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Savings and investment behaviour in the euro area

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Contents

Abstract

Although monetary union created the conditions for improving economic and financial integration in the euro area, in the context of the financial and sovereign crises, it has also been accompanied by the emergence of severe imbalances in savings and investment, credit and housing booms in some countries and the allocation of resources towards less productive sectors. The global financial crisis and the euro area sovereign debt crisis then led to major and abrupt adjustments as the risks posed by the large imbalances materialised. Although the institutional shortcomings in the EU that permitted the emergence of imbalances have been largely addressed since 2008, the adjustment process is not yet complete. From a macroeconomic perspective, the imbalances in the external accounts have led to the accumulation of high levels of external liabilities that need to be reduced, which, in turn, is weakening investment and therefore weighing on growth prospects and growth potential. From a macroprudential perspective, the lingering imbalances have added to systemic risk and rendered the euro area more vulnerable to risks. This Occasional Paper analyses the dynamic patterns in macroeconomic imbalances primarily from the former perspective, addressing in particular the connections between macroeconomic and sectoral adjustments of imbalances and the challenges for economic growth and performance over a longer horizon.

Non-technical summary[1]

This Occasional Paper studies the evolution and patterns in net external positions within the euro area since the introduction of the euro, with a stronger focus on the period since 2008. It does so primarily through the analysis of savings, consumption and investment trends over the last decade, both from a cross-country and sectoral perspectives, yet focusing mainly on households and non-financial corporations. The Occasional Paper also draws some policy lessons relevant for the reduction of imbalances in the euro area.

Although the monetary union created conditions for improving economic and financial integration in the euro area, in the context of the financial and sovereign crises, it has also been accompanied by the emergence – and in some cases an aggravation – of severe imbalances in savings and investment, credit and housing booms in some countries and the allocation of resources towards less productive sectors. The global financial crisis and the euro area sovereign debt crisis then led to major and abrupt adjustments as the risks posed by the large imbalances materialised. The adjustment process is however not complete as the imbalances in various sectors have led to an accumulation of high levels of liabilities that still need to be reduced and brought on a sustainable downward path. From a macro-prudential perspective, the lingering imbalances have added to systemic risk and rendered the euro area more vulnerable to risks. This Occasional Paper analyses the dynamic patterns in imbalances primarily from a macroeconomic perspective, addressing in particular the connections between macroeconomic and sectorial adjustments of imbalances and the challenges for economic growth and performance over longer horizons.

The Occasional Paper aims in particular to answer the following questions: How have euro area countries' net external positions evolved since the introduction of the euro, and what has been the contribution of households and non-financial corporations (NFCs) to savings and investment patterns? What have been the factors driving the adjustment of external flows since the crisis? What are the long-term trends in household savings and investment, and how have they changed more recently, especially since the financial crisis? What is the role of NFCs in the adjustment of external imbalances, and what could explain the weakness in investment since the crisis? How could economic policies support further unwinding of imbalances while creating an environment that promotes economic growth and a smooth functioning of the monetary union?

The Occasional Paper attempts to shed light on these key issues, first through an analysis of the net lending/borrowing of the euro area and euro area countries since the late 1990s, second, by an analysis of households' savings and investment behaviours based on macroeconomic data and household surveys, and, third, by studying the main drivers of business investment over time and across countries, including the role of international financial flows in NFCs' investment patterns.

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[1]   Prepared by Stéphane Dees, Malin Andersson, Martin Bijsterbosch, Katrin Forster and Nico Zorell.

The Occasional Paper also provides a number of possible actions in the field of economic policies that could serve to address the remaining adjustment needs in the private and public sectors and increase the future resilience and adjustment capacity of the euro area. In this context, in addition to appropriate monetary and growth-friendly fiscal policies, policy measures are needed to facilitate balance sheet adjustment, while raising productive investment, not least in the surplus economies, including completing ongoing financial and corporate restructuring. Structural reforms to improve the regulatory environment and to increase competition in product and labour markets are also essential for more effective and speedy macroeconomic adjustment processes in the euro area and for increasing potential growth and the creation of additional investment opportunities.

Against this backdrop, the main findings of the Occasional Paper can be summarised as follows:

Following the liberalisation of the capital account and the introduction of the euro, stimulated by the elimination of exchange rate risk and a reduction of liquidity risk, capital partly flew to countries and sectors underestimated by market participants of sovereign and private sector risks. This led, however, to external surplus and deficit levels and positions across euro area countries that proved in many cases unsustainable. As a consequence, and, as is the pattern with most similar episodes of large capital inflows, non-tradable sectors, such as services and construction, expanded at the expense of sectors producing tradable goods and services, weighing negatively on the competitiveness of the latter sectors. The 2007-08 global financial crisis led to a general reassessment of financial risks and a recognition of the unsustainability of the imbalances in several euro area countries. In that context, the member countries with large external liabilities subsequently experienced sudden reversals of private capital inflows. From a savings-investment perspective, the adjustment in net borrowing of stressed euro area countries since 2008 has been largely driven by a severe decline in investment, although increases in gross savings have also played a role in some countries. From a sectorial perspective, the adjustment has been largely driven by changes in the net lending/borrowing of the private sector, particularly NFCs and households.

Although many euro area countries that used to have current account deficits have seen a significant correction of external flows since the onset of the crisis, the external adjustment of stock positions is still ongoing. Net foreign liabilities have remained at elevated levels and even continued to diverge within the euro area, despite some stabilising valuation effects related to changes in exchange rates and other asset prices. Moreover, external adjustment has involved, in some cases, a widening of internal imbalances, including significant economic slack and high unemployment rates. The investment drop that has helped to reduce current account deficits can partly be attributed to the large and persistent decline in expected demand in many external deficit countries. Concerning the external surplus countries, although they do not face external sustainability risks similar to those associated with large net foreign liabilities, high saving rates and weak investment have led to a further strengthening of their current account surpluses, and their net external assets are expected to increase further in the coming years. Irrespective of its impact on the current account, increasing the potential growth of these economies would not just be beneficial for them, but is also in the interest of the euro area as a whole.

Following a pre-crisis period characterised by solid consumption growth, fuelled in particular by strong income developments and credit growth, households' savings behaviour has partly cushioned lower income and wealth since the crisis. The post-crisis period has been characterised by increases in precautionary savings, against the backdrop of higher uncertainty. High and increasing unemployment rates in many euro area countries as well as fiscal instability have led to an increase in precautionary savings. Financial uncertainty – related to tensions in the banking system and financial markets – together with political uncertainty – as many governments have faced increasing instability risks – have also contributed to the increase in precautionary savings. Households' survey data confirm the role of uncertainty as a major motive for savings.

As regards developments and cross-country differences in household investment, income appears to be the most important determinant of household investment, but developments in financial markets and structural factors also seem to matter. The analysis in this paper suggests that it is difficult for indebted households to finance their investment by borrowing additional funds. Moreover, the analysis provides further evidence for savings-investment imbalances in some countries at the household level, as countries featuring a rather high savings rate of private households often seem to lag behind in terms of housing investment. Although vulnerabilities related to households' indebtedness are limited overall, debt remains an important factor in driving savings and investment decisions. In particular, deleveraging needs are weighing on households' expenditures, contributing to the weakness in demand, in particular in stressed euro area countries.

The crisis was characterised by a negative demand shock (especially in connection with worsening future income prospects), amplified by a negative shock to the supply of external finance for non-financial corporates. This shock was followed by sharply tighter financial constraints via the financial accelerator channel as well as via increased uncertainty. As a result, firms tended to cancel or postpone investment decisions and retain their earnings (i.e. increase their savings) and investment gaps built up in many countries, compared to past averages and to projected future steady-state levels. The analysis of investment trends since the crisis at aggregate level hides some heterogeneity, as the financial crisis affected investment decisions across countries, sectors and firms' size asymmetrically. Granular data show that, particularly for small and medium sized firms, future profitability is an important determinant of investment. Since the crisis, investment by SMEs has become increasingly reduced by existing bank debt while liquidity has become more important for investment plans, probably due to their more restricted access to external finance. Also public investment (as a % of GDP) has declined in the euro area since 2010 due to high levels of public debt, banks' deleveraging needs as well as regulatory, management and administrative impediments.

International capital flows are increasingly crucial to understanding investment dynamics in the euro area. During the pre-crisis period, they were, in particular, strongly associated with domestic credit growth in euro area recipient countries, often in the construction and real estate sectors, suggesting that profitability and productivity did not strongly drive the allocation of capital flows. Regarding foreign direct investment (FDI), key factors to attract inflows are not only related

to production costs or demand considerations, but also relate to factors such as institutions, taxation, infrastructures or human capital development. The empirical evidence in this paper also shows that outward FDI positively affects domestic investment in euro area countries.

Main policy implications

This Occasional Paper shows that the moderate net debtor position of the euro area as a whole belies important cross-country differences. Despite significant adjustments in the current account deficits since 2009, net foreign liabilities in some countries remain very large, representing a source of vulnerability. The analysis in this Occasional Paper also shows that investment rates are unusually low for this stage of the economic cycle, and the weakness of investment is largely a result of the still-ongoing efforts by both the private and the public sectors in many euro area countries to strengthen their balance sheets by paying down debt and reducing budget deficits. Also public investment has declined as governments have consolidated their budgets in recent years. In this context, steps to facilitate balance-sheet adjustment, raise productive investment, not least in the surplus economies and support economic growth in the euro area in general — including completing ongoing financial and corporate restructuring — would help to reduce imbalances between savings and investment.

Although structural policies facilitating more efficient resource allocation have not been assessed in detail in this Occasional Paper, they can play a key role in supporting investment in a durable way. Product market reforms can lift productivity and foster sustainable growth. In the labour market, reforms focusing on removing downward wage rigidities may increase the speed of adjustment and contain its costs in terms of job losses as wages would become more responsive to changes in economic conditions.

Facilitating resource reallocation towards the production of tradable goods and services would also help adjustment mechanisms in EMU. Since the crisis broke out, deficit countries have faced the need to regain competitiveness through an adjustment of relative prices in the absence of nominal exchange rate flexibility vis-à-vis the other euro area countries. Strengthening competitiveness can come through a relative decline in unit labour costs in tradables or a relative decline in prices in non-tradables. Such a reallocation does not only require flexibility in wages and prices, but also reforms that lead to higher productivity in the tradable sector or that allow a country to move up the product quality ladder. Depending on the specific situation of the country, the latter type of adjustment could be less deflationary than the adjustment process in recent years, which relied strongly on so-called internal devaluations. In addition, policies are needed to reduce barriers to investment (e.g. targeting licensing procedures, public administration inefficiencies, public procurement rules and the judicial system) and to further improve financial integration within the euro area.

From a union-wide perspective, important steps have been taken to strengthen the resilience of the euro area, including improving the governance framework for crisis

prevention and resolution and strengthening the fiscal and economic governance framework with the introduction of the EU Semester. Within this framework, countries should aim for growth-friendly fiscal consolidations and support public investment in growth-enhancing infrastructure. Finally, the creation of a banking union will improve the supervision of the euro area banking system and weaken the link between the financial health of banks and that of their sovereigns. Such an improvement in the governance framework should contribute to a more efficient allocation of resources within EMU and enhance financial integration within the euro area. However, to be effective, comprehensive structural policies would need to be implemented forcefully also at national level. At the same time, it is necessary to progress towards a genuine capital markets union, which would contribute to the completion of the euro area financial system, lower the cost of capital and help strengthening equity financing relative to debt.

1 Introduction and motivation[2]

Euro area countries have witnessed significant differences in developments in savings and investment since the launch of the euro. These developments resulted in persistent divergences in external balances in the run-up to the financial crisis of 2008. Although differences in external balances within a monetary union do not necessarily threaten its functioning as long as they reflect social-economic fundamentals, such as income levels, growth prospects and demography, large and persistent external imbalances at the country level will lead to a deviation from the path of sustainable and balanced growth, which is a fundamental precondition for the smooth functioning of EMU as a whole.

When EMU was set up, balance of payments constraints were expected to be alleviated as markets would finance viable borrowers, and savings and investment balances would no longer be constrained at national level.[3] By eliminating exchange rate transaction costs and the uncertainty associated with exchange rate volatility, the euro was expected to foster trade in goods and services and stimulate productive investment across euro area countries, thereby improving resource allocation within the area. By fostering trade and cross-border financial integration, EMU would also allow for risk sharing, in the sense that a savings-investment imbalance would be more easily financed. The euro was also expected to increase the transparency of prices and thereby foster competition in the euro area.

After the introduction of the euro, market participants' risk assessment of euro area financial and non-financial corporations and governments became gradually less related to country-specific developments. Capital flows reinforced external surplus and deficit positions across euro area countries, while the external position of the euro area as a whole remained close to balance. Despite a lack of fully fledged financial integration (including a banking union), the introduction of the euro was expected to result in growth-enhancing financial flows. However, financial flows within the euro area appear ex-post to have been directed to sectors with relatively low profitability, suggesting that resources were allocated according to other dimensions, for instance expected yields. The associated credit boom also increased domestic and external indebtedness and in some cases created housing bubbles. On the supply side, capital inflows were not sufficiently channelled towards investment in the tradable sector, preventing the returns necessary to service and repay the accumulated external liabilities. The heavy reliance on debt financing, rather than on equity-based foreign direct investment, tended to add to the sustainability risk. In a context of significant declines in real interest rates, consumers', firms' and banks' investment and consumption decisions were insufficiently driven by sustainable income, profit and growth prospects. These capital inflows also fuelled domestic demand, leading to increases in wages and prices to levels that implied severe competitiveness losses in the external deficit countries. This was often accompanied or intensified by countries' insufficiently tight underlying fiscal stance.

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[2] Prepared by Stéphane Dees, Malin Andersson, Martin Bijsterbosch, Katrin Forster and Nico Zorell.

[3] European Commission (1990), "One Market, One Money".

The 2008 global financial crisis led to a general reassessment of financial risks: risk perceptions in the euro area became again strongly associated with individual countries and the member countries with large external liabilities experienced sudden reversals of private capital inflows. This was exacerbated by adverse feedback loops between sovereign debt markets, banking systems and the real economy. Large and persistent external deficits, which were not thought to be a cause of concern in a monetary union, proved to be unsustainable. The correction of macroeconomic imbalances and structural vulnerabilities began in 2008 in some countries and accelerated after the 2010 sovereign debt crisis, involving an increased reliance on Eurosystem funding and, in some cases, EU/IMF financial assistance programmes, including economic adjustment programmes (Greece, Ireland, Cyprus, Latvia and Portugal) and, in the case of Spain, a financial assistance programme for the recapitalisation of financial institutions.

From a savings-investment perspective, the large external imbalances within EMU could also be interpreted as a misallocation of savings into less productive investment. The post-crisis rebalancing process has partly been characterised by a certain level of unwinding of these past excesses. Current account adjustments in deficit economies since the crisis have largely been driven by adjustments made by both non-financial corporations (NFCs) and households. Both sectors increased savings rates and lowered investment spending. Total investment declined relatively more in external deficit countries, leading to large adjustments in the pre-crisis over-investment dynamics. In particular, a large part of the investment decline reflected developments in the construction sector, which adjusted significantly in Greece, Spain and Ireland, following unsustainable pre-crisis trends.

The adjustment process is, however, not complete, first because stock imbalances persist and, second, because the external adjustment has involved in some cases a widening of internal imbalances, including significant economic slack and high unemployment rates. Although under-savings have been corrected rapidly, the key issues are to assess to what extent the investment drop has helped to reduce current account deficits and to what extent it can be attributed to the large and persistent drop in expected future demand in many of the external deficit countries. Concerning the external surplus countries, although they do not face external sustainability risks similar to those associated with large net foreign liabilities, high savings rates and weak investment have not only led to a further strengthening of their current account surpluses, but also to domestic vulnerabilities. Regardless of their impact on the current account, addressing these domestic weaknesses is key to increase potential growth of these economies, also in the interest of the euro area as a whole.

