

3 THE EFFECT OF THE ECB'S MONETARY POLICIES IN THE RECENT PERIOD

Since spring 2014 the Governing Council of the ECB has deployed a broad raft of monetary policy actions to avoid the materialisation of risks arising from a situation of excessively low inflation over an extended period. The actions revolved around four broad strategic lines which include: setting a negative interest rate on the deposit facility; forward guidance on the future path of policy rates; the use of specific programmes directed at the transmission channels operating through bank intermediaries and the credit supply; and the implementation of a quantitative easing programme involving the large-scale purchase of private and public assets – for an amount equivalent to around 17 percentage points (pp) of euro area GDP during its first two years in operation.

This chapter provides evidence that shows how the ECB's actions have been effective in providing the monetary stimulus required by the demanding macroeconomic situation. It has done so by easing the financial conditions faced by economic agents both in the euro area as a whole and in the Spanish economy. In particular, it is estimated that the ECB's measures have been responsible for the reduction of around 100 basis points (bp) in average euro area long-term sovereign debt yields and of 130 bp in the case of Spain. By using different quantitative tools, the chapter assesses the contribution of the ECB's policies to GDP growth and inflation during 2015 and 2016, identifying some asymmetry in the strength of the effects by country. For the euro area as a whole, it is estimated that the ECB's actions have contributed to raising the level of GDP and of prices by around 1.4 pp and 1.2 pp, respectively, at end-2016. In the case of the Spanish economy, the estimated impact would be close to 1.2 pp on GDP and around 0.9 pp on prices.

Despite the extraordinarily accommodative monetary policy stance, the growth outlook for the area remains modest and medium-term inflation expectations are clearly below the benchmark of 2%. To reduce the risks of a protracted scenario of low economic growth and overly low inflation, and to lay the foundations for a stronger and sounder recovery of activity and employment, there is an ever pressing need for the involvement of other economic policies – particularly in the fiscal and structural arenas and in the area of strengthening the institutional arrangements of economic and monetary union.

1 Introduction

Against a background of weak recovery in the euro area economy and excessively low inflation, the ECB embarked on a new expansionary phase in its monetary policy in 2014.

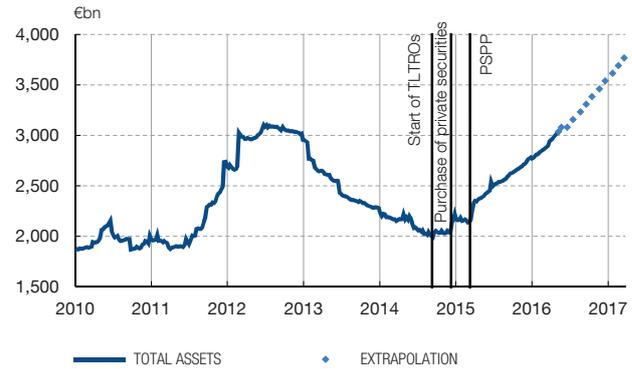
In 2014 the ECB embarked on a new expansionary phase in its monetary policy against a background of weak recovery in the euro area economy and excessively low inflation. The situation required the implementation of a broad raft of actions to overcome the restrictions arising from the increasingly narrow margin for reducing nominal interest rates. In addition to introducing a slightly negative interest rate on the deposit facility, the ECB stepped up the monetary impulse by providing long-term funding to the banking system and in 2015 took the historic step of introducing a large-scale Asset Purchase Programme. The worsening of the outlook for inflation last year and at the start of this year made it necessary to strengthen the stimulus from these measures and to fine-tune them.

This chapter analyses the latest expansionary phase of ECB monetary policy, paying particular attention to the Asset Purchase Programme and its transmission mechanisms, since this is the most novel feature in the recent implementation of monetary policy in the euro area. This chapter analyses the main effects of the central bank's various actions since mid-2014 on financial and credit conditions as well as the impact on economic activity and inflation for the euro area and Spanish economies.

1 OFFICIAL INTEREST RATES AND EONIA



2 EUROSISTEM BALANCE SHEET (a)



SOURCES: Datastream and ECB.

a For the extrapolation, the last-observed value in the balance sheet is increased monthly taking into account the acquisitions of securities envisaged in the expanded Asset Purchase Programme, while maintaining the pace of decline observed in the securities portfolio of the inactive programmes (SMP, CBPP and CBPP2).



2 A new phase in ECB actions

In 2015, the ECB embarked on a quantitative easing programme...

At the start of 2015, the ECB Governing Council decided to expand the Asset Purchase Programmes then in place to include government debt securities. This measure was adopted in the context of a new phase of ECB actions initiated in mid-2014, in which the size and composition of the balance sheet would become the main tool for setting the monetary policy stance, since there was practically no room for manoeuvre left in the conventional sphere. The initial calibration of the expanded Asset Purchase Programme envisaged monthly purchases of euro-denominated public and private securities¹ for €60 billion, until the inflation rate returned to a sustained convergence path in line with the medium-term objective, or at least until September 2016. This entailed a liquidity injection of more than €1,100 billion (around 11% of euro area GDP), so that the ECB balance sheet, which accounted for around 20% of GDP at the beginning of 2015, would expand to slightly more than 30% of GDP by the end of the minimum 19-month programme period (see Chart 3.1).

...which marked a quantum leap in the actions that the ECB had been adopting until then.

The decision to buy public debt marked a quantum leap in the actions adopted by the ECB since the summer of 2014. Thus, on the one hand, the Governing Council reduced official interest rates, bringing the rate for main refinancing operations down to 0.05% and credit and deposit facility rates to 0.30% and -0.20%, respectively, in September 2014. In a setting of excess liquidity, in which the main refinancing operations are conducted with full allotment, the remuneration on the deposit facility becomes the main reference determining yields in the money markets and shaping expectations about interest rates. On the other, the decision was taken to create a new, longer-term, bank financing facility linked to the size and growth of banks' loan portfolios, the so-called "targeted longer-term refinancing operations" (TLTRO). In a context of very timid credit growth, this specific measure aimed to strengthen the monetary transmission channel that operates through bank intermediation. Furthermore, two private Asset Purchase Programmes were launched in the corresponding financing markets for banks

¹ To take account of the specific institutional features of the Monetary Union, where monetary policy exists alongside the fiscal policies of 19 Member States, a partial financial risk-sharing system was set up for the government debt securities portfolio, whereby only 20% of potential losses would be shared.

	CBPP3	ABSPP	PSPP	CSPP
	Covered bond purchase programme	Asset-backed securities purchase programme	Public sector purchase programme	Corporate sector purchase programme
	Private debt	Private debt	Public debt	Private debt
Type of security	Covered bonds	Simple transparent securitisations whose underlying assets are loans to the non-financial private sector	Bonds issued by central government and by supranational agencies and institutions in the euro area. Programme extended in December 2015 to regional and local government issues in the euro area	Non-bank corporate bonds
Market	Primary/secondary		Secondary	Primary (a) /secondary
Announcement/start	September/October 2014	September/December 2014	January/March 2015	March/June 2016
Running to	March 2017 at least (extended in December 2015 relative to the initial date of September 2016)			
Volume of purchases	€60 bn monthly from March 2015 to March 2016, €80 bn from April 2016			
Reinvestment policy	Redeemed amounts are re-invested for as long as is necessary			
Volume purchased (€bn)				
End 2014	30	2	—	—
End 2015	143	15	491	—
April 2016	172	19	727	—

SOURCES: ECB and Banco de España.

a Issues of entities with the status of a public corporation may not be purchased on the primary market.

in the euro area: the programme known as CBPP3, for covered bonds (such as *cédulas hipotecarias* in Spain), and the ABSPP, for simple and transparent securitisations whose underlying assets include loans to households and corporations in the euro area. Both programmes, announced in September 2014, were launched in the final quarter of that year, with purchases both in primary and secondary markets (see Table 3.1).

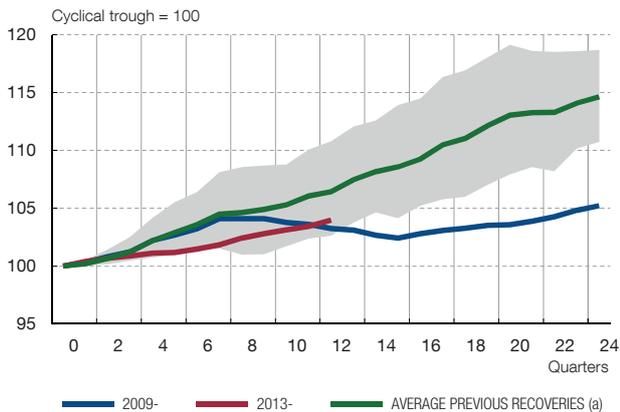
The Asset Purchase Programme stemmed from a context of weak growth and inflation prospects that were far removed from the medium-term monetary policy objective.

The large-scale Asset Purchase Programme was the Council's response to the challenge of ensuring the gradual return of the inflation rate, negative at the time, to levels closer to the reference value of 2%.² This challenge had to be addressed in a particularly complex macroeconomic setting, characterised by a very weak economic recovery and a slightly contractionary fiscal policy in the euro area as a whole (see Chart 3.2). Although the fall in inflation provided a stimulus for the economy in the short term by improving agents' purchasing power, the prospect of an inflation rate that remained too low for a prolonged period would eventually constrain aggregate demand, already weakened in some countries by the ongoing deleveraging process, with a rise in real financing costs and the debt burden. Furthermore, this prospect jeopardised the proper anchoring of inflation expectations, and the very credibility of the monetary policy objective. With nominal rigidities in prices and wages, a scenario of excessively low inflation also hampered the ongoing absorption of the imbalances in terms of competitiveness in some euro area countries.³

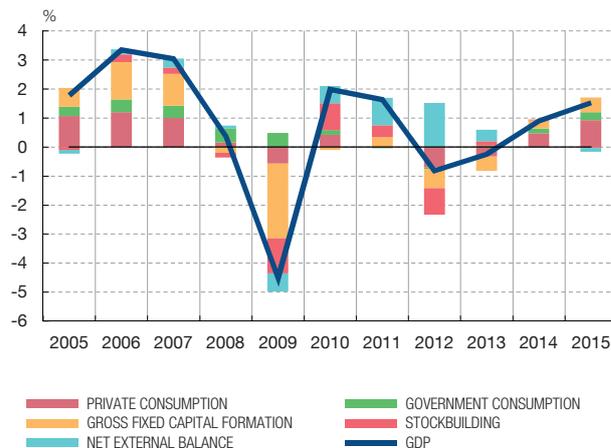
² See Chapter 2 of the 2014 *Annual Report* of the Banco de España for a more detailed description of these measures.

³ See Chapter 4 of the 2014 *Annual Report* of the Banco de España for an analysis of the channels through which de-anchoring of inflation expectations has negative effects at the aggregate level.

1 REAL GDP. DEVELOPMENTS RECENTLY AND IN PREVIOUS RECOVERIES



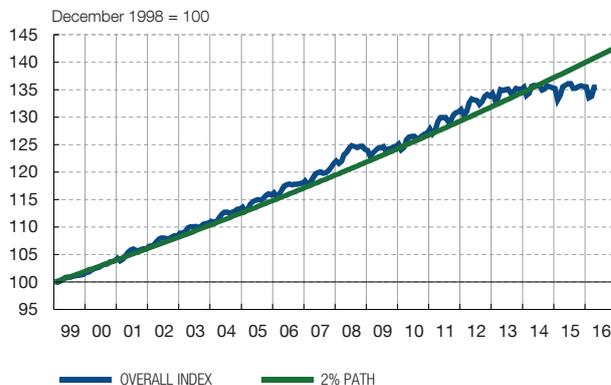
2 GDP AND CONTRIBUTION OF ITS COMPONENTS
Year-on-year growth



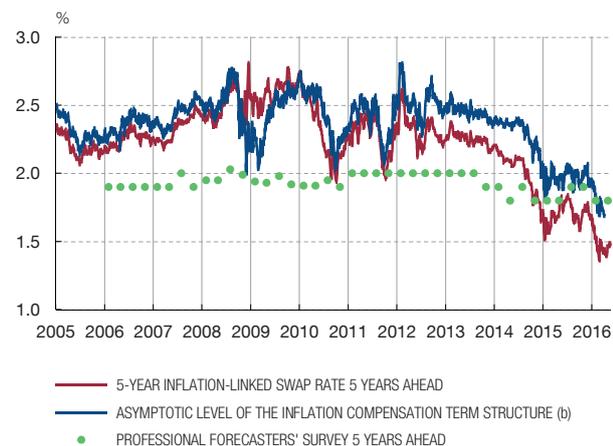
3 HARMONISED INDICES OF CONSUMER PRICES (HICP)
Year-on-year rates of change



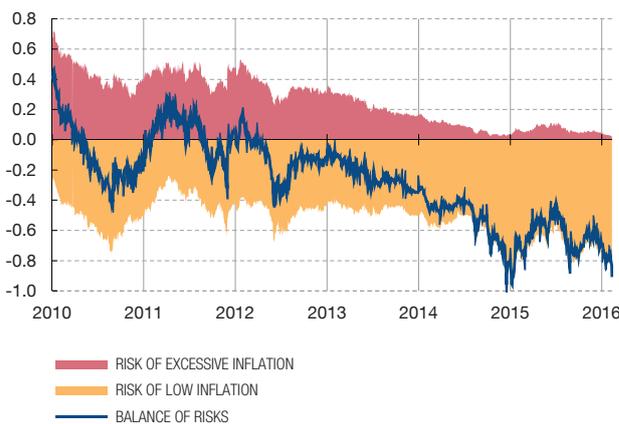
4 HARMONISED INDICES OF CONSUMER PRICES (HICP)



5 MEDIUM AND LONG-TERM INFLATION EXPECTATIONS



6 BALANCE OF RISKS TO PRICE STABILITY (c)



SOURCES: ECB, European Commission, Datastream, OECD and Banco de España.

