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1. Introduction

Projections for the Portuguese economy now released point to an ongoing process of gradual economic recovery that had started in 2013. After growing by 0.9 per cent in 2014, GDP is expected to accelerate by 1.7 per cent in 2015, followed by 1.9 and 2.0 per cent increases in 2016 and 2017 respectively. The Portuguese economy's growth in the course of this period is close to the ECB's euro area projections.

These projections consider a continued adjustment to some imbalances in the Portuguese economy. Exports should grow substantially, thus strengthening the recent trend of reallocation of productive resources to the economic sectors that are more exposed to international competition. Consequently, the Portuguese economy's net lending should remain stable and the reduction in external indebtedness should be sustained. The pace of growth of private domestic demand should be consistent with the continued deleveraging of private economic agents (households and non-financial corporations). Higher nominal economic growth, the persistence of historically low interest rates and the existence of positive primary balances will make it possible to start reducing public debt as a percentage of GDP. Finally, projected growth for the Portuguese economy is in line with a gradual decline in the unemployment rate, despite its persistently high levels.

Inflation is expected to remain low, but should tend to grow gradually until the end of the forecast horizon, to levels still below projections for the euro area as a whole.

Table 1.1 • Projections of banco de portugal: 2015-2017 | Annual change, in percentage

	Weights 2014	June EB 2015				Projection March 2015			
		2014	2015 (p)	2016 (p)	2017 (p)	2014	2015 (p)	2016 (p)	2017 (p)
Gross domestic product	100.0	0.9	1.7	1.9	2.0	0.9	1.7	1.9	2.0
Private consumption	66.0	2.1	2.2	1.7	1.7	2.1	2.4	1.7	1.7
Public consumption	18.6	-0.3	-0.5	0.2	0.0	-0.7	-0.5	0.2	0.0
Gross fixed capital formation	14.6	2.5	6.2	4.4	6.0	2.3	4.0	4.4	5.3
Domestic demand	99.5	2.1	2.1	1.8	2.1	2.0	1.6	1.8	2.0
Exports	39.9	3.4	4.8	6.0	6.4	3.4	4.3	5.8	6.2
Imports	39.4	6.4	5.7	5.5	6.5	6.2	3.9	5.5	6.1
Contribution to GDP growth, net of imports (in p.p.) (a)									
Domestic demand		0.3	1.1	0.7	0.8	0.3	1.0	0.8	0.8
Exports		0.6	0.6	1.2	1.2	0.6	0.8	1.1	1.2
Current plus capital account (% of GDP)		2.1	3.0	3.2	3.4	2.1	3.3	3.3	3.5
Trade balance (% of GDP)		1.1	2.1	2.1	2.1	1.1	2.7	2.6	2.5
Harmonized index of consumer prices		-0.2	0.5	1.2	1.3	-0.2	0.2	1.1	1.1

Source: Banco de Portugal.

Notes: (p) – projected, (p.p.) – percentage points. For each aggregate, this table shows the projection corresponding to the most likely value, conditional on the set of assumptions considered.

(a) The demand aggregates net of imports are obtained by subtracting an estimate of the imports needed to meet each component. The calculation of import contents was based on data for 2005. For more information, see the Box entitled 'The role of domestic demand and exports in economic activity developments in Portugal', in the June 2014 issue of the *Economic Bulletin*.

The risks surrounding the economic activity projection are broadly balanced, reflecting the combination of external and domestic risk factors. The overall balance of risks to inflation points to slight downside risks.

2. Recent information

The projection for the Portuguese economy comprises the information and technical assumptions available up to 19 May 2015 (Box 'Projection assumptions'). This projection was included in the Eurosystem's exercise published by the ECB on 3 June.

In 2014 gross domestic product (GDP) grew by 0.9 per cent, in real terms, continuing the gradual economic recovery that had started in 2013. This was characterised by an acceleration in domestic demand and the maintenance of exports as the most buoyant expenditure component. In the first quarter of 2015, according to the first estimate released by Statistics Portugal (*Instituto Nacional de Estatística – INE*), GDP increased by 0.4 per cent from the previous quarter, growing by 1.4 per cent from the first quarter of 2014 (Chart 2.1).

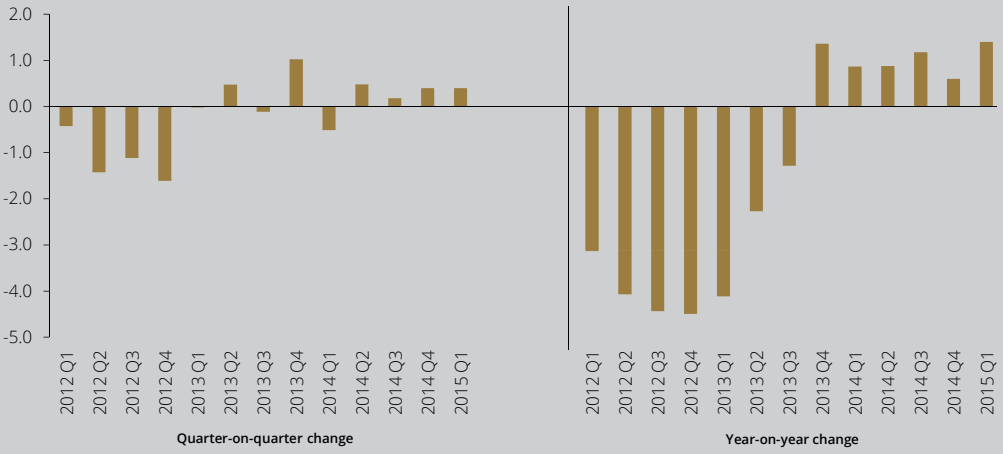
The breakdown of GDP developments into the main expenditure components was only released after the cut-off date for this Bulletin. Nevertheless, based on recent conjunctural and qualitative data included in the first estimate published by Statistics Portugal, it is estimated that underlying GDP developments in the first quarter of 2015 will be an increase in domestic demand and a decrease in exports from the previous quarter, which correspond, year on year, to a relative stabilisation of domestic demand growth and the maintenance of strong export growth, higher than that seen in the fourth quarter of 2014.

Increase in domestic demand in the first quarter of 2015

On the domestic demand side, both private consumption and gross fixed capital formation (GFCF) increased in the first quarter of 2015 from the previous quarter, which resulted in a rise in the year-on-year rate of change, more marked in the case of GFCF. Most short-term indicators associated with these expenditure items, particularly GFCF, posted more favourable developments in the first quarter of 2015 than those implied in projections released in March.

Chart 2.1 • Gross domestic product

| Real rate of change, per cent



Source: *INE*.

In the case of private consumption, together with a relative stabilisation of consumer confidence in the first four months of 2015 around values above the average for the past ten years, there was a year-on-year acceleration in retail trade turnover. Passenger car sales also accelerated in the first quarter of 2015, year on year, growing by more than 35 per cent.[1] Data for April point to a deceleration in these sales, with an increase of slightly more than 20 per cent.

GFCF developments largely reflect increased investment in construction, following successive falls in annual average terms since 2002. In the first quarter of 2015, confidence in construction rose and cement sales to the national market increased substantially, year on year, extending into April. High growth of cement sales should partly reflect the base effect of particularly adverse weather conditions in early 2014. The year-on-year increase in investment in machinery and equipment remained relatively stable from the previous quarter.

Maintenance of strong year-on-year export growth in the first quarter of 2015

Year-on-year export growth in the first quarter of 2015 reflected an acceleration in exports of both goods and services. Developments in exports of goods reflected a strong acceleration in exports of energy goods, year on year, which mirrors the base effect associated with the temporary closing down of an oil refinery unit in the first quarter of 2014. This effect also greatly influenced changes in inventories, which made a highly negative contribution to year-on-year GDP growth in the first quarter of 2015.

In turn, exports of non-energy goods decelerated, largely due to a marked fall in exports to Angola, following the oil price decrease and its effect on that country's financing conditions (Chart 2.2). Conversely, more recently, the positive contribution of exports of non-energy goods to EU countries increased.

Turning to exports of services, tourism exports continued to grow substantially, year on year, standing at around 15 per cent in the first quarter of 2015, in nominal terms.

In the first quarter of 2015, imports increased from the previous quarter, albeit decelerating year on year. This deceleration mainly reflected developments in imports of goods, with year-on-year growth in imports of services remaining relatively stable. Developments in imports reflected the strong decrease

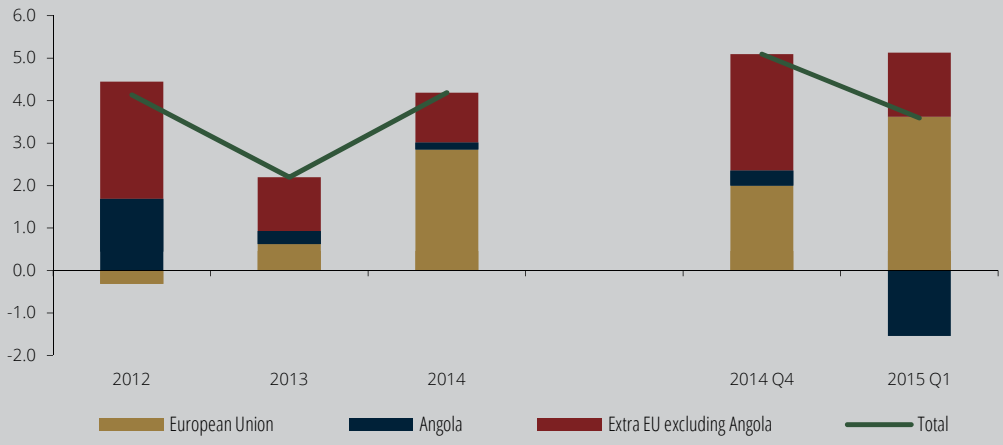


Chart 2.2 • Nominal exports of goods excluding energy by country of destination

| Contributions in percentage points

Source: *INE* (International Trade Statistics).

in changes in inventories, associated with energy goods with a high import content, together with buoyant growth in overall demand items with high import content, namely GFCF in machinery and equipment and transport equipment, and durable goods consumption.

Box 1 | Projection assumptions

Table 1 shows the main technical assumptions of projections for the Portuguese economy. These assumptions are in line with data underlying the Eurosystem's projection exercise, released by the ECB on 3 June, and include an estimate of the impact on the euro area of monetary expansion measures recently adopted by the ECB, both in terms of real activity and in terms of price developments.

With regard to international trade developments, current assumptions presuppose an intensification of global trade, albeit less buoyantly than prior to the international financial crisis. In this context, external demand for Portuguese goods and services is expected to accelerate over the projection horizon, including developments in demand from both euro area and non-euro area markets. Growth in demand from euro area countries is expected to exceed that of non-euro area markets, reflecting a more favourable outlook for the euro area than for emerging market economies. Compared with projections released in March, external demand remained relatively unchanged, with just a slight upward revision in 2016.

The evolution assumed for the 3-month EURIBOR rate is based on expectations implied in futures contracts. These contracts point to the maintenance of the short-term interest rate at historically low levels over the projection horizon, which were even below those anticipated in projections released in March for 2015 and 2016. Assumptions for the long-term interest rate on Portuguese debt are based on an estimate of the rate implied in public debt, which includes an assumption for the interest rate associated with new issues. This rate has been substantially influenced by the ECB's ongoing monetary expansion programme (the Special Issue in this Bulletin). The interest rate implied in Portuguese debt was revised downwards in 2016 and 2017 compared with the assumptions released in March.

The technical assumption for exchange rates assumes that average levels seen in the two weeks prior to the cut-off date will remain stable over the projection horizon. In annual average terms, this technical assumption for exchange rates implies a significant depreciation of the euro in 2015 and a smaller depreciation in 2016 (in nominal effective terms and against the US dollar), which should be more marked in 2015 than that taken into account in projections released in March.

In the case of oil prices, the technical assumption is based on information implied in futures markets. This information points to a marked fall in oil prices in 2015, denominated in both US dollars and euros, which is less substantial than that indicated in the note released in March. For 2016 and 2017 an increase in oil prices is expected, albeit less marked than that projected in March.

Table 1 • Projection assumptions

		EB June 2015				Projection March 2015			
		2014	2015	2016	2017	2014	2015	2016	2017
External demand	yoy	4.6	4.5	5.5	5.8	4.3	4.5	5.4	5.8
Interest rate									
Short-term (3-month EURIBOR)	%	0.21	0.01	0.05	0.21	0.21	0.05	0.06	0.16
Implicit in public debt	%	3.9	3.8	3.5	3.4	3.9	3.8	3.8	3.6
Euro exchange rate									
Effective exchange rate index	yoy	0.6	-9.5	-0.2	0.0	0.6	-7.9	-0.2	0.0
Euro-dollar	aav	1.33	1.12	1.12	1.12	1.33	1.14	1.13	1.13
Oil prices									
in dollars	aav	98.9	63.8	71.0	73.1	99.3	58.5	66.8	70.7
in euros	aav	74.2	57.1	63.5	65.4	74.4	51.5	58.9	62.3

Sources: Bloomberg, ECB, Thomson Reuters and Banco de Portugal calculations.

Notes: yoy – year-on-year rate of change, aav – annual average value. An increase in the exchange rate corresponds to an appreciation. The implicit interest rate on public debt is computed as the ratio between interest expenditure for the year and the simple average of the stock of debt at the end of the same year and at the end of the preceding year.