The issues related to external imbalances in the euro area are studied in this Occasional Paper through the analysis of savings and investment trends from a sectoral perspective, focusing mainly on households and non-financial corporations, and from a cross-country perspective. The main goal is to identify the structural factors that drive savings and investment behaviours in order to point to weaknesses that could be tackled through structural and other economic policies.

The remainder of this Occasional Paper is divided into four chapters.

Chapter 2 provides a general overview of the net lending/borrowing of the euro area and euro area countries since the late 1990s, with a particular focus on the adjustment of external flows since the crisis. The chapter identifies the factors behind the external rebalancing in the euro area countries and particularly the role of domestic demand and relative prices. The chapter also looks at the adjustment from a sectoral perspective. Finally, an analysis of stock adjustments is provided.

The next two chapters analyse the savings and investment behaviours from a sectoral perspective, reviewing successively the household and the non-financial corporation sectors.

Chapter 3 looks at long-term trends in household savings and investment and how they may have changed more recently. The chapter studies, from a macroeconomic viewpoint, changes as well as cross-country differences regarding factors affecting the various savings motives. The use of household surveys complements the macroeconomic analysis, studying in particular the relationship between savings and households' demographic and social-economic characteristics. Developments and cross country differences in household investment is then analysed, with a focus on factors driving households' investment decisions. The chapter finally looks at the role of indebtedness and households' vulnerability in assessing how deleveraging forces could affect households' savings and consumption decisions.

Chapter 4 then turns to the main drivers of business investment over time and across countries. It focuses first on macroeconomic and structural factors before studying the impact of the financial crisis on NFCs' investment decisions, using granular data on corporate investment decisions. It discusses how the protracted fall in the business investment ratios after the financial crisis led to large investment gaps and looks at granular information on the effect of the crisis across sectors, countries and firms' sizes. Then the role of international financial flows in NFCs' investment patterns is analysed.

Finally, Chapter 5 derives policy lessons from the analysis. The Occasional Paper identifies several structural weaknesses that need to be addressed in order to improve the functioning of the euro area. Structural policies can play a key role in supporting investment in a more durable way, and business activity could strongly benefit from an improvement in the regulatory environment, in particular as regards product and labour markets.

2 External flows and stocks[4]

The developments in savings and investment are closely related to an economy's interactions with the rest of the world. By the arithmetic of national accounting, the difference between savings and investment equals the net borrowing/lending position vis-à-vis the rest of the world.[5] An economy in which savings fall short of investment is a net borrower and accumulates net foreign liabilities. In essence, the economy engages in inter-temporal trade with the rest of the world, receiving additional income today and granting foreign residents a claim on future income in return. The opposite reasoning applies to economies acting as a net lender. Against this backdrop, this chapter looks at the divergence in net lending/borrowing of euro area countries prior to the global financial crisis and the subsequent adjustment (Section 2.1), the sectoral developments in net lending/borrowing (Section 2.2) and external stock positions (Section 2.3). Section 2.4 highlights the role of the government sector in the evolution of macroeconomic imbalances in the euro area.
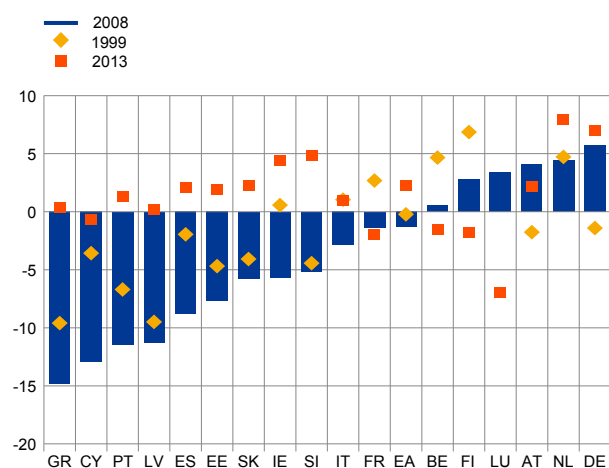
2.1 Developments in external flows[6]

2.1.1 Pre-crisis divergence and post-crisis adjustment

Chart 1

Net lending/borrowing of the total economy

(in percentages of GDP)

Source: Eurostat.
Notes: Data unavailable for LU (1999) and MT. First observation is 2000 for GR, last observation 2012 for LU. Data based on ESA95 for LU (all observations) and for EA, EE and GR (1999 only).

The years leading up to the financial crisis were characterised by a marked divergence in the net lending/borrowing of euro area countries. A number of countries registered increasingly large deficits in the combined current and capital accounts and thereby borrowed extensively from the rest of the world while others increasingly acted as net lenders (Chart 1). The net lending/borrowing of the euro area as a whole was close to zero.

These developments reflected cross-country divergences in savings and investment patterns. In the wake of the introduction of the euro, nominal interest rates converged throughout the euro area. In countries with inflation rates above the euro area average, this resulted in relatively low and even negative real interest rates.[7] At the same time, exchange rate risk disappeared for investors from other euro area countries.

4   Coordinated by Nico Zorell (ECB).

5   Net lending/borrowing, in turn, equals the sum of the current and capital account balances.

6   Prepared by Nico Zorell (ECB) with input from Gabriele Di Filippo (LU).

7   This should be seen against the backdrop of a concomitant decline in the long-term real interest rate at the world level, which is often attributed to a "global saving glut". See Bernanke (2005).

Contributions of savings and investment to deviation
of net lending/borrowing from euro area level in 2008

(in percentages of GDP)
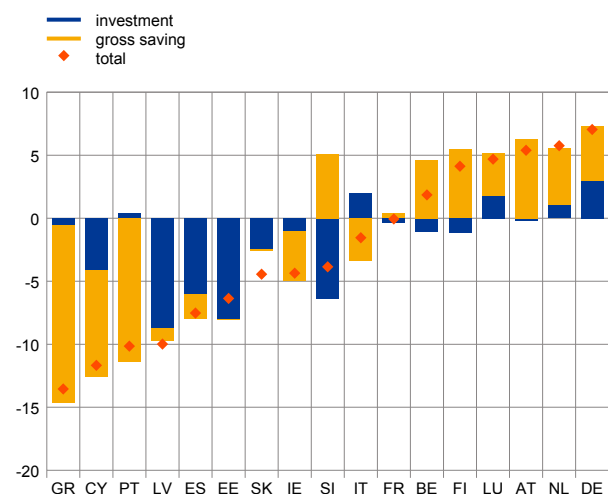
Source: Eurostat.
Notes: Data unavailable for MT. Data based on ESA95 for LU. Numbers may not
add up.

Partly as a result of these developments, a number of euro area countries – usually with income per capita below the euro area average – saw large net foreign capital inflows, which resulted in a decoupling of savings and investment rates. More specifically, international borrowing financed investment rates well above euro area levels and/or private and public consumption, as reflected in relatively low savings rates (Chart 2). The net lending registered in other euro area countries mainly reflected relatively high savings rates, although below-average investment rates also mattered in Germany and Luxembourg.

Net lending/borrowing from the rest of the world can in principle reflect an efficient form of inter-temporal trade if it is justified by economic fundamentals. In the euro area countries with high pre-crisis net borrowing, investment opportunities appeared to be relatively attractive prior to the financial crisis and expectations of future increases in income prompted households to engage in inter-temporal consumption smoothing. However, with hindsight, these flows do not appear to have been allocated to the most productive sectors. Moreover, in some countries the funds were channelled into the construction sector, thereby fuelling an unsustainable housing boom. The net external borrowing also went hand in hand with a significant loss of price competitiveness. The high and persistent pre-crisis net lending registered in other euro area countries, which was associated with significant competitiveness gains, partly reflected demographic trends, although relatively low expected growth amid structurally weak domestic demand also appears to have played a role.

Overall, the pre-crisis savings-investment patterns signalled fundamental macroeconomic imbalances in some euro area countries that necessitated adjustments. These adjustments were eventually triggered by the global financial crisis. With the general reassessment of financial risks and the uncovering of deficiencies in the institutional framework of EMU, risk perceptions in the euro area became again associated with individual countries. This resulted in a sudden reversal of private capital flows away from stressed countries, leading to substantial improvements in their net lending/borrowing positions (Chart 1). The developments in economies that had already been persistent net lenders before the crisis were more heterogeneous. Still, as a result, the cross-country dispersion of net lending/borrowing narrowed significantly and the euro area as a whole became a net lender.[8] Overall, the external rebalancing in the euro area in the wake of the financial crisis was largely concentrated in countries with large pre-crisis net borrowing. This partly reflects the fact that adjustment needs and market pressure were more pronounced in these countries.

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[8] Notwithstanding this, intra-euro area deficits in countries with large pre-crisis net-borrowing have narrowed or turned into surpluses, mirrored by shrinking intra-euro area surpluses in other euro area countries. See the article entitled "Intra-euro area trade linkages and external adjustment", Monthly Bulletin, ECB, January 2013.

## 2.1.2   Factors driving the ongoing external adjustment

From a savings-investment perspective, the adjustment in the net borrowing of stressed euro area countries between 2008 and 2013 was largely driven by a severe decline in investment, although increases in gross savings also played a role in some of these countries (Chart 3). Declines in the investment rate, albeit of a smaller magnitude, were also observed in the other euro area countries. As a result of these developments, the correlation between savings and investment rates has increased significantly since the onset of the financial crisis.

To understand the ongoing external adjustment in the euro area, it is also useful to look at the developments in trade. From this perspective, the correction of large current account deficits – or extensive net borrowing, for that matter – typically requires reining in imports and improving export performance. In the euro area countries with large pre-crisis net borrowing, both adjustments have taken place since 2008, albeit to varying degrees (Chart 4). In Cyprus and Greece, the current account improvement stems from a compression of imports and, in the case of Greece, growth in exports, particularly since 2009. In the other countries, the larger part of the current account improvement is attributable to an increase in exports.[9]

Macroeconomic theory suggests that the necessary adjustments in imports and exports can be achieved through a decline in domestic demand relative to foreign demand ("expenditure shifting") and/or gains in competitiveness, particularly in the form of the depreciation of the real effective exchange rate ("expenditure switching").

Chart 3

Net lending/borrowing of the total economy

(in percentages of GDP)
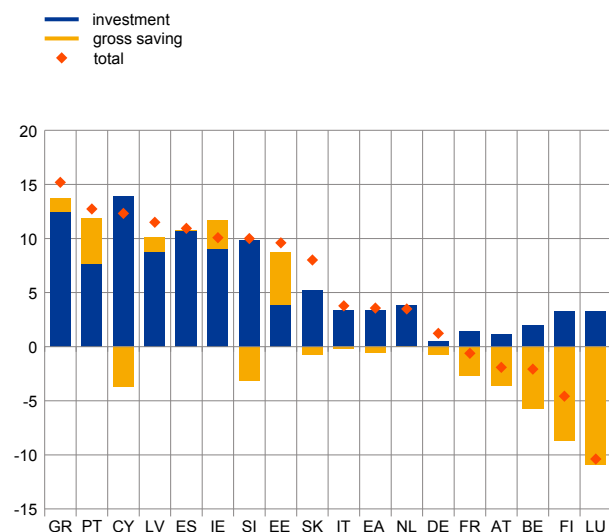
Sources: Eurostat.
Notes: Data unavailable for LU (1999) and MT. First observation is 2000 for GR; last observation is 2012 for LU. Data based on ESA95 for LU (all observations) and for EA, EE and GR (1999 only).

Chart 4

Contributions of savings and investment to deviation of net lending/borrowing from euro area level in 2008

(in percentage of GDP)
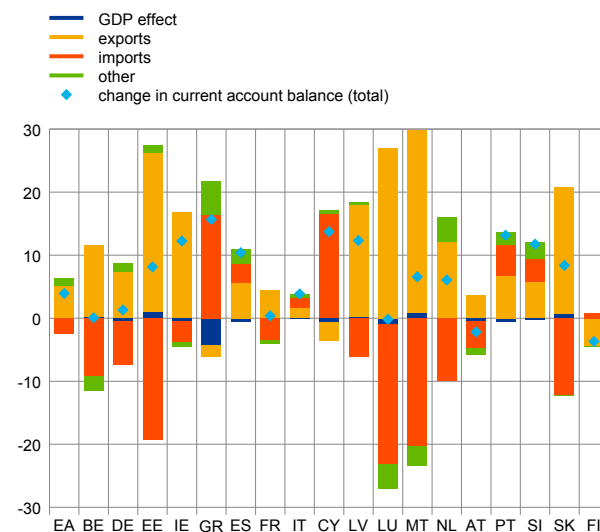
Source: Eurostat.
Notes: Data unavailable for MT. Data based on ESA95 for LU. Numbers may not add up.

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9   Changes in the income account also played a role, as shown later in this chapter.

Chart 5

Change in domestic demand and the real effective exchange rate between 2008 and 2013

(in percent)

Sources: ECB and Eurostat.
Notes: The real effective exchange rate is deflated by unit labour costs. A decline corresponds to a real depreciation, i.e. an improvement in competitiveness.

Chart 6

Breakdown of the change in the real effective exchange rate between 2008 and 2013

(in percent)

Source: ECB.
Notes: The real effective exchange rate is deflated by unit labour costs. A decline corresponds to a real depreciation, i.e. an improvement in competitiveness.

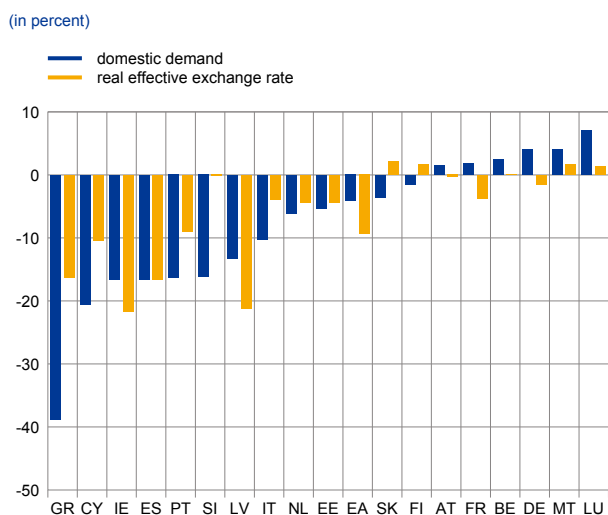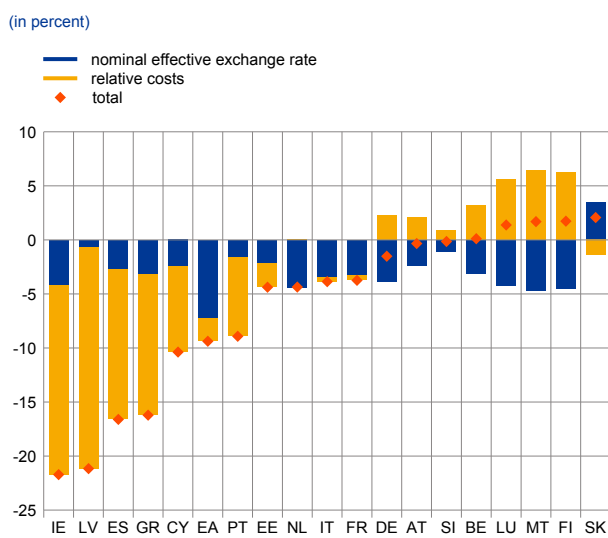In euro area countries undergoing external adjustment, a combination of both mechanisms has been at work (Chart 5). In the initial phase of the crisis, downward rigidities in domestic prices and costs as well as the strength of the euro stood in the way of gains in competitiveness. In this phase, the external rebalancing was largely driven by a severe decline in domestic demand, which compressed imports. However, this costly form of external rebalancing was gradually complemented by a correction in relative prices and costs, with flexible economies such as Ireland witnessing a more front-loaded adjustment. Although declining inflation in the euro area as a whole and in other major economies complicated this so-called internal devaluation, the countries undergoing external adjustment eventually managed significant improvements in competitiveness vis-à-vis the other euro area countries and the rest of the world (Chart 6). It should be noted though that the underlying declines in unit labour costs were largely driven by labour shedding in low-productivity sectors. Moreover, the pass-through to product prices was incomplete, partly owing to increases in profit margins and the impacts of fiscal consolidation measures.