- a Average for recoveries initiated in 1975, 1980 and 1993. The shaded area indicates the GDP low and high attained in these recoveries.
- b Estimate by R. Gimeno and E. Ortega (2016), *The Evolution of Inflation Expectations in Euro Area Markets*, Working Paper, Banco de España, forthcoming.
- c The indicator is constructed for a parametrisation of price stability defined by the interval (1.8%-2%) following L. Killian and S. Manganelli (2007), "Quantifying the Risk of Deflation", *Journal of Money, Credit and Banking*, Vol. 39, No. 2/3, pp. 561-590. The probability that inflation is situated outside this interval is calculated using option and inflation swap prices in accordance with the methodology of R. Gimeno and A. Ibáñez (2016), *The Eurozone (Expected) Inflation: An Option's Eyes View*, Working Paper, Banco de España, forthcoming.



The announcement and implementation of the programme helped to boost internal demand, due to the favourable effect it had on financial conditions

As analysed in greater detail in the following sections, the announcement and implementation of the Asset Purchase Programme contributed to easing financial conditions in the early months of 2015 and helped the economy in the euro area to gradually consolidate its recovery. Economic growth relied increasingly on the contribution of domestic demand and, particularly, of private consumption, underpinned by improved consumer confidence and higher purchasing power arising from job creation and cheaper energy prices. Investment, which had been notably subdued and weighed down by the weak prospects for growth in demand, experienced a muted improvement, despite the fact that financing costs, business confidence, profits and capacity utilisation performed favourably.

However, the economic recovery lost momentum as a result of the worsening global growth outlook after the summer months...

In the second half of 2015 and the early months of 2016, it became clear that global growth was not immune to the signs of slowdown observed in the emerging economies since the summer. The global implications of a slowdown in the pace of growth of the Chinese economy and the readjustment in its growth pattern, along with the marked downward path of oil prices, also gave rise to episodes of instability in international financial markets and capital flows, leading to a widespread downward revision of global growth projections and a moderation of the expected pace of normalisation of the Federal Reserve's monetary policy stance. These events were reflected in the euro area, where lower dynamism in exports was only partially offset by the fall in oil prices. Notwithstanding the above, GDP continued on a path of moderate recovery and rose by 1.5% in the whole of 2015, as compared with 0.9% in 2014.

...which reduced the rate of inflation, strongly influenced by the changes in energy prices...

The sharp fall in oil prices, which began in mid-2014 and became more marked from May 2015 on, affected euro area inflation more than expected, the latter remaining close to zero in the second half of 2015 and start of 2016. In parallel, private analysts and international organisations significantly scaled back their forecasts for 2016. In the case of the Eurosystem, the inflation forecast for this year based on their macroeconomic projection exercises fell from 1.5% in March 2015 to 0.1% a year later.

...and had a very negative impact on the prospects of the inflation rate making a sustained return to levels closer to the medium-term reference rate of 2%...

Beyond the obvious direct effects of falling oil prices on the general price index, as 2015 progressed, the medium- and long-term inflation expectation indicators dropped to very low levels, below those observed before the launch of the Programme. Moreover, the correlation between these indicators and those referring to shorter-term inflation expectations pointed to possible problems regarding the anchoring of inflation expectations. The March 2016 ECB staff macroeconomic projections foresaw the inflation for 2017 and 2018 at 1.3% and 1.6%, respectively, clearly far from the medium-term objective of monetary policy.

...which prompted the ECB Governing Council to adopt additional stimulus measures in December 2015 and March 2016

The worsening global macroeconomic outlook from mid-2015 led to a substantial increase in risks regarding compliance with the medium-term target set for price stability, as shown in the balance of risks indicator in Chart 3.2. This situation led to the ECB Governing Council announcing, in October 2015, its intention to review the monetary policy stance so as to ensure that it was appropriate for the new macroeconomic setting. Thus, in December 2015 and March 2016, it adopted a broad package of additional stimulus measures which affected official interest rates on one hand, and the size and composition of the ECB's balance sheet on the other, through a dual channel: the expansion of the Asset Purchase Programme and a new TLTRO series, aimed at strengthening monetary policy transmission through the credit channel.

The ECB Governing Council reduced official interest rates,...

The ECB reduced the deposit facility rate by 10 bp, both in December and in March, to leave it standing at -0.40%. Also, in March, the rate of main refinancing operations and the marginal lending facility rate were reduced by 5 bp, to 0% and 0.25%, respectively. As part

of the communication policy on the future stance of monetary policy, the Council also indicated that official interest rates would remain at those, or lower, levels for a prolonged period and, in any event, beyond the time frame of the net acquisitions envisaged under the Asset Purchase Programme. With this communication strategy, the ECB tried to ensure that short-term interest rate movements passed more efficiently through to the rest of the yield curve.

...expanded the Asset Purchase Programme, both in terms of duration and amount and type of eligible assets...

With respect to the Asset Purchase Programme, the Council recalibrated certain parameters in order to boost its effects. In December 2015, it extended the programme by six months, until March 2017, conditional upon the Council observing a sustained change in the inflation rate to levels approaching 2%. It was also announced that maturing securities purchased under the programme would be reinvested for as long as required. The longer time frame and the reinvestment policy will lead to a significant increase in liquidity until 2019, of around €680 billion (6.5% of GDP). Also, the universe of eligible government assets was adjusted to include debt issued by regional and local governments in the euro area, provided that they meet the remaining eligibility criteria, such as a minimum credit rating.

In March 2016, the Council decided to increase the volume of monthly purchases to €80 billion and to include as eligible assets under the programme bonds from the non-banking corporate sector, by means of the new Corporate Sector Purchase Programme (“CSPP”; see Table 3.1). The CSPP aims to contribute to reducing the cost of corporate bond issues and, insofar as there is a shift in larger firms’ financing decisions towards the fixed income markets, it is also expected to have a positive side-effect on the supply of bank loans to smaller firms.

... and introduced a new series of longer-term refinancing operations

Also with the aim of strengthening the transmission channel which operates through the supply of bank loans, in March the Council announced a new series of four targeted longer-term refinancing operations (known as TLTRO-II), to be implemented as from June 2016. These operations will have a four-year maturity and the same fixed rate as the main refinancing operations, which could be brought down to the level of the deposit facility rate if the loan portfolio exceeds a reference benchmark.

3 Transmission channels for quantitative easing measures

3.1 TRANSMISSION TO FINANCIAL CONDITIONS

Asset purchase programmes affect long-term interest rates, mainly through two channels: the signalling channel, which strengthens the central bank’s communication policy...

In a setting where the scope for reducing short-term interest is limited, large-scale Asset Purchase Programmes are an effective tool to stimulate aggregate demand, since they affect long-term interest rates, prices and asset returns. The literature based on recent experience highlights two key mechanisms in the transmission process⁴.

The first of these is known as the “signalling channel”, which capture the effect of these measures on agents’ expectations over the future monetary policy stance. The prospect of lower official interest rates or of rates kept at low levels over a more prolonged period immediately influences longer-term rates, insofar as the yield on a long-term bond reflects, among other things, the expected short-term rates throughout the life of the instrument⁵. The signalling channel reinforces the effects of other measures which also have an impact

⁴ For a broader discussion of these and other channels, see, for example, Krishnamurthy and A. Vissing-Jorgensen (2011), *The effects of Quantitative Easing on Interest Rates: Channels and Implications for Policy*, Brookings Papers on Economic Activity, Autumn, pp. 215-287.

⁵ Moreover, as the uncertainty over possible changes in official interest rates is reduced, a certain decline may be expected in the term premium, that is, the excess yield demanded by investors for investing in the longer-term, as compensation for possible fluctuations in bond prices in the event of unexpected changes in interest rates.

on official interest-rate expectations⁶, such as the publication of guidelines on the future path of monetary policy (“forward guidance”)⁷.

...and the portfolio rebalancing channel

Quantitative easing measures are also transmitted to asset prices through the adjustments they bring about in investor portfolios. This is known as the “portfolio rebalancing channel”. When the central bank purchases securities, it does so against central bank reserves, which are often not perfect substitutes for the assets purchased. Consequently, investors seek to rebalance their portfolios to reinvest this liquidity, either by purchasing the same type of asset as that sold or other close substitutes, which tends to bring down returns on assets on the whole (and push up the price)⁸. The size of the effects will depend on the specific characteristics of the assets purchased, such as credit risk and duration. The effect of euro-denominated asset purchases on the exchange rate also forms an integral part of this channel. The exchange rate will tend to depreciate, either due to the increase in the demand for assets denominated in foreign currencies by euro area investors as a result of the portfolio rebalancing process, or to the decrease in the holdings of euro-denominated assets by foreign investors in a context of falling returns.

The expansionary effects are reinforced by the negative remuneration on the deposit facility

In the case of the ECB, reducing the deposit facility rate to negative levels has served to reinforce the effects of the Asset Purchase Programme in two ways. On one hand, the decrease in the remuneration on the deposit facility directly affects current interbank market rates and interest rate expectations, compressing longer-term rates. On the other, the higher cost of maintaining excess liquidity in the Eurosystem provides an incentive for reinvesting in alternative assets and for bank lending. This innovation, shared with other central banks in Europe and Japan, has shown that the lower bound of nominal interest rates is not necessarily 0%, since cash holdings can yield negative returns once the storage, distribution and insurance costs have been taken into account. However, the capacity to generate additional impulses by pushing negative official rates further down is limited. Below a certain negative value, not easy to identify, the difficulty of passing through negative rates to retail deposits could prevent them from being transmitted to the cost of lending transactions or lead to a narrowing of margins which would hamper banks’ intermediation capacity.

Empirical evidence finds that asset purchase programmes have positive effects on long-term interest rates, although there is uncertainty as to the scale of these effects

Recent experience has allowed for empirical evidence to be gathered on the effects of Asset Purchase Programmes on long-term interest rates. However, the broad range of available estimates illustrates the difficulties involved in empirical exercises and the specific features of the different programmes. In the case of the United States Federal Reserve, Williams (2014)⁹ estimates that \$600 billion of asset purchases (approximately 3% of GDP) would lower ten-year yields by around 15 bp to 25 bp. According to the author,

6 Studies highlighting the importance of this channel compared with others in the case of the Federal Reserve include J. Christensen and G. D. Rudebusch (2012), “The response of interest rates to US and UK quantitative easing”, *Economic Journal*, November, n° 122, pp. 385-414, and M. Bauer and G. Rudebusch (2014), “The signaling channel for Federal Reserve bond purchases”, *International Journal of Central Banking*, n° 10, pp. 233-289.

7 For more details see, for example, S. López and P. del Río (2013), “El uso de la orientación de expectativas o *forward guidance* como instrumento de política monetaria”, *Boletín Económico*, December, Banco de España.

8 For this effect to occur, certain financial market imperfections must be present to allow for interest rates to react to the supply of bonds available to private investors. Specifically, the literature identifies a liquidity shortage channel where, in the presence of investors with a preferred environment (such as pension funds or insurance companies with a more conservative and long-term investment profile), the demand for the assets purchased by the central bank does not decline, thus pushing up the prices. Alternatively, the effect on the price can also be explained by the fact that the central bank’s asset purchases lower the risk level of private investor portfolios (for example, duration risk), exerting downward pressure on risk premia.

9 J. C. Williams (2014), “Monetary Policy at the Zero Lower Bound. Putting Theory into Practice”, *Hutchins Center on Fiscal & Monetary Policy at Brookings*, January.

this would be the equivalent of a cut in the federal funds rate of around 75 bp to 100 bp. In the case of the United Kingdom, Joyce *et al.*¹⁰ (2011) estimate that the Asset Purchase Programme of the Bank of England, amounting to £200 billion or 11% of GDP, contributed to reducing long-term interest rates by around 100 bp. In Japan, a review by the central bank itself suggests that the programme launched in April 2014 lowered ten-year rates by 30 bp in the first two years since its introduction, 80 bp in real terms, taking into account the upward revision of inflation expectations¹¹.

3.2 TRANSMISSION TO AGGREGATE DEMAND AND PRICES

Changes in financial conditions contribute to countering deflationary tensions through the usual transmission channels

The changes described in financial conditions contribute to combating possible deflationary tensions by boosting demand through the usual transmission channels of conventional monetary stimulus. Thus, lower real interest rates favour the bringing forward of current consumption decisions and expand spending on investment and durable consumption since they reduce the user cost of capital. There is also an impact in disposable income¹² and positive wealth effects¹³ through asset revaluations. The scale of these effects depends on the size and composition of agents' balance sheets and on the distribution of financial assets among the population. In the case of the public sector, savings in financing costs, and the consequent freeing up of funds, should facilitate the ongoing consolidation processes.