As usual, current projections follow the rules used in the Eurosystem's exercises for public finances projections. As such, these projections include information on the general government account for 2014, released by Statistics Portugal at the end of March, and comprises the measures included in the State Budget for 2015 and the Stability Programme for 2015-19, which was presented in April. In the case of the Stability Programme, all measures were taken into account, except for those associated with the sustainability of Social Security and the reform and rationalisation of public services, as they are not specified in sufficient detail.

For 2015 a small decrease in public consumption is expected, due to a smaller decrease in government employment than in previous years, partly offset by an increase in goods and services expenditure. In 2016 public consumption is projected to grow somewhat in real terms, given that the effect of the expected cut in the number of civil servants is smaller than that resulting from intermediate consumption growth, as a result of the sudden increase in expenditure with concessions to public-private partnerships in the road sector. Projections for 2017 presuppose a stabilisation in this aggregate. With regard to the public consumption deflator, it includes the reversal of the annual 20 per cent wage cut (taking 2011 as reference) between 2015 and 2019, according to the Stability Programme.

Turning to public investment, this aggregate is expected to recover considerably, in real terms, in 2015. The 2014 budget implementation was below that planned and was associated with a marked decrease in transfers from Community funds that are not considered to be permanent. In 2016 public investment is expected to fall, primarily due to the recording of a share of revenues from the sale of military equipment. For 2017 this aggregate is expected to remain stable as a ratio of GDP.

3. Demand, supply and external accounts

Moderate domestic demand recovery together with strong export growth

Projections for the Portuguese economy point to the maintenance of moderate economic recovery that had started in 2013, which is expected to result in a pace of growth close to that projected for the euro area (Chart 3.1). At the end of the projection horizon, the GDP level should stand close to that seen prior to the onset of the international financial crisis. These developments reflect a substantial recomposition of the expenditure structure towards a growing shift of productive resources to sectors more exposed to international competition, similarly to that seen over the past few years. To this effect, the share of exports in GDP in real terms should increase by 14 p.p. between 2008 and 2017, standing at around 46 per cent at the end of the projection horizon. The share of private consumption in GDP should remain at around 66 per cent, close to that seen in the recent past.

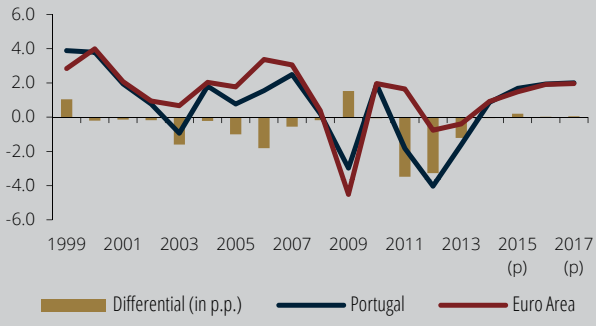
Finally, the share of GFCF in GDP in 2017 should amount to around 17 per cent, below that seen in 2008, despite an increase in this ratio over the projection horizon.

Projected GDP developments reflect strong export growth, slightly above 6 per cent at the end of the projection horizon, together with domestic demand growth of approximately 2 per cent (Chart 3.2). The net contribution of domestic demand (i.e. less import content) to GDP growth should increase from 0.3 p.p. in 2014 to 0.8 p.p. in 2017 (Chart 3.3), while the net contribution of exports is expected to increase from 0.6 p.p. in 2014 to around 1.2 p.p. of GDP in 2017.

Continued reorientation of the economy towards sectors with greater exposure to international competition

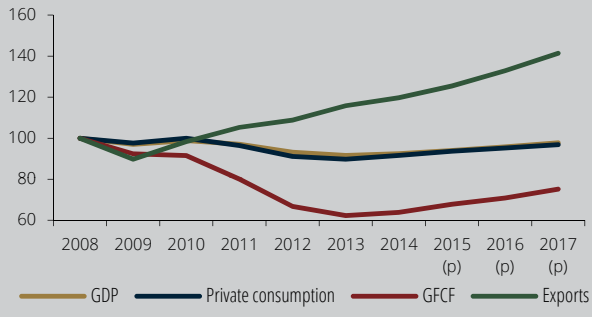
Over the projection horizon, private sector activity is expected to grow by around 2.4 per cent, while public sector activity is projected to continue to decrease, albeit at a gradually slower pace.[2]

Chart 3.1 • GDP gowth in Portugal and in the Euro Area | Rate of change, in percentage



Sources: ECB, *INE* and Banco de Portugal.
Note: (p) – projected.

Chart 3.2 • Evolution of GDP composition | Index 2008=100



Sources: *INE* and Banco de Portugal.
Note: (p) – projected.

Following a 0.6 per cent increase in 2014, Gross Value Added (GVA) of the main sectors of economic activity is expected to recover moderately over the projection horizon. Developments in sectoral activity are projected to continue to reflect the ongoing restructuring of the Portuguese economy, characterised by a transfer of resources to the sectors that are more exposed to international competition. Against this background, manufacturing and services GVA is expected to recover over the projection horizon, benefiting from buoyant exports of goods and services and, to a lesser extent, the recovery in domestic demand. After a protracted period of consecutive drops, activity in construction is expected to recover somewhat, in line with developments projected for housing investment. Despite returning to positive rates of change, in 2017 this sector's activity is projected to stand at around 60 per cent of the level seen in 2008.

According to the European Commission's confidence survey, firms reporting insufficient demand as a factor limiting production have decreased over the past few quarters, in particular in sectors that are more exposed to international competition. In the case of manufacturing, this indicator is below the average reference value (2001-2014 period), while for services it is close to its average (Chart 3.4). Regarding construction firms, insufficient demand continues to be considered a limiting factor relevant to their activity, despite improving somewhat since the start of 2013.

According to this survey, construction firms point to financial constraints as an important factor limiting their activity. In turn, firms in manufacturing and services consider that financial constraints have lost importance as a factor limiting production in the most recent period, and are therefore not considered very relevant.

According to European Commission surveys, the level of capacity utilisation in manufacturing has increased throughout the past few quarters, standing slightly above its long-term average (Chart 3.5). The level of capacity utilisation in services also recovered somewhat since the end of 2013, standing at a level close to that of the second half of 2011 (corresponding to the start of this series).

European Commission surveys also include a question on the importance of insufficient

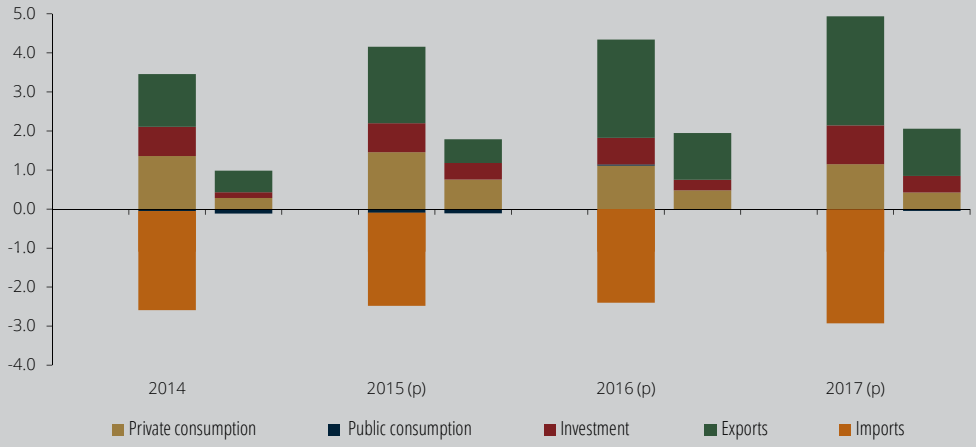


Chart 3.3 • Gross and net contributions to GDP growth

| In percentage points

Sources: *INE* and Banco de Portugal.

Notes: (p) – projected. For each year, the left-hand bar refers to gross contributions from each GDP component and the right-hand bar to the corresponding net contributions.

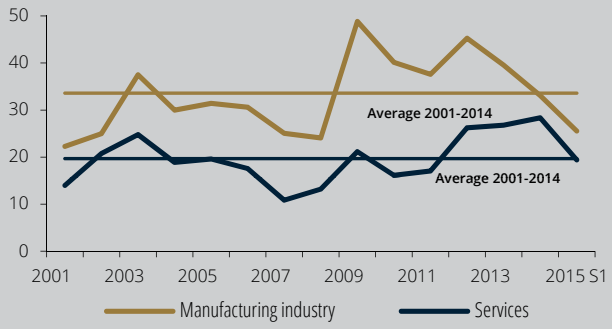
labour force as a factor limiting production (Chart 3.6). In this case, the balance of responses in the three sectors under review shows a negative differential *versus* its long-term average – an additional indication that unemployment is still above its structural level.

Per capita output growth in the projection horizon is expected to stand at 1.7 per cent, in annual average terms, after an average annual decrease of 1.2 per cent in the 2011-2014 period (Chart 3.7). In this context, after a negative contribution to GDP growth in the 2011-2014 period, labour input is projected to make a positive contribution over the projection horizon. Against this background, the improvement seen in human capital is expected to continue to make a considerable contribution to *per capita* output growth over the projection horizon. In turn, capital input is projected to make a marginally negative contribution in the 2015-2017 period, in contrast with the positive contribution seen during the 2000s. In effect, according to the assumptions regarding the depreciation rates of several types of capital – despite the projected growth for GFCF over the projection horizon, in particular for the corporate component – the recovery in GFCF is not expected to be sufficient to replace the depreciated capital stock. Finally, GDP growth in 2015-2017 is expected to benefit from favourable developments in total factor productivity, against the background of an ongoing process to improve resource allocation in the economy.

Moderate recovery of private consumption and GFCF, affected by high indebtedness levels

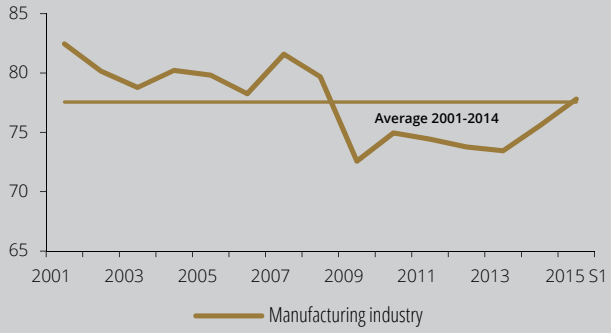
Private consumption is expected to grow by 2.2 per cent in 2015, slowing down to 1.7 per cent in 2016 and 2017 (Chart 3.8). Developments in private consumption over the projection horizon reflect to a large extent the profile of real household disposable income. In effect, household disposable income is expected to grow by slightly more than 2 per cent in 2015, reflecting, in particular, the increase in the income for pensioners from the phasing out of the *Contribuição Extraordinária de Solidariedade* (extraordinary solidarity contribution). A slight deceleration to average annual growth of 1.7 per cent is projected for 2016 and 2017, amid a moderate recovery in employment,

Chart 3.4 • Firms that considerer insuficient demand as a factor limiting the business | Balance of responses



Sources: European Commission and Banco de Portugal calculations.

Chart 3.5 • Level of capacity utilization in the manufacturing industry | In percentage

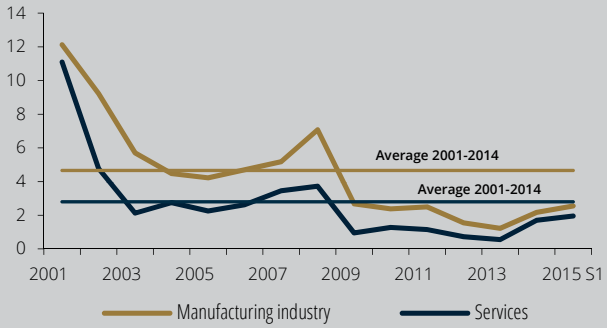


Sources: European Commission and Banco de Portugal calculations.

wage moderation in the private sector and acceleration of consumer prices. In addition, the phasing out of the surcharge on the personal income tax from 2016 onwards is projected to contribute also to a recovery in the household disposable income.

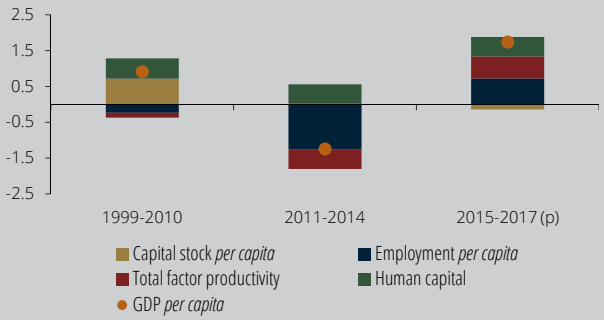
After starting a path of recovery in 2013 and reaching growth of around 15 per cent in 2014, the consumption of durable goods is expected to grow by around 10 per cent in 2015, reflecting to a large extent growth of car sales. This component has been highly buoyant in the most recent period partly as a result of purchases postponed during the recession period for precautionary reasons. For 2016 and 2017, the consumption of durable goods is expected to decelerate to average annual growth of around 3 per cent. Growth of purchases of durable

Chart 3.6 • Firms that considerer labour force as a factor limiting the business | Balance of responses



Sources: European Commission and Banco de Portugal calculations.

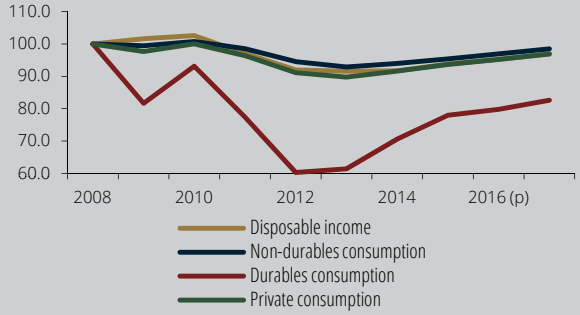
Chart 3.7 • Breakdown of the growth in real GDP *per capita* | Contributions in percentage points



Sources: Barro and Lee (2013), Quadros de Pessoal, *INE* and Banco de Portugal.