In countries with large pre-crisis net lending, the real effective exchange rate remained broadly unchanged between 2008 and 2013. The competitiveness losses vis-à-vis the other euro area countries were offset by a gain in competitiveness vis-à-vis the rest of the world. At the same time, domestic demand was typically more resilient in these countries. However, this was not sufficient to counterbalance the demand compression in the other euro area countries, resulting in a decline in domestic demand for the euro area as a whole between 2008 and 2013.

A central question is whether the external rebalancing in countries with large pre-crisis net borrowing is sustainable. In order to quantify the cyclical and non-cyclical components of the adjustment, one can draw on standard current account models relating the current account balance to a broad set of medium-term fundamentals (such as demographics and growth potential), policy variables and cyclical variables (including the output gap relative to the rest of the world).[10] Based on such panel regressions, cyclical factors are typically found to explain less than half of the current account adjustment between 2008 and 2013 in most

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[10]   See, for instance, IMF (2013).

of the stressed euro area countries.[11] Non-cyclical adjustments, including a decline in potential output, appear to have played a more important role. Although such estimates are fraught with uncertainty, they suggest that a significant part of the current account correction achieved so far is likely to be maintained in the near future. Nevertheless, some deterioration is to be expected in the external balances of stressed euro area countries once output recovers. To reconcile internal and external balance in countries with large pre-crisis net borrowing, sustained improvements in price and non-price competitiveness are indispensable (Box 1) as the concomitant increase in net exports can be expected to lift both the current account balance and GDP growth.

Box 1

External performance, macroeconomic factors and competitiveness issues[12]

Countries participating in a monetary union relinquish the country-specific nominal exchange rate instrument as an economic adjustment margin of mutual adjustment. Once a common currency is adopted, their external adjustment hence needs to operate via internal channels. Broadly speaking, one can then distinguish between "nominal" adjustment mechanisms, i.e. those which entail changes in the domestic cost and price levels (e.g. internal devaluations), and structural adjustments, which modify a country's institutional framework or affect the intrinsic characteristics of the goods and services that are produced by its firms. Both mechanisms are fundamentally associated with changes in competitiveness. Against this backdrop, this box assesses the link between external performance, macroeconomic factors and competitiveness.

Chart A

Change in export market shares and harmonised competitiveness indicators

(percentages)

x-axis: export market share, 2007 (2000=100)
y-axis: HCI-ULC, 2007 (2000=100)
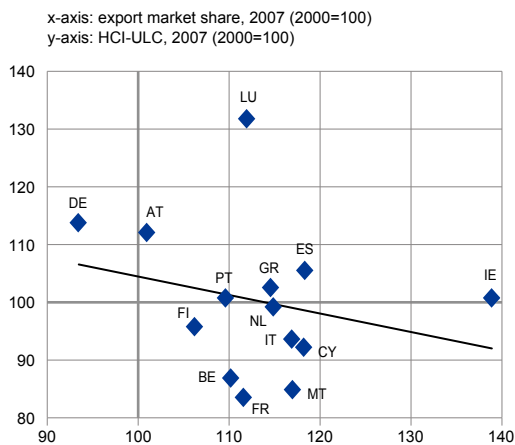
Sources: Eurostat and ECB.
Notes: The chart shows the share of each country's exports of goods and services as a percentage of total world exports, as provided by the MIP scoreboard. EE, LV, SK and SI are excluded due to their characteristics as catching-up/transition economies. The relationship remains weak if outliers, particularly Luxembourg and Ireland, are excluded.

The traditional approach: Export market shares and the real effective exchange rate

In theory, net exports are expected to be negatively related to a country's real effective exchange rate. A depreciating real exchange rate implies lower relative prices of domestic products, driving up the demand for exports. A depreciating real exchange rate should thus be ultimately reflected in growing export market shares, and vice versa. From the domestic economy's point of view, meanwhile, the higher foreign price level should induce expenditure-switching towards domestic goods and services, thereby bringing down imports.

Chart A displays the changes in export market shares and in the unit labour cost (ULC) deflated Harmonised Competitiveness Indicator (HCI) over the pre-crisis period 2000-2007 for the euro area countries. Overall, it suggests a weak negative relationship between the two variables. For some countries, the observed developments indeed conform to the expected pattern (e.g. Germany, France or Italy). However, a number of countries, including some of the stressed economies, are located in the top right quadrant, implying that they maintained or widened their export market share over that period, in spite of an eroding cost-competitiveness. Gaulier and Vicard (2012) confirm the limits in the link between cost developments and export growth performance.[13]

Macroeconomic factors as a joint driver of current account deficits and relative prices

The fact that most of the ULC increase occurred in the non-tradable sector may also explain why exports did not substantially weaken. A plausible explanation for the weak REER-export relationship is also that the joint development of trade deficits and the deterioration of price/cost-competitiveness observed in the pre-crisis period, reflects macroeconomic factors that simultaneously drove or facilitated them.[14] In particular, several euro area countries witnessed credit-fuelled demand booms that supported imports and thus led to a deterioration in the current account.

The role of non-price factors

Focusing solely on REERs when explaining trade flows omits important "non-price" factors[15], such as horizontal (i.e. product variety) and vertical (i.e. product quality) differentiation as well as the overall regulatory framework the firms operate in.[16] Many of the structural reforms currently undertaken by stressed euro area countries aim precisely at improving such framework conditions.

This includes the quality of institutions[17] and economic governance[18], macroeconomic fundamentals, the quality of infrastructure, the education system and the overall skill level as well as R&D spending. The multi-facetted aspects of competitiveness are often summarised by composite indicators, such as the World Bank's Ease of Doing Business index or the World Economic Forum's Global Competition index. Chart B depicts the evolution of the Ease of Doing Business index over the period 2007-2014 in the euro area. The euro area as a whole recorded a continuous improvement over that period.

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[13] The overall weak relationship between REERs and trade outcomes is also shown in Christodoulopoulou and Tkacevs (2014).

[14] See Wyplosz (2013).

[15] The relevant competitiveness drivers identified strongly depend on the operational definition of competitiveness that is adopted – e.g. export market share, productivity growth – which is far from unanimous in the literature. A better understanding of the role of non-price competitiveness is one of the objectives of the ESCB's Competitiveness Research Network (CompNet).

[16] M. Draghi: "A competitive economy, in essence, is one in which institutional and macroeconomic conditions allow productive firms to thrive." Speech 30 November 2012.
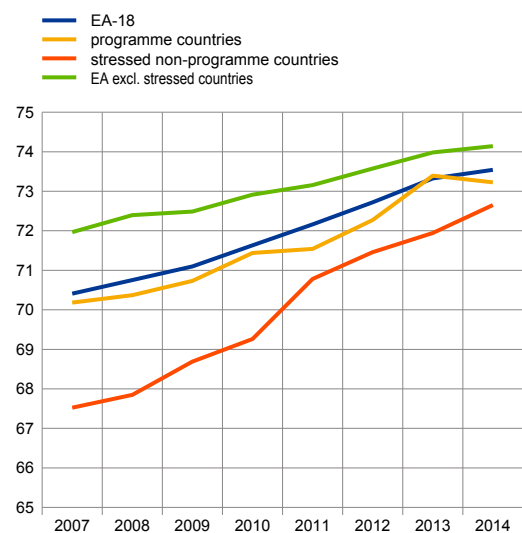
[17] Non-price competitiveness factors could also be seen as savings and investments-shifters, respectively (see the IMF's EBA approach). For instance, foreign direct investment increases in the quality of institutions, as shown by Bénassy-Quéré et al. (2007).

[18] See, for example, Buccirossi et al. (2013).

Chart B

Ease of doing business 2007-2014

(proximity to frontier – percentage points)

- EA-18
- programme countries
- stressed non-programme countries
- EA excl. stressed countries

Source: World Bank.
Notes: Due to data availability, CY and MT are excluded. The frontier corresponds to the best performers worldwide. A higher reading of the index corresponds to closer proximity to the frontier (with the scale ranging from 0 to 100).

Another reason behind the weak link between some economy-wide competitiveness indicators and exports may be that the former are not fully representative of exporting firms. Across countries, exports are typically concentrated on a relatively small number of firms, which differ from non-exporters in a number of characteristics, such as a larger size and higher productivity.[19] The importance of firm-specific characteristics would suggest that exporting firms could to some extent take shelter from economy-wide trends. However, the isolation of firm performance from the domestic economy is likely to be temporary as firms ultimately rely on domestic labour and inputs (notably services), and are subject to domestic taxation. While in the short run economy-wide cost increases can possibly be absorbed through lower profit margins, they are likely to erode firms' competitiveness in the long-run (for example, as lower profit margins limit potential R&D spending).

2.2 Sectoral breakdown of net lending/ borrowing[20]

This section studies the sectoral breakdown of net lending/borrowing of euro area countries vis-à-vis the rest of the world, which is the sum of the net lending/borrowing of all sectors of the economy, including households (including non-profit institutions serving households, i.e. NPISH), non-financial corporations, financial corporations and the general government.[21]

2.2.1 The dynamics of net lending/borrowing from a sectoral perspective

A sectoral perspective reveals that both the build-up of external imbalances in the euro area and their subsequent adjustment in the wake of the financial crisis were largely driven by the private sector, notably by non-financial corporations

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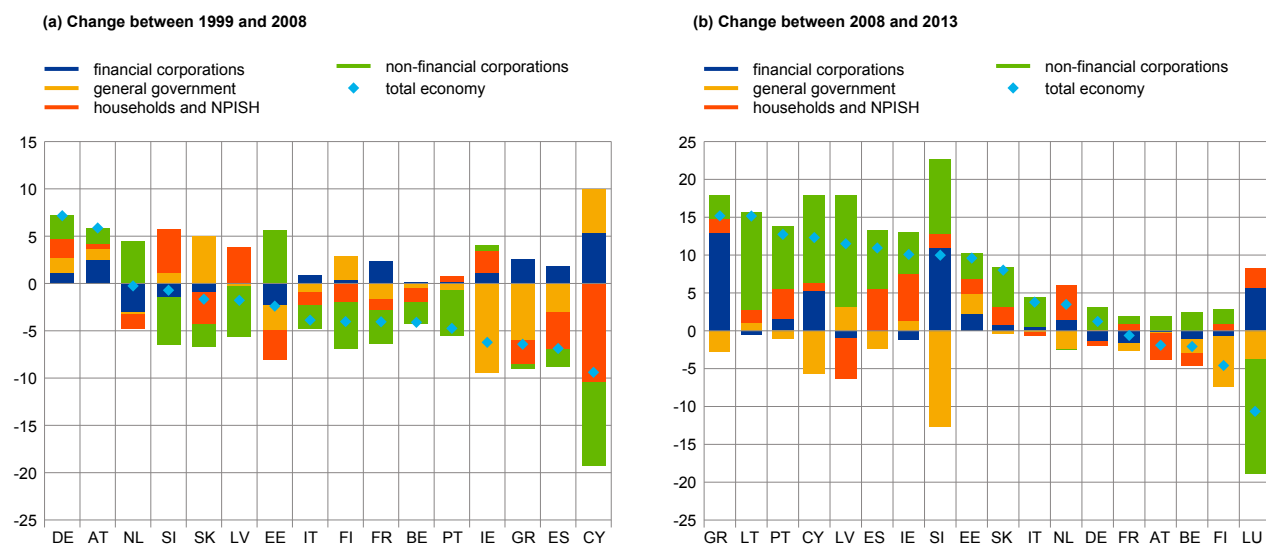[19]   See, for example, Bernard and Jensen (1999).

[20]   Prepared by Adam Gulan (FI) and Vincent Vicard (FR).

[21]   For an analysis of the evolution of the various stages of the financial crisis through the lens of the integrated Euro Area Accounts, see the article entitled "The financial crisis in the light of the euro area accounts: a flow-of-funds perspective", Monthly Bulletin, ECB, October 2011.

Chart 7

Sectoral breakdown of changes in net lending/borrowing

(in percentages of GDP)

(a) Change between 1999 and 2008

- financial corporations
- general government
- households and NPISH
- non-financial corporations
- ◆ total economy

(b) Change between 2008 and 2013

- financial corporations
- general government
- households and NPISH
- non-financial corporations
- ◆ total economy

Sources: Eurostat, European Sector Accounts and Non-financial transactions.
Notes: Data missing for LT, LU and MT in panel (a) and for MT in panel (b). For EE and GR, data are based on ESA95 and the year 2000 is used instead of 1999 in panel (a).
For LU data are based on ESA95 and the year 2012 is used instead of 2013 in panel (b).

(Chart 7).[22] Prior to the financial crisis, non-financial corporations increased their net savings in countries with large pre-crisis net lending (in particular Germany and the Netherlands) and decreased it in most countries with large pre-crisis net borrowing. Since 2008 the process has reversed, with increasing lending in the latter group and no systematic evolution in the former. Economic theory does not provide clear-cut guidance as to what may drive the improvement in the net position of non-financial corporations. However, limited access to credit, a decline in the price of capital, cost-cutting measures, elevated economic uncertainty, differences in taxation, low demand coupled with ageing societies as well as rising real interest rates amid a low inflation environment are potential factors.[23] The household sector also contributed systematically to the evolution of the net lending/borrowing of euro area countries over the period under review, albeit to a lesser extent.

2.2.2 Gross contributions by sector: savings and investment

In order to better understand the developments in net lending/borrowing at sector level, this subsection takes a closer look at the underlying changes in gross savings and investment for non-financial corporations and households.[24]

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[22] This is confirmed by a correlation analysis for the periods 1999-2008 and 2008-2013. In both periods, the changes in the net lending/borrowing of the total economy are positively and significantly correlated with the changes in the net lending/borrowing of non-financial corporations and households. By contrast, the correlation is insignificant for the general government and financial corporations. See Section 2.4 for a more detailed analysis of the role of the government sector in the build-up of macroeconomic imbalances.

[23] See Chapter 4 for a more detailed analysis of the savings and investment decisions of non-financial corporations. See also the Structural Issues Report 2013 as well as Karabarbounis and Neiman (2012).

[24] The difference between gross savings and investment equals net lending/borrowing.