The credit and exchange rate channels are particularly important in the euro area

Given the high presence of banks in the euro area, the effects of monetary policy measures are expected to occur largely through changes in the availability and cost of loans. The fall in interest rates reduces the cost of funding for banks and allows them to apply lower interest rates on new loans, stimulating demand for financing and, consequently, spending. Furthermore, the rise in asset prices contributes to strengthening the net worth of banks, which will experience an increase in their lending capacity, and that of their borrowers, which will see the value of their collateral grow. From the supply standpoint, a backdrop of low returns encourages portfolio rebalancing towards higher-risk assets which should stimulate lending.

Exchange rate depreciation improves price competitiveness of goods produced in the euro area and increases net exports, with expansionary effects on aggregate demand and inflation. It also has a direct effect on inflation insofar as it raises the prices of imported goods and services, whether these relate to final consumption or intermediate goods.

Empirical evidence of the macroeconomic impact of quantitative easing measures is not very extensive

The available studies, focusing especially on the experience of the United States and the United Kingdom, generally identify that this type of programmes has a positive effect on activity and prices. However, the disparity in the magnitude of their estimated effects reveals a very high degree of uncertainty which is even greater than in the case of financial variables. The various approaches in the empirical literature differ in very significant aspects such as the assumptions which permit the identification of what constitutes an exogenous monetary policy stimulus in the non-conventional sphere.

¹⁰ M. A. Joyce, A. Lasasoa, I. Stevens, y M. Tong (2011), "The financial market reaction of quantitative easing in the United Kingdom". *International Journal of Central Banking*, Vol. 7, n° 3, pp 113-161.

¹¹ This is the impact of a programme involving 110,000 billion yen, the amount by which the central bank's holdings of government debt securities increased to December 2014. See Bank of Japan (2015), *Quantitative and Qualitative Monetary Easing: assessment of its effects in the two years since its introduction*, Bank of Japan Review, May.

¹² In general, there will be a positive effect for net debtors insofar as lower interest rates feed through to debt servicing costs, increasing their spending capacity. In the case of creditors, however, the future earnings on their assets will fall, with a contractionary effect on their gross disposable income.

¹³ These effects will foreseeably be less powerful in the euro area than in the United States owing to the smaller holdings of financial assets whose valuation fluctuates according to market conditions, such as bonds and, in particular, shares. See, for example, OECD (2015), "Quantitative easing and household wealth" Box 1.4 *Economic Outlook* Vol. 1.

According to the summary in Constâncio (2015)¹⁴, the available studies for the United States estimate effects of between 0.2% and 1.7% on the level of GDP and between 0 pp and 1.7 pp on the level of inflation per every \$1,000 billion of purchases (equivalent to 5.5% of the country's GDP). More recent studies, such as that by Engen *et al.* (2015)¹⁵, have estimated that the size of these effects is slightly lower. In the case of the United Kingdom, it is estimated that the Bank of England's programme has had a positive effect ranging from 1% to 3% on the level of GDP and from 0.2 pp to 2.5 pp for inflation. However, the hypothetical adverse effects which would have occurred if these measures had not been applied were not estimated in any of these studies.

4 An estimation of the effects of the ECB monetary policy on financial and credit conditions

4.1 THE EFFECTS ON THE EURO AREA AS A WHOLE

Since spring 2014, financing conditions in the euro area as a whole have eased significantly

Since May 2014¹⁶, nominal interest rates in the euro area have decreased along the entire yield curve. This decrease was sharper at the longer end of the curve, with interest rates ultimately turning negative even at relatively long maturities (see Chart 3.3). For instance, the interest rate curve based on euro area sovereign debt yields – for all issuers – decreased notably and levelled off significantly. For maturities of three and ten years the reduction was around 75 bp and 150 bp during the two-year period analysed and stood at 0.2% and 1%, respectively, at the cut-off date of this report. This decline was not uniform across countries. While ten-year German *Bund* yields declined by around 130 bp to below 0.2%, Spanish sovereign debt yields decreased by approximately 140 bp to 1.6% and in the case of Italy they fell about 150 bp to 1.5%. The yield on covered bonds issued in the euro area experienced a fall of some 120 bp. Other financing instruments also seem to have benefited from these trends. The exchange rate depreciated notably (by around 20% against the dollar), influenced by the increasingly different monetary policy stance of the Eurosystem and the Federal Reserve which in the case of the latter is less accommodative.

The fall in inflation expectations meant, however, that the easing of financial conditions was lower in real terms than in nominal terms. For example, the decline of around 100 bp in the real yield on ten-year bonds, which stood at levels close to 1%, is 50 bp lower than the nominal decline. In this respect panel 2 of Chart 3.3 shows the downward shift and levelling-off in the term structure of real interest rates as from May 2014.

The analysis of the response of asset prices to monetary policy announcements is not without difficulties...

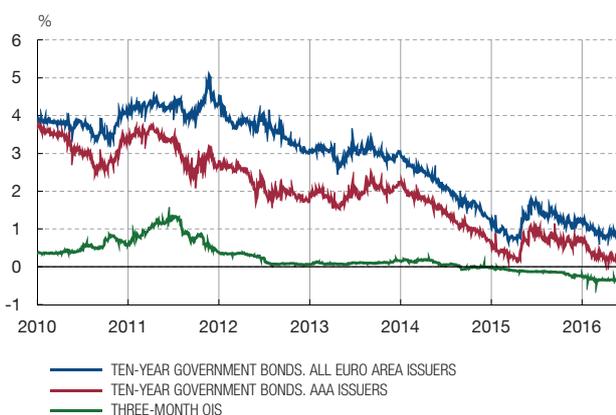
It is very difficult to isolate the effect on financial markets of a specific monetary policy decision compared with effects caused by other factors such as revisions of the outlook for growth or inflation, changes in the perceived solvency of various institutional sectors, reforms undertaken by certain Member States or progress made in European governance. A commonly used approach to isolate this impact on financial variables is to analyse the response of respective asset prices to different announcements of monetary policy actions. The core assumption is that market prices would react relatively rapidly to central bank announcements, whereas flows of purchases, insofar as they do not provide additional information, would not generate additional expansionary effects on their own. The use of this methodology called *event study* is not without practical difficulties. In particular, it requires selecting the size of the time window during which changes in prices are measured. A very short time span will probably tend to underestimate the effects; however, extending it increases the possibility that the measurement will be biased by the occurrence of other factors. The simultaneous announcement of several measures also raises specific

14 V. Constâncio (2015), *US Monetary Policy Forum Panel discussion on Central Banking with Large Balance Sheets*, presentation in New York, 27 February.

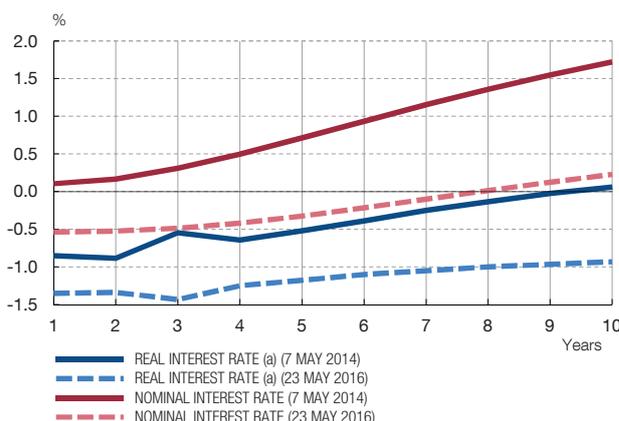
15 E. M. Engen, T. Laubach and D. Reifschneider (2015), "The Macroeconomic Effects of the Federal Reserve's Unconventional Monetary Policies", *Finance and Economics Discussion Series 2015-005*, Washington, Board of Governors of the Federal Reserve System.

16 The period considered is from 7 May 2014, the day before the Governing Council meeting at which the ECB indicated the need to adjust the monetary policy stance, to 23 May 2016, the cut-off date of this report.

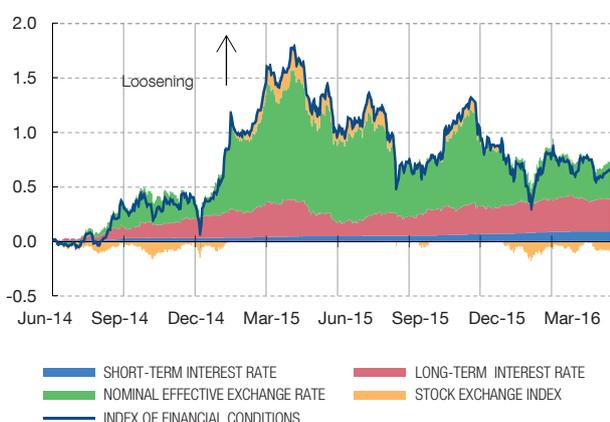
1 INTEREST RATES



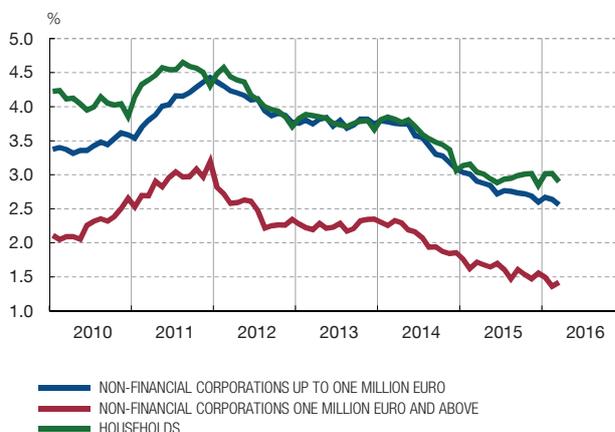
2 YIELD CURVE BY MATURITY. GOVERNMENT DEBT. AAA ISSUERS



3 FINANCIAL CONDITIONS INDEX (b)



4 INTEREST RATES ON BANK LOANS



SOURCES: ECB and Banco de España.

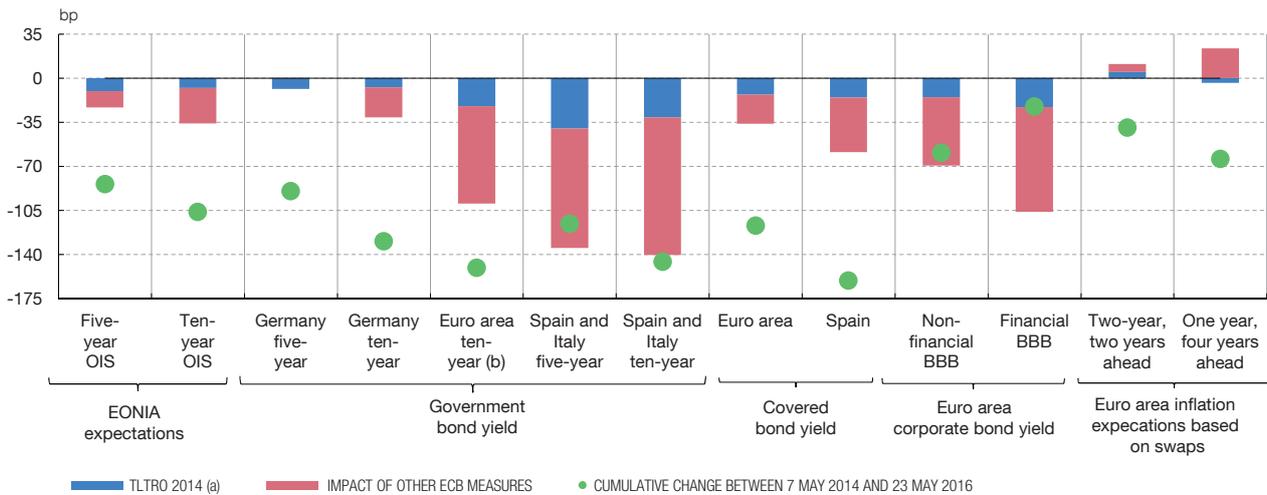
- a Calculated as the difference between the nominal interest rate and inflation expected for the corresponding maturity, obtained using inflation swaps.
- b Daily frequency index incorporating the four variables represented in the chart, to which the weightings included in the following article are applied: J. Martínez Pagés and E. Ortega Eslava (2000), "Una evaluación de la situación monetaria y financiera en España a partir de un índice de condiciones monetaria", *Boletín Económico*, February, Banco de España. Specifically, 0.18 is used for the short-term interest rate, 0.23 for the long-term rate, 0.10 for the exchange rate and 0.012 for the stock exchange — the first three are included in the index with a negative sign. Given that the changes observed in the variables are not only the result of genuine shocks affecting them, but also of their endogenous performance, the value of the financial conditions index cannot be interpreted directly as an indicator of the monetary policy stance.

problems since it prevents the corresponding effects from being identified separately, as in the case of the ECB with TLTROs, Asset Purchase Programmes, official interest rate decisions and various refinements of its communications policy. Finally, a further difficulty lies in the fact that financial markets usually anticipate the effects of possible subsequent official announcements where the publication of macroeconomic data or public speeches by monetary policy-makers fuel expectations that the central bank will act. Measuring the impact of the decisions taken, for example, in December 2015 and in March 2016 is particularly complicated owing to the presence of considerable anticipatory effects in a context of high volatility in financial markets

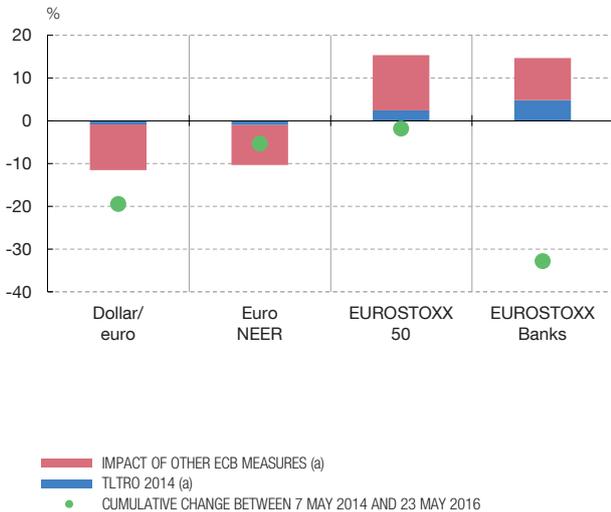
...however, with certain caveats, it attributes a large share of the easing of financial conditions to monetary policy...