Notes: The growth accounting exercise of GDP *per capita* is based on a Cobb-Douglas production function. The measures of human capital were constructed from the data of Barro and Lee (2013) 'A new data set of educational attainment in the world, 1950-2010', *Journal of Development Economics 104*, pp. 184-198. For Portugal, these series were annualized and extended using the profile of the average years of education of employment of *Quadros de Pessoal* (until 2012) and of the Labour Force Survey of *INE*.

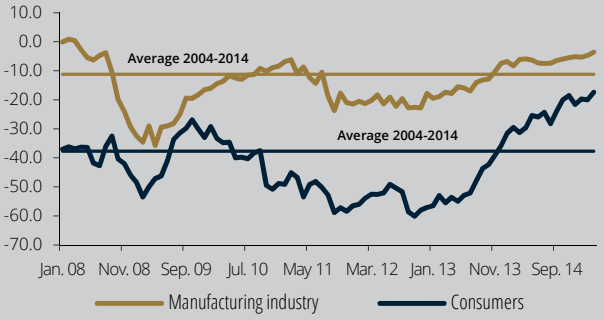
Chart 3.8 • Consumption and disposable income | Index 2008=100



Sources: *INE* and Banco de Portugal.

Note: (p) – projected.

Chart 3.9 • Confidence indicators | Balance of responses (c.v.s.)



Sources: European Commission and Banco de Portugal calculations.

goods, although higher than projected for real household disposable income, reflects the historical elasticity between these two aggregates. Despite recovering, the consumption of durable goods is expected to be around 20 per cent below the level in 2008 at the end of the projection horizon.

After 1.2 per cent growth in 2014, the consumption of non-durable goods is expected to grow by 1.7 per cent in 2015, reflecting to a large extent the acceleration of real household disposable income, amid a continued recovery in consumer confidence, which has consistently remained above the average recorded in the past ten years (Chart 3.9). For 2016 and 2017, the consumption of non-durable goods is projected to grow by 1.8 per cent.

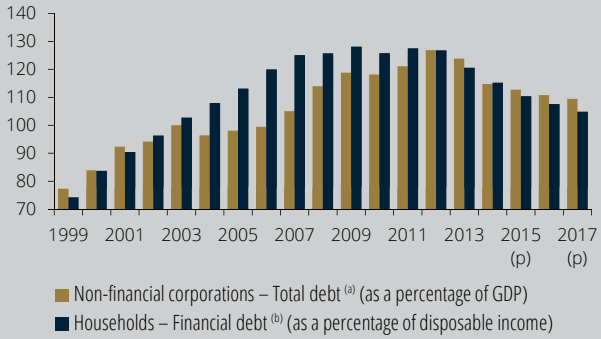
The recovery in private consumption over the projection horizon is also expected to benefit from a slight reduction in the household debt service, similarly to developments in the recent period, against a background of persistently low market interest rates, together with an ongoing decrease in the indebtedness levels and a gradual improvement in financing conditions.

Against this background, after a marked drop in the savings rate in 2014, to 6.9 per cent, current projections point to a relative stabilisation over the projection horizon. These developments are in line with a continued reduction in household indebtedness as a percentage of disposable income, which is expected to decrease by 23 p.p. in the 2011-2017 period (Chart 3.10).

After growing by 2.5 per cent in 2014, interrupting the downward path observed since 2009, GFCF is projected to grow by 6.2 per cent in 2015 and by 4.4 and 6.0 per cent in 2016 and 2017 respectively (Chart 3.11). Despite this expected recovery, the share of GFCF in GDP at the end of the projection horizon is expected to stand considerably below the figure of the past few decades. These developments show marked adjustments in public and housing investment, which are expected to be persistent, and a recovery in business investment levels (Chart 3.12).

The weak dynamics of GFCF in the current economic cycle is common to the euro area and one of the factors explaining the more

Chart 3.10 • Debt of the non-financial private sector | End of period figures

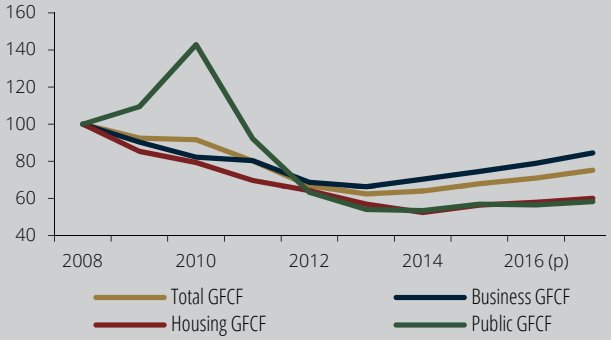


Sources: *INE* and Banco de Portugal.

Notes: (p) – projected.

(a) It includes loans granted to non-financial corporations by other institutional sectors; commercial paper and bonds issued by non-financial corporations held by other sectors and trade credits received from other sectors. (b) The financial debt corresponds to loans and debt securities issued by the sector.

Chart 3.11 • Breakdown of GFCF by institutional sectors | Index 2008=100



Sources: *INE* and Banco de Portugal.

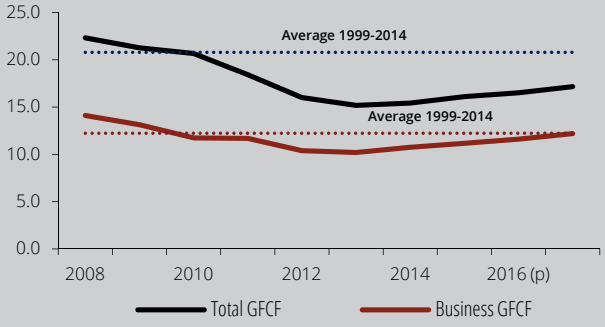
Note: (p) – projected.

moderate recovery in economic activity compared with previous cycles.[3] Periods of economic recovery are generally characterised by a significant increase in the share of GFCF in GDP (as a result of higher volatility and the pro-cyclicality of investment), which has not occurred in the current economic cycle.

Business investment is projected to experience robust growth over the horizon, accelerating from 5.8 per cent in 2015 to 5.9 and 7.1 per cent in 2016 and 2017 respectively, which is not far from this aggregate's average behaviour in previous phases of economic recovery (Chart 3.13). The recovery in business investment is expected to benefit from an improvement in the outlook for demand both in the domestic market and in destination markets for Portuguese exports, as well as from the need to replace the capital stock, after an extended period of decreases in investment. In addition, the improvement in financing conditions, benefiting from the ECB's non-standard monetary policy measures, is expected to contribute also to an increase in this component. Projections point to a gradual decrease in the interest rate spreads on loans to non-financial corporations (against the reference interest rate for the interbank market) and to the return of positive growth rates on the stock of bank credit. These developments are consistent with a continued decrease in the indebtedness level of non-financial corporations as a percentage of GDP, which, despite the recent drop, remains high compared with the euro area average (Chart 3.10).

The projection points to a moderate recovery in housing investment, after a prolonged period of consecutive drops. The developments in this component reflect an increase in disposable income and a gradual improvement in financing conditions, as well as an improvement of the labour market conditions. The relatively moderate growth projected for housing investment reflects the fact that the reduction seen in this component since 2001 is largely structural in nature. Indeed, the high level of investment in this sector throughout the 1990s (benefiting from very favourable financing conditions), together with the recent trend of a decreasing resident population and the still high level of

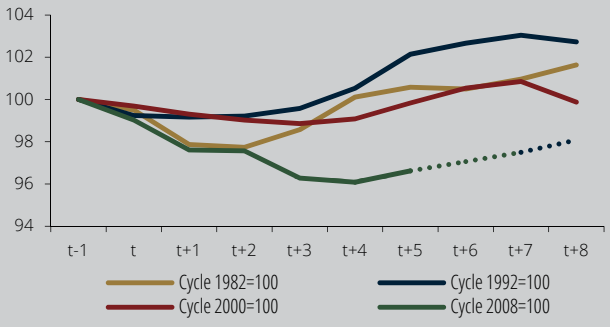
Chart 3.12 • Gross Fixed Capital formation
| In percentage of GDP



Sources: *INE* and Banco de Portugal.

Note: (p) – projected.

Chart 3.13 • Ratio of business GFCF to GDP
| Index t-1=100



Sources: *INE* and Banco de Portugal.

Note: Dotted values correspond to projections. The reference t-1 corresponds to the last year of business GFCF growth before a recession.

household indebtedness, is expected to affect developments in residential investment over the projection horizon. At the end of the projection horizon, the level of housing investment (in real terms) is expected to be around 30 per cent below the level in 2000.

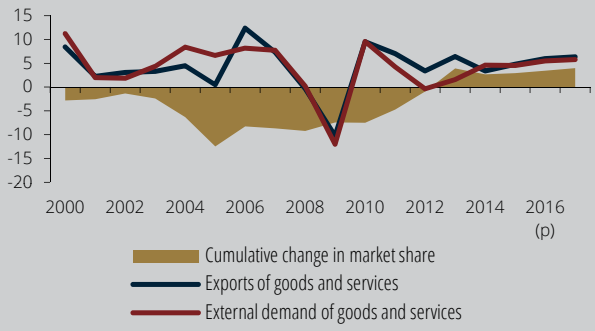
Public investment is expected to continue to be affected by the need for fiscal consolidation and is projected to grow moderately over the projection horizon, after dropping by around 60 per cent in the 2011-2014 period.

Acceleration of exports over the projection horizon

Projections for exports of goods and services point to growth of 4.8 per cent in 2015 and an acceleration to 6.0 and 6.4 per cent in 2016 and 2017 respectively. The acceleration in exports in 2015 reflects developments in foreign demand and gains in price competitiveness, against a background of a strong depreciation of the euro. In 2015, these gains in competitiveness are offset by a strong decrease in exports to Angola. In this context, exports in 2015 are expected to grow approximately in line with foreign demand for Portuguese firms, after recording significant market share gains in the 2011-2013 period (Chart 3.14). In 2016 and 2017 developments in exports are expected to reflect the acceleration in foreign demand, with projections anticipating a slight increase in the market share as a result of an improvement in price competitiveness, associated in particular with a depreciation of the euro's effective exchange rate. Developments projected for exports include continued buoyant growth of both the goods and the services components, particularly tourism.

The strong growth of exports in the last few years and the market share gains observed in the 2011-2013 period have been among the most important aspects of the adjustment process in the Portuguese economy, reflecting Portuguese companies' considerable adaptation to the demands of the international markets. The recent performance of exports reflects a gradual change in the pattern of Portuguese exports over the last decade, which has also responded to the needs imposed by the additional demand from new markets, as domestic demand has adjusted markedly. Against this background, the share of exports as a percentage of GDP in the next few years is projected

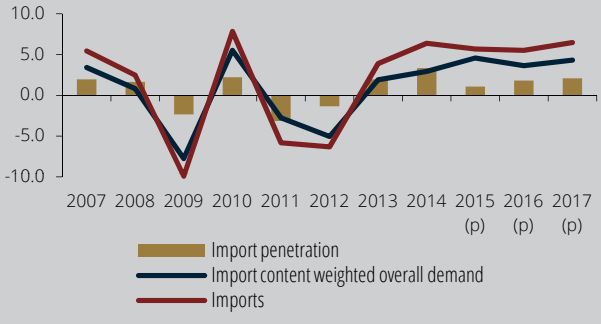
Chart 3.14 • Exports and external demand | Annual rate of change, in percentage



Sources: ECB, *INE* and Banco de Portugal.

Note: (p) – projected.

Chart 3.15 • Imports and import-content weighted overall demand | In percentage



Sources: *INE* and Banco de Portugal calculations.

Note: (p) – projected.

to continue to grow, from around 41 per cent in 2014 to around 46 per cent in 2017.

In 2015, imports of goods and services should grow 5.7 per cent, after growth of 6.4 per cent in 2014 (Chart 3.15). It is important to note that the figure for 2014 is affected by the sizeable accumulated stock of energy goods that have a high import content. Over the rest of the projection horizon, imports should evolve in line with the average historic elasticity of this component to developments in overall demand weighted by import content.

Continuation of the adjustment process of the accumulated external imbalances

According to current projections, the Portuguese economy's net lending, measured by the combined current and capital account, will strengthen over the projection horizon, from 2.1 per cent of GDP in 2014 to 3.0 per cent of GDP in 2015 and to 3.2 and 3.4 per cent of GDP in 2016 and 2017, respectively. The evolution of the economy's net lending results from the combination of an increase in the economy's saving rate and a relative stabilisation of the investment rate over the projection horizon (Chart 3.16).

The increase in the current and capital account surplus of 0.9 percentage points (p.p.) of GDP projected for 2015 essentially reflects the increase in the goods and services surplus. This is closely linked to a favourable effect from terms of trade, which was strongly affected by the falling euro-denominated oil price (Box 'Projection Assumptions'). Furthermore, exports' dynamism ensures that the growth of imports, driven by private consumption and investment, results in the maintenance of the external surplus.

In turn, the primary income account deficit is projected to increase, through a reduction in transfers of certain structural EU funds, according to information in the State Budget for 2015.