Chart 8

Gross savings and investment by institutional sector

(in percentages of GDP)
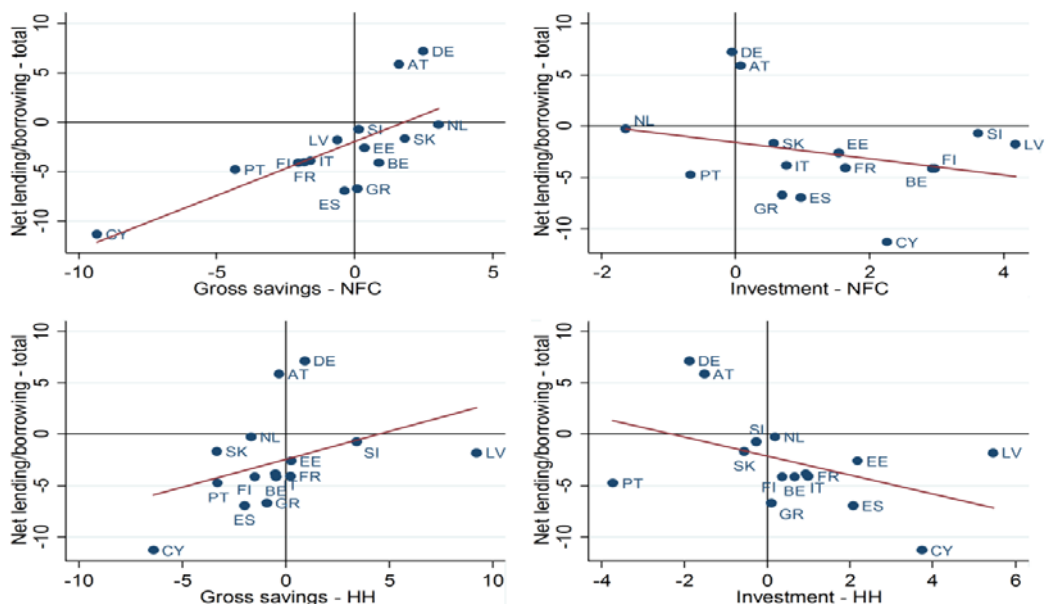
(a) Change between 1999 and 2008

(b) Change between 2008 and 2013
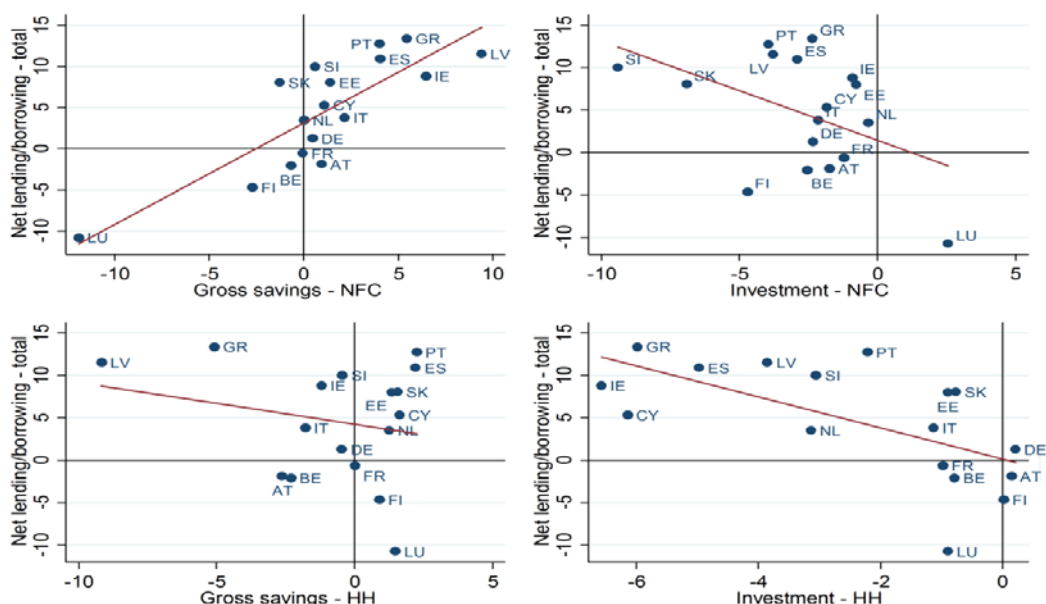
Both gross savings and investment played a role in the evolution of the net lending/ borrowing of non-financial corporations (Chart 8). In countries acting as net lenders, the increase in net lending of non-financial corporations between 1999 and 2008 resulted from increasing corporate savings coupled with decreasing investment. In countries with large pre-crisis net borrowing, corporate investment increased and corporate savings decreased over this period.

Chart 9

Sectoral breakdown of net lending\borrowing
of the total economy in 2013

(in percentages of GDP)

Legend:
- financial corporations
- general government
- households and NPISH
- non-financial corporations
- total economy
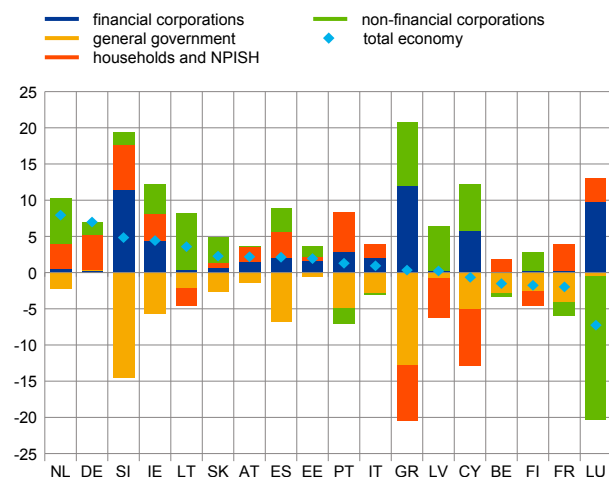
Sources: Eurostat, European Sector Accounts and Non-financial transactions.
Notes: Positive (negative) numbers correspond to net lending (borrowing). Data are missing for MT. For LU data are based on ESA95 and the year 2012 is used instead of 2013.

The reversal since 2008 is also accounted for by both corporate savings and investment. Investment of non-financial corporations fell substantially across the board, whereas gross savings actually increased in many euro area countries. In the household sector, investment also clearly contributed to the change in net lending/borrowing between 1999 and 2008. This partly reflects the credit-fuelled housing boom observed in some countries before the crisis. Over the period 2008-2013, the decrease in investment of the household sector systematically contributed to the rebalancing while adjustments in savings were not correlated with the net lending/borrowing developments of the total economy.

2.2.3   Cross-country patterns after the crisis

The adjustments seen in the euro area since the onset of the financial crisis have changed the sectoral savings-investment patterns profoundly, with financial corporations, households and non-profit institutions serving households (NPISH) as net lenders in euro area countries, whereas the government sector is usually a net borrower (Chart 9). Greater heterogeneity is observed for non-financial corporations, which act either as net lenders or net borrowers. Germany, the Netherlands, and Finland stand out in that non-financial corporations have persistently acted as net lenders, both before and after the onset of the financial crisis. Such a pattern, if sustained over a prolonged period, is in contrast with the prediction of simple flow-of-funds models that non-financial corporations will borrow from other sectors to finance their investments.[25] Overall, the net lending of the private sector tends to be reduced or even more than offset by the borrowing of the government sector.

Box 2 provides a complementary analysis of the bilateral financial linkages between euro area countries at the sectoral level.

Box 2

Financial inter-sector linkages in euro area countries[26]

The first decade of the monetary union saw considerable divergences in the creditor/debtor positions of euro area countries. This box analyses the underlying intra-euro area financing patterns at sector level in order to understand the financing of macroeconomic imbalances.

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[25]   Working on US data, Baily and Bosworth (2013) underline that the broad-based net lending of the business sector since the onset of the financial crisis is an unprecedented phenomenon.

[26]   Prepared by Nuno Silva (PT).

Charts A to C show bilateral relations between euro area sectors in terms of stock positions for 2004Q4, 2007Q4 and 2012Q4, respectively.[27] Only debt instruments (i.e. currency and deposits, loans, debt securities, insurance technical reserves and other accounts receivable) were considered. Total assets considered sum up to 54, 73 and €87 trillion in 2004, 2007 and 2012, respectively. Countries were split in two groups: low rating (LR) countries (EE, IE, GR, ES, CY, IT, MT, PT, SI, SK) and high rating (HR) countries (AT, BE, DE, FI, FR, LU, NL). For each group of countries, financial corporations, non-financial corporations, households and the general government were considered. The ECB/Target2 positions were taken into account under sector 'Other'. All remaining institutions were pooled into the rest of the world sector. The arrows go from the creditor sector to the debtor sector. The numbers presented were normalised by euro area GDP. Note that HR countries GDP is significantly higher than LR countries GDP, with the latter corresponding to around one-third of euro area GDP.[28]

Section 2.2 showed that non-financial sectors in surplus countries tended to increase their net lending in the period before the financial crisis, while the opposite occurred in deficit countries.

Chart A

Financial inter-sector linkages in euro area countries in 2004Q4

(percentage of GDP)
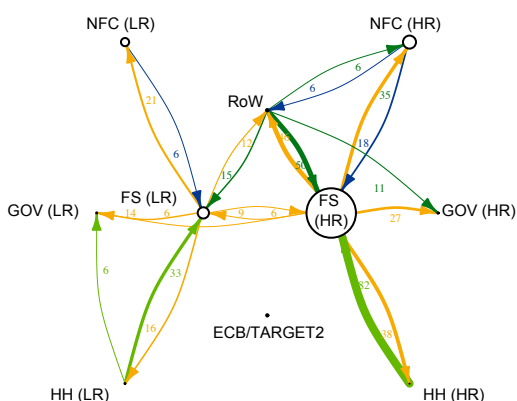
Source: Eurosystem staff calculations.

Chart B

Financial inter-sector linkages in euro area countries in 2007Q4

(percentage of GDP)
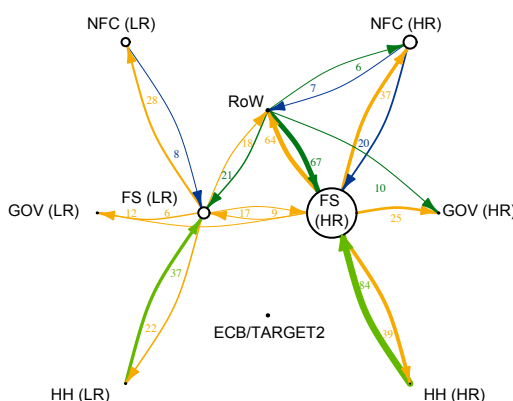
Source: Eurosystem staff calculations.

Charts A and B show that these movements took place mainly through the financial sector in both groups of countries, while direct financing from the rest of the world and the non-financial sectors played a minor role.

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[27] Numbers were estimated using maximum entropy with constraints. Bilateral relations below 5% of euro area GDP were left out for readability. A more detailed description of the approach is available in the Appendix to Chapter 2.

[28] LR countries' GDP corresponded to 36%, 37% and 34% of euro area GDP in 2004, 2007 and 2012, respectively. As an example of how these numbers can be compared, in 2004Q4 LR and HR financial sector claims on households correspond to 16% and 38% of euro area GDP, respectively. Normalising by the GDP of each of these groups leads to claims of 45% and 59% of their GDP, respectively. In order to normalise by the GDP of each group of countries, the reader has to divide by 0.36 and 0.64 in 2004Q4 in the case of LR and HR countries, respectively.

Chart C

Financial inter-sector linkages in euro area countries in 2012Q4

(percentage of GDP)

Assets
- NFC
- FS
- GOV
- HH
- ECB/TARGET2
- RoW

2012 Q4
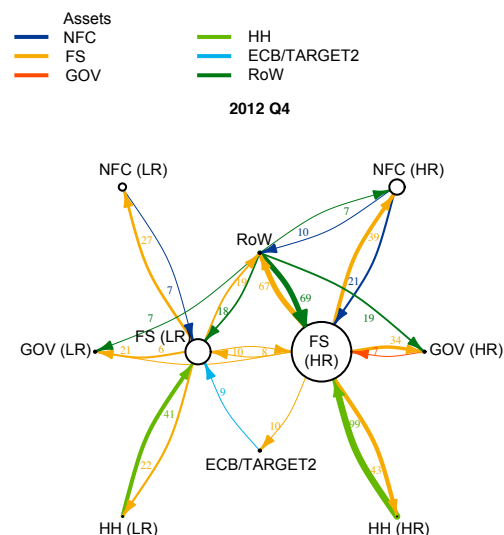
Source: Eurosystem staff calculations.

Between 2004 to 2007 there was a strong increase in non-financial corporations' and households' liabilities towards the financial sector in LR countries, while the same position grew only slightly in HR countries.

Charts A and B show that between 2004 and 2007 the financial sector in HR (LR) countries increased considerably its credits (debits) to the financial sector in LR (HR) countries. Bilateral linkages with the rest of the world intensified in both groups. The financial crisis triggered important changes in financial linkages affecting all institutional sectors. In LR countries, the financial sector held lending relatively stable vis-à-vis both households and non-financial corporations, notwithstanding an increase in funds received by households, while HR countries saw an increase in the amount of credit granted by the financial sector to both non-financial corporations and households.

These increases, albeit significant, are nevertheless modest when compared to the expansion recorded in the claims of the non-financial sector to the financial sector.

Governments in both HR and LR countries substantially increased their liabilities in both groups of countries. In a context of high risk aversion and financial segmentation, governments covered their financial needs mainly by borrowing from the domestic financial sector.

Charts B and C point to an increase in financial sector claims on the government sector in both groups of countries. In LR countries a larger fraction of the government's financial needs was covered by the domestic financial sector with the remaining additional financial needs being covered by the rest of the world (including EU-IMF loans).[29]

Finally, the financial crisis also led to significant changes in the relation between the financial sector in LR and HR countries, the rest of the world and the 'Other' sector. The decrease in lending from financial institutions in HR countries to the financial sector in LR countries together with a reduction in the rest of the world's claims on the financial sector of LR countries were compensated by a substantial increase in financing from the Eurosystem.
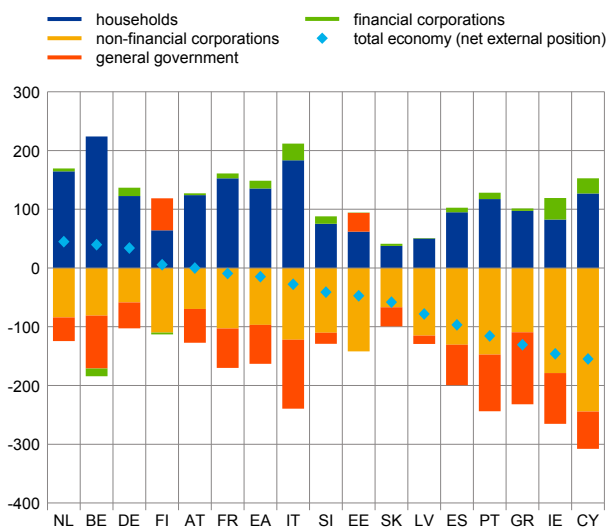
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[29] Credit from HR financial institutions to the sovereign in LR countries stayed constant in percentage terms at 6% of euro area GDP from 2004 to 2012.

2.3 Developments in external positions[30]

Source: ECB (National financial accounts).
Notes: National financial accounts definition. Difference between the outstanding amount of financial assets and liabilities. Data for MT and LU are excluded for readability.

2.3.1 Cross-country comparison of external positions

The net external stock position of a country is the sum of the net financial wealth of all domestic sectors and reflects the net assets or liabilities vis-à-vis the rest of the world. There are only a few net creditor countries (Austria, Belgium, Finland, Germany, Malta and the Netherlands) in the euro area while the remaining countries, as well as the euro area as a whole, record net financial liabilities relative to the rest of the world (Chart 10). At the end of 2013, the net external position varied markedly across euro area countries, ranging from 44.9% (the Netherlands) to -155% of GDP (Cyprus).[31] The net external position is weakest in programme/post-programme countries, with net liabilities close to or exceeding GDP. Against this backdrop, Box 3 takes a closer look at the sustainability of external positions in euro area countries, while Box 4 examines their relationship with financial stability.

Box 3

Net international investment positions and external sustainability[32]

Net international investment positions (NIIPs) of euro area countries and the euro area as a whole need to be also analysed from the perspective of external sustainability (defined as a low probability of an external crisis now and in the medium term). External crises often take the form of a sudden stop of private capital inflows, necessitating either recourse to (international) official financial support or a current account reversal to avoid a default on external liabilities. The literature suggests that the probability of an external crisis depends on both the level and the composition of the net international investment position.[33] This box provides both a forward-looking assessment of the NIIP level and a balance sheet analysis focused on its composition.

At the end of 2013, the NIIP of the euro area stood at -12% of GDP. This moderate net debtor position hides substantial cross-country differences (Table). Although some euro area countries reported sizeable net foreign assets, others recorded net foreign liabilities well in excess of the

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[30] Prepared by Arne Nagengast (DE) and Christophe Van Nieuwenhuyze (BE).

[31] These figures on the net external position are taken from the national financial accounts since they allow for a subdivision into sectoral net financial wealth. Although these data conceptually correspond to the net international investment position, statistical differences between both sources may exist owing to different valuation rules for outstanding assets and liabilities in national financial accounts and IIP statistics.

[32] Prepared by Christophe Van Nieuwenhuyze (BE) and Nico Zorell (ECB), with input from Richard Audoly and Sören Radde (both ECB).

[33] See, for instance, Catão and Milesi-Ferretti (2014).