With these caveats, this *event study* methodology was used to approximate the impact of the monetary policy decisions of the ECB Governing Council as from May 2014. The exercise is conducted by considering a two-day time window – namely, between the close of the day before and that of the day after the announcement of the measures – for a total

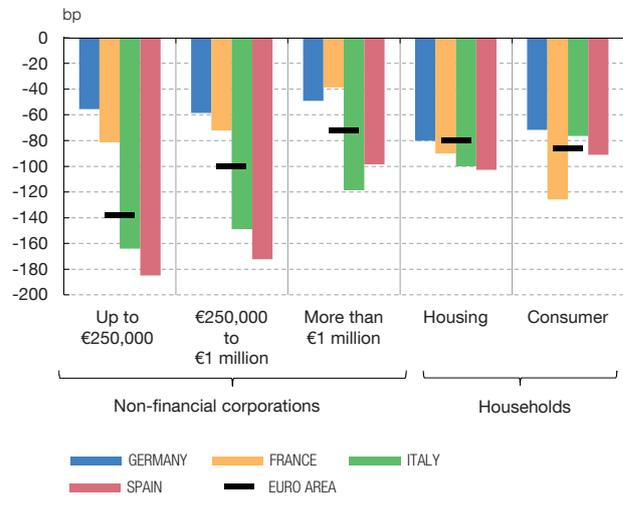
1 CHANGES IN CERTAIN FINANCIAL VARIABLES SINCE MAY 2014 AND CONTRIBUTION OF MONETARY POLICY DECISIONS



2 EXCHANGE RATE AND EQUITIES MARKETS



3 CHANGE IN INTEREST RATES ON BANK LOANS (MAY 2014 TO MARCH 2016)



SOURCES: ECB, Dealogic and Banco de España.

- a Event study considering the change in prices with a two-day window around 36 dates when the Governing Council of the ECB announced measures, accounts of its meetings were published or speeches were made by distinguished members of the Council that allowed the possibility of actions being adopted shortly (see footnote 17 to the text) to be anticipated. The TLTRO caption includes the meetings of the Governing Council of the ECB of 8 May and 5 June 2014.
- b Estimation made by the ECB using national data.



of 36 dates when the Council announced measures, accounts of meetings were published or speeches were made by distinguished members of the Council that anticipated the possibility of actions being adopted shortly.¹⁷

The results of the exercise, presented in Chart 3.4 indicate that monetary policy measures have made an appreciable contribution to the easing of financial conditions in the euro area

17 Until March 2015, the dates were selected in accordance with ECB (2015), *The transmission of the ECB's recent non-standard monetary policy measures*, Economic Bulletin, No 7 and C. Altavilla, G. Carboni and R. Motto (2015), *Asset purchase programmes and financial markets: lessons from the euro area*, Working Paper, No 1864, November, European Central Bank. Other dates considered relevant were added to the aforementioned ones so that the exercise is extended until the Governing Council meeting in March 2016.

since May 2014. The impacts estimated are higher in the case of assets included in the purchase programme – government debt and covered bonds¹⁸ – and the longer the maturity and the higher the risk level, the greater the impacts. Thus, it is estimated that the ECB's measures would be responsible for around 100 bp of the reduction in euro area long-term sovereign debt yields, although this effect would be higher for the securities which initially had higher risk premia: approximately 130 bp and 150 bp for Spanish and Italian sovereign debt, respectively, compared with 30 bp in the case of the German Bund. It is estimated that the effect on covered bond yields was around 40 bp, whereas in the case of yields on the BBB bonds of non-financial and financial corporations it was approximately 70 bp and 110 bp, respectively.

...including stock market gains and a depreciation of the exchange rate,...

Despite the losses posted by stock market indices since May 2014, the Eurosystem's expansionary monetary policy is estimated to have contributed to raising equity prices by more than 15% in the case of the EUROSTOXX index, according to the estimations of the exercise. The analysis seems to indicate that as a result of the ECB's measures, the nominal effective exchange rate depreciated 10% and the exchange rate against the dollar declined by around 12%.

...and a modest improvement in medium-term inflation expectations

Lastly, it should be emphasised that medium-term inflation expectations of market indicators had a positive, albeit modest, reaction to the announcements of the ECB's measures. For example, the exercise estimates that the latter would have increased two-year inflation expectations two years ahead based on inflation swaps by 10 bp. In any event, the size of the estimated effect is insufficient to offset the tightening of financial conditions in real terms which has involved a cumulative fall of 40 bp by the indicator since May 2014.

The loosening of financial conditions resulted in a reduction in the costs of liabilities for euro area banks...

The banks in the euro area also took advantage of the widespread loosening of financial conditions which resulted in the lower cost of debt issuance in capital markets against a backdrop where they had the possibility of accessing long-term central bank funding at very low interest rates through the TLTROs. In turn, retail deposits rates were also subject to downward pressure on account of the levels of money market interest rates, some of which were even negative.

...which the latter passed through in the form of better terms and conditions for bank loans...

On the asset side, banks passed through the rate reduction to the interest rates on loan transactions. As shown in Chart 3.4, the sharpest fall was in the loans extended to corporations for an amount of less than one million euro, targeted mainly at SMEs. The qualitative indicators of the Bank Lending Survey (BLS) and the Survey on the Access to Finance of Enterprises (SAFE) in the euro area also indicate that access to credit has improved. According to the BLS, banks reported that both TLTROs and the Asset Purchase Programme seem to have contributed significantly to the easing of credit conditions, whereas the impact of these programmes on lending standards seems to have been more limited.

...and it triggered a slight recovery in credit

These circumstances fostered the gradual recovery in lending to the private sector in the euro area during 2015 and in 2016 to date. Although the improvement was widespread by country, the respective rates of increase diverged considerably as a result of the deleveraging processes under way in several euro area countries. Thus, lending to the private sector halted its decline, which was still visible at end-2014, and

¹⁸ The scant buoyancy of primary securitisation markets, still feeling the toll of regulatory uncertainty, among other factors, prevented the ABSPP purchase programme from being ambitiously deployed.

is currently expanding at a year-on-year rate of around 1% in the area as a whole. The stock of loans to households and non-financial corporations continued to decrease in year-on-year terms in countries such as Spain, the Netherlands, Greece, Portugal and Ireland.

In conclusion, the available evidence suggests that the raft of monetary policy actions applied by the ECB in the last two years has contributed to a considerable loosening of credit conditions

In line with the available evidence for the euro area and other geographical areas, the analysis performed suggests that the monetary policy actions adopted by the ECB have had a considerable impact on financial conditions in the euro area. This impact occurred despite the fact that the ECB took these decisions at a time when, having overcome the most acute bouts of financial instability which affected the euro area in 2011-2012, financing conditions had already loosened considerably. The fact that purchases by the Eurosystem targeted securities with longer maturities and covered a broad range of credit ratings seems to have resulted in the programme being more effective and having a stronger impact on term premia and credit risk premia.

4.2 THE EFFECTS ON FINANCIAL AND CREDIT CONDITIONS IN THE SPANISH ECONOMY

The financial conditions of the Spanish economy followed a similar pattern to those described for the euro area with sharp falls in financing costs...

The financial conditions of the Spanish economy followed a similar pattern to those described for the euro area, although interest rates fell slightly more sharply in Spain. For instance, among the instruments included in the Eurosystem's purchase programme, the nominal yield on ten-year government debt has decreased by approximately 140 bp since May 2014 to levels of around 1.6% while that on long-term covered bonds has declined by more than 160 bp and that on long-term bond issues of non-financial corporations (NFCs) has fallen by around 145 bp. This trend fed through to varying degrees to other financial instruments not included in the programme. It is estimated that the cost of equity¹⁹ of NFCs decreased by around 120 bp in this period. Given that long-term inflation expectations fell during these two years, the real reduction in financing costs seems to have ranged, according to the maturity of the instrument, from 50 bp to 60 bp²⁰ which is more moderate than the nominal change.

...partly as a result of the Eurosystem's expansionary monetary policy

The impact attributable to monetary policy actions in the reduction of financing costs in the case of the Spanish economy is greater than for the euro area as a whole. In fact, by using the event study methodology in the previous section, these impacts, in nominal terms, are calculated to be around 130 bp for ten-year government debt, approximately 60 bp for covered bonds, almost 90 bp for the cost of long-term bond issues of NFCs and slightly more than 80 bp for the sector's equity²¹ (see panel 2 of Chart 3.5). In real terms, the impacts estimated seem to have been only marginally higher, given the modest reaction of inflation expectations to the ECB's measures. The effect on stock market prices during this period was also significant, amounting to more than 15% in the case of the Madrid Stock Exchange General Index, in line with what was seen for the EUROSTOXX index.

Credit institutions passed through the decline in their funding costs to interest rates on loans...

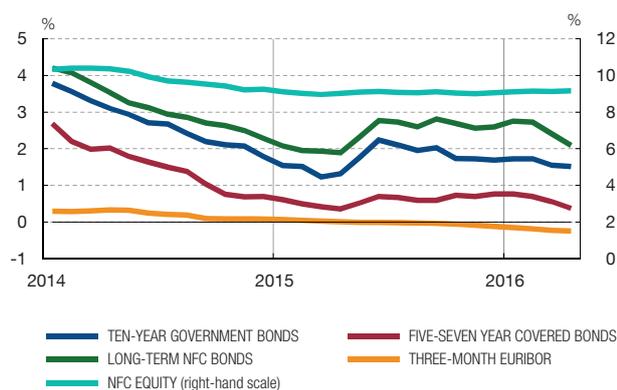
As shown in panel 3 of Chart 3.5, the widespread reduction in interest rates was also reflected in the cost of bank deposits which represent the bulk of their liabilities. Banks which also had access to TLTRO funds passed the lower funding costs through to interest rates on loans. As in the euro area, the decline was across all segments, albeit sharper in

¹⁹ The cost of equity is estimated using Gordon's dividend discount model.

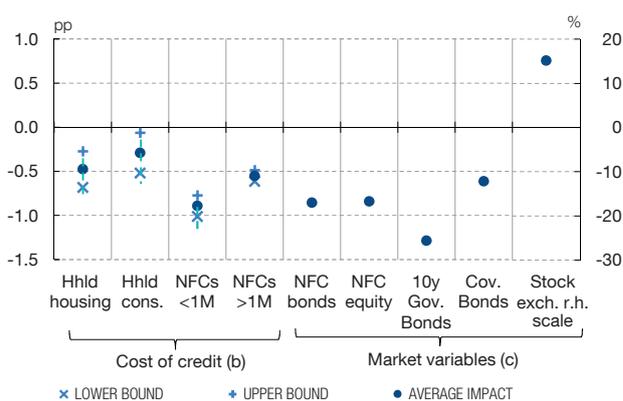
²⁰ Inflation expectations are approximated using inflation swaps.

²¹ In this case, the estimate probably represents the lower bound of the true impact which was calculated under the assumption that monetary policy has no effect on dividend growth. In particular, Gordon's dividend discount model shows that the change in the cost of corporations' equity is approximately the same as the difference between the dividend yield ratio and the dividend growth rate. Consequently, assuming that this variable does not change, the variation in the cost of equity coincides approximately with the change in the dividend yield ratio. This ratio was calculated using the available information on Spanish listed non-financial corporations.