In 2016 and 2017, the goods and services account balance as a percentage of GDP remains at similar levels to 2015. In 2016, the positive volume effect driven by a projected growth in exports slightly higher than the growth projected for imports is offset

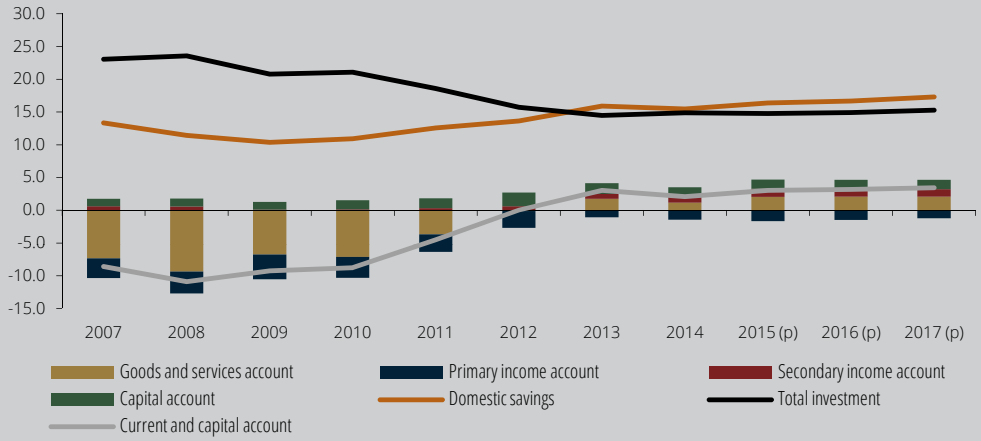


Chart 3.16 • Net lending or borrowing of the total economy

| Percentage of GDP

Sources: *INE* and Banco de Portugal.

Note: (p) – projected.

by slightly unfavourable developments in the terms of trade, in a context of moderately increasing oil prices. A relative stabilisation of these effects is projected for 2017. Over these two years, the primary income account deficit should fall, against a backdrop of falling interest rates, given that the surpluses in the secondary income account and capital account should remain relatively stable as a percentage of GDP.

Projections for GDP growth unchanged from previous projections

The current projection for GDP growth remains unchanged from the last projections published by Banco de Portugal in March, with certain changes taking place in the composition of aggregate demand. Thus GFCF, durable goods consumption and exports are now projected to be more buoyant. This revision was offset however by stronger import growth than projected at that time, reflecting inter alia the revised composition of aggregate demand. For 2016 and 2017, the revised composition of expenditure is marginal.

4. Prices and wages

After falling 0.2 per cent in 2014, inflation measured by the rate of change in the Harmonised Index of Consumer Prices (HICP) should be positive but low over the 2015-2017 period, with prices accelerating in line with the recovery of economic activity. Average price growth of 0.5 per cent is projected for 2015, followed by increases slightly over 1 per cent per year for the next two years. Compared to euro area projections published by the ECB on 3 June, after a negative differential of 0.6 p.p. observed in 2014, the prices in Portugal should grow above the euro area average in 2015 (0.2 p.p.). The negative inflation differential *versus* the euro area average is projected to return in 2016 and 2017.

Moderate increase in prices over the projection horizon

The international and Portuguese economic recovery contributes to progressively and moderately increasing (domestic and external) pressure on prices over the projection horizon.

Reflecting the assumptions for oil price developments, the prices of energy goods should fall in 2015 and increase in 2016 and 2017, staying at levels lower than those of 2014 at the end of the projection horizon.

Non-energy goods and services prices should accelerate moderately over the projection horizon (Chart 4.1). Against a backdrop of a depreciating euro, underlying this situation is an acceleration of import prices excluding energy over the projection horizon, interrupting the downward trend in place since 2012.

Furthermore, wages per employee are assumed to evolve moderately, in parallel with the gradual improvement of the labour market situation and the increase in productivity, stabilising in relative terms in 2015 and accelerating in the following two years. The increase in compensation per employee in the private sector will be influenced inter alia by a negative skew in aggregate compensation associated with a composition effect arising from the change of the employment structure that typically occurs in cyclical upturns and that results in an increasing proportion of workers with lower compensation.

Thus unit labour costs should fall in 2015 and rise slightly in 2016 and 2017. The average change in unit labour costs projected for Portugal is lower than that of the euro area average as projected by the Eurosystem. Regarding the economy's profit margins, measured by the gross operating surplus per unit of output, an increase is projected in 2015, that will be influenced by the fact that the sharp fall in the oil price will not be passed on to consumers in full. A relative stabilisation in profit margins is projected in 2016 and 2017.

Interruption of the downward trend of inflation expectations

The progressive increase in prices projected for the 2015-2017 period is influenced by the positive impact of non-standard monetary policy measures adopted by the ECB recently, specifically through the strengthening of economic activity and the depreciation of the euro, as well as the incorporation of the technical assumption of the increasing oil price. This should contribute over the medium and long term to inflation expectations in the euro area, and concomitantly in Portugal, remaining anchored. In the most recent period, these expectations interrupted their downward trend (Chart 4.2).

Upward revision of projected inflation

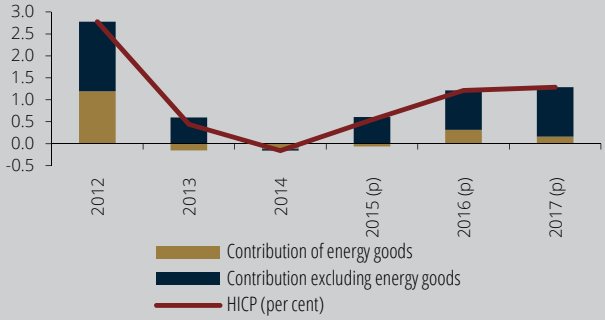
The projected change in consumer prices was revised upwards from the projections published in March. In 2015, this revision reflected the incorporation of more recent information from the HICP and oil price developments, pointing to a less sharp fall in this year, in line with the revision of the technical assumptions for the period in review. In turn, the projections for 2016 and 2017 were revised slightly upwards.

5. Uncertainty and risks

The projections presented represent the most likely scenario, conditional on the assumptions included in 'Box 1 Projection assumptions'. Should these assumptions fail to materialise, or should events occur that due to their idiosyncratic nature were not factored into the projections, a set of risks and uncertainties arise. The quantified analysis of the risks and uncertainty surrounding the projection is presented in this section.[4]

Over the projection horizon, risk and uncertainty factors may be identified, both from abroad and from within Portugal. Internationally, the possibility of a slower recovery of economic activity was deemed a risk factor, in particular in the emerging market economies, as well as a more moderate evolution of international trade flows. The materialisation of this risk would lead to lower external demand for Portuguese goods and services, in particular in 2016 and 2017 (Table 5.1). There is also a downside risk associated with the possibility of an upsurge in geopolitical and sovereign debt market tensions, with an impact on consumption and investment over the projection horizon.

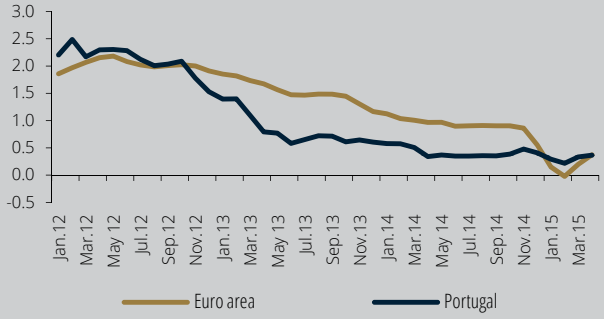
Chart 4.1 • Harmonized index of consumer prices | Contributions to the annual rate of change, in percentage points



Sources: Eurostat and Banco de Portugal.

Note: (p) – projected.

Chart 4.2 • Inflation expectations for a 12-month horizon | In percentage



Source: Consensus Economics.

Table 5.1 • Risk factors – Probability of an outcome below the implicit in the projections | In percentage

	2015	2016	2017
Underlying variables			
External demand	50	55	55
Public consumption	50	55	55
Endogenous variables			
Private consumption	50	55	55
Investment	50	45	45
HICP	52	52	52

Source: Banco de Portugal.

Table 5.2 • Probability of an outcome below the projections | In percentage

	Weights	2015	2016	2017
Gross domestic product	100	50	52	55
Private consumption	66	49	54	55
GFCF	15	50	48	48
Exports	40	51	53	55
Imports	39	50	53	53
HICP		53	55	55

Source: Banco de Portugal.

Regarding domestic risks, there is a potential positive impact from structural reforms, both on consumption and on investment, and the downside impact on profit margins.[5] Furthermore, additional measures may be necessary to meet fiscal targets, resulting in a reduction both in public and private consumption *versus* the baseline scenario in 2016 and 2017. Finally, an upside risk is considered in investment in 2016 and 2017, arising from the investment incentive measures decided at European level, as well as from the need to increase productive capacity in certain companies, in particular in the exporting companies, as a result of the increase of the productive capacity utilisation of the companies in manufacturing observed in the latest period.

The set of risks identified above give a 55 per cent probability of the external demand and public and private consumption for 2016 and 2017 being more unfavourable than that considered in the projection presented in this Bulletin. On the other hand, there is a 55 per cent probability of developments in private investment being more favourable than that considered for 2016 and 2017. Lastly, there is a downside risk identified for prices, with a 52 per cent probability of occurrence over the projection horizon.

Risks to economic activity broadly balanced

This balance of risks means risks to the economy are broadly balanced, as a result of the combination of risk factors mentioned above (Table 5.2 and Chart 5.1). With regard to the HICP, the analysis points to slight downside risks over the projection horizon, mainly arising from the possibility of a reduction in profit margins, reflecting the impact of structural reforms (Table 5.2 and Chart 5.2).

6. Conclusions

These projections suggest the continuation of the moderate recovery of economic activity that began in 2013, and average growth at a pace close to that projected for the euro area. The growth of the Portuguese economy should be based on sustained robust growth of exports, in parallel with a recovery of domestic demand. This is compatible with external net lending, a fundamental condition for maintaining access to the capital markets under normal conditions. Furthermore, nominal growth projected for GDP and the reduction of the interest rate implicit in the debt, together with the maintenance of a primary surplus, as has been the case since 2013, will contribute to a reduction in public debt from 2015.

Over the last few years, the Portuguese economy has seen significant progress in the correction of certain macroeconomic imbalances accumulated over the last few decades, in particular the achievement of an external account surplus, directing resources to sectors with greater exposure to international competition and maintenance of the fiscal consolidation process. However, growth potential in the Portuguese economy is still restricted by the need to sustain the reduction of indebtedness in the public and private sectors, by the unfavourable outlook for demographic trends, by the high level of long term unemployment, and by the limited levels of productive capital per employee, after a long period of sharp falls in investment.

Against this background, the Portuguese economy should pursue the adjustment process under way, with sustainable increases in consumption, investment growth that ensures the renewal of capital and progressively lower indebtedness levels. The success of the Portuguese economy will depend above all on its ability to increase the quantity and quality of its productive resources, its pursuit of structural reforms that promotes economic growth sustainably and equitably and economic policy decisions that preserve the fundamental macroeconomic balances. The favourable international environment at present is a good opportunity to deepen this agenda in Portugal.

Chart 5.1 • Gross domestic product
| Rate of change, in percentage

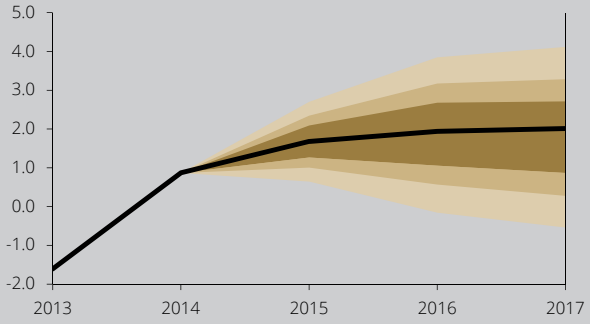
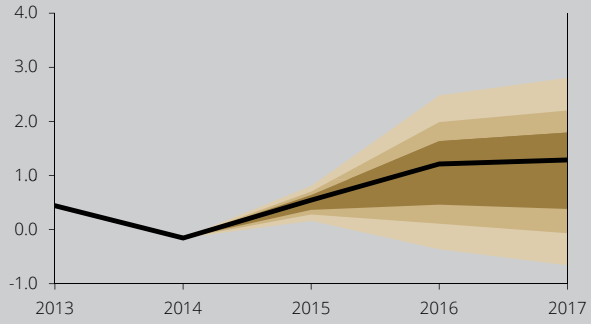
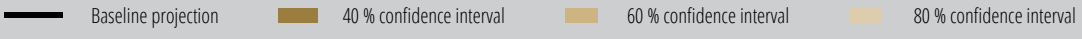


Chart 5.2 • Harmonized index of consumer prices
| Rate of change, in percentage





Source: Banco de Portugal.

Notes:

1. The 36.1 per cent increase in sales of light passenger vehicles in the first quarter of 2015 is affected by the high growth in sales of rental vehicles, contributing around 11 percentage points.

2. Compensation and the consumption of fixed capital are considered a measure of public sector activity.

3. See 'Private investment: what's the holdup', *World Economic Outlook*, IMF, April 2015.

4. The methodology used in this section is based on Pinheiro, M. and Esteves P. (2012) 'On the uncertainty and risks of macroeconomic forecasts: combining judgements with sample and model information', *Empirical Economics*, 42, 639-665.

5. For a brief summary of the main results presented in the literature of the macroeconomic effects of structural reforms, see 'Box 7: The macroeconomic effects of structural reforms' in ECB, *Monthly Bulletin*, July 2014 and 'Structural reforms in the euro area', Banco de Portugal, *Economic Bulletin*, October 2014.