Overview of external stock positions in euro area countries

(in percentages of GDP unless otherwise indicated)

	2008Q4						2013Q4				
	NIIP	NIIP, private sector	NIIP, official sector	Gross external debt	Debt/ equity ratio	Investment income balance	NIIP	NIIP, private sector	NIIP, official sector	Gross external debt	Debt/ equity ratio	Investment income balance
BE	39.7	71.2	-31.5	334.5	2.1	1.0	45.8	49.5	-3.7	234.3	1.2	-1.0
AT	-16.9	-4.4	-12.5	211.0	2.9	0.5	0.5	0.8	-0.2	189.4	2.2	-0.3
CY	-15.1	24.9	-40.0	447.4	6.8	-2.7	-85.7	7.0	-92.7	348.0	3.9	-1.2
DE	25.5	21.8	3.7	148.8	4.7	1.3	48.4	29.3	19.1	144.2	3.4	2.7
EE	-76.7	-77.9	1.2	117.2	1.6	-6.3	-47.5	-56.4	8.9	87.1	0.9	-5.0
ES	-79.3	-75.7	-3.6	153.7	3.3	-3.3	-98.2	-73.2	-24.9	159.7	2.4	-1.5
FI	-2.7	-7.0	4.4	131.9	1.8	-0.7	15.8	2.4	13.4	211.2	2.9	-0.3
FR	-12.9	-3.9	-8.9	181.2	4.3	1.2	-21.2	-14.3	-6.9	200.8	3.6	0.7
GR	-76.8	-58.0	-18.9	156.3	8.7	-4.5	-119.3	29.5	-148.8	229.1	16.3	-1.4
IE	-72.9	-51.8	-21.1	965.9	1.9	-13.1	-98.5	-32.8	-65.6	917.9	0.7	-14.8
IT	-25.5	-29.3	3.8	107.7	5.2	-1.3	-30.0	-18.8	-11.2	122.1	4.4	-0.8
LU	100.1	-10.4	110.5	4101.2	0.6	-14.2	184.1	-45.3	229.4	5415.3	0.6	-16.2
LV	-79.0	-75.6	-3.4	129.0	4.7	-3.2	-64.9	-49.1	-15.8	130.3	3.3	-3.7
MT	2.6	10.7	-8.0	541.8	5.8	-2.8	23.3	33.1	-9.8	533.9	3.2	-6.2
NL	4.2	7.1	-2.9	290.9	3.4	-1.4	46.3	36.5	9.8	294.4	2.5	3.6
PT	-96.2	-84.0	-12.2	204.4	3.2	-4.5	-118.7	-40.0	-78.7	223.1	3.2	-3.5
SI	-35.9	-29.9	-6.0	105.3	4.7	-2.8	-38.7	-38.7	0.0	113.2	4.7	-2.6
SK	-59.4	-58.1	-1.3	65.1	1.2	-4.9	-65.1	-60.2	-4.9	82.8	1.5	-4.5
EA	-16.7	-12.2	-4.5	116.3	2.1	-0.8	-12.0	-7.9	-4.1	120.9	1.7	0.6

Source: ECB.
Notes: 2013Q4 not available for France (2012Q4) and Malta (2013Q2). 2008Q4 not available for gross external debt Slovakia (2009Q1).

threshold of 35% of GDP underlying the alert mechanism of the Macroeconomic Imbalance Procedure (MIP). Most of the countries with large net foreign liabilities witnessed a sudden reversal of private capital inflows in the wake of the global financial crisis, which were partly offset by official capital inflows (i.e. programme loans and funding provided by the Eurosystem).[34] Together with a reversal of the current account deficits, the situation stabilised at the end of 2012 and private capital inflows partly resumed. However, in some countries net foreign liabilities remain at very high levels and continue to reflect to a large extent official funding (Table). Hence, the composition of the NIIP in these countries has changed significantly since the onset of the financial crisis, with the public sector accounting for an increased share of total net foreign liabilities.

The high net external liabilities also go hand in hand with a deficit in the investment income account, notwithstanding the favourable impact the official funding had on the external liabilities' implicit yield.

Against this backdrop, an important question is how fast the NIIPs of stressed euro area countries will return to levels that are deemed sustainable, such as the MIP threshold of -35% GDP. Chart A shows illustrative projections based on the law of motion for the NIIP, IMF forecasts of the current account balance and nominal GDP growth, and the assumption that valuation effects cancel out over the medium term.[35] Under these assumptions, the NIIP of stressed debtor countries will

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[34] See de Sola Perea and Van Nieuwenhuyze (2014).

[35] The law of motion stipulates that the NIIP in the next period equals the NIIP in the current period, plus valuation effects, plus the combined current and capital account balances as well as net errors/ omissions. The dynamics of the NIIP-to-GDP ratio are also determined by a denominator effect (i.e. nominal GDP growth).

Chart

Model-based projections for the net international investment position

(in percentages of GDP)

Legend:
- 2013
- 2016
- 2019
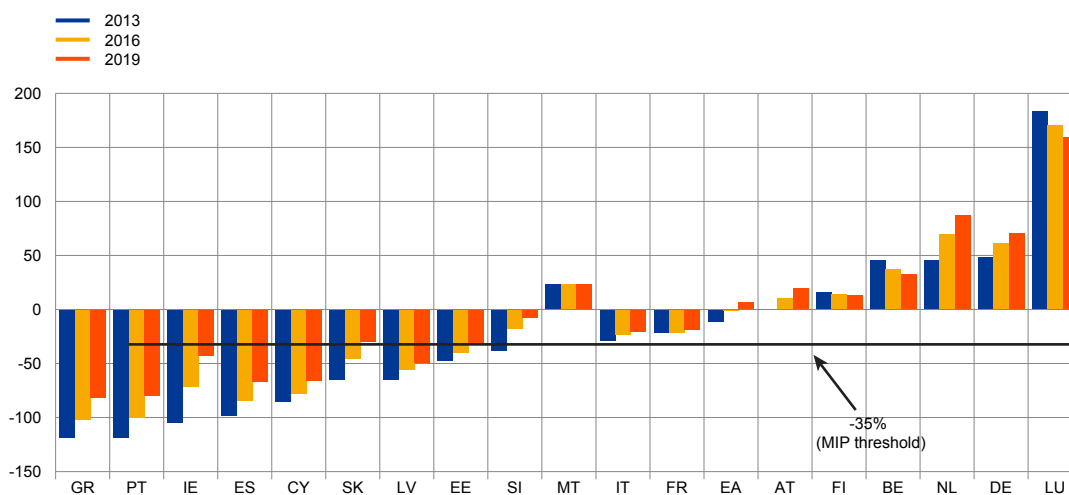
Sources: Eurosystem staff calculations.
Notes: The mechanical projections are based on the law of motion for the net international investment position and the latest WEO forecasts for the current account, real GDP and inflation. Valuation effects are assumed to cancel out over the medium term.

improve over the medium term, albeit only very gradually. Several countries will not have reached the MIP threshold of -35% GDP by 2019. Sustained trade surpluses are the main driver of the improvement in the NIIPs, since nominal GDP growth is expected to pick up only gradually and payments on existing net liabilities will continue to weigh on the current account. However, the projections are fraught with uncertainty as shocks could derail the adjustment. These shocks relate in particular to lower-than-expected GDP growth and inflation as well as to higher yields.

Although the level of the NIIP is key for external sustainability, the composition of the international balance sheet also matters. In particular, an international portfolio geared towards debt (as opposed to equity) tends to increase sustainability risks.[36] The fixed-commitment nature of debt complicates the absorption of shocks, in contrast to the state-contingent pay-out associated with equity. Moreover, sudden stops are more likely to occur through a reversal of portfolio debt flows than through a reduction in FDI equity.[37] As shown before, the net external positions of euro area countries and the euro area predominantly consist of debt. Since the peak of the crisis, the composition of the liabilities changed somewhat, as illustrated by a reduction in the debt-to-equity ratios (Table A). The differences in NIIP composition across countries also illustrate the fact that NIIP sustainability has a country-specific dimension.

Maturity and currency composition of the external position also matter to assess external sustainability. In euro area countries, the largest part of gross external debt[38] is typically of a

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[36] The debt and equity components of the NIIP can be broken down further into individual instruments, such as portfolio investment, direct investment and other investment. However, macroeconomic theory suggests that the distinction between debt and equity matters most from the perspective of external sustainability.

[37] See, for instance, Levchenko and Mauro (2006).

[38] Statistics on gross external debt are taken from JEDH (Joint External Debt Hub).

longer-term nature (with an original maturity of more than one year) or reflects intercompany lending[39]. Short-term debt, accounting on average for around one third of total gross external debt, also plays a significant role. While this is not unusual for economies with mature and liquid financial markets, short-term debt (notably from MFIs) nevertheless implies rollover and interest rate risks. As such, external sustainability is closely linked to financial stability and issues related to financial (banking) integration. Next to maturity mismatches, vulnerabilities may also arise from currency mismatches between assets and liabilities, since they may expose debtors to liquidity risk. In addition, currency mismatches increase the sensitivity of the NIIP to fluctuations in exchange rates. Euro area countries typically record net valuation gains when the euro depreciates as they are long in foreign currencies. This facilitates the external rebalancing of the net debtor countries as the NIIP will increase on the back of valuation gains as well as through the positive effects a depreciation usually has on net exports. In addition, the valuation gains might lead to higher GDP growth if wealth effects are at play. In the case of a euro appreciation, valuation losses may occur, particularly in financial hubs with large gross positions.

Overall, the large net foreign liabilities recorded in some euro area countries will unwind only gradually over the medium term and therefore continue to pose risks to external sustainability. The dominance of debt instruments in cross-border exposures adds to these sustainability risks. Official lending with long-term maturity (i.e. financial assistance programme funds) is perceived as a stabilising component. This underscores the need for continued adjustment in countries with large external stock imbalances, both in terms of sustained current account surpluses and robust nominal GDP growth. Furthermore, external sustainability may be enhanced by a NIIP composition geared towards instruments that allow for a more stable funding and/or a more effective risk-sharing.

The net external position can be subdivided into the net financial wealth of different domestic sectors. At present, the household sector contributes positively to the net external position in all euro area countries on account of its net financial assets (Chart 10). The other non-financial sectors typically record net financial liabilities.

While the net financial wealth of both the general government (-60%) and the private sector[40] (-23%) in net debtor countries is on average below that of net creditor countries (-24% and -83% respectively), the difference between the two country groups is most pronounced for the net financial wealth of the private sector. Hence, private sector investment and savings decisions seem to be key to explaining differences in euro area countries' external positions (see Chapters 3 and 4).

Net external positions in euro area countries largely take the form of (intra-euro area) debt positions while net equity positions are nearly balanced (Chart 11). Similarly, for the euro area as a whole, the net exposure to the rest of the world is mainly in debt securities. The importance of differentiating between net equity and net debt

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[39]   In general, (cross-border) intercompany lending is subject to a smaller sustainability risk since most of the intercompany transactions on the liability side have a counterpart on the asset side.

[40]   The private sector includes households, non-financial corporations and financial corporations. The averages exclude MT and LU.

Chart 11

Net international investment position: breakdown by instrument and funding source

(in percentages of 2013 GDP)

a) Debt/equity breakdown* (2013Q4)

— net equity
— net debt

b) Breakdown by funding source (programme countries)

— net international investment position (NIIP)
— reserve assets
— official net financing, government [1]
— official net financing, central bank [2]
— private net financing [3]

positions is underlined by Catão and Milesi-Ferretti (2014)[41] who find that the stock of net external debt is a robust indicator of the incidence of external crises. "Sudden stops" are more likely to occur due to a decrease in external (short-term) debt than through a reduction in FDI/equity.[42] Given their large negative net debt positions, the programme/post-programme countries proved particularly vulnerable to such a sudden stop. The breakdown of their net position by funding source shows that the retrenchment of (often bank-related) debt that occurred during the sudden stop was partly compensated for by official funding (government and monetary authorities).[43]

Box 4

External debt and financial stability[44]

At the time of the creation of EMU, it was widely held that balance of payments constraints for individual euro area countries would disappear.[45] As pointed out by Merler and Pisani-Ferry (2012), the general view was that, within a monetary union, inter-temporal budget constraints would apply to individual borrowers rather than countries. Contrary to this dominant view, private capital suddenly stopped flowing into euro area deficit countries in the wake of the global financial crisis. Understanding why financial constraints at the national level might emerge inside a

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[41] See Catão and Milesi-Ferretti (2014).

[42] See, for instance, Levchenko and Mauro (2006).

[43] See de Sola Perea and Van Nieuwenhuyze (2014).

[44] Prepared by Nuno Silva (PT).

[45] See Commission of the European Communities (1990).

monetary union is of crucial importance given its potential impact on how resources are allocated. This box contributes to this debate by showing that MFIs and sovereigns account for the bulk of external debt in most euro area countries, two sectors that depend heavily on the economic and financial performance of the country where they are located. This together with the fact that default is typically more complex in the case of MFIs and sovereigns leads to the accumulation of risks inside a country - turning a micro-level problem into a macroeconomic problem - and contributes to the appearance of financial constraints at the national level whenever these risks are seen as very significant.

Chart A shows the contribution from each sector to gross external debt in 2007 and 2012, respectively.[46] As expected, sovereigns and MFIs account for the largest part of gross external debt in most euro area countries. Notable exceptions are Luxembourg, Ireland and the Netherlands, which act as financial centres. While sovereigns and MFIs play a crucial role in channelling and allocating external funds, their relative importance varies across countries. In 2007, the combined share of these two sectors accounted for more than 80% of gross external debt in Austria, Malta, Greece, Belgium Italy, Cyprus and Portugal, and for around 50% in Ireland, Slovakia, the Netherlands and Spain. In Luxembourg these sectors represent less than 40% of gross external debt in 2007. In most countries, MFIs are by far the largest contributor to gross external debt. Greece is a notable exception, with the sovereign being the largest contributor. In Italy, the contribution of MFIs to gross external debt in 2007 was only slightly higher than that of the sovereign. Non-financial corporations and households account for only a small share of gross external debt in most countries in 2007 (below 15%). In Ireland and the Netherlands,

Chart A

Gross external debt

(percent of GDP)
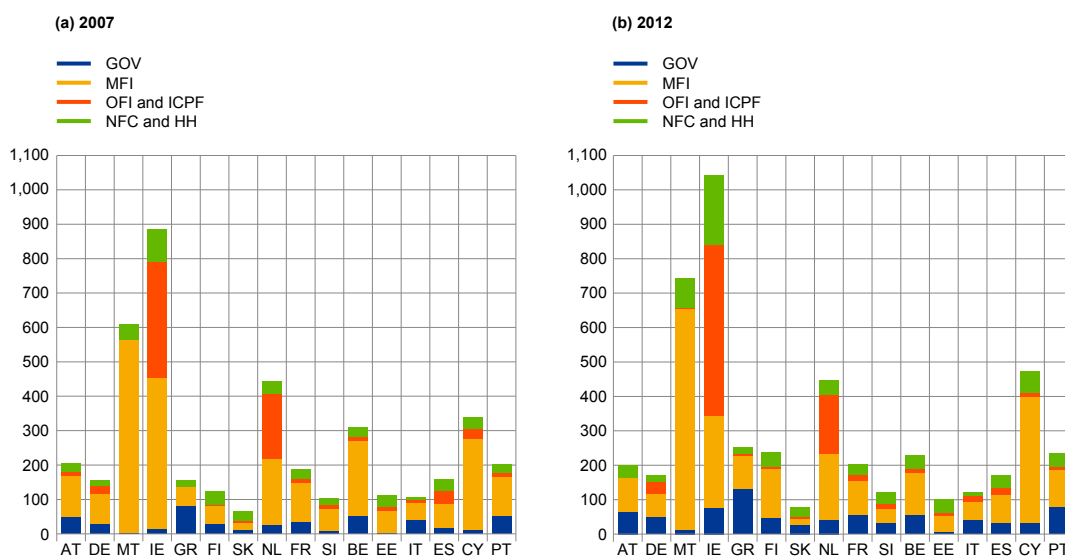
Source: Eurosystem staff calculations.
Note: LU excluded for readability.