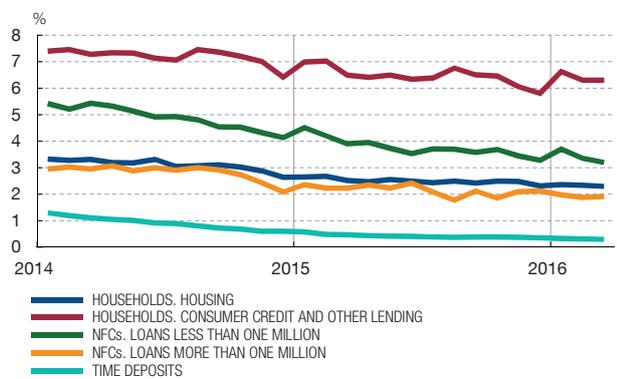
1 FINANCING COSTS



2 EFFECTS OF MONETARY POLICY ON FINANCIAL CONDITIONS (a)



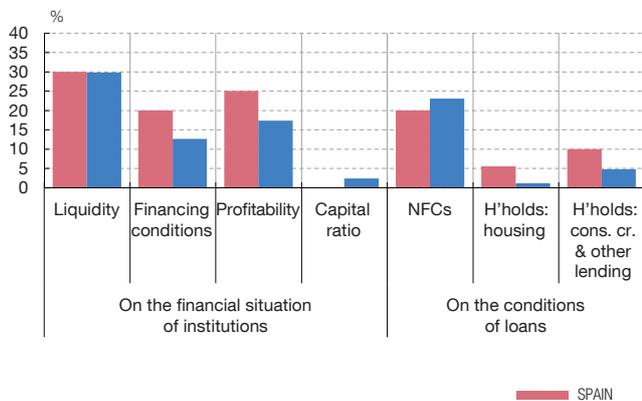
3 INTEREST RATES ON CREDIT AND DEPOSITS



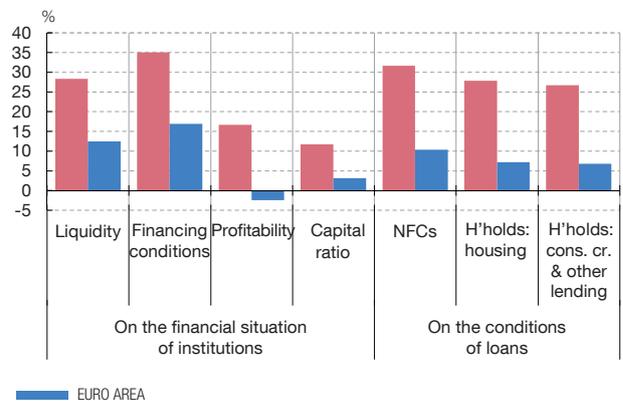
4 NEW LENDING (d)



5 IMPACT OF THE TLTROs (e) (f)



6 IMPACT OF THE EUROSISTEM ASSET PURCHASE PROGRAMME (f) (g)



SOURCES: ECB, Dealogic and Banco de España.

- a Cumulative effect between May 2014 and March 2016.
- b Interest rates on housing loans to households (Hhld. housing), consumer credit and other lending to households (Hhld. cons.), loans to non-financial corporations for less than one million euro (NFCs <1M) and to non-financial corporations for more than one million euro (NFCs >1M).
- c NFC bonds: yields on non-financial corporations' bonds; NFC equity: cost of equity of non-financial corporations; 10y Gov. bonds: yield on ten-year government bonds; Cov. bonds: covered bond yields; Stock exch: Madrid Stock Exchange General Index.
- d In the housing and consumer credit and other lending segments, as from January 2015, the rate is calculated excluding the restructured loans (the data have only been available for these two segments since December 2014).
- e Calculated using the responses to an ad hoc question included in the January 2016 Bank Lending Survey.
- f Indicator: percentage of institutions which indicate that the TLTROs or the Eurosystem's asset purchase programme have contributed or will contribute considerably to improving the financial situation or to easing the conditions on loans × 1 + percentage of institutions which indicate that they have contributed or will contribute to a certain extent × 1/2.
- g Calculated using the average of the responses to an ad hoc question included in the Bank Lending Survey of April 2015, October 2015 and April 2016.



higher risk ones such as loans to NFCs for an amount of less than one million euro, where transactions with SMEs are concentrated, and lending to households for consumption and other purposes. In both cases, the cost of these funds started out from considerably higher levels than those observed in the core euro area countries

... and relaxed lending standards

In addition to the decrease in the cost of bank credit, available evidence points to an improvement in access to this type of financing during the period analysed. This is also indicated, for example, by the qualitative findings of the BLS and, to a greater extent, by those of the SAFE and also by the quantitative information of the Central Credit Register of the Banco de España.²²

The available evidence suggests that part of the improvement in credit conditions is attributable to the Eurosystem's expansionary monetary policy

The responses of Spanish banks participating in the BLS confirm that both the TLTROs and the Asset Purchase Programme seem to have contributed to the improvement in their liquidity and profitability situation and to the decline in their financing costs, seemingly to a greater degree than in the euro area as a whole²³ (see panels 5 and 6 of Chart 3.5). Spanish banks also pointed out that these two actions contributed to the easing of credit conditions and that this, once again, occurred to a greater degree in Spain than in the euro area. The microeconomic evidence presented in Box 3.1 suggests that these effects were slightly stronger in the case of Spanish banks, which started out from less generous funding conditions and participated more intensively in the TLTROs, particularly those for loans to NFCs.

In order to approximate the portion of the decline in the cost of bank credit attributable to conventional and non-conventional monetary policy measures, several econometric models available at the Banco de España were used. These models relate the level of lending rates in each segment to variables such as interbank interest rates (which approximate market interest rates), the unemployment rate (which includes the effect of the economic cycle through credit risk premia) and the spread between Spanish ten-year government debt and the swap rate at the same term²⁴. On the basis of these equations, lending rates in the absence of monetary policy measures²⁵ were projected, which allows the effect of the measures to be estimated as the difference in relation to said projection. The results of this exercise are shown in the form of ranges in panel 2 of Chart 3.5. The average effect estimated ranged from 30 bp to 90 bp and was highest in the segment of loans to firms for amounts of less than one million euro.

22 For more details on the results of the SAFE, see the Box "Evolución reciente del acceso de las pymes españolas a la financiación externa de acuerdo con la encuesta semestral del BCE", in the "Informe trimestral de la economía española", *Boletín Económico*, December 2015. For the BLS, see, M. García-Posada (2016), "Encuesta sobre préstamos bancarios en España: enero de 2016", *Boletín Económico*, January, Banco de España. The indicator on access to credit based on the Central Credit Register can be found in the *Financial Stability Report* of the Banco de España, November 2015, p. 31.

23 Compared with the euro area, note that the participation of Spanish banks in TLTROs was above the euro area average and that the indicators provided in panel 5 of Chart 3.5 are calculated only on the basis of the responses of the institutions that participated in this programme. Consequently, where the level of the indicator is the same in the two areas, the effect on the banking system will be higher in Spain given that these impacts affect a greater proportion of institutions.

24 Specifically, error correction models were estimated in which the above-mentioned variables are included in the long-term relationship. The estimation was performed with data from the period January 2003-April 2014.

25 The path of interest rates in the absence of measures is constructed under the following assumptions. First, it is considered that interbank rates would have remained constant, therefore attributing the full change in them to monetary policy measures. Second, the effects attributable to the central bank's action based on the event study in the previous section were discounted from the other financial variables. Third, for the unemployment rate, we use the results of a first estimate of the effects of monetary policy, according to the methodology described in the next section which did not take into account the effect of the fall in the unemployment rate on interest rates on credit.

5 A quantification of the macroeconomic impact of monetary policy

5.1 THE EFFECTS IN THE EURO AREA

Evidence on the macroeconomic effects of the expansionary measures introduced since 2014 is still limited

The estimates made suggest that the ECB balance sheet expansion has had significant positive effects on growth and inflation in the euro area...

...with certain cross-country differences...

The available empirical evidence on the macroeconomic effects of non-conventional monetary policy measures deployed recently by the ECB and, in particular, of the Asset Purchase Programme currently under way, is still very limited. According to Constâncio (2016)²⁶, ECB experts have estimated that, without the monetary policy measures, euro area inflation would have been around 0.3 pp lower in 2015 and would be at very negative levels during 2016. Likewise, he attributes approximately 0.7 pp of growth recorded in the last two years to monetary policy.

A recent attempt to estimate the impact of the ECB's quantitative easing measures on the euro area economy has been developed at the Banco de España in Burriel and Galesi (2016)²⁷, which is explained in detail in Box 3.2. The results confirm that the ECB's quantitative easing policy is seemingly having a positive impact on economic activity in the euro area, thus contributing to countering the deflationary trends that have recently affected the area.

The macroeconomic impact of the ECB's Asset Purchase Programme²⁸ can be simulated on the basis of the above-mentioned study. Taken with due caution and considering the estimation difficulties discussed in the box, the positive contribution of the Asset Purchase Programme to the GDP growth rate and to inflation in the euro area in 2015 is estimated to be 0.7 pp and 0.3 pp, respectively (see Chart 3.6). The impact projected for 2016, which is surrounded by greater uncertainty, is approximately 0.7 pp for GDP growth and 0.8 pp for the inflation rate. This measurement is of a comparable order of magnitude to that referred to in Constâncio (2016), although the estimation exercises are not fully comparable. It is necessary to point out that this type of approach does not usually consider other potentially very significant effects of central bank action geared towards eliminating or substantially reducing the probability of adverse risk scenarios that are difficult to quantify and with potentially very high costs for the economy, such as a hypothetical scenario of a persistent widespread fall in prices.

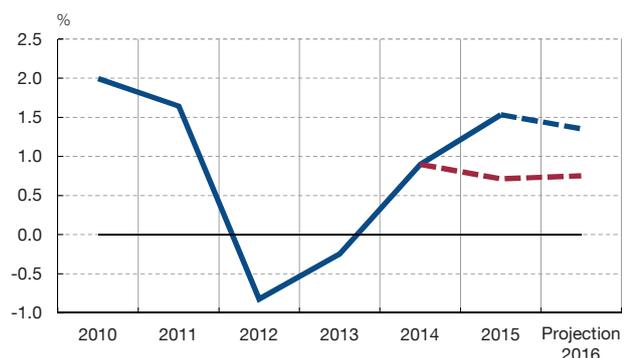
The estimation presented in Box 3.2 also suggests two results of interest regarding the transmission channels of the quantitative easing programme. First, the portfolio rebalancing channel which operates through the increase in the relative pricing of private assets and the depreciation of the exchange rate contributes most to explaining the total effects. Second, the estimations reveal some differences in the strength of the credit channel across the various countries in the period under analysis; this channel was stronger in the so-called core euro area countries than in the more vulnerable ones. This asymmetry would explain that, although the improvement in financing conditions during the period analysed was greater in the second group of countries, the response of activity

26 V. Constâncio (2016), *In defence of monetary policy*, Opinion piece, 11 March, European Central Bank.

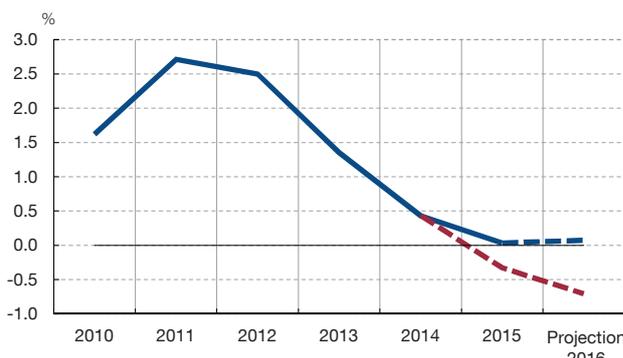
27 They used a global structural vector autoregressive (GSVAR) econometric model estimated with monthly data as from 2008 in which the ECB monetary policy stimulus is identified from the performance of the central bank's balance sheet. See P. Burriel and A. Galesi (2016), *Unconventional monetary policies in the euro area: a global VAR analysis*, mimeo.

28 Using a baseline scenario excluding the purchase programme – in which the balance sheet follows the path marked by the model in the absence of shocks – a scenario with a purchase programme is constructed where the programme's regular purchases according to the decision of December 2015 (€60 billion per month until March 2017) are added to the central bank's balance sheet. The decision of March 2016 to increase the volume of purchases to €80 billion as from April 2016 is considered separately. The exercise does not include, consequently, the effects of, or the interaction with, other measures such as the decrease in the deposit facility rate and does not take into account relevant characteristics in the programme such as the asset class acquired.

1 YEAR-ON-YEAR GDP GROWTH



2 INFLATION



— OBSERVED AND ECB PROJECTION OF MARCH 2016 - - - ESTIMATED PATH IN THE ABSENCE OF APP

SOURCES: ECB and Banco de España.

a Estimation in accordance with Burriel and Galesi (2016). The ECB March projection exercise does not include the effects of the measures adopted at the March meeting of the Governing Council. For this reason, in order to construct the counterfactual path in the absence of APP, only the effects of the measures adopted until December are considered.



to the monetary stimulus could have been slightly higher in the core countries of the area.²⁹

...given the bottlenecks in the transmission mechanism in certain countries

The latter result is analysed in detail within the framework of a theoretical macroeconomic model developed at the Banco de España by Arce, Hurtado and Thomas (2015) (see Box 3.3). In this model the bottlenecks in the monetary transmission mechanism in the most vulnerable countries occur due to the negative effect of pre-existing excessive indebtedness levels on new credit flows. Thus, the positive impact of the ECB's quantitative easing programme on asset values results in a sharper increase in credit and private spending in the core countries of the monetary union than in those of corporations and households in the more vulnerable economies which have greater indebtedness levels and are immersed in a deleveraging process.

Another possible source of asymmetry in the strength of the credit channel would be the greater weakness shown by the financial system in the more vulnerable countries, especially during the early stages of the crisis, which could have limited their capacity to increase lending³⁰. Accordingly, the improvement in the balance sheet position of the banks, resulting from the restructuring of the financial sector or the lower financial fragmentation arising from progress in the banking union process, should tend to bolster the expansionary effects of monetary policy on the economic activity of the area as a whole.

29 For more details on asymmetries in the transmission of monetary policy, see M. Ciccarelli, A. Maddaloni and J. L. Peydró (2013), "Heterogeneous Transmission Mechanism: Monetary Policy and Financial Fragility in the Euro Area", *Economic Policy*, July, Vol. 28-75, pp. 459-512; L. Gambacorta, B. Hofmann and G. Peersman (2014), "Effectiveness of unconventional monetary policy at the zero lower bound: a cross-country analysis", *Journal of Money, Credit and Banking*, 46(4), pp 615-642; and M. Mandler, M. Scharnagl and U. Volz (2016), *Heterogeneity in euro-area monetary policy transmission: results from a large multi-country BVAR model*, Discussion Paper No. 03/2016, Deutsche Bundesbank.