SPECIAL ISSUE

ECB's unconventional monetary policy:
what has been done and did it work?

ECB's unconventional monetary policy: what has been done and did it work?

1. Introduction

The global financial crisis had a significant impact on the conduct of monetary policy in major advanced economies and highlighted the importance of the financial system for macroeconomic stability. The sudden increase in risk aversion, the decline of confidence in major financial institutions and the consequent collapse of liquidity in interbank markets, particularly after the bankruptcy of Lehman Brothers in September 2008, triggered an unprecedented response by central banks and governments in various countries.

The measures adopted had a stabilising effect on financial markets, though temporary. In the spring of 2010, a new wave of financial turmoil took place with origin in the euro area and associated with a reassessment of risks stemming from public finances in several countries. These tensions gave way to a sovereign debt crisis, exposing limitations in the institutional framework of the Economic and Monetary Union as well as the difficulties in correcting them promptly and effectively.

The crisis escalated from mid-2011 fuelled by an adverse feedback loop between banks and sovereign risk, amidst a deterioration of economic activity. As a result, financial fragmentation across euro area countries increased and banks' funding conditions differed according to their country of operation. The pressure on sovereign risk premia persisted until the summer of 2012, when the viability of the euro came into question, undermining the singleness of monetary policy.

These two successive crises – financial and sovereign debt – had a negative and persistent impact on the euro area economy. In early 2015, activity in the euro area as a whole still stood below the levels seen before the financial crisis, inflation continued to fall and financial fragmentation between countries remained relatively high.

The Governing Council of the European Central Bank (ECB) reacted to the problems created by the financial and sovereign debt crises by significantly reducing official interest rates and introducing unconventional measures.[1] In the initial phase, the interest rate on the main refinancing operations (MRO) was cut by a total of 325 basis points (b.p.) between October 2008 and May 2009 (Chart 1). At the same time, in response to the shutdown of interbank markets, the ECB started to provide liquidity on an unlimited basis and ensured its adequate distribution across the banking system. The ultimate objective of the adopted measures was to support bank lending to the economy, given the central role of banks in the euro area financial system.

Following the easing of tensions in financial markets during 2009, the ECB initiated a gradual withdrawal of some of its unconventional measures, which turned out to be premature given the emergence of the sovereign debt crisis in 2010. This crisis prompted the ECB to expand progressively its action to respond also to frictions in sovereign debt markets, acknowledged as essential to banks' funding conditions and to the transmission of monetary policy.[2]

In the summer of 2012, doubts about the irreversibility of the euro forced the ECB to resort to new measures to safeguard the single currency. Since then, the ECB's intervention has focused on providing a higher degree of monetary accommodation and on ensuring its effective transmission to all euro area countries. The ECB continued to cut official interest rates and tried to directly influence expectations about

future policy rates through communication (forward guidance).

In September 2014, the ECB considered that there was no room for further reductions in official interest rates[3] and decided to provide additional monetary stimulus through large-scale outright purchases of assets, including at a later stage of sovereign debt securities.

The unconventional monetary policy measures have resulted in a substantial expansion of the Eurosystem's balance sheet, as observed in central banks of other major advanced economies (Chart 2). However, both the size and the composition of balance sheets reflected different responses to the global financial crisis and to frictions in specific markets.

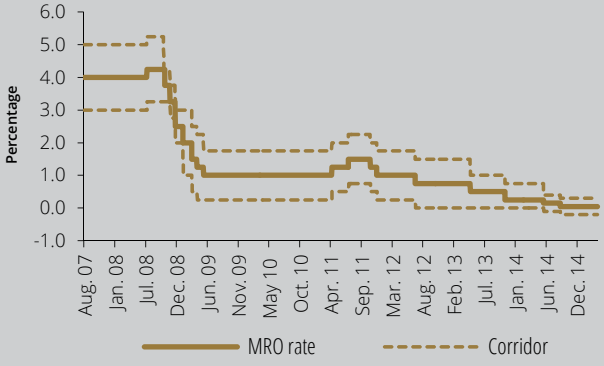
In the case of the ECB, unconventional measures were seen as a complement to the interest rate instrument and aimed at ensuring an adequate functioning of the monetary policy transmission mechanism, in which banks play a key role. Furthermore, the complexity and length of the sovereign debt crisis demanded a significant adjustment effort of the unconventional policy response. In addition, it should be noted that ECB's actions coincided with a process of profound changes in the monetary union's institutional framework (including the creation of the European Stability Mechanism and the banking union). Finally, and in contrast to the experience of other central banks, the dimension of the Eurosystem's balance sheet was until very recently driven by the demand of liquidity by the banking system.

The aim of this article is to analyse ECB's unconventional policy measures and to discuss their effectiveness given their objectives. Section 2 reviews in detail the main measures adopted since the beginning of the crisis and section 3 discusses the channels through which they are expected to work. Section 4 reviews the available empirical evidence on the financial and economic impact of the unconventional measures. This section includes the results of a preliminary estimation of the effects of the large-scale asset purchase programme announced by the ECB in January 2015.

2. The ECB's unconventional monetary policy response

Major unconventional monetary policy measures taken by the ECB since the beginning of the

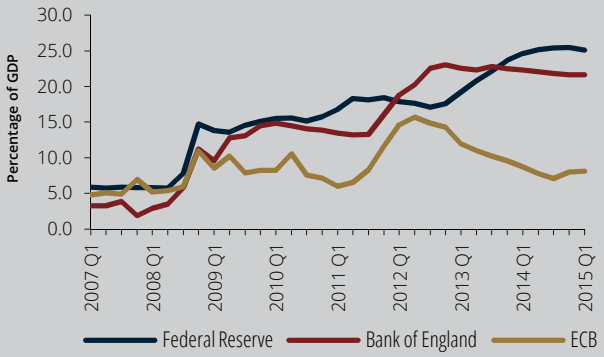
Chart 1 • ECB key interest rates



Source: ECB.

Note: The corridor corresponds to the range between the lending and deposit facilities rates.

Chart 2 • Central banks' balance sheets



Sources: Thomson Reuters and Eurostat.

Note: The balance sheet includes only monetary policy assets.

crisis are analysed distinguishing largely between collateralised lending and outright purchases of assets (see Table 1 for a timeline of major announcements and the List of abbreviations at the end of the article).[4]

Both types of measures may generate an expansion of the central bank's balance sheet, but they differ in various ways. As pointed out by Cour-Thimann and Winkler (2013), unlike collateralised lending, asset purchases allow bypassing the banking system and supporting asset markets more directly. Also, they may contribute to the deleveraging process of banks and of the private sector. Asset purchases imply that the central bank interferes with market--based mechanisms of asset prices' determination and becomes more exposed to the risks associated with the assets purchased.

2.1. Collateralised lending

The main measures taken – liquidity provision in unlimited amounts and over longer than usual time horizons – intended to ease liquidity constraints in the money market and banks' funding problems and, at a later stage, to mitigate financial fragmentation. These measures ultimately aimed at supporting bank credit to the economy.

- Since October 2008, the ECB moved to a Fixed-Rate Full Allotment (FRFA) procedure for all refinancing operations. With this procedure, the central bank satisfies all the liquidity demanded by banks at the prevailing interest rate, subject to adequate collateral.[5] This means that the ECB takes up the money markets' usual function of liquidity redistribution. The FRFA led to an abrupt rise in the liquidity surplus held by euro area banks and consequently to a significant expansion of the Eurosystem's balance sheet (Chart 2).
- The collateral accepted in refinancing operations was extended in various occasions in order to facilitate banks' access to the additional liquidity provided by the central bank. The set of extensions of the collateral framework included, among others, an expansion of the list of eligible assets, a reduction of the rating thresholds and allowing national central banks to accept certain additional credit claims (i.e. bank loans) as collateral.
- The ECB conducted several Longer-Term Refinancing Operations (LTRO) with significantly longer maturities than in the pre-crisis period (previously LTRO had a 3-month maturity and monthly frequency). Between April 2008 and October 2011, the ECB carried out several LTRO with 6 and 12-month maturities. As tensions in sovereign debt markets intensified and given indications of increased fragmentation in the banking system, the ECB announced in December 2011 two LTRO with a 3-year maturity, with the option of early repayment after one year. Take-up in these two operations, implemented in December 2011 and February 2012, set new records in allotted amounts (around 500 billion euro each). This corresponded to a net liquidity injection of about half of the total allotment – as banks partially shifted out of operations with shorter maturities – and resulted in the second noticeable increase of the Eurosystem's balance sheet since the beginning of the crisis (Chart 2).

Table 1 • Timeline of major announcements of ECB's unconventional policy measures

Aug. 07	First supplementary 3-month LTRO
Dec. 07	Start of joint action with the Federal Reserve to provide USD funding
Mar. 08	First 6-month LTRO
Oct. 08	FRFA procedure; Expansion of the collateral framework; Start of joint action with the Swiss National Bank to provide CHF funding
May 09	CBPP1; First 12-month LTRO (3 operations: Jun. 09, Sep. 09 and Dec. 09)
Jun. 09	Technical modalities of CBPP1
May 10	SMP
Aug. 11	Reactivation of SMP
Oct. 11	CBPP2; 12-month LTRO (2 operations: Oct. 11 and Dec. 11)
Nov. 11	Technical modalities of CBPP2
Dec. 11	3-year LTRO (2 operations: Dec. 11 and Feb. 12); Expansion of the collateral framework; Reduction of the reserve ratio to 1%
Jun. 12	Expansion of the collateral framework
Aug. 12	OMT
Sep. 12	Technical modalities of OMT
Jul. 13	Forward guidance '...key ECB interest rates to remain at present or lower levels for an extended period of time'
Jun. 14	TLTRO (8 quarterly operations: from Sep. 14 to Jun. 16); Preparatory work for ABS purchases; Suspension of SMP sterilisation; Forward guidance '...key ECB interest rates will remain at present levels for an extended period of time'
Sep. 14	CBPP3; ABSPP
Oct. 14	Technical modalities of CBPP3 and ABSPP
Jan. 15	APP (encompasses CBPP3, ABSPP and PSPP); Change of the pricing of the remaining TLTRO
Mar. 15	Implementation aspects of PSPP

Source: ECB.

Notes: LTRO: Longer-Term Refinancing Operations. FRFA: Fixed-Rate Full Allotment. CBPP: Covered Bond Purchase Programme. SMP: Securities Markets Programme. OMT: Outright Monetary Transactions. TLTRO: Targeted Longer-Term Refinancing Operations. ABSPP: Asset-Backed Securities Purchase Programme. APP: Expanded Asset Purchase Programme. PSPP: Public Sector Purchase Programme.

- In June 2014, the ECB announced that it would conduct a series of Targeted Longer--Term Refinancing Operations (TLTRO), all maturing in September 2018, with the intention of directly supporting bank lending to the private sector. The distinctive feature of the TLTRO is that the amount that banks are entitled to borrow depends on their lending behaviour. The initial borrowing allowance was equal to 7 per cent of banks' outstanding loans to the euro area non-financial private sector (excluding loans to households for house purchase) as of 30 April 2014, to be drawn in the first two operations. In the following six operations, banks can borrow additional amounts up to three times the difference between their net lending and a bank-specific benchmark. This benchmark was designed in a way that allowed access to the TLTRO to banks that had registered a negative change in net lending. The take-up amounted to 212.4 billion euro in the first two TLTRO (around 55 per cent of the total initial allowance) and to 97.8 billion euro in the third.

2.2. Asset purchases

The ECB carried out outright purchases of assets in various markets – covered bonds, sovereign bonds and Asset-Backed Securities (ABS) – since the outbreak of the financial crisis, but the purpose and dimension of interventions varied significantly over time (see Table 2 for details).

- The first Covered Bond Purchase Programme (CBPP1), announced in May 2009, was aimed at reviving this important market segment – a primary source of financing for euro area banks – that had been particularly affected by the financial crisis.[6] In October 2011, covered bond markets came again under pressure driving the ECB to announce a second purchase programme (CBPP2), sharing with the first the ultimate objective of encouraging bank lending. The amount purchased in the CBPP1 was in line with that initially intended (60 billion euro)[7]; in the CBPP2, it stood significantly below the targeted amount, owing both to the lack of primary market issuance and to improvements in investors' demand, after the 3-year LTRO.
- In May 2010, the ECB decided that it would intervene in public and private debt securities markets under the Securities Markets Programme (SMP), to ensure the working of dysfunctional market segments and to restore the monetary policy transmission mechanism. The ECB acknowledged the essential role that sovereign debt markets play in this transmission mechanism, given its influence on the prices of other assets, on borrowing costs and on banks' balance sheets, as well as its role as collateral in repo transactions. The scope and size of interventions were not preannounced. The first wave of purchases, from May 2010 to March 2011, was mostly limited to Greek, Irish and Portuguese sovereign bonds. In response to increased risks of contagion to other sovereigns and markets, SMP purchases were resumed between August 2011 and February 2012, being mostly directed to Italian and Spanish sovereign bonds. On 31 December 2012, the Eurosystem's holdings under the SMP stood at around 200 billion euro (roughly 50 per cent Italian, 20 per cent Spanish and the remainder divided amongst Greek, Portuguese and Irish sovereign bonds), with an average residual maturity of around four years.