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[46]   This box looks only at debt instruments, thereby excluding other securities, such as portfolio equity instruments. Numbers were estimated using maximum entropy with constraints. A detailed description of the approach is available in the Appendix to Chapter 2.

the contribution of non-financial corporations and households appears to be concealed by the importance of other financial institutions, although it is among the highest among all euro area countries relative to GDP.

Chart A also reveals changes in gross external financing patterns between 2007 and 2012 as the contribution of non-financial corporations and households to gross external debt increased in most countries. This is in line with the idea that, in the context of the sovereign debt crisis, non-financial firms sought to obtain financing outside their domestic banking sector. Ranked by the level of external finance as a percentage of GDP, the most notable examples are Ireland, Cyprus and Malta, although significant changes were also registered in Portugal, Austria, Belgium and Slovenia. The exception is Greece, where external credit to non-financial corporations and households effectively decreased from 2007 to 2012 both as a percentage of total external debt and as a percentage of GDP.

Since MFIs account for most of gross external debt, it is important to analyse their balance sheets in order to check whether they are excessively dependent on the risk factors affecting their home countries. Chart B shows the home country assets of MFIs[47] as a percentage of total MFI assets in 2007 and 2012, respectively. A clear home bias in MFIs' balance sheets is particularly strong in Greece, Slovakia, Estonia, Italy, Spain and Portugal (claims on residents represent more than 70% of total debt holdings[48]). The corresponding share is significantly lower in Ireland, Malta, Belgium, Cyprus and Luxembourg, where the banking sector is also larger relative to GDP. In particular, Luxembourg, Ireland and Cyprus show the highest ratio of credit to resident sectors over GDP. Between 2007 and 2012, the home bias in MFI balance sheets increased in most countries, reaching values above 80% in Portugal and Slovenia and around 90% in Spain and Italy.[49]

As long as MFIs and sovereigns balance sheets show a significant bias towards domestic assets, the risk profile of these sectors will continue to be significantly affected by economic and financial conditions in the home country. In particular, given the important role of MFIs as financial intermediaries in most euro area countries, they will tend to concentrate most of a country's non-financial sector credit risk. Whenever MFIs' financial position is seen as weak, problems may arise on the normal flow of funds from savers to investors. This is especially relevant given not only the possibility of sudden changes in markets expectations, but also the non-linearities present in any debt contract.[50]

In this context, it is vital to approximate those sectors that are creditors and those that are debtors without necessarily putting into question MFIs' role as financial intermediaries. In this regard, further attention should be given to the asset-backed securities market (ABS). Whenever the right

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[47] In the following, the analysis is restricted to MFIs as the financial position of the sovereign is for obvious reasons strongly correlated with the economic performance of the country. In addition, holdings of financial instruments are a poor description of the sovereign's balance sheet.

[48] Debt instruments represent 94% of total financial assets held by MFIs in the euro area (excluding financial derivatives).

[49] Central banks are included in the MFI sector. As a result, the increase in home bias also reflects an increase in the recourse to Eurosystem funding.

[50] Credit risk (expected loss) is generally modelled as a non-linear function of the debtor's leverage position. This helps explain sudden moves in credit markets when the debtor is not far from the default region.

Chart B

Geographical breakdown of MFI assets

(left-hand scale: percent of total MFI assets; right-hand scale: percent of GDP)

- home country assets 2007 (percentage GDP – right-hand scale)
- external assets 2007 (percentage GDP – right-hand scale)
- home bias 2007 (percentage total assets – left-hand scale)
- home bias 2012 (percentage total assets – left-hand scale)
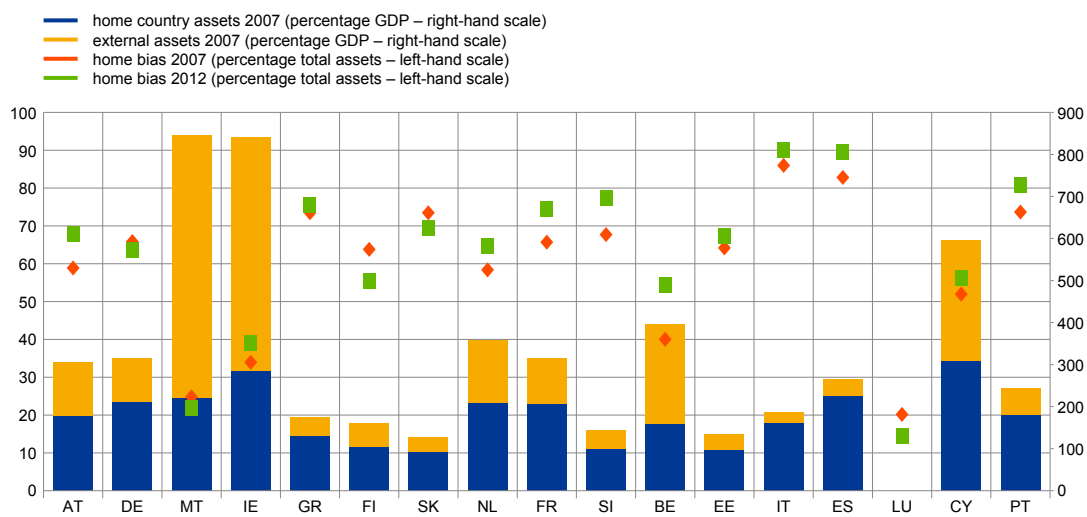
Source: Eurosystem staff calculations.
Note: LU excluded for readability.

regulatory incentives are given (i.e. MFIs' incentives to monitor credits should not be eliminated), ABSs may be an efficient way to increase geographic diversification in MFIs' balance sheets without necessarily leading to further cross-border consolidation in the banking sector.[51] This could contribute not only to reduce risk in banks' balance sheets (through further diversification), but also to improve monetary policy transmission in the sense that banks become less sensitive to asymmetric shocks.

2.3.2   Trends in net external positions

While many euro area countries have seen a significant correction of external flows since the onset of the crisis, external adjustment of stock positions has largely been absent. Net foreign liabilities remain at elevated levels and even continued to diverge within the euro area until the end of 2013 (Chart 12). The continued divergence is not surprising as − leaving aside valuation effects − an improvement in the net external position requires sustained positive current account balances. While most countries with large pre-crisis net borrowing have recorded sharp current account improvements since the onset of the financial crisis, their combined current account balance remained in deficit until mid-2013. Similarly, countries with persistent pre-crisis net lending continued to post current account surpluses and thereby accumulated additional net external assets.

The dynamics of the net external position are determined by (i) a flow effect, i.e. net lending / borrowing to/from the rest of the world and (ii) "other effects", mainly due

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[51]   The introduction of the bail-in principle in the Single Resolution Mechanism goes in this direction by allowing creditors to suffer losses and thereby recapitalise banks without necessarily closing the bank in cases where shareholders are not able to raise capital. This contrasts with the case of a bank bailout where the banks-sovereign loop is reinforced, further contributing to the accumulation of risks inside a country.

Chart 12

Net international investment position

(in percentages of annual nominal GDP)

- surplus[1]
- deficit[2]
- (post-)programme[3]
- euro area
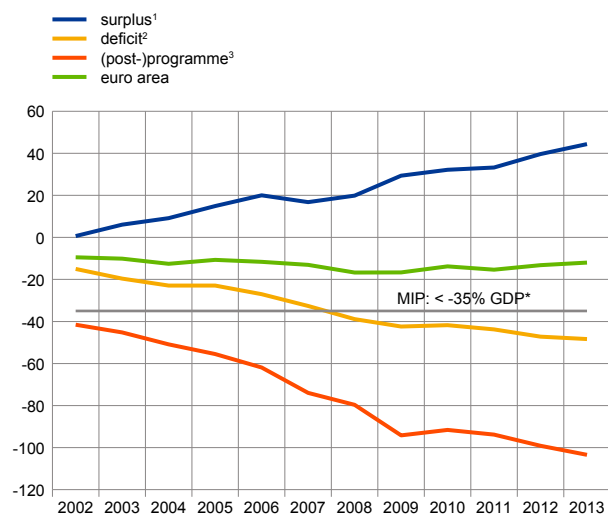
Sources: European Commission and ECB.
* Threshold as defined in the Scoreboard of the Macroeconomic Imbalance Procedure (MIP).
1 Austria, Belgium, Finland, Germany, Luxembourg and the Netherlands.
2 Cyprus, Estonia, France, Greece, Ireland, Italy, Latvia, Portugal, Slovakia, Slovenia and Spain.
3 Cyprus, Greece, Ireland, Spain and Portugal.
Notes: Country groupings based on net lending/net borrowing at the end of 2007.
No data available for France and Malta in 2013. For both countries, it is assumed that the NIIP level in 2013 remained unchanged.

to valuation effects on the existing stock of assets and liabilities. Although valuation effects are expected to be neutral for the development of the net external position in the long run, they can be sizeable and volatile in the short run. Valuation effects can be approximated by the difference between the change in the net external position and the net lending/borrowing of an economy, defined here as the sum of the current and capital account balances as well as errors and omissions.[52] Valuation effects on the outstanding stock of assets and liabilities are due to asset price fluctuations and exchange rate movements and can either be stabilising for the NIIP, when they offset the net lending/borrowing, or destabilising, when they have the same sign as the net lending/borrowing. Since the cross-border exposures of euro area countries mainly consist of intra-euro area debt, valuation effects tend to be small relative to countries with foreign-currency denominated positions and/or a larger equity component.[53]

Prior to the financial crisis (1999-2008), negative valuation effects contributed to the deterioration of the NIIP in net debtor countries, while they somewhat dampened the positive effect of the current account surplus in net creditor countries (Chart 13). The negative valuation effects in net creditor and net debtor countries can be partly explained by the appreciation of the euro in that period. However, since the onset of the financial crisis (2008-2013), the net debtor (creditor) countries recorded slightly positive (negative) valuation effects attenuating the impact on the NIIP of further net borrowing (lending). These valuation effects compensate each other at the level of the euro area, and thus suggest the existence of a – albeit quantitatively small – risk sharing mechanism. The latter operates within the euro area largely through (intra-euro area) debt holdings.[54]

Compared to risk-sharing through equity markets, the former is only active in the context of high risk premiums and debt write-downs. Notably, for some net creditor or net debtor countries the valuation effects worked in the opposite direction, e.g. for Cyprus, which recorded negative valuation effects given its large net exposure towards Greek sovereign debt. Negative valuation effects were also recorded in Ireland, which according to Lane (2012) can be related to the high equity component in its foreign assets due to the presence of a large international financial

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[52] The analysis of valuation effects is complicated by the fact that current statistics do not allow for a breakdown of "other effects" into genuine valuation effects and "other changes in volume" (such as reclassifications, statistical breaks, stock-flow adjustments, etc.). Furthermore, the lack of detailed data in some countries does not allow for attributing valuation effects to individual asset classes.

[53] See also Lane (2013a).

[54] When confronted with an income shock, the risk sharing in the euro area is usually found to be less complete than in the United States. Furthermore, while the risk sharing in the euro area mainly runs through credit markets, equity markets have an equally important weight as debt markets in the risk sharing in the United States. See Allard et al. (2013).

Chart 13

Change in the net international investment position: breakdown

(in percentages of 2013 GDP)

a) 1999Q4-2008Q4 [1)]

- net creditor
- net debtor
- EA

b) 2008Q4-2013Q4 [2)]

- net creditor
- net debtor
- EA
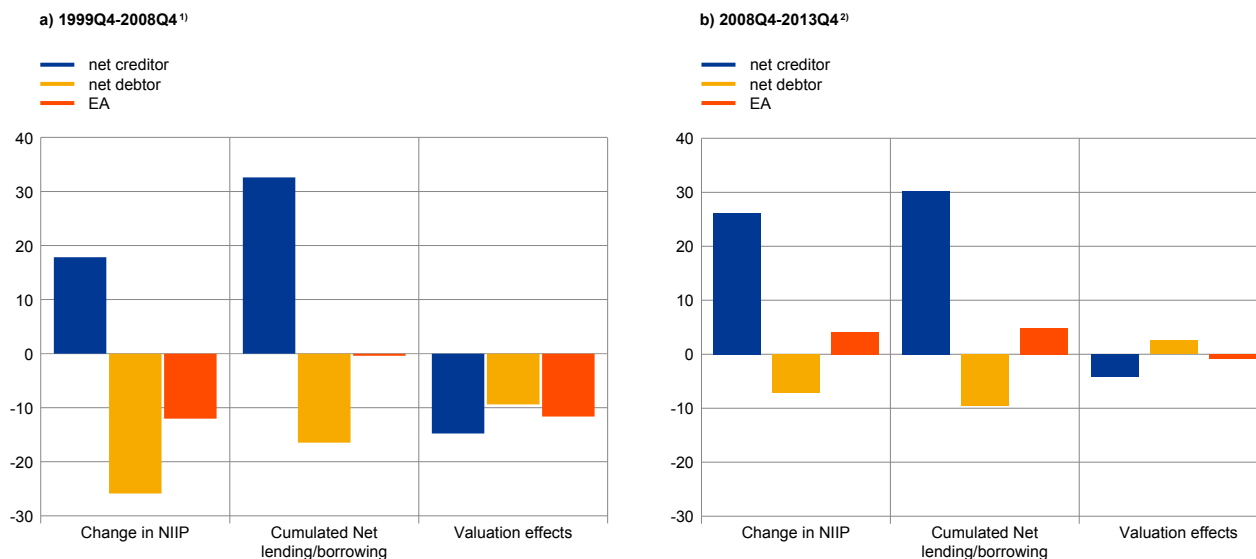
Source: ECB.
Notes: 1) BE, LU, CY, EE, IT, SI and SK are not included in the first period due to missing data; 2) For France and Malta, the sample ends in 2012Q4. Net creditors: BE, DE, LU, MT, NL (based on NIIP end 2008). Net lending/borrowing is defined here as the total of the current account, capital account and errors and omissions. The valuation effects are calculated as the difference between the change in the NIIP and the cumulated net lending/borrowing. Valuation effects might include "other changes in volume" (e.g. reclassifications).

services centre. Finally, it should be noted that valuation effects can reverse easily. For instance, net debtor countries in the euro area tended to record negative valuation effects when tensions in sovereign debt markets receded, given the price increases in their government bonds.

2.3.3 Relation between the net external position and current account

The net external stock position is linked to the current account through the investment income balance. Large net creditor (debtor) positions can therefore, in principle, have a long-lasting positive (negative) impact on the current account balance. The sign and level of the investment income balance depend on both the level and composition of a country's external financial assets and liabilities as well as on their respective yields.[55] Chart 14 shows the investment income balance of all euro area countries in 2008 and 2013.

Although several countries with large pre-crisis current account deficits now record a current account surplus, they are still net payers of investment income due to their net debtor position. In fact, not even all net creditor countries are receivers of net investment income due to unfavourable yield differentials (Austria, Belgium, Finland, Luxembourg and Malta). On average, the investment income balance of euro area

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[55] The investment income balance is also influenced by the presence of globally operating banks and multinational companies, which results in large net investment income payments in the case of Ireland and Luxembourg.

(in percentages of 4-quarter cumulated nominal GDP)

countries improved from -0.5% to 0.3% of GDP between 2008 and 2013.[56] Although a number of countries saw their investment income balance deteriorate, on average an improvement in the investment income balance was seen in both net creditor countries as well as net debtor countries and particularly in the subset of programme/post-programme countries in this period.

These observations highlight the importance of taking into account changes in yields as well as yield differentials when analysing developments in the investment income balance. An index breakdown analysis allows for quantifying the contribution of all proximate factors that determine changes in the investment income balance as measured in per cent of GDP. Chart 15 shows the contributions of (i) changes in the yield level[57], (ii) changes in the yield spread[58], (iii) changes in the stock of net foreign assets and liabilities and (iv) changes in the GDP level to the overall change in the investment income balance between 2008 and 2013.