30 For evidence of this channel, see J. Boeckx, M. Dossche and G. Peersman (2014), *Effectiveness and Transmission of the ECB's Balance Sheet Policies*, Working Paper No 4907, CESifo.

	2015	2016
Financing conditions		
Three-month EURIBOR	-0.4	-0.5
Ten-year government bonds	-1.1	-1.3
Interest rates on housing loans to households	-0.4	-0.5
Total cost of financing NFCs	-0.4	-0.7
Conditions of consumer credit and other lending to households	-3.8	-5.0
Conditions of housing loans to households	-2.8	-5.6
Conditions of loans to corporations	-2.5	-2.5
Stock exchange	7.5	15.1
Euro exchange rate	-10.1	-10.4
GDP of other euro area countries	0.7	1.4
Imports of other euro area countries	1.4	2.8
GDP	0.6	1.2
Private consumption	0.2	0.7
Private productive investment	2.0	3.8
Residential investment	0.5	2.5
Goods and services exports	1.6	2.9
Goods and services imports	1.2	2.4
Contributions to GDP growth		
National demand (excl. change in inventories)	0.4	1.1
Net exports	0.2	0.2
CPI excluding unprocessed food and energy	0.1	0.4
HICP	0.6	0.9

SOURCE: Banco de España.

a Percentage deviations from the baseline scenario levels. The lower panel estimates the effect of the changes described in the upper panel with the Quarterly Model of Banco de España. See S. Hurtado, P. Manzano, E. Ortega and A. Urtasun (2014), *Update and re-estimation of the Quarterly Model of Banco de España (MTBE)*, Occasional Paper, No. 1403, Banco de España.

5.2 THE EFFECTS ON THE SPANISH ECONOMY

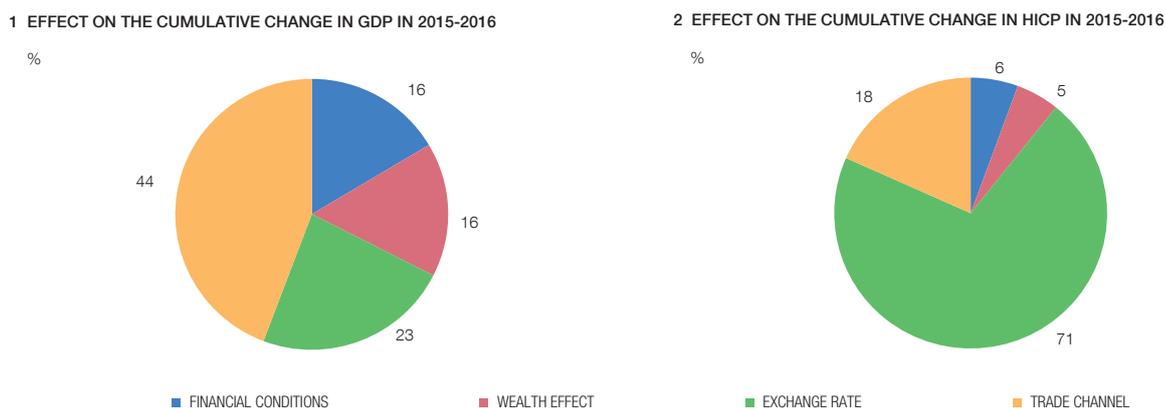
The Quarterly Model of Banco de España estimates the effects of monetary policy on the Spanish economy through various channels

The Quarterly Model of Banco de España (MTBE, by its Spanish abbreviation)³¹ allows the impact on the Spanish economy during 2015 and 2016 of the measures adopted by the ECB Governing Council as from spring 2014 to be approximately estimated. The monetary policy stimulus operates through the various channels discussed in Section 4.2 and also comprises the trade channel, which includes the expansionary effect on the euro area economy and its boost to Spanish exports.

The upper panel of Table 3.2 summarises the changes in the exogenous variables of the model which were used to estimate the effects. Specifically, for the three-month EURIBOR and lending standards, the change since spring 2014 is used, implicitly assuming therefore, that the whole of this change is attributable to monetary policy³². For the other financial variables and the exchange rate, the calibration is based on the

31 The MTBE is a large-scale macroeconomic model used to make medium-term projections of the Spanish economy and to simulate alternative scenarios. It represents the Spanish economy as a small open economy which is integrated into a monetary union and whose performance is essentially determined by the demand side, especially in the short term. For more details, see A. Estrada, J. L. Fernández, E. Moral and A. V. Regil (2004), *A quarterly macroeconomic model of the Spanish economy*, Working Paper, No. 0413, Banco de España and S. Hurtado, P. Manzano, E. Ortega and A. Urtasun (2014), *Update and re-estimation of the quarterly model of Banco de España (MTBE)*, Occasional Paper, No. 1403, Banco de España.

32 The effects estimated should be interpreted, consequently, as upper limits on the real effects which could be expected in practice.



SOURCE: Banco de España.

a Estimation of the effect of the change in variables described in the upper panel of Table 3.2 with the Quarterly Model of Banco de España. See S. Hurtado, P. Manzano, E. Ortega and A. Urtasun (2014), *Update and re-estimation of the Quarterly Model of Banco de España (MTBE)*, Occasional Paper, No. 1403, Banco de España.

analysis performed in Section 4³³. Lastly, the effects are estimated for euro area GDP and the imports of the other countries in the area, using the exercise in Box 3.2.

The estimates suggest that the monetary policy stimulus contributed to a cumulative increase in GDP of around 1.2 pp in the period 2015-2016...

The lower panel of Table 3.2 includes the overall effect of these changes in financial and external conditions on the average annual growth rates of the main aggregates of the Spanish economy in the period 2015-2016. The greatest expansionary effects are observed in private productive investment by corporations, which benefit from a higher estimated reduction in their cost of borrowing and respond to the better outlook for the Spanish and European economies as a result of the monetary stimulus, and in exports, owing to the growth of activity of Spain's trading partners in the euro area and on account of the depreciation vis-à-vis trading partners outside the euro area. Imports also reacted to the final demand stimulus with the result that the contribution of net exports to GDP growth is lower than that of domestic demand. According to the results, the ECB's monetary policy measures contributed to raising the level of GDP by around 1.2 pp at the end of the simulation period.

...mainly on account of its impact on the growth of our trading partners and the nominal effective exchange rate of the euro...

As shown in Chart 3.7, which breaks down the estimated total effects on GDP, the most important contribution stems from the trade channel through the growth induced in the euro area and its effect on our exports. Specifically, this would explain 44% of the cumulative increase in activity at end-2016. For its part, the exchange rate channel also played a significant role, explaining up to 23% of the total effect. Finally, the wealth effect (stock market gains) and the improvement in financing conditions (lower rates and more favourable supply terms) would each explain 16%.

...and a cumulative increase in prices of 1 pp until 2016

On the prices side, it is estimated that monetary policy actions in this period contributed to raising the annual average inflation rate of the HICP by 0.6 pp in 2015 and a further 0.3 pp in 2016. The main channel of transmission to prices over the two years was the increase induced by the depreciation of the euro in the cost of imports, especially energy imports.

33 The middle of the estimated range was used in the case of interest rates on credit.

6 Conclusions and challenges

Since spring 2014, the Governing Council of the ECB has used a broad raft of conventional and non-conventional measures available to it,...

...which are comparable with those of other central banks

Despite the accommodative monetary policy stance, the euro area economy continues to recover very moderately, with inflation rates far from the medium-term objective

These circumstances pose considerable challenges in various areas such as financial stability...

...and should be tackled with the involvement of other economic policies, including the use of fiscal and structural measures as well as those to strengthen the institutional arrangements of the economic and monetary union

Beginning in spring 2014, there were increasing signs of the existence of downward risks to maintaining the medium-term price stability target. Since then, the Governing Council of the ECB has used, within its mandate, a broad raft of conventional and non-conventional measures to avoid the adverse consequences which would arise from a protracted period of excessively low inflation for the euro area as a whole. As analysed in this chapter, the ECB's action was effective in providing the monetary stimulus required by the demanding macroeconomic environment and appreciably eased the financing conditions of the economy. Considered overall, this action will help to sustain the economic recovery of the euro area and will quicken, therefore, the gradual return of inflation to rates more in line with the medium-term monetary policy reference.

From a more general standpoint, the actions of the Governing Council have demonstrated that despite the specific institutional features of the euro area, the ECB has a broad raft of monetary policy instruments, comparable with that available to the central banks of other developed economies. As shown by international experience, the capacity to deploy flexibly this set of instruments is essential for ensuring that monetary policy remains effective when official interest rates are close to the zero lower bound, thus guaranteeing the correct anchoring of inflation expectations around values which are in line with the medium-term target.

Despite the extraordinarily accommodative monetary policy stance and the momentum from cheaper energy prices, the pace of recovery in the euro area remains modest, weighed down by persistently high levels of unemployment and public and private indebtedness. Economic growth has been based on the strength of private consumption, while private productive investment has failed to take off, affected by the high uncertainty and growing risks about changes in external demand. While it is foreseeable that in the short term the growth rate of consumer prices will rise gradually as the direct effects of the drop in oil prices are diluted, weak aggregate demand, excess capacity and moderate wage developments will continue to exert negative pressure on euro area inflation. Under these circumstances, ensuring that inflation gradually returns to values close to the benchmark of 2% is the main challenge for ECB monetary policy.

Encouraging spending and investment decisions, which necessarily involve risk, is an essential part of the monetary policy transmission mechanism under the current circumstances. In this setting, it cannot be ruled out that situations may arise in certain parts of the economic and financial system which prompt resources to be allocated inefficiently and which possibly cause financial stability problems. Notwithstanding the fact that in the current situation no risk factors of this type have been detected for the euro area as a whole, ensuring the synergic action of monetary and macroprudential policy is shaping up as one of the major challenges for the coming years. The pressure exerted by the setting of low nominal growth and very low interest rates on the returns of financial intermediation and, in particular, the banking business³⁴ should be monitored.

Similarly, under the current circumstances, laying the foundations for a sound and lasting recovery of activity, productive investment and employment in the euro area requires the involvement of other economic policies – particularly in the fiscal and structural arenas and in the area of strengthening the institutional arrangements of the economic and monetary union. Thus, euro area countries should use the room for manoeuvre afforded by the Stability and Growth Pact, depending on the specific situation of their public finances, to

³⁴ See the *Financial Stability Report* of the Banco de España and the *Financial Stability Review* of the European Central Bank, both of May 2016.

apply policies to support aggregate demand and activity. Likewise, it is important for governments to recommence the reform drive,³⁵ to introduce improvements in the functioning of product and factor markets and in the business environment, and to complete the European governance framework.

³⁵ See M. Draghi (2015), *Monetary policy and structural reforms in the euro area*, speech of 14 December 2015, and Chapter 4 of the *2014 Annual Report* of the Banco de España. Ó. Arce, S. Hurtado and C. Thomas (2015), *Policy Spillovers and Synergies in a Monetary Union*, Working Paper, No. 1540, Banco de España, analyse the synergies arising from the joint application of non-conventional monetary policies with structural reforms and fiscal measures in the framework of an asymmetrical monetary union.

The various measures implemented by the Eurosystem over the last two years have led to more favourable financing conditions for Spanish banks overall, and also to improving their liquidity situation. As discussed in the main text of this chapter, it is estimated that these measures contributed to increasing credit supply, mainly as a result of the lower cost of lending. This box provides empirical evidence of these effects and their asymmetric impact on different credit institutions. For this purpose, the various estimates presented in this box link the relative performance of various Spanish institutions since the Eurosystem's new measures were launched in June 2014 with their starting point, in terms of their financing costs and the extent to which they have used the new facilities.

In the case of TLTROs, as the chart below (panel 1) shows, there is a marked heterogeneity as regards the extent to which Spanish banks have had recourse to them.¹ An analysis based on simple correlations shows that the amount requested in the first five bids (between September 2014 and September 2015), as a proportion of total assets, is positively correlated with various individual characteristics, such as the size, the net debtor position in the interbank market, the weight of financing other than deposits from Spanish households and non-financial corporations and the non-performing loans ratio.

The positive correlation with the interbank debtor position and with the weight of wholesale funding may be related to the higher relative cost of this type of funding when set against retail funding. Lastly, the non-performing loans ratio could be indicative of the marginal cost for institutions of accessing new funds, i.e. the higher the cost, the stronger the incentive to resort to TLTROs.²

A multivariate regression analysis shows that the two most explanatory variables are non-performing loans and the weight in the balance sheet of the recourse to the Eurosystem before TLTROs were introduced, which jointly explain almost three quarters of the variability across institutions. These results would support the assumption that it was precisely the institutions which had the highest relative costs of access to finance which made the greatest use of the new facilities.

1 The results shown in this box are based on a sample of Spanish banks (excluding the subsidiaries of other Spanish or foreign banks), which have provided information on the interest rates on their new lending business with customers. The institutions which have participated jointly in the Eurosystem's TLTRO bids are considered as a single institution. The result is a sample of 20 institutions, representing 85 % of total credit in Spain and 95 % of TLTRO applications.