Table 2 • Main features of ECB's asset purchase programmes

					APP		
	CBPP1	SMP	CBPP2	OMT	CBPP3	ABSPP	PSPP
Implementation period	Jul. 09 to Jun. 10	Started May 10; to be temporary but no end-date was specified; terminated Sep. 12	Nov. 11 to Oct. 12	Not initiated to date	From Oct. 14 until at least end-Sep. 16	From Nov. 14 until at least end-Sep. 16	From Mar. 15 until at least end-Sep. 16
Coverage	Euro-denominated covered bonds issued in the euro area	Euro area public and private debt securities	Euro-denominated covered bonds issued in the euro area	Sovereign bonds issued by euro area countries	Euro-denominated covered bonds issued in the euro area	Euro-denominated senior and guaranteed mezzanine tranches of ABS issued in the euro area	Euro-denominated bonds issued by euro area central governments and agencies (88% of PSPP purchases) and by international organisations and multilateral development banks located in the euro area (12% of PSPP purchases)
Restrictions/ Conditionality	As a rule, minimum rating AA or equivalent by one of the major rating agencies and, in any case, not lower than BBB-; as a rule, minimum issue size of €500 ml and, in any case, not lower than €100 ml	The Governing Council decides on the scope of interventions	Minimum rating BBB- or equivalent by one of the major rating agencies; minimum issue size of €300 ml; maximum residual maturity of 10.5 years	Residual maturity 1 to 3 years/ Strict and effective conditionality attached to an appropriate EFSF/ESM programme; no purchases during review periods of financial assistance programmes	Minimum rating BBB- or equivalent by one accepted rating agency; 70% issue share limit per ISIN to the holdings in all portfolios; specific rules for Greece and Cyprus	Minimum rating BBB- or equivalent by two accepted rating agencies; limit of 70% of the oustanding amount of a tranche of ABS per ISIN; specific rules for Greece and Cyprus	Minimum rating BBB- or equivalent by one accepted rating agency; residual maturity 2 to 30 years; negative yield to maturity above the deposit facility rate; black-out period for new issuances and during review periods of financial assistance programmes; 25% issue share limit per ISIN to the holdings in all portfolios; 33% aggregate limit per issuer; specific rules for securities that do not achieve the required rating
Market	Primary and secondary	Primary: private debt securities; secondary: public and private debt securities	Primary and secondary	Secondary	Primary and secondary	Primary and secondary	Secondary
Amount	Intended amount €60 bn; fully implemented (27% in primary market)	Not specified	Intended amount €40 bn; purchased €16.4 bn (37% in primary market)	No ex-ante limits on the amount	Intended monthly purchases €60 bn (public and private sector securities)		
Sterilisation	No	Yes; suspended in Jun. 14	No	Yes	No	No	No
Holding intention/Eligibility for lending	Held to maturity/Available for lending since Mar. 10	Held to maturity	Held to maturity/ Available for lending	–	Available for lending	–	Available for lending
Creditor treatment	–	–	–	Same (*pari passu*) treatment as private and other creditors	–	–	Same (*pari passu*) treatment as private investors
Disclosure policy	Monthly: breakdown by primary and secondary markets	Weekly: aggregate holdings; breakdown by country first disclosed in Feb. 13	Monthly: breakdown by primary and secondary markets	Weekly: aggregate holdings; monthly: average duration and breakdown by country	Weekly: aggregate holdings; monthly: breakdown by primary and secondary markets	Weekly: aggregate holdings	Weekly: aggregate holdings; monthly: holdings and weighted average residual maturity by issuer residence

Source: ECB.

Notes: EFSF/ESM – European Financial Stability Facility/European Stability Mechanism. ISIN – International Securities Identification Number.

- In August 2012, the ECB announced the setting-up of the Outright Monetary Transactions (OMT) and, in the following month, specified the technical features of the programme. The purpose of the OMT was to safeguard the singleness of monetary policy in the euro area. These transactions were designed as an effective backstop mechanism against undesirable scenarios and self-fulfilling expectations, including that of redenomination of the euro. Purchases of short-term sovereign bonds under the OMT are potentially unlimited, but they are subject to conditionality. In particular, they require the Member State to be under an appropriate European Financial Stability Facility/European Stability Mechanism (EFSF/ESM) programme and to fully comply with its conditionality. These features of the OMT tried to address a number of shortcomings of the SMP, including lack of transparency and lack of conditionality required to ensure that governments make the necessary reforms and maintain fiscal discipline. The programme has not been activated to date.
- In September 2014, the ECB launched two purchase programmes of private sector assets: covered bonds (CBPP3) and simple and transparent ABS secured by claims against the euro area non-financial private sector (Asset-Backed Securities Purchase Programme – ABSPP).[8] Together with the TLTRO, these programmes aimed at supporting the provision of credit to the economy and further ease the monetary policy stance. In particular, they would significantly increase the Eurosystem's balance sheet towards its size at early-2012[9] and, ultimately, contribute to a return of inflation rates to levels closer to 2 per cent. In January 2015, the ECB considered that the degree of monetary accommodation already achieved was insufficient, given the heightened risks of a too prolonged period of low inflation, and decided to expand the scope and size of acquisitions. The Expanded Asset Purchase Programme (APP) encompasses the CBPP3 and the ABSPP and a new Public Sector Purchase Programme (PSPP). The expansion of purchases to sovereign bonds is justified by both their role as a benchmark for the pricing of a vast array of assets and by their availability in sufficient volumes.[10] Only a small fraction of purchases is subject to risk sharing, in order to preserve incentives for prudent fiscal policies. Purchases under the APP should amount to a monthly pace of 60 billion euro at least until September 2016 and, in any case, until the Governing Council sees a sustained adjustment in the path of inflation towards 2 per cent. In March 2015, the first month of purchases under the APP, the amounts purchased were in line with the monthly target, comprising around 47 billion euro of sovereign bonds (with an average residual maturity of 8.6 years).

3. How does unconventional monetary policy work?

In normal times, monetary policy involves setting the policy interest rate and conducting liquidity management operations to guide money market rates.[11] Changes in the policy rate are then transmitted to market interest rates at different maturities and to the prices of financial assets such as bonds and equities and to the exchange rate, via well-functioning financial arbitrage.

As inflation expectations adjust only slowly, the central bank also affects real interest rates, which influence spending decisions and, ultimately, inflation.

Monetary policy also feeds through to the economy by changes in net wealth and in credit to households and firms. The latter plays a key part in the transmission mechanism in bank-based economies like the euro area.

The traditional view of the bank lending channel contends that policy-induced changes in

deposits drive bank loans. For example, a decline in policy interest rates reduces the opportunity cost of holding deposits, which translates into an increase in available funds in the form of deposits and leads banks to provide more credit.[12] However, deregulation and financial innovation likely contributed to changes in the monetary transmission via the bank lending channel. In particular, banks' overall funding conditions – which are affected by their increasing reliance on market funding, their capital position and the perceived strength of their balance sheets – seem to have become especially relevant to the way banks react to monetary policy. Although these changes occurred in the years prior to the global financial crisis, it was only in its aftermath that their importance was fully understood. Pre-crisis mainstream theoretical models tended to overlook the role of financial markets as a source of frictions in the transmission of monetary policy.

In troubled times, monetary policy transmission can be severely disrupted. In the context of the recent financial crisis, central banks were compelled to shift to non-traditional ways of providing monetary stimulus, generally involving a significant expansion of their balance sheets. Post-crisis theoretical contributions departed from the rather strong and unrealistic assumptions of frictionless financial markets and perfect substitutability between assets, under which the increase in the central bank balance sheet is completely neutral.[13] According to these models, despite the lower bound for interest rates,[14] monetary policy may still have an impact on overall financial conditions through several channels. In practice, these channels may work in tandem and their strength will depend on the specific design of each measure and on the underlying financial structure of the economy.

The exceptional provision of liquidity to financial intermediaries by central banks in the initial phase of the crisis mainly intended to repair the transmission mechanism, namely the credit channel. In the case of the ECB, measures such as the adoption of a FRFA procedure and the LTRO with longer than usual maturities and against a much wider range of collateral are examples of this. As a result, excess reserves of the banking system became extremely large relative to those observed in the past for precautionary reasons. This is at odds with the traditional view of the bank lending channel and suggests that other factors became relatively more important in explaining the supply of credit.

Measures involving asset purchases in specific market segments, which had become highly dysfunctional amidst heightened uncertainty and risk aversion, operate via the so-called liquidity or market functioning channel. The presence of the central bank as a buyer in these markets enhances their functioning through actively encouraging trading. By providing a source of demand for low liquidity assets, the central bank bids up their prices and lowers their yields.[15] This liquidity channel is potentially more relevant at times of severe financial distress. Examples of measures adopted by the ECB operating through the liquidity channel are the CBPP and the SMP.

In turn, large-scale outright asset purchases aimed at influencing longer-term interest rates and financial conditions more broadly through the portfolio rebalancing channel. The working of this channel depends on the imperfect substitutability between assets that arise in the presence of market frictions such as asymmetric information or limited participation. To put it simply, when the central bank purchases a large quantity of assets held by the private sector, it reduces the relative supply and pushes up the prices and lowers the yields of those assets.[16] If the price is high enough, investors will opt to sell the assets to the central bank and increase their money holdings. As long as money is not a perfect substitute for the assets sold, the sellers will then seek to re-invest in other similar, but less expensive, assets. This is the case

when investors have a strong preference for assets with specific maturity or risk characteristics (e.g. pension funds and insurance companies).[17]

The portfolio adjustment continues until all assets prices have adjusted and investors, in aggregate, are willing to hold the overall amount of money and assets. During this process, substitution effects drive up the prices of financial assets besides those initially purchased. Large-scale asset purchases may also put downward pressure on the exchange rate if a significant part of the assets purchased by the central bank is held by foreign investors or if in the process of portfolio rebalancing investors decide to replace domestic with foreign assets. Portfolio rebalancing is one of the main channels through which the APP recently launched by the ECB is expected to operate.

Another channel through which unconventional monetary policies operate is the signalling channel. To the extent that these measures disclose information about the future policy stance – via forward guidance, long-term refinancing operations at a fixed rate or large-scale asset purchases[18] – the central bank may contribute to lower interest rates at longer maturities even when official interest rates are at their lower bound. In addition, by communicating its willingness to ease the policy stance as much as needed, the central bank emphasizes its commitment and confidence to attain its objectives. This contributes to reduce the overall risk in the economy, to improve business and consumers' confidence and to avoid that inflation expectations become unanchored.[19] These signalling effects could be an important element in the transmission of the APP. In times of high uncertainty, the signalling channel can be particularly effective in helping to reduce the likelihood of extreme risks, as was the case with the OMT announcement.

4. Empirical evidence on the impact of ECB's unconventional monetary policy

To address the question of how effective were the measures adopted by the ECB, a summary of selected empirical studies is presented organised by type of measure (collateralised lending or asset purchases) and by impact on financial variables, bank loans and the broader economy. Contributions surveyed mainly focus on the euro area as a whole, but evidence for individual countries is also reported when available.

The evaluation of the effectiveness of unconventional monetary policy is not straightforward.

First, gauging the effects of individual measures is complicated in a context where the economy suffered successive shocks and where central banks and fiscal authorities announced several initiatives simultaneously. This simultaneity problem is particularly relevant when examining the effects on macro variables, the more so as these variables are observed at lower frequency.

Second, building a proper counterfactual – what would have happened to economic conditions in the absence of policy response – is a particularly challenging task at times of heightened uncertainty and unusual financial and economic conditions. For this reason, most of the empirical literature tries to answer the simpler question of what is the effect on activity and inflation of easier financial conditions due to the unconventional policy measures, assuming that the usual monetary transmission mechanisms still hold.[20]

Third, given the very different methodologies used (e.g. event studies, regression analysis, vector autoregressive (VAR) models, dynamic stochastic general equilibrium (DSGE) models) the comparability of the various results is not clear-cut.

Overall, these caveats suggest that empirical results should be read with due caution.

4.1. Collateralised lending

The evidence on the effectiveness of the substantial liquidity provided by the ECB against collateral is summarised in Table 3, distinguishing

between the impact of the adoption of the FRFA procedure and the LTRO with maturities up to 1 year from the effects of the subsequent 3-year LTRO. In the case of the TLTRO, there is still no available evidence.

The results suggest that the LTRO (up to 1 year) and the FRFA were successful in alleviating tensions in euro area money markets. Studies show that these measures had significant effects in money market interest rates/spreads[21] and may have contributed to a decline in money markets volatility. Therefore, ECB´s measures likely helped to support the transmission of monetary policy to banks' financing conditions, thus mitigating the fall of credit flows to the private sector.

Research confirms that there was a positive impact on bank loans, especially to non-financial firms.

To assess the macroeconomic effects of LTRO (up to 1 year) and the FRFA, studies follow basically two approaches: VAR models, which impose little structure on the data, or more structural models such as DSGE. Both methodologies point to positive effects either on industrial production or real gross domestic product (GDP), implying that euro area economic activity would have been weaker in 2009/2010 without ECB intervention. Fahr *et al.* (2013), who attempt to disentangle the impact of unlimited provision of liquidity from that of the expansion of maturities at which liquidity is provided, come to the conclusion that the larger macroeconomic impact resulted from the adoption of FRFA. Regarding inflation, studies point to a more limited increase.

The evidence on the impact of the 3-year LTRO suggests that these operations reduced money market spreads, mainly on announcement. The 3-year LTRO may have also influenced sovereign bond markets via banks' balance sheets. While studies do not find an impact on 10-year bond yields from the announcement of the 3-year LTRO, there is evidence that their actual implementation reduced yields, particularly in stressed countries. This is consistent with the use of some of these funds to buy sovereign bonds.

