HICP and –2.5% on the energy component

4 Taking €65/barrel as the starting level for oil prices, which would be the average of the previous quarters.

FALL OF 10% IN OIL PRICES

	Accumulated level differences		
	2015	2016	2017
GDP	0.15	0.19	0.23
Contributions to real GDP growth			
Domestic demand	0.12	0.18	0.24
Net exports	-0.04	-0.07	-0.09
Net lending position	0.10	0.09	0.08
HICP	-0.40	-0.41	-0.42
Wages	-0.06	-0.05	-0.05
Employment	0.19	0.25	0.31

SOURCE: Banco de España.

Certain recent papers have argued that, where nominal rates are constrained by the zero bound[5], a fall in oil prices might not be expansionary since its deflationary effect could prompt rises in real interest rates which limit short-term domestic demand. However, this literature has omitted the potential role of non-standard policies which entail a reduction in the expected path of interest rates. Accordingly, presented below are the effects which would be produced by a shock, similar to a fall in oil prices, in the model [Arce, Hurtado and Thomas (2015)] comprising two regions in a monetary union. Specifically, the effects of a supply-side shock are considered which causes inflation to fall and increases real household disposable income in three different scenarios (see accompanying panel): (i) where the shock occurs when interest rates are far removed from the lower bound (blue line); (ii) where nominal interest rates are constrained at the lower bound (red line), and (iii) where rates are at the lower bound but the central bank applies non-standard monetary policy to reduce long-term nominal interest rates (for example, by managing the size and composition of its balance sheet or by guiding expectations) (green line).

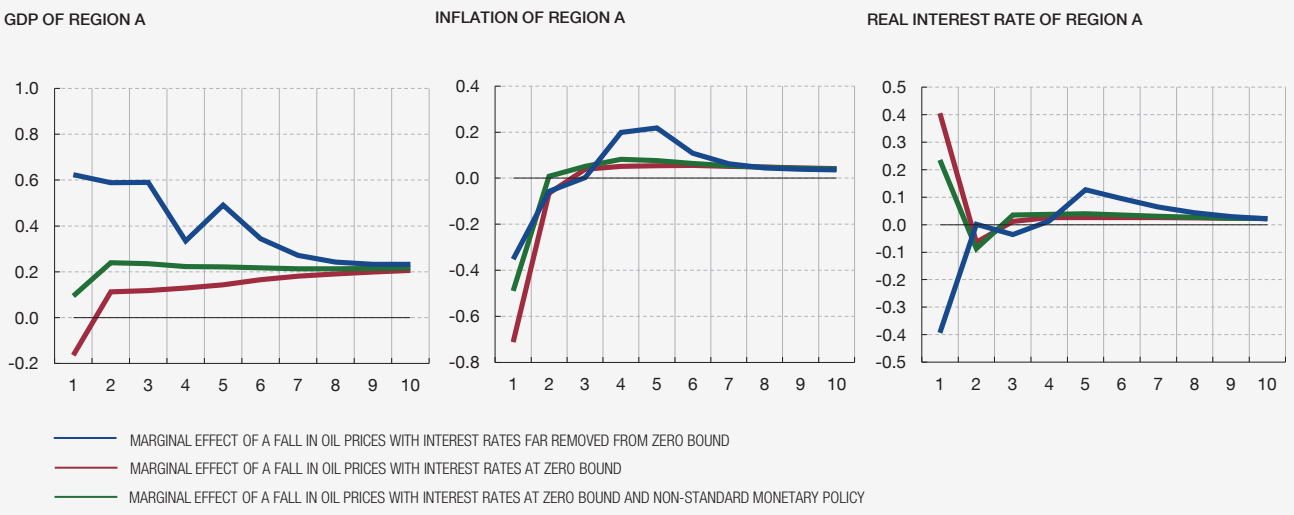
As shown in the panel, the model concludes that a shock of this type would trigger a fall in inflation in the three scenarios[6]. However, the monetary policy response, which varies in the different cases, has significant effects on the response of inflation and GDP. First, where interest rates are clearly above the lower bound, the fall in inflation leads the monetary authority to cut nominal rates substantially and, consequently, real interest rates moderate and GDP responds positively. By contrast, in the second scenario, it is considered that nominal interest rates are restricted by the lower bound and lower inflation, in the absence of a counterbalancing response by nominal rates, which pushes real interest rates higher, giving rise to an impact of a contraction in GDP. In this case, although the medium and long-term effect continues to be positive, GDP declines during the first two or three quarters.

As highlighted in the latter scenario, the previous short-term contractionary effect of the moderation in oil prices might be mitigated largely where the monetary authority responds to a fall in short-term inflation (and lower medium-term expectations) with a non-standard policy of managing its balance sheet and providing forward guidance, which keeps interest rates at their lower bound for longer than the rules governing their usual behaviour would suggest. In short, this central bank policy affects agents' expectations and neutralises the contractionary effect of a fall in oil prices which, in fact, becomes slightly expansionary from as early as the initial quarters.

5 See, for example, S. Neri and A. Notarprieto (2014), *Inflation, debt and the zero lower bound,* Occasional Paper No 242, Banca de Italia, I. Fisher (1933), "The debt-deflation theory of great depressions", *Econometrica,* B. Bernanke (2007), "Inflation expectations and inflation forecasting", in his speech at the NBER Summer Institute of July 2007 and D. Laxton, P. N'Dyiage and P. Pesenti (2006), "Deflationary shocks and monetary policy rules: an open-economy scenario analysis", *Journal of the Japanese and International Economies.*

6 The panel shows the responses of economy A in the two-region model, which is in a deleveraging phase. The responses of region B are qualitatively similar.

MARGINAL IMPACT OF A FALL IN OIL PRICES
% deviations from scenario with no change in oil prices. % difference (vertical axis), year (horizontal access).



SOURCE: Banco de España.