2 This marginal cost is difficult to measure. For institutions participating in the financial markets and issuing securities listed on exchanges, this cost can be measured by the value of the associated CDSs. However, the Spanish banks in this situation are too few to allow for a reliable statistical analysis. The costs of term deposits could be considered an alternative approximation. However, these vary from one institution to another, not only due to the different marginal costs, but also depending on the idiosyncratic features of their customers and the financing strategies in place at each bank.

In the case of the securities purchase programme, it is estimated that the most significant effects on institutions arose as a result of the pass-through of lower government bond yields to other instruments traded in the financial markets, including securities issued by financial institutions. This is likely to have particularly benefited the banks with the greatest weight of market-based financing, measured, for example, using the loan-deposit ratio,³ which, as shown in panel 2 of the chart below, also revealed considerable heterogeneity between institutions in December 2014, before the expansion of the programme to include public debt was announced.

More generally, the set of measures implemented by the Eurosystem since June 2014 would be expected to have had a greater expansionary effect on the supply of bank credit of institutions facing higher financing costs before that date and, consequently, also applying higher interest rates on credit. In keeping with this, available evidence points to a negative correlation between the interest rates applied by Spanish banks to their customers in May 2014 and later developments. Thus, the institutions which had less favourable financing conditions and consequently faced higher average interest rates on term deposits, were those which were subsequently able to reduce the rates to a greater degree (see panel 3 of the chart below). Likewise, the institutions with the highest interest rates on new loans to non-financial corporations are also those which would be expected to have lowered them the most following implementation of the new measures (see panel 4 of the chart below).

The Table below shows the relationship between the different variables indicating the financial position of institutions in May 2014 or their participation in the TLTROs and subsequent performance of lending and the cost at which new loans are granted. The first two columns show that the institutions which had the greatest recourse to TLTRO funds were also those which reduced their interest rates the most on lending to non-financial corporations, including smaller-volume loans, generally relating to loans to SMEs. However, the effects on interest rates of credit to households do not differ significantly considering the extent to which TLTROs were used, nor were notable differences detected in the recent behaviour of lending.⁴

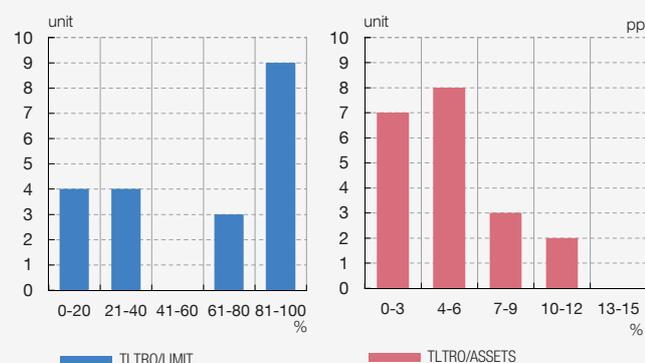
Considering the remaining variables analysed which attempt to approximate, in one way or another, the degree of difficulty of access to finance faced by institutions before the programmes were

3 The higher the ratio, the lower the proportion of credit financed with retail funds (deposits) and, therefore, the higher the proportion of credit financed through other channels, mainly the markets.

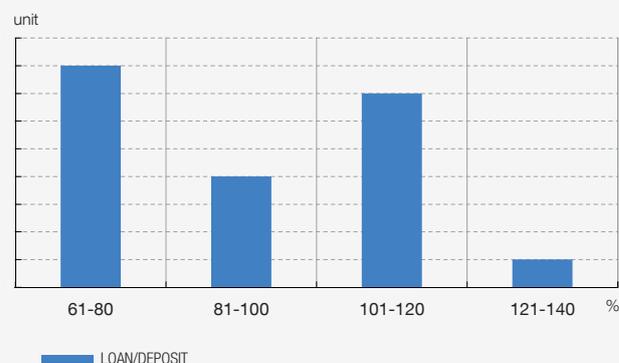
4 Various regression analyses have been conducted, based on specific supply and demand variables and including an analysis of credit supply at bank-firm level using data from the Central Credit Register. However, the results are not reliable, owing to the relatively small number of observations available and the difficulty of adequately measuring the different channels (direct and indirect) through which the Eurosystem measures may have had a bearing on institutions.

Chart 1
MONETARY POLICY MEASURES AND THEIR IMPACT ON SPANISH CREDIT INSTITUTIONS (a)

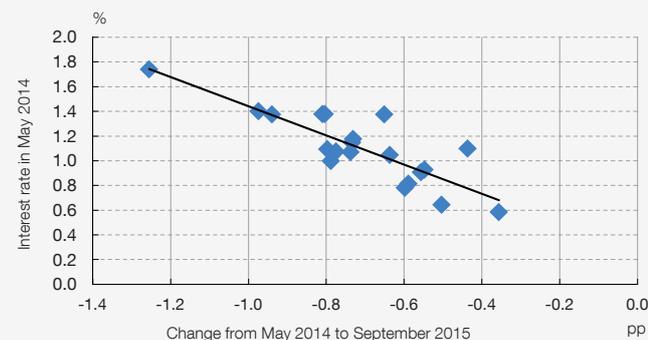
1 DISTRIBUTION OF BIDS IN TLTROS (b)



2 DISTRIBUTION OF THE LOAN-DEPOSIT RATIO AT DECEMBER 2014



3 CHANGE IN INTEREST RATE ON TERM DEPOSITS



4 CHANGE IN INTEREST RATE ON LOANS TO NFCs

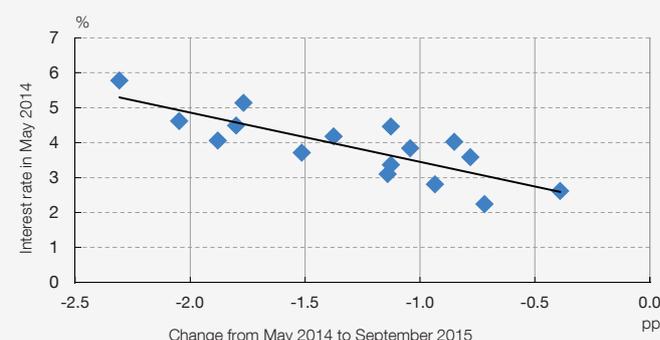


Table 1
CORRELATIONS BETWEEN BANK VARIABLES AND SUBSEQUENT BEHAVIOUR OF CREDIT

Change in interest rates between May-14 and Sep-15	TLTRO/TA (c)		Term-deposit int. rate (d)		NPL ratio (d)		Loan-deposit ratio (d)	
	Simple	Weighted (e)	Simple	Weighted (e)	Simple	Weighted (e)	Simple	Weighted (e)
Housing loans	-0.04	0.03	0.09	0.33	0.17	0.28	0.25	0.40 *
Consumer loans and other lending	-0.08	-0.19	0.37	-0.21	-0.05	-0.40 *	-0.12	-0.12
Loans to NFCs	-0.59 **	-0.62 **	-0.23	-0.52 **	-0.55 **	-0.65 ***	-0.13	-0.43 *
Loans to NFCs <250,000 euros	-0.61 ***	-0.40 *	0.11	-0.51 **	-0.48 **	-0.60 ***	-0.33	-0.40 *
Year-on-year growth of loans in Sep-15								
Housing loans	-0.39 *	-0.14	0.27	0.09	-0.47 **	-0.23	-0.34	-0.22
Consumer loans and other lending	0.33	0.16	-0.31	-0.16	0.38 *	0.33	0.40 *	0.14
Loans to NFCs	0.10	0.17	-0.17	0.34	-0.06	0.06	0.32	0.55 **
Eligible loans in TLTROs	0.31	0.20	-0.11	0.29	0.27	0.13	0.50 **	0.60 ***
Total loans to households and NFCs	-0.12	0.17	0.31	0.42 *	-0.21	0.11	0.17	0.48 **

SOURCE: Banco de España.

NOTE: *, **, *** indicate a correlation ratio which is significantly different from zero, at a confidence level of 10 %, 5 % and 1 %, respectively.

a Corresponding to a sample of 20 institutions representing 85 % of total credit in Spain and 95% of TLTRO applications. It excludes Spanish and foreign subsidiaries and considers all those institutions which jointly submitted bids for TLTRO funds as a single institution.

b Accumulated in the first five bids (September 2014 to September 2015).

c Total volume requested in the first five TLTRO bids as a proportion of total assets.

d In May 2014.

e Correlation calculated by means of weighting observations by the total volume of lending to customers.

announced and, consequently, the likely impact of these programmes on them, a significant effect in the same direction can be observed on the interest rates on credit to non-financial corporations, but not in the case of credit to households. As regards the changes in the amount of lending, there is some evidence of positive correlations in certain segments and in respect of certain variables, such as the loan-deposit ratio. This result suggest that the amount of lending of institutions which had a higher loan-deposit ratio, and which in principle would have benefited more from a reduction of market-

based financing costs, tended to perform more dynamically than that of the other intermediaries.

Overall, the results shown in this box are consistent with the positive impact of the Eurosystem measures on credit supply conditions in Spain, particularly visible in the case of loans to non-financial corporations. It is estimated that these effects were more marked at institutions which had started out from less generous funding conditions.

This box simulates the macroeconomic impact of a quantitative easing programme similar to that implemented by the ECB, using a global structural vector autoregressive model developed in Burriel and Galesi (2016). The model efficiently combines aggregate euro area data on changes in monetary policy instruments¹ with other national data on economic activity and the financial position of each member state, with monthly data covering the period 2008–2015. In addition to GDP and consumer prices, the national variables include others that allow a distinction to be drawn by transmission channel. Along with the exchange rate, the model considers a measure of credit risk premium² and new lending to capture transmission through the credit channel, as well as an asset price variable to reflect the portfolio readjustment channel.

Estimating the macroeconomic effects of the ECB's quantitative easing measures is a complex exercise. There is no precedent for the extent to which central banks have used non-standard instruments since the onset of the financial crisis in 2007, which means that the empirical analysis must be concentrated on a relatively short period. An added difficulty is the wide range of non-standard measures that the ECB has used in the various phases of the crisis.

In line with the most recent literature, the model uses the change in the Eurosystem balance sheet as a variable to capture the interventions of the monetary authority. In particular, non-standard monetary policy decisions are identified by exogenous balance sheet expansion: that is, an expansion that is not a response to heightened financial tightening and that, at the same time, increases the negative spread between very short-term interbank rates and the interest rate on the main refinancing operations. The first condition excludes changes in the ECB's balance sheet that arise from banking system liquidity requirements in the face of stress situations. This is especially relevant in a setting in which the monetary authority has kept to its liquidity-providing policy with full allotment of the demand for liquidity. The second condition identifies measures that actually increase the level of banks' excess reserves, which should bring very short-term money market rates (Eonia) closer to the ECB's deposit facility rate.

To illustrate the effects, the chart shows the response functions of the model's main variables to an exogenous shock to the size of the central bank's balance sheet (equivalent to a standard deviation of that size). The monetary impulse significantly increases

economic activity and prices in the euro area as a whole, through several channels: the portfolio rebalancing channel, by means of the increase in the relative price of private assets; the exchange rate channel, through a real depreciation of the euro; and the credit channel. In the latter case, the decline in the risk premium on lending to non-financial corporations is significant for the euro area as a whole, while the growth in new lending is only significant for non-vulnerable countries. In the case of inflation expectations, although they respond in the expected direction, the estimated impact is not statistically significant.

From a disaggregated standpoint, these results point to certain possible differences in the effect of non-standard monetary policy between different groups of euro area countries. In fact, the estimated impact on growth is greater in the core countries than in the more vulnerable ones, while in the case of inflation the opposite is the case, although the limited length of the period analysed means that it is not possible to conclude that these differences are statistically significant.³ Analysis of the various transmission channels reveals a relative degree of homogeneity across countries, except in the functioning of the credit channel. In that case, new lending only increases significantly in certain countries (Germany and France), even though the decline in firms' risk premium is on a similar scale. There are two, possibly complementary, explanations for this. First, the high indebtedness of households and firms in the more vulnerable countries may make it difficult for the improvement in credit conditions prompted by a more expansionary monetary policy stance to pass through to an increase in new lending (see exercise in Box 3.3). Moreover, it is in general in the more vulnerable countries where banks have displayed most fragility, especially during the initial phases of the crisis, which may have limited their ability to increase credit.⁴

To sum up, the empirical evidence analysed suggests that the quantitative easing measures taken by the ECB are helping to invigorate aggregate demand and activity and, therefore, to combat the deflationary trends affecting the euro area. One of the main reasons for their effectiveness seems to rely on the fact that measures of this kind, together with the progress made in the Banking Union process and other steps taken at a national level, such as the restructuring of banking sectors, have helped to reduce financial fragmentation in the euro area. This progress, together with other measures still pending in the field of Banking Union and the Capital Markets Union, should prompt a more uniform credit flow among the euro area countries and should, therefore, make common monetary policy more effective.

1 Five aggregate euro area variables are included: growth in Eurosystem balance sheet assets; the interest rate on the main refinancing operations; the spread between that rate and the overnight interest rate (Eonia); a financial stress indicator; and long-term inflation expectations.