Available studies suggest that the 3-year LTRO also had a positive effect on the supply of bank loans in the euro area. Evidence for individual countries (Spain and France) using micro data on bank-firm relationships confirm that illiquid banks or those that bid more in 3-year LTRO used the funding to increase lending to firms.

Evidence on the macroeconomic effects of the 3-year LTRO is scarce, but according to Darracq-Paries and De Santis (2015) the impact on euro area real GDP was positive, reaching a peak of 0.8 per cent by mid-2013, while the effects on inflation were smaller and more delayed.

Table 3 • Impact of ECB's collateralised lending in the euro area (or in euro area countries)

Measures	Authors	Methodology	Impact on financial markets	Impact on bank loans/rates	Impact on output/inflation
LTRO (up to 1 year) + FRFA	Abbassi and Linzert (2012)	Regression analysis	12-m Euribor: -80 b.p.		
	Angelini *et al.* (2011)	Panel regression using micro interbank transactions data	1/2-m Euribor-Eurepo spread: -15 b.p. from 1-m LTRO; -10 b.p. from 3-m LTRO		
	Cahn *et al.* (2014)	DSGE model simulations of liquidity injections			GDP: +1.2% (peak effect) after one year Inflation: limited impact
	Carpenter *et al.* (2013)	Regression for Euribor spread; simultaneous equation model for loan demand and supply	Euribor-OIS spread:-35 b.p.	Growth of loans to firms: +4 p.p. over 2007-2009	
	Fahr *et al.* (2013)	DSGE model counterfactual simulations			LTRO minor impact compared to that of FRFA GDP growth: +1.0 p.p. and inflation: +0.6 p.p., on average over 2009-2010 of FRFA
	Frank and Hesse (2009)	VAR model for Euribor spread; GARCH for Euribor spread variance	3-m Euribor-OIS spread: -5 b.p. Euribor-OIS spread volatility: decline following announcement and implementation		
	Giannone *et al.* (2012)	VAR model (policy identification: ECB intermediation)		Loans to firms: +6% and loans to households: +1.0-1.5%, two years after Lehman´s failure	Industrial production: +2%, two years after Lehman's failure
	Lenza *et al.* (2010)	VAR model (policy identification: money market interest rate spreads)		Growth of loans to firms: around + 3 p.p. and loans to households: around +1.5 p.p. (peak effects)	Industrial production: sizeable positive effect and inflation: positive effect, only after several months
3-year LTRO	Darracq-Paries and De Santis (2015)	Panel VAR (policy identification: Bank Lending Survey answers)		Loans to firms: +2.8% (peak effect) in 2014 H2 Lending rate to firms-OIS spread: around -20 b.p. (peak effect) in the following quarter	GDP: +0.8% (peak effect) in mid-2013 Inflation: +0.3 p.p. (peak effect) in early 2014
	Everett (2015)	Panel regression using micro bank data		Loans supply to firms and households: positive effect of the second 3-y LTRO	
	Falagiarda and Reitz (2015)	Event study	10-y sovereign bond spread *vs.* DE: generally no impact in stressed countries		
	Fratzscher *et al.* (2014)	Panel data regression	10-y sovereign bond yields: -5.1 b.p. in stressed countries (IT, ES) and -0.6 b.p. in core countries (DE, NL, AT, FI) per €100 bn change in 3-y LTRO outstanding amounts		
	Krishnamurthy *et al.* (2014)	Event study	10-y sovereign bond yields: no impact in stressed countries		
	Pattipeilohy *et al.* (2013)	Panel data regression	10-y sovereign bond yields: downward effect in some stressed countries, especially of the second 3-y LTRO (-50 b.p. in **IT** and -150 b.p. in **PT**), but short-lived		
	Szczerbowicz (2014)	Event study	3-m Euribor-OIS spread: -28 b.p. mainly on announcement		
	Andrade *et al.* (2015)	Panel regression using micro bank-firm relationship data		**FR** Loans to firms: each €1 bn of central bank money lent to average bank led to a €95 ml increase in credit made available to average firm, over Sep. 11 to Sep. 12	
	Casiraghi *et al.* (2013)	Event study for money market spreads; panel data regression for credit supply; macro-model	**IT** Overnight/3-m money market spreads: -70 to -100 b.p.	**IT** Credit supply conditions: positive impact Growth of loans to firms: +1.4 p.p. in 2012 and +4.0 p.p. in 2013 of 3-y LTRO + SMP + OMT	**IT** GDP growth: +1.1 p.p. in 2012 and +1.6 p.p. in 2013 of 3-y LTRO + SMP + OMT Inflation: limited impact
	García-Posada and Marchetti (2015)	Panel regression using micro bank-firm relationship data		**ES** Growth of loans to firms: around +1.0 p.p. on average in the year after the first 3-y LTRO	

Sources: Authors, see column two. The results presented involved selection and calculations to allow comparison across studies.

Notes: DSGE: Dynamic Stochastic General Equilibrium. VAR: Vector Autoregressive. GARCH: Generalised Autoregressive Conditional Heteroscedasticity. OIS: Overnight Index Swap.

4.2. Asset purchases

Table 4 presents a summary of the empirical evidence on the impact of ECB's purchases of assets – comprising CBPP1 and 2, SMP and OMT – on financial market variables.

A large part of the literature estimates the effects of the programmes using event studies. This methodology focuses on the change of asset prices in a narrow time window around the dates of policy news/announcements, relying on the premise that the impact on asset prices occurs not when purchases are actually made but when expectations of those purchases are formed. Other studies go beyond the impact of announcements and assess also the effects of the actual purchases using regression-based techniques. This is the case of some studies on the SMP, given that information on how the programme worked (e.g. amounts and timing of purchases, bonds targeted) could only be learned as actual interventions occurred.

Evidence on the impact of ECB's covered bond purchases is scanty. Beirne *et al.* (2011) show that CBPP1 was effective in achieving its objectives, given that it contributed to a reduction in yields, stimulated issuance and improved liquidity in covered bond markets. Besides, there is tentative evidence of small spillover effects from covered bond purchase programmes to sovereign bond yields.

In the case of the SMP, all studies show that the announcement of the decisions to initiate and reactivate the programme had a substantial downward impact on longer-term sovereign bond yields in stressed countries (of at least 100 b.p.). For Portugal, the estimated reduction in 10-year sovereign bond yields ranges from 170 to 230 b.p.

The impact of actual SMP purchases in the following months is more difficult to quantify given that interventions were usually triggered by adverse developments in yields, creating an endogeneity problem. Empirical studies adopt different strategies to deal with this problem (e.g. control for common factors, use of higher frequency data) and find a significant yield reduction per euro spent, even if mostly short-lived. There is also some evidence of a reduction in volatility in targeted sovereign bond markets. This suggests that unconventional measures designed to address dysfunctional market segments can be particularly effective.

Most of the empirical literature does not assess the channels through which interventions affected sovereign bond markets. The exceptions are Krishnamurthy *et al.* (2014) and Eser and Schwaab (2015), who suggest that the SMP worked mainly through the liquidity or market functioning channel. Moreover, the SMP seems to have had important spillover effects on other markets. In particular, it reduced covered bond spreads, suggesting that the interdependence of bank and sovereign risk played a role in the transmission of unconventional measures (Szczerbowicz, 2014). The SMP also affected positively equity prices, both broad and banks' indices.

Papers that assess the effects of OMT announcements[22] point to large and significant reductions in 10-year sovereign bond yields in Italy and Spain (from 74 to 129 b.p.). For Portugal, Szczerbowicz (2014) and Krishnamurthy *et al.* (2014) also find a large impact of OMT announcements (from 54 to 118 b.p.). There is evidence of even larger reductions in shorter-term yields, which is not unexpected given the focus of OMT on residual maturities of 1 to 3 years. The impact on longer-term rates also likely reflected the attenuation of euro redenomination risk. In fact, Krishnamurthy *et al.* (2014) find that this may have been an important factor in the transmission of the OMT in the case of Spain and Portugal.

Table 4 • Impacto dos programas de compra de ativos do BCE na área do euro (ou em países da área do euro)

Measures	Authors	Methodology	Impact on financial markets
CBPP1	Beirne *et al.* (2011)	Event study and regression analysis for yields; cointegration analysis for outstanding amounts	Covered bond yields: around -12 b.p. (-17 b.p. in **DE** and **ES**, -10 b.p. in **FR** and no impact in **IE**), mostly on announcement Covered bond primary market: stimulated issuance and improved market liquidity
CBPP1 and 2	Falagiarda and Reitz (2015)	Event study	10-y sovereign bond spread *vs.* DE: no announcement impact in stressed countries
	Kilponen *et al.* (2012)	Regression analysis	10-y sovereign bond yield-euro swap rate spread: no announcement impact in stressed and core countries (DE, FR); only CBPP1 had a significant negative announcement impact in all countries
	Szczerbowicz (2014)	Event study	Covered bond yields *vs.* DE sovereign: announcement impact -4 b.p. (-10 b.p. in **IT**, around -5 b.p. in **DE**, **FR** and **ES**, no impact in **PT** and **IE**) 10-y sovereign bond spread *vs.* DE: announcement impact -5 b.p. (around -15 b.p. in **IT**, **ES** and **GR** and no impact in **PT**, **IE** and **FR**)
SMP	Beetsma *et al.* (2014)	Panel data regression	5-y sovereign bond yields (co)variances: reduced spillovers among stressed countries; reduced flight-to-safety from stressed countries to DE
	De Pooter *et al.* (2014)	Panel data regression	5-y sovereign bond liquidity premium: -23 b.p. from purchase of 1% of outstanding debt in stressed countries (IT, ES, PT, IE) (-5 b.p. in the long run)
	Eser and Schwaab (2015)	Panel data regression	5-y sovereign bond yields: substantial announcement impact; purchase impact ranges from -1 b.p. in **IT** to -20 b.p. in **GR** per €1 bn of purchases (smaller long-run effcts) Sovereign bond yields volatility: lower on intervention days for most stressed countries
	Falagiarda and Reitz (2015)	Event study	10-y sovereign bond spread *vs.* DE: announcement impact ranges from -107 b.p. in **IE** to -447 b.p. in **GR**
	Fratzscher *et al.* (2014)	Panel data regression	10-y sovereign bond yields: announcement impact -121 b.p. and purchase impact of -1.5 b.p. per €1 bn purchases in stressed countries (IT, ES); no impact in core countries (DE, NL, AT, FI) Stock market: positive impact for total and bank stocks in both country groups
	Ghysels *et al.* (2014)	Multi-frequency component model (daily and intra-daily data)	5-y sovereign bond yields: purchase impact ranges from no impact in **IT** to -280 b.p. in **IE** per €1 bn of purchases Sovereign bond yields volatility: lowered in general for stressed countries
	Kilponen *et al.* (2012)	Regression analysis	10-y sovereign bond yield-euro swap rate spread: announcement impact significantly negative in stressed countries and to a less extent in core countries (DE, FR)
	Krishnamurthy *et al.* (2014)	Event study	10-y sovereign bond yields: announcement impact ranges from -123 b.p. in **IT** to -503 b.p. in **GR** Stock market: positive impact, specially for financial sector stocks, in stressed countries
	Mesters *et al.* (2014)	Extended Nelson-Siegel model of sovereign bond yield curve	Sovereign bond yields: negative impact in **IT** and **ES**, but temporary
	Pattipeilohy *et al.* (2013)	Panel data regression	10-y sovereign bond yields: negative short-run effect in stressed countries in summer 2011
	Szczerbowicz (2014)	Event study	10-y sovereign bond spread *vs.* DE: announcement impact -41 b.p. (ranges from -111 b.p. in **IT** to -485 b.p. in **GR**) Covered bond yields *vs.* DE sovereign: announcement impact -19 b.p. (ranges from -31 b.p. in **IT** to -163 b.p. in **PT**; around -10 b.p. in core countries (DE, FR))
	Casiraghi *et al.* (2013)	Regression analysis	**IT** 10-y sovereign bond yields: -5 b.p. per €1 bn purchases
	Doran *et al.* (2013)	Cumulative average returns analysis for individual bond yields (intra-daily data)	**IE** Sovereign bond yields: substantial announcement impact; stabilisation of yields from the initial intervention until the end of trading on intervention days
	Trebesch and Zettelmeyer (2014)	Cross-sectional and panel data regressions for individual bond yields	**GR** Sovereign bond yields: -175 to -194 b.p. in an individual bond yield per €1 bn purchases; steeper drop in yields for the bonds purchased by the ECB
OMT	Altavilla *et al.* (2014)	Event study	10-y sovereign bond yields: announcement impact around -100 b.p. in **IT** and **ES** (around -200 b.p. for 2-y maturity); no impact in **DE** and **FR**
	Falagiarda and Reitz (2015)	Event study	10-y sovereign bond spread *vs.* DE: announcement impact around -85 b.p. **IT** and **ES**; no impact in **PT**, **IE** and **GR**
	Fratzscher *et al.* (2014)	Panel data regression	10-y sovereign bond yields: announcement impact -74 b.p. in stressed countries (IT, ES); +10 b.p. in core countries (DE, NL, AT, FI) Stock market: positive impact, specially for bank stocks, in both country groups
	Krishnamurthy *et al.* (2014)	Event study	10-y sovereign bond yields: announcement impact ranges from no impact in **GR** to -129 b.p. in **ES** Stock market: positive impact, specially for financial sector stocks, in stressed countries
	Szczerbowicz (2014)	Event study	10-y sovereign bond spread *vs.* DE: announcement impact -23 b.p. (ranges from -25 b.p. in **IE** to -115 b.p. in **ES**)
	Casiraghi *et al.* (2013)	Event study	**IT** 10-y sovereign bond yields: announcement impact -95 b.p. (-180 b.p. for 2-y maturity)

Sources: Authors, see column two. The results presented involved selection and calculations to allow comparison across studies.