Yields on both external assets and liabilities declined in almost all euro area countries as a consequence of the low interest rate environment and weaker economic performance both in the euro area and in the rest of the world. The declining yield level has eased the burden of net foreign liabilities of all net debtor countries, improving the investment income balance by 0.6 percentage points (pp) of GDP in the average net debtor country and by as much as 1.2pp of GDP in the average programme/post-programme country. At the same time, the investment income balance in the average net creditor country deteriorated by 0.2pp of GDP as a result

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[56] All averages for the euro area, net creditor and net debtor countries in this subsection are GDP-weighted averages.

[57] The international yield level is proxied by the individual countries' yield on assets.

[58] The yield spread equals the difference between a country's yield on assets and liabilities.

Chart 15

Contribution to changes in the investment income balance between 2008 and 2013

(in percentages of 4-quarter cumulated nominal GDP)

- GDP effect
- Stock effect
- Yield spread effect
- Yield level effect
- total
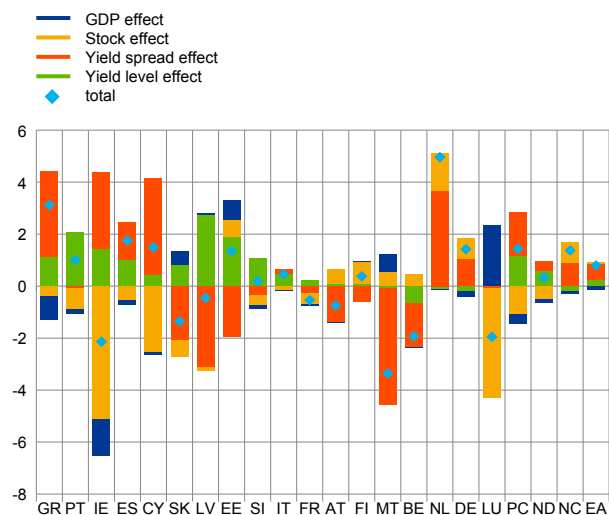
Source: ECB (BoP).
PC = Average programme/post-programme country. NC = Average net creditor country.
ND = Average net debtor country. EA = Average euro area country. Countries are ordered by their net external position in 2013.

of declining international yields.[59] Changes in the yield differential had a more heterogeneous effect on the investment income balance across countries. The yield spread effect was positive in most programme countries (Cyprus, Greece, Ireland and Spain) and Italy as well as some net creditor countries (Germany and the Netherlands), while the remaining eleven euro area countries' investment income balance declined due to more unfavourable yield differentials. Improvements in the spreads of net debtor countries may have been partially due to shifts in the composition of their foreign liabilities from high-yield private debt to lower-yield liabilities of the public sector, such as TARGET2 deficits and programme loans, which has (temporarily) alleviated the strain of high investment income payments. Germany and the Netherlands, in turn, may have benefited from lower yields on their liabilities due to safe haven flows as well as profitable foreign direct investments, which in the aggregate more than offset the impact of increased holdings of low-yielding public assets.

The role of the government sector in the build-up and evolution of imbalances[60]

Fiscal policy influences the external position through various channels. From a sectoral accounting perspective, general government net lending/borrowing is one component of total economy net lending/borrowing and the net liabilities of general government are a component of the net international investment position. Going beyond pure accounting, an expansionary fiscal policy is expected to increase domestic demand and thereby imports (at least in the short to medium-term), worsening the external position.[61] Significant increases in the government wage bill may also contribute towards the erosion of competitiveness if increases in government employment divert labour from more productive uses or if large increases in the wages of government employees act as a signalling device for wage negotiations in the private sector.[62] Through these channels, fiscal imbalances exacerbate external imbalances typically giving rise to "twin deficits".

At the same time, the external position influences the government accounts. Exports are not taxed while imports are subject to VAT (and in some cases excise duty). Other things being equal, the tax content of GDP is therefore higher in a country

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[59] Austria and Finland were not net creditors in 2008 and hence benefited from the low yield level.

[60] Prepared by Arne Nagengast (DE) and Christophe Van Nieuwenhuyze (BE).

[61] It is however possible that if government debt is high, consumers react to a fiscal expansion by increasing their savings and the current account improves (see Nickel and Vansteenkiste (2008)). Furthermore, it should be noted that the impact may depend on the fiscal instrument used.

[62] See Lamo et al. (2008).

running an external deficit. If an external deficit is driven by strong demand for imports, it will exert a favourable impact on tax revenue which may camouflage a fiscal imbalance and leave the government accounts vulnerable to a sudden correction. If an external deficit results from a loss in competitiveness, and hence low demand for exports, the lower production and profits will weigh down on tax receipts.

More generally, both the external and government accounts are influenced by broader factors, including not just the cyclical position of the economy, but also the structure of the economy and developments in the financial sector. In this regard, the role of the government sector in the build-up and evolution of imbalances in the euro area needs to be seen in light of the extraordinary circumstances resulting from the global financial crisis and the recession and sovereign debt crisis which followed.

2.3.4 A narrative of fiscal policy in selected "deficit" and "surplus" countries

Heterogeneous fiscal developments and policy have undoubtedly contributed both to the initial build-up of external imbalances in the euro area and, more recently, to their on-going correction. Constructing a concise narrative is, however, challenging given the numerous channels of interaction and the different experiences across countries.

To make the analysis tractable, this section focuses on a limited subset of euro area countries. Specifically, the evolution of the government accounts and the stance of fiscal policy in four "deficit" countries (Greece, Ireland, Spain and Portugal) and one "surplus" country (Germany) are considered. It is also helpful to distinguish three periods since the start of Stage Three of EMU: the pre-crisis period (1999-2007), the financial crisis and recession which gave rise to very large government deficits (2008-2009) and the subsequent period of fiscal consolidation and correction of imbalances also in the context of the sovereign debt crisis (2010-2013).

Chart 16 to Chart 20 help to summarise the fiscal positions and stance of fiscal policy of these five countries over these periods. The fiscal position is summarised by the cyclically adjusted primary balance (Chart 16).[63] The fiscal stance is summarised by the change in the cyclically adjusted primary balance as well as by estimates of the impact of tax measures[64] (Chart 16) and primary spending growth (Chart 18). Looking only at the traditional measure of the fiscal stance (i.e. the change in the cyclically adjusted primary balance) would be misleading because of the effect that the deep and prolonged recession had on estimates of potential output growth and because of the way that the composition of economic growth, the financial crisis and the boom/bust in the housing market (in some countries) has affected tax receipts. Chart 18 shows changes in the government revenue-to-GDP ratio not explained by the estimated impact of tax measures (i.e. largely driven by these aforementioned factors).

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[63] All figures for net lending/borrowing and government expenditure reported in this section and in the related charts exclude the impact of government assistance to banks and proceeds from the sale of UMTS licences.

[64] The estimates are those reported in the context of ESCB projection exercises which are based, to a large extent, on official estimates made at the time. All such estimates are subject to considerable uncertainty and should be viewed with caution.

Chart 16

Cyclically adjusted primary balance

(in percentages of GDP)

- DE
- IE
- GR
- ES
- PT
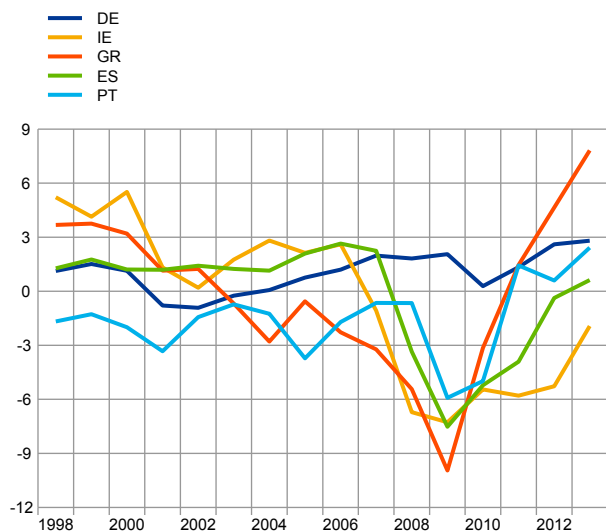
Source: AMECO.
Note: Excluding government assistance to banks and UMTS proceeds.

Chart 17

Estimated impact of tax measures

(in percentages of GDP)

- DE
- IE
- GR
- ES
- PT
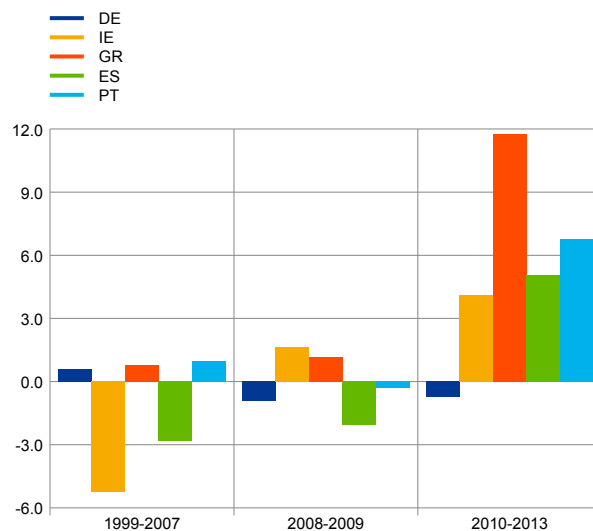
Source: ECB.
Note: Due to measurement uncertainty, estimates should be viewed as approximate. A positive value indicates a tax increase.

In Germany, the government accounts remained relatively stable. In the early years of EMU when Germany was experiencing subdued economic growth, its exports-driven growth model and the decline in the wage share, coupled with unexpectedly strong shortfalls in tax receipts following tax reforms put downward pressure on the tax-to-GDP ratio (Chart 18). This also put upwards pressure on the government deficit. This was, however, a period of underlying fiscal adjustment characterised by subdued primary spending growth, which was basically flat in real terms (Chart 18), and, on balance, a broadly neutral tax policy (with tax relief in the early 2000s offset by tax increases later on). Having achieved a near balanced budget in 2007, the recession of 2008-09 had, compared with other countries, a relatively modest effect on German tax receipts as the economy was mainly hit via lower exports and investment and the economy recovered quickly. The post-recession consolidation needs in Germany were relatively limited as part of the expansion during the economic and financial crisis of 2008/09 was temporary and several factors (declining interest rates, a favourable labour market development, and the kicking in of past pension reform) helped to achieve the pre-crisis level of the structural budget balance already in 2012.

Turning to the external deficit countries, there is no straightforward relationship between the magnitude of external imbalances built up prior to the financial crisis and the government accounts. Greece and Portugal both ran persistent government deficits of 3% of GDP or more. Greece's fiscal policy was clearly expansionary. According to available estimates, tax policy was broadly neutral, while primary spending grew by around 6% per annum in real terms and by 2007 was around two-thirds above its 1998 level. In the case of Portugal, fiscal policy was broadly neutral, but this implied a failure to reduce the government deficit in a context of absent economic growth.

(in percentages of GDP)
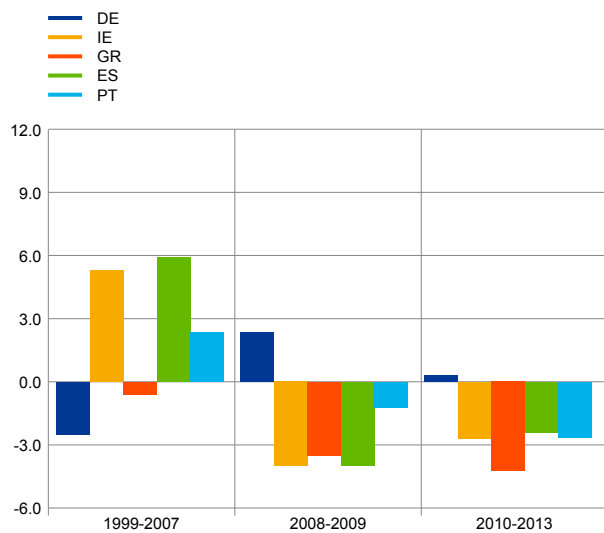
Source: ECB.

By contrast, in Ireland and Spain, fiscal policy contributed to the build-up of imbalances as tax policy was expansionary. There were waves of tax cuts in Ireland in 2000-2002 and then again in 2005-2007. In Spain, there were tax cutting reforms to personal and corporate income taxation in 1999, 2003 and 2007. These reforms were compatible with the maintenance of a broadly stable (or even rising) government revenue-to-GDP ratio because of the tax receipts generated by developments in the housing/construction and financial sectors. This, together with a significant decline in the burden of interest payments, created room for robust primary spending growth.

Because of the collapse in tax receipts related to the housing and financial sectors (in Ireland and Spain) and because of robust spending growth (in Greece, Ireland and Spain), the recession hit the government accounts of these countries particularly hard, resulting in double-digit deficits.

All euro area countries have had to undertake fiscal consolidation since 2009 or 2010 to adjust for the permanent loss in economic activity and tax receipts induced by the recession, but this adjustment has been particularly strong and abrupt in Greece, Ireland, Portugal and Spain. Tax increases have been substantial (with estimated impacts of several percentage points of GDP) and spending cuts have been deep. Primary spending in Greece has been cut in real terms by around 35% since its peak, while in Ireland, Spain and Portugal it has been cut by around 15-18%. The reduction in (cyclically adjusted) general government net borrowing in these countries – while sizeable – understates the adjustment undertaken in a context of significant headwinds caused by recession, rebalancing and a rising debt interest burden. One of the reasons for this has been the apparent tendency for actual tax bases to evolve in a more cyclical or volatile manner than closely corresponding national accounts aggregates.

2.3.5   The effect on the government's financial position

Chart 20 reports the evolution of general government gross debt (on a Maastricht basis), while Chart 20 reports the net liabilities (i.e. liabilities minus assets) of general government as recorded in financial accounts. The large deficits which emerged during the recession have resulted in a significant deterioration of

Chart 19

Primary spending

(HICP-deflated; 1995=100)

Sources: ECB and Eurostat.
Note: Excluding government assistance to banks and UMTS proceeds.

Chart 20

General government consolidated gross debt

(in percentages of GDP)

—	DE
—	IE
—	GR
—	ES
—	PT
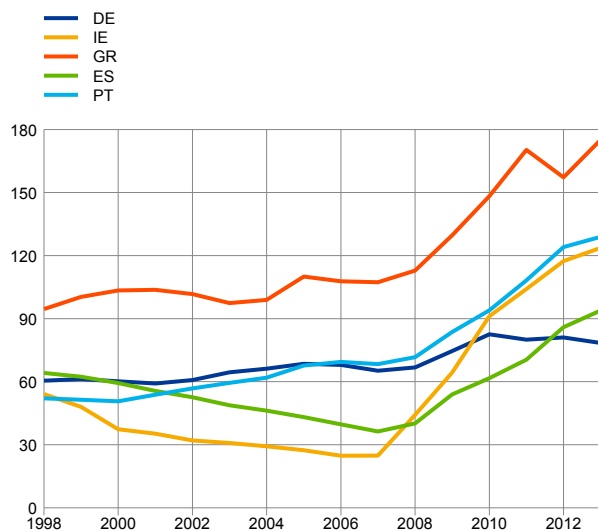
Source: ECB.

Chart 21

Net liabilities of general government

(in percentages of GDP)

—	DE
—	IE
—	GR
—	ES
—	PT
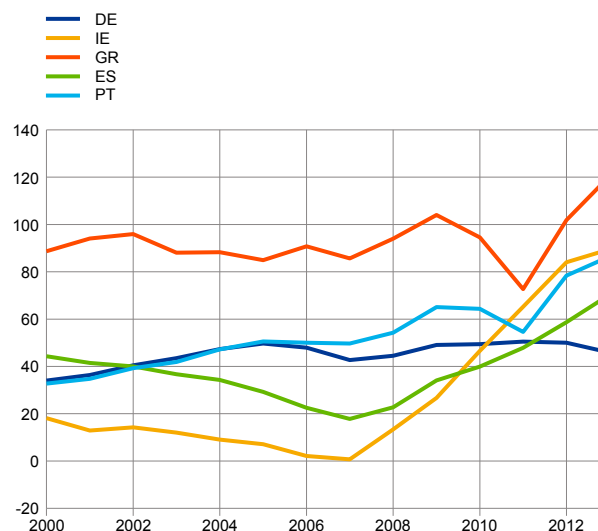
Sources: ECB, Eurostat.
Note: Excluding government assistance to banks and UMTS proceeds.

governments' financial positions, although this deterioration appears somewhat more muted when looking at the evolution of the financial accounts compared to Maastricht debt. There are two main reasons for this. The first relates to the accumulation by the government of financial assets. This includes the effect of government actions to recapitalise banks. The second relates to fluctuations in the value of assets and liabilities. Whereas in Maastricht debt statistics, financial instruments are recorded at face value, in the financial accounts they are – at least in principle – recorded at their market value. The sovereign debt crisis reduced the market value of government debt in the countries affected giving rise to a favourable valuation effect on the balance sheet.

3   Household savings and investment[65]

This part of the Occasional Paper looks at long-term trends in household savings and investment and how they may have changed more recently, especially since the financial crisis. After an overview on the developments in households' savings since the introduction of the euro and a snapshot of the composition of households' wealth (Section 3.1), the chapter studies, from a macroeconomic viewpoint, changes as well as cross-country differences regarding factors affecting the various savings motives (Section 3.2). The use of household surveys complements the macroeconomic analysis, studying in particular the relationship between savings and savings motives and households' demographic and social-economic characteristics. Developments and cross country differences in household investment are then analysed, with a focus on factors driving households' investment decisions, before taking a further look at the role of household indebtedness, as an indicator of possible vulnerabilities in terms of financial stability (Section 3.3).

3.1   Developments in households' savings and the composition of households' wealth[66]

Chart 22

Euro area household savings rate, consumer confidence and macro-economic uncertainty

(left-hand scale: in percentages of disposable income; right-hand scale: standardised)
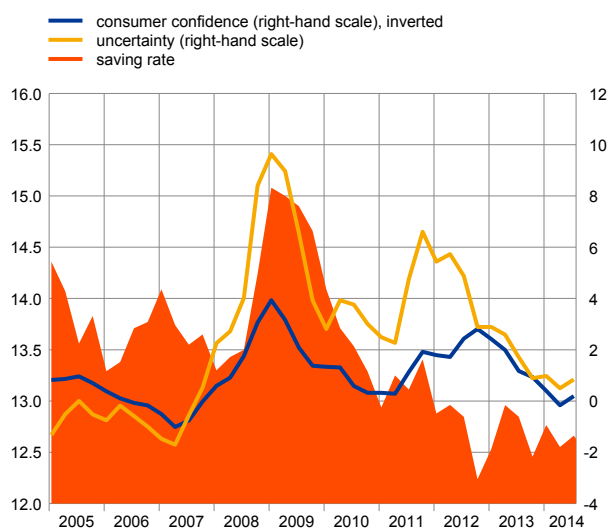
Sources: Eurostat, EU-SILC.

Since the beginning of the crisis, euro area households have had to adapt their decisions to an adverse macroeconomic backdrop, characterised by a high degree of uncertainty, accompanied by a marked decrease in consumer confidence (Chart 22). Following the outbreak of the financial crisis in 2008, the indicator of macroeconomic uncertainty in the euro area, which is a summary measure of various measures of economic, financial and economic policy uncertainty, picked up sharply, reflecting similar developments across all its components.[67] After falling back somewhat in the course of 2009 and 2010, all indices then rose again in the second half of 2011, during the euro area sovereign debt crisis.

Against this background, the household savings rate, as a percentage of their disposable income, temporarily increased in most of the countries during the early stages of the crisis, as households appeared to increase their precautionary savings (Chart 23).[68]

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[65]   Coordinated by Katrin Forster (ECB).

[66]   Prepared by Alberto Urtasun (ES).

[67]   For more details on the macroeconomic uncertainty indicator, see Box entitled "How has macroeconomic uncertainty in the euro area developed recently?" in the October 2013 of the ECB Monthly Bulletin.

[68]   For further evidence, see Estrada et al (2014). Analysing a panel of OECD countries, this study finds that precautionary savings influenced household decisions especially during the 2007-2009 period.

Chart 23

Developments in households' savings rate across euro area countries

(in percentages of disposable income)
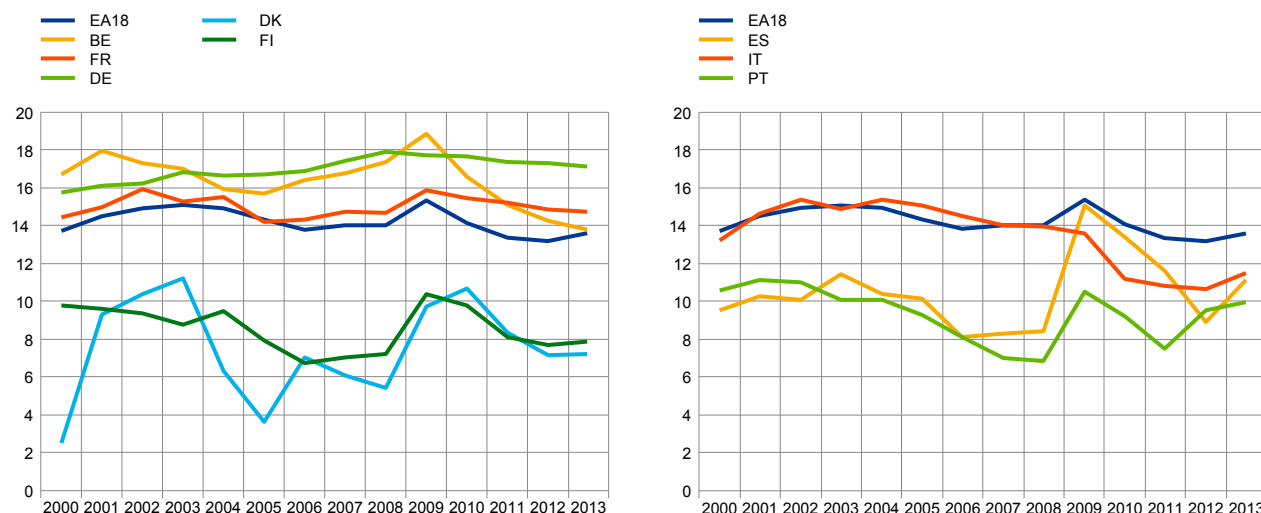
Source: Eurostat.
Notes: The charts refer to gross savings rates, for households and non-profit institutions serving households. All calculations are based on ESA 2010 data. Cyprus, Greece and Luxembourg were excluded from this analysis as they either do not provide such data or as the most recent data appear too preliminary.

In some countries subject to a high degree of macro-financial uncertainty, like Ireland, Portugal and Spain, the pick-up in the savings rate was particularly pronounced and, in spite of the downward correction in the 2010-11 period, stayed in 2013 at a higher level than observed before the crisis. By contrast, in Italy, the savings rate has been on a downward path since 2006 and was below the euro area average by the end of 2013. In other countries, such as Germany and France, savings rates have remained relatively stable and generally above those registered by the stressed countries.

Chart 24

Gross disposable income and breakdown by end-use

(annual percentage growth of disposable income; contributions to changes in disposable income in percentages points)
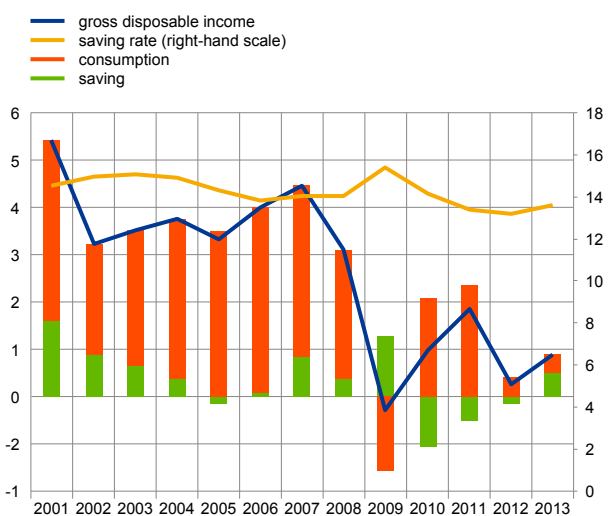
Sources: Eurostat and Eurosystem staff calculations calculations.

The fluctuations in the household savings rate during the crisis suggest the presence of factors with countervailing influences on this variable, relating both to developments in households' disposable income and the sensitivity in consumption to these changes.[69]

In general, households' savings behaviour has been largely influenced by changes in disposable income (Chart 24). In the period before the crisis, disposable income and the savings rate of the euro area were broadly stable. In 2009, however, the developments in the savings rate and disposable income diverged. As a consequence of the impact of the financial crisis, the nominal income and private consumption of the euro area households decreased sharply.

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[69] For evidence for Spain and Italy, see Arce, Prades and Urtasun (2013) and Rodano and Rondinelli (2014), respectively.

The savings rate picked up, mostly due to precautionary reasons. Since 2010, the importance of precautionary reasons might have declined somewhat and household income began to increase, in spite of continuing, significant job destruction and the onset of a severe fiscal consolidation process in some countries. This increase was accompanied by a fall in savings and by increases in household nominal consumption. The fact that the savings rate has remained lower than its pre-crisis level appears consistent with some consumption-smoothing behaviour by euro area households. To the extent that reductions in income, when compared with the pre-crisis level, were perceived as temporary, this appears to have resulted in reductions in the savings rate. It is also possible that the propensity to save decreases during phases of very sharp declines in income as households may encounter short-term obstacles to adjusting their consumption by the same proportion. These obstacles may stem from the existence of habits, minimum consumption thresholds for certain goods and contractual relationships for the supply of certain services, which, overall, seem to reduce households' capacity to respond in the short-term to negative shocks in their income (see, for example, Carroll et al. (2008) and Slacalek (2009)). Beyond this, there is also evidence that other factors, particularly the dynamics of housing debt and deleveraging, may have accentuated the impact of the traditional determinants of consumption in some countries (see, for example, Estrada et al. 2014).

As for the savings rate, there have also been different patterns in consumption, income and savings across the euro area member states (Chart 25). In the period before the crisis (left-hand panel of Chart 25), disposable income increased in

Chart 25

Gross disposable income and savings rate by country

(average annual changes in the savings rate and gross disposable income, average contributions of savings and consumption to changes in disposable income in percentage points over the respective periods)

(a) 1999 – 2007

- income
- consumption
- saving
- saving rate

(b) 2008 – 2013

- income
- consumption
- saving
- saving rate
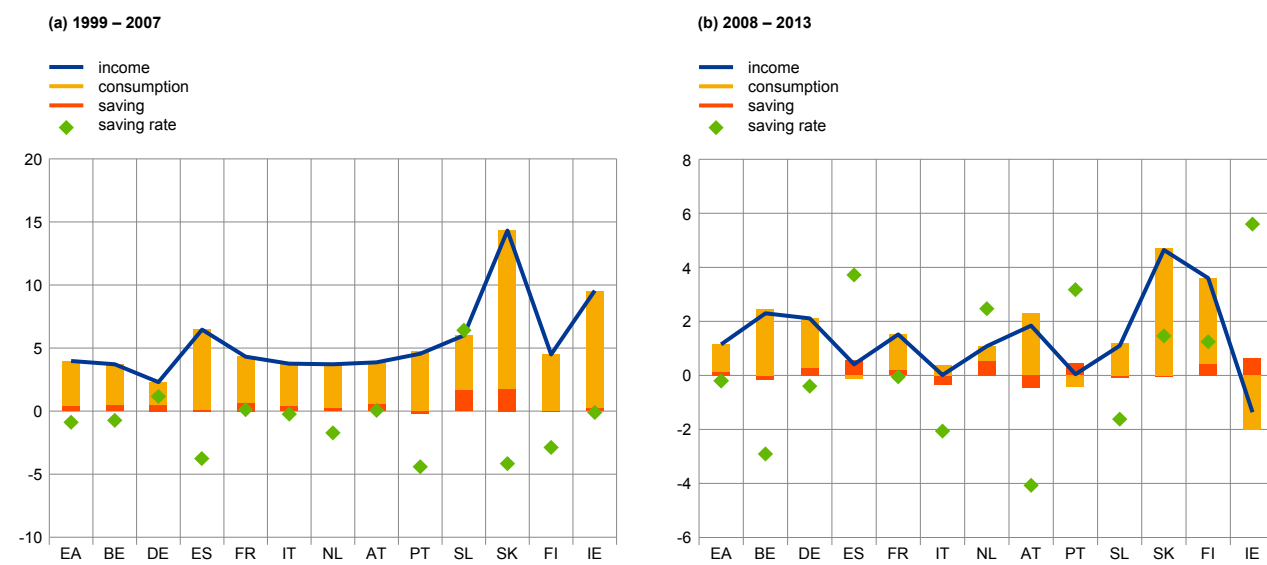
Source: Eurostat.
Notes: All calculations are based on ESA 2010 data. Cyprus, Greece and Luxembourg were excluded from this analysis as they either do not provide such data or as the most recent data appear too preliminary.

Table 1

The distribution of net wealth in the euro area

(EUR thousands)

	Median	Mean
EA18	109.2	230.8
BE	206.2	338.6
DE	51.4	195.2
GR	101.9	147.8
ES	182.7	291.4
FR	115.8	233.4
IT	173.5	275.2
CY	266.9	670.9
LU	397.8	710.1
MT	215.9	366
NL	103.6	170.2
AT	76.4	265
PT	75.2	152.9
SI	100.7	148.7
SK	61.2	79.7
FI	85.8	161.5

Source: HFCS first wave (2009/11).

Chart 26

Composition of total assets

(percentages)
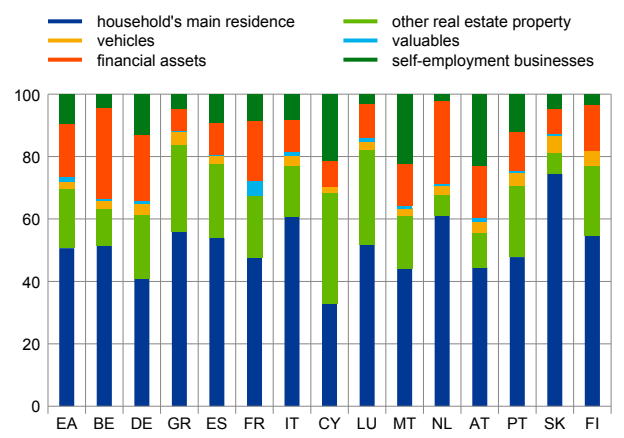
Sources: HFCS first wave (2009/11).

all euro area member states, with most countries registering a rise in the savings rate. Since 2009, disposable income has decelerated significantly in some stressed countries such as Italy and Portugal. However, although in Italy the decline in consumption was not enough to offset the decrease in income, resulting in a further decline in the savings rate until 2013, the savings rates in Spain and Portugal in 2013 were above their respective levels in 2008. By contrast, in Germany and France, gross disposable income continued to grow over the more recent period, allowing consumption to increase while maintaining the savings rate at a relatively stable level.

Before analysing in more detail the factors driving the savings rate, Table 1 and Chart 26 provide an overview on the distribution of net wealth and the composition of households' assets across euro area countries. As for savings,[70] the distribution of wealth is very unequal, with wealth being highly concentrated at the top end of the wealth distribution. In the euro area, the top decile holds more than 50% of net wealth, while 50% of the households below or just at the median level hold only 12% of net wealth. As regards the composition of assets, real assets represent the predominant asset category in all euro area countries (accounting on average for 85% of total assets), but differences in the composition of aggregate wealth are considerable. While the value of the main residence tends to be the major asset for homeowners and represents a significant part of total assets in all countries, homeownership varies strongly between countries, ranging from 44% in Germany to 90% in Slovakia. All other asset categories account for substantially smaller shares of gross wealth.

3.2   Factors driving the households' savings rate[71]

3.2.1   The theoretical determinants of household savings

Most contemporary consumption-savings theories can trace back their foundation to the life-cycle hypothesis (Modigliani and Brumberg (1954) and Ando and Modigliani (1963)), which, in its simplest form, posits that consumers try