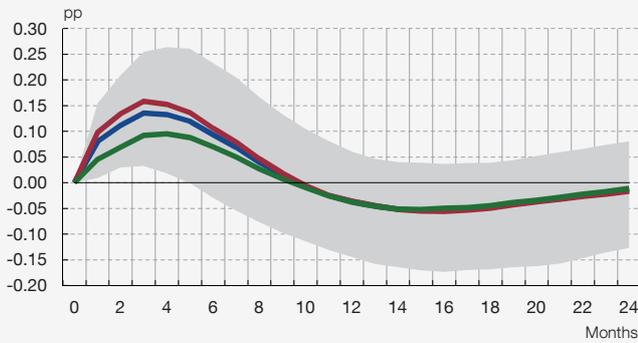
2 The credit risk premium is, for each country, the spread of non-financial firms' corporate bond yields over government bond yields, in accordance with S. Gilchrist and B. Mojon (2014), *Credit risk in the euro area*, Working Paper 20041, National Bureau of Economic Research.

3 A total of 19 euro area countries are considered, including among the more vulnerable countries Italy, Spain, Ireland, Greece, Portugal, Slovenia, Cyprus, Lithuania, Latvia and Malta.

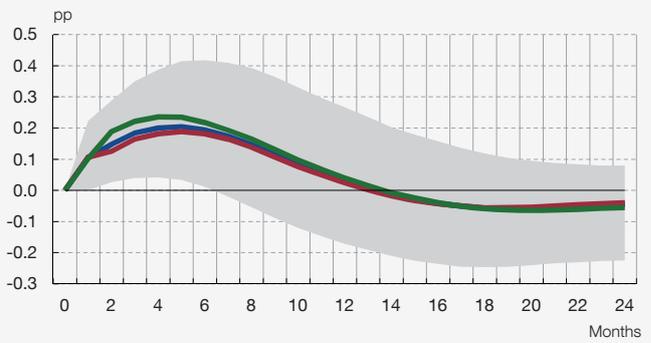
4 See J. Boeckx, M. Dossche and G. Peersman (2014), *Effectiveness and transmission of the ECB's balance sheet policies*, Working Paper, Nationale Bank van België/Banque Nationale de Belgique.

Chart 1
AN EMPIRICAL ASSESSMENT OF THE ECONOMIC IMPACT OF QUANTITATIVE EASING

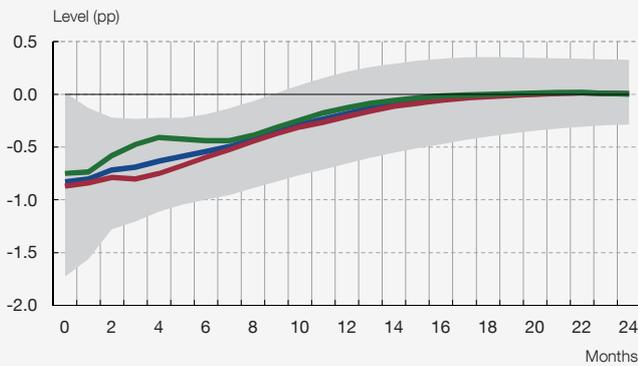
1 GDP GROWTH Q-o-Q



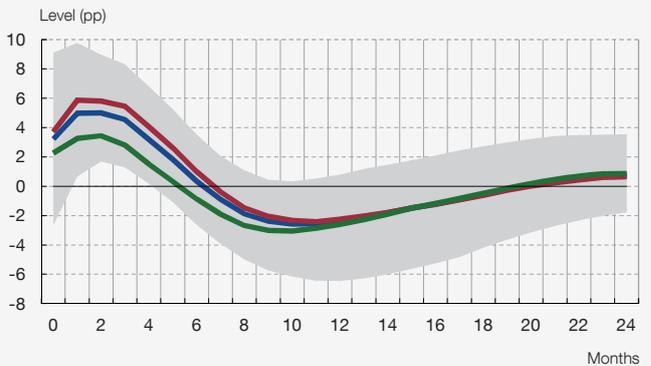
2 INFLATION



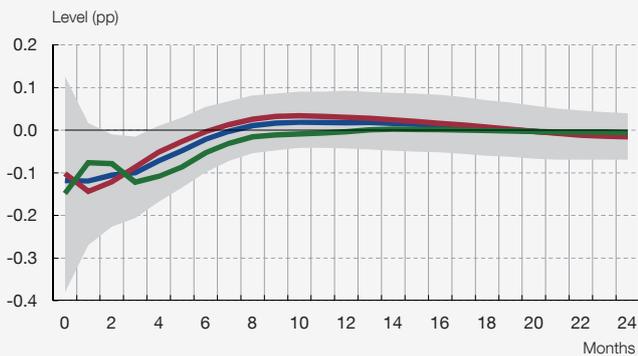
3 REAL EFFECTIVE EXCHANGE RATE



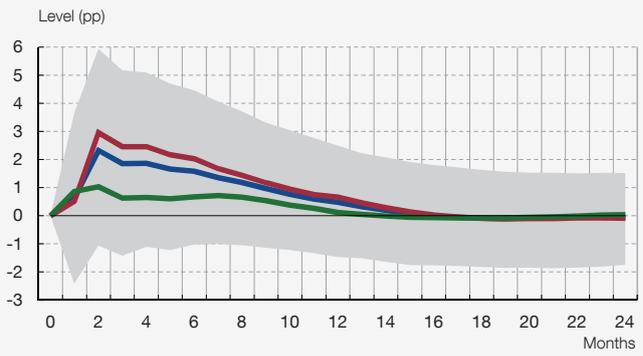
4 PRIVATE ASSET PRICES



5 RISK OF LENDING TO FIRMS



6 CHANGE IN NEW LENDING



— EURO AREA — MORE VULNERABLE COUNTRIES (a) — OTHER COUNTRIES

SOURCE: Banco de España.

NB: The shaded area represents the confidence interval of a standard deviation relating to the estimated impact for the euro area.

a This group includes Italy, Spain, Ireland, Greece, Portugal, Slovenia, Cyprus, Lithuania, Latvia and Malta.

This box analyses some of the main transmission channels of a government Asset Purchase Programme similar to that implemented by the ECB since early 2015, using as the framework of analysis the macroeconomic model of a monetary union comprising two dissimilar areas (“vulnerable countries” and “core countries”) developed by Arce, Hurtado and Thomas (2015).¹

In the model, households and firms in each country have long-term debt, and their capacity to borrow is limited by the value of their assets admissible as collateral. In addition, the national tax authorities issue both short and long-term public debt, with a yield spread over short-term interest rates that depends positively on the volume of private-sector-held long-term debt.²

In order to isolate the effect of an Asset Purchase Programme, first a baseline scenario is built, including some of the characteristic features of the present macro-financial situation in the euro area. Thus, the nominal interest rate set by the common monetary authority has an effective lower bound, against a backdrop of persistently low inflation across the whole of the euro area as a result of the weakness of aggregate demand. Moreover, the vulnerable countries are immersed in a *deleveraging* process in which both households and firms are gradually paring down their debt. This phase lasts until they recover a sufficient level of net financial wealth and are again able to access credit. This scenario is characterised by persistently weak growth throughout the euro area, especially in the vulnerable countries, owing to that deleveraging process.

Taking this base scenario as a starting point, the model simulates the implementation of a long-term government bond purchase programme in which the central bank acquires new bonds in an amount with a distribution by country similar to that of the ECB’s Asset Purchase Programme.³ The model is calibrated such that the purchase programme reduces long-term government bond yields to a similar extent as estimated in a range of studies; in particular, the effect of the programme on sovereign yields in the core euro area is estimated as approximately one third of the effect on sovereign yields in the vulnerable countries.⁴

The chart illustrates the effects of the bond purchase programme on the main macroeconomic variables.⁵ The programme has a clearly

expansionary effect on economic activity in both areas (the vulnerable and the core countries). This is because the programme reduces long-term government bond yields, which encourages households to increase their consumption spending, with the consequent expansionary effect on aggregate demand.⁶

In addition to the channel indicated, which operates in both parts of the euro area, there are other specific channels in each. In the *core euro area*, the positive effect of the programme on the value of assets that serve as collateral in loans translates into an increase in credit and, therefore, higher private spending, thus reinforcing the impact of the programme. In the vulnerable countries, although the programme also increases the value of collateral, neither households nor firms can benefit immediately as they are immersed in a relatively protracted deleveraging process. This asymmetric response of lending activity in the core euro area and the vulnerable countries, which is consistent with the evidence for the euro area shown in Box 3.2, would explain why in the short term the expansionary effects of the programme are somewhat higher in the *core euro area*.

Nevertheless, the increase in the value of assets will allow the net wealth of households and firms in the vulnerable countries to reach the minimum levels necessary in order to access credit again *sooner*. Accordingly, the programme is effective in reducing the duration and intensity of the deleveraging phase and, therefore, in bringing forward the recovery in the flow of credit and activity in the vulnerable economies.⁷ An added effect that encourages the deleveraging process in the vulnerable countries is the “debt inflation” channel whereby the additional inflation that is produced by the Asset Purchase Programme reduces the real value of the nominal debt burden of households and firms. The combination of the above-mentioned channels explains the uptick observed in the medium term in the expansionary effects of the programme on private credit, private consumption and GDP in that group of countries (see panels 5, 3 and 2, respectively).

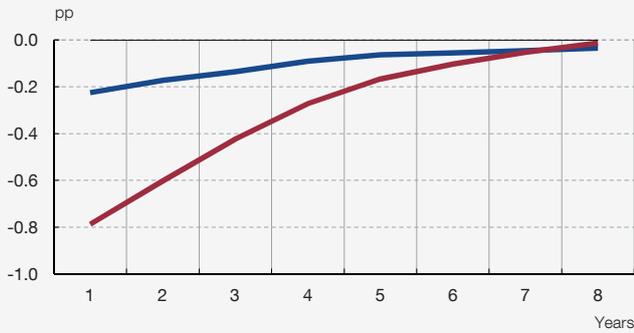
Lastly, the additional inflation generated by a measure of this kind allows the central bank to regain room for manoeuvre in terms of standard monetary policy earlier, following the initial constraint represented by the effective lower bound on interest rates, as shown in panel 6 of the chart.⁸

1 Ó. Arce, S. Hurtado and C. Thomas (2015), “Policy Spillovers and Synergies in a Monetary Union”, Working Paper 1540, Banco de España.
2 See H. Chen, V. Cúrdia and A. Ferrero (2012), “The Macroeconomic Effects of Large-Scale Asset Purchase Programmes”, *Economic Journal*, 122.
3 Specifically based on the initial configuration of the ECB’s Asset Purchase Programme, with monthly purchases of €60 billion, mostly in long-term government bonds.
4 In accordance with C. Altavilla, G. Carboni and R. Motto (2015), “Asset purchase programmes and financial markets; lessons from the euro area”, Working Paper 1864, November, ECB.
5 Specifically, the chart shows the *differences* in the changes in those variables compared with the base scenario.

6 The investment response is comparatively smaller than the consumption response in both areas.
7 For a detailed discussion of this aspect in the context of a similar model, see J. Andrés, Ó. Arce and C. Thomas (2014), *Structural reforms in a debt overhang*, Working Paper 1421, Banco de España.
8 In the model, the standard monetary policy rule is a “Taylor rule” whereby the nominal interest rate responds positively to deviations of inflation from its long-term target in the euro area as a whole. Thus, starting from a situation in which the interest rate according to that rule is temporarily below the zero bound, higher inflation (such as that produced by the Asset Purchase Programme) means that the interest rate will be quicker to rise above the lower bound.

Chart 1
A SIMULATION OF THE EFFECTS OF A GOVERNMENT DEBT PURCHASE PROGRAMME USING A GENERAL EQUILIBRIUM MODEL

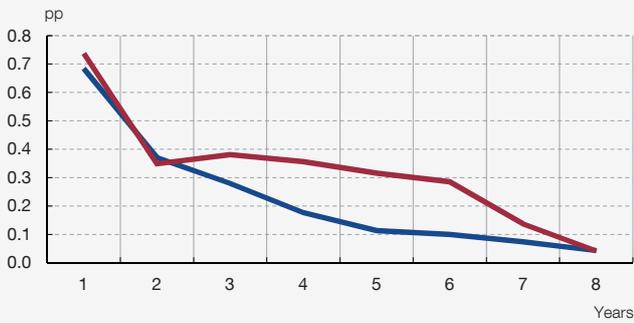
1 GOVERNMENT DEBT YIELDS



2 GDP



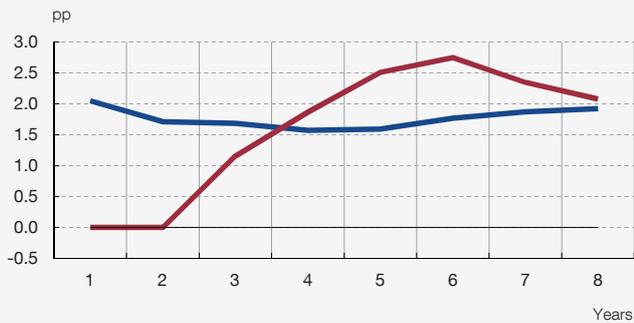
3 PRIVATE CONSUMPTION



4 INFLATION



5 NOMINAL PRIVATE DEBT/GDP



6 NOMINAL INTEREST RATE



— CORE EURO AREA — VULNERABLE COUNTRIES — BASELINE SCENARIO — QUANTITATIVE EASING SCENARIO

SOURCE: Banco de España.