The macroeconomic impact of the OMT was only assessed by Altavilla *et al.* (2014), who quantify the effects of the reduction in bond yields on the real economy through the lens of a multi-country VAR model for the four largest euro area countries.[23] They found that OMT announcements were associated with a significant increase in real activity, credit and prices in Italy and Spain.

There is still no published evidence on the impact of the APP launched by the ECB in January 2015.[24] Preliminary work by Abreu *et al.* (2015) using event-based regressions finds that the APP had a significant impact on several euro area financial variables. The response of asset prices is assessed using a two-day window around a set of events related with the APP, while controlling for the impact of surprises in macroeconomic data released during that time window as proposed in Altavilla *et al.* (2014). Given that a quantitative easing programme in the euro area was to some extent anticipated by financial market participants, the set of events comprises the official announcement date (22 January 2015) as well as several ECB communications since end-August 2014 that likely changed expectations about such a programme.[25]

Results show that the total impact of the APP exceeded largely that of the official announcement, confirming significant anticipation effects (Table 5). The APP led to a 59 b.p. reduction in 10-year euro area sovereign bond yields – with larger reductions in Portugal, Italy and Spain than in France and Germany – and to a depreciation of the euro against the dollar and in nominal effective terms of around 13 and 7 per cent, respectively. These effects account for a substantial part of the observed changes in these variables since end-August 2014, when expectations of such a programme started to build up. The estimated impact of the APP on long-term sovereign bond yields in the euro area is within the range of estimates of the impact of the two first large-scale asset purchase programmes in the United States, adjusted for programme size.[26]

Table 5 • Impact of ECB's APP announcements on selected financial variables

	Monetary policy press conference 22 January 2015	Total impact	*Memory item*: Cumulative change (from 21 August 2014 to 6 March 2015)
Euro area sovereign bond yields (b.p.)			
10-year	-17**	-59**	-76
30-year	-23**	-64**	-104
10-year sovereign bond yields (b.p.)			
Germany	-15**	-27*	-60
France	-15**	-51**	-75
Italy	-19**	-101**	-126
Spain	-17**	-97**	-110
Portugal	-32**	-128**	-146
Exchange rate €/USD (% change)	-3.0**	-12.5**	-18.2
Euro nominal effective exchange rate (% change)	-2.4	-7.2**	-9.8
Eurostoxx index (% change)	3.2**	4.1	17.4

Source: Abreu *et al.* (2015).

Notes: Daily changes of each variable were regressed on event dummies (using a two-day window), controlling for the effect of surprises on macroeconomic releases. Surprises were computed as the difference between the actual data release and the corresponding expectation of a panel of market participants collected by Bloomberg. The total impact corresponds to the sum of the estimated coefficients for the event dummies. The sample period is 2 January 2007 to 6 March 2015. * and ** denote significance at the 5 and 1 per cent levels, respectively.

Nonetheless, the lower level of euro area sovereign bond yields induced by the APP may not persist over time, either because of an eventual initial overreaction of financial markets or because of ensuing macro and fiscal developments.

Concluding remarks

The ECB's unconventional monetary policy has relied on different instruments for reaching different goals. Faced with two successive crises, the ECB resorted to exceptional liquidity provision and limited asset purchases in dysfunctional markets in order to restore the functioning of money and financial markets and bank intermediation. More recently, with the aim to provide further monetary policy accommodation after having reached the lower bound for interest rates, the ECB adopted forward guidance and embarked on large-scale asset purchases.

The evidence on the impact of unconventional measures put in place by the ECB suggests that they were instrumental in reducing financial market tensions and averting tail risks. Initiatives like the FRFA procedure and longer than usual LTRO were effective in improving the functioning of money markets and preventing a more drastic drop of credit and real activity. Asset purchases in dysfunctional market segments had also significant effects. In particular, the SMP lowered long-term sovereign bond yields in targeted countries, though mostly temporarily, and had positive spillovers on other markets. Empirical research shows that OMT and APP announcements have also contributed to easier financial conditions in the euro area, especially in stressed countries.

However, the degree of uncertainty underlying quantitative results is considerable. Moreover, findings on macroeconomic impacts of some of the measures are very limited, impeding a definitive assessment of their effectiveness.

The inclusion of unconventional measures in the toolkit of central banks requires a widening of the evidence base, including work on the transmission channels of unconventional measures to better understand their functioning. Empirical research has also yet to account for potential negative externalities, such as financial market distortions and issues related to balance sheet management and to central bank credibility and independence. One last relevant question, still little discussed in the literature, concerns the exit strategy from unconventional monetary policy, though this is not expected to be an issue in the short to medium term in the case of the euro area.

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List of abbreviations

European Central Bank (ECB) unconventional policy measures

ABSPP	Asset-Backed Securities Purchase Programme
APP	Expanded Asset Purchase Programme
CBPP	Covered Bond Purchase Programme
FRFA	Fixed-Rate Full Allotment
LTRO	Longer-Term Refinancing Operations
OMT	Outright Monetary Transactions
PSPP	Public Sector Purchase Programme
SMP	Securities Markets Programme
TLTRO	Targeted Longer-Term Refinancing Operations

Tables: variables, countries and units

ABS	Asset-backed securities
CHF	Swiss franc
GDP	Gross Domestic Product
USD	US dollar
AT	Austria
DE	Germany
ES	Spain
FI	Finland
FR	France
GR	Greece
IE	Ireland
IT	Italy
NL	Netherlands
PT	Portugal
y	Years
m	Months
ml	Millions
bn	Billions
b.p.	Basis points
p.p.	Percentage points

Notes

1. Monetary policy measures decided by the Governing Council are actually implemented by the Eurosystem, but for the sake of simplicity, will be referred to as ECB measures. In this article, unconventional measures are understood as those that required significant changes to the existing operational framework and/or an active use of the balance sheet of the Eurosystem.

2. During this period, the ECB continued to ensure an ample provision of liquidity to banks and, in the context of an apparent stabilisation of markets and upside risks to inflation, decided to raise official interest rates in April and July 2011. However, these increases were reversed by year-end.

3. In this date, the Governing Council set the MRO rate at 0.05 per cent and the interest rate on the deposit facility at -0.20 per cent.

4. ECB's forward guidance is not addressed. For an analysis see 'Forward guidance – communication about the future path of monetary policy', *Economic Bulletin Autumn* 2013, Banco de Portugal.

5. The most important operations conducted by the ECB are the main refinancing operations that before this change were implemented through auctions for pre-set amounts of liquidity at variable rate tenders (with a minimum bid rate set by the ECB). These operations continued to be conducted weekly and for a 1-week maturity.

6. Covered bonds are securities usually backed by mortgages. Contrary to ABS, in case of default covered bond holders have recourse to the issuer as well as to the underlying collateral pool and banks must hold the underlying collateral on their balance sheet.

7. The size of the programme corresponded roughly to 2.5 per cent of the outstanding amount of covered bonds (Cour-Thimann and Winkler, 2013).

8. The ABS market has an important role in facilitating new credit to the economy, namely due to the link between interest rate spreads at which ABS are traded and the lending rates applied on the underlying loans.

9. The reduction in the balance sheet since 2013 was related to substantial early repayments of the two 3-year LTRO.

10. In March 2015, the outstanding amount of euro area sovereign bonds in the 2 to 30-year maturity range was around 5 trillion euro at market value (Claeys *et al.*, 2015).

11. For a more detailed analysis, see 'Monetary policy transmission in the euro area', *Economic Bulletin Autumn* 2012, Banco de Portugal.

12. A broader credit channel also considers the impact of monetary policy on the balance sheets of borrowers (see Bernanke and Gertler, 1995).

13. This result – also known as the irrelevance proposition – was formalised in Eggertsson and Woodford (2003) following Wallace (1981). The intuition is that central bank purchases of a given asset do not change its risk characteristics, but merely shifts it from the private sector balance sheet to that of the consolidated public sector. Since economic agents anticipate that any risks taken on by the government will translate into future taxes, central bank purchases are completely ineffective.

14. Central banks can only reduce the policy interest rate to levels slightly lower than the nominal yield on money, which is zero, as holding money also involves costs (e.g. storage and insurance).

15. A theoretical formalisation of these effects is put forward by Kiyotaki and Moore (2012).

16. Moreover, if the central bank purchases long-term fixed income assets, the share of interest rate risk to be borne by private investors declines and, all else equal, long-term interest rates fall due to a lower term premium.

17. Vayanos and Vila (2009) provide a formal model of the preferred habitat hypothesis. Krishnamurthy and Vissing-Jorgensen (2012) apply this view to the demand of safe assets and offer evidence that the existence of significant clienteles for these assets lowers their yields.

18. If the central bank holds long-term assets, it may lose money if interest rates increase and prices decline.

19. Farmer (2012) shows that the Federal Reserve unconventional monetary policy was effective in stabilising inflation expectations by signaling the central bank's intent to achieve its inflation target.

20. The counterfactual implicitly assumes that financial tensions remain around the levels observed prior to the policy response. However, the policy response may have prevented the materialisation of more extreme scenarios of financial markets collapse. In this case, results will tend to underestimate the impact of unconventional measures.

21. Early studies using a sample period that ends before or immediately after the adoption of the FRFA generally find smaller effects (e.g. Frank and Hesse, 2009 and Angelini *et al.*, 2011).

22. The OMT set of events includes, in general, the speech of President M. Draghi in London on 26 July 2012 and the Governing Council announcements in August and September 2012.

23. Casiraghi *et al.* (2013) assess the combined impact of the 3-year LTRO, the SMP and OMT for Italy (see Table 3).

24. Cova and Ferrero (2015) quantify the potential macroeconomic impact of the APP on the Italian economy, using the econometric model of the Bank of Italy and assumptions regarding the direct impact of the programme on financial variables, namely Italian sovereign bond yields and the euro exchange rate.

25. The event set includes all monetary policy press conferences from September 2014 to March 2015 (some APP operational details were only disclosed in the March meeting) as well as selected speeches/interviews of President M. Draghi since end-August 2014 that conveyed a rise – or, at least, a no-change – in the rhetoric on the use of additional unconventional tools.

26. The estimated APP impact on euro area 10-year sovereign bond yields corresponds to a reduction of 5 b.p. per 100 billion euro of purchases (assuming that the monthly purchase pace of 60 billion euro is maintained until September 2016). According to Bernanke (2012), the evidence on the cumulative impact of the first two large-scale asset purchase programmes on the United States' 10-year Treasury yields ranges between -2 to -8 b.p. per 100 billion dollar of purchases. Note that the comparison overlooks differences in the type of assets purchased and in market conditions.

SERIES

Annual series on household wealth:
1980-2014

Annual series on household wealth: 1980-2014

The annual series on household wealth, for the period from 1980 to 2014, correspond to an update and revision of the estimates published in the *Economic Bulletin* of June 2014. These wealth estimates, published annually,[1] include the financial component (assets and liabilities) and housing (the main component of the non-financial wealth). The underlying concepts and methodology are identical to those described in Cardoso, Farinha and Lameira (2008).[2]

The financial series (assets and liabilities) presented here are consistent, as before, with the financial national accounts published by Banco de Portugal. Currently, the financial accounts for 1994 to 2014 are available.

The methodology used to calculate housing wealth is based on a method normally used to calculate capital stock estimates – the perpetual inventory method. This method involves, first, successively accumulating fixed capital investment (in this case, in housing), and then, postulating reasonable hypotheses for its service life and depreciation method. The resultant series on housing wealth was adjusted by benchmarking 2010 on the estimate from the Household Finance Survey (*Inquérito à Situação Financeira das Famílias – ISFF*).[3] The survey data provide a one-off estimate for the benchmarked year, while the other years are calculated in compliance with rates of change implicit in the series updated with the usual methodology, based on long series of Housing GFCF.

New retrospective series were published in September 2014, both as part of the financial accounts (reflected in the financial assets and liabilities) and as part of the non-financial national accounts (reflected in the long series of Housing GFCF) due mainly to the changeover to new international standards, the European System of National and Regional Accounts (ESA 2010) and the new Balance of Payments and International Investment Position Manual (BPM6). The main methodological changes are described in Banco de Portugal (2014) with regard to the financial national accounts,[4] and in INE (2014)[5] regarding non-financial accounts. The published series begin in 1994 in the case of financial accounts and 1995 in the case of non-financial accounts.

The financial series for the period before 1994 were retropolated using the implicit rates of change in the previous wealth series and obtained in accordance with the methodology described in detail in Cardoso, F. and Cunha, V. (2005). Similarly, the long series of Housing GFCF used to calculate the respective housing stock were retropolated using implicit rates of change in the series estimated before.

Notes

1. The series are only available in electronic format on Banco de Portugal's website.

2. Cardoso, F., Farinha, L. and Lameira, R. (2008), 'Household wealth in Portugal: revised series', *Occasional Paper 1*, Banco de Portugal. This publication corresponds to the revised series previously published in Cardoso, F. and Cunha, V. (2005) 'Household wealth in Portugal: 1980-2004', *Working Paper No. 4*, Banco de Portugal, where the calculation methodology is described in more detail.

3. More information on this survey may be consulted here.

4. Statistical Press Release No. 11 of 2014 of Banco de Portugal 'Banco de Portugal publishes new statistical series'.

5. Press Release of 29 August 2014 of Statistics Portugal 'New Series of the Portuguese National Accounts for the period 1995-2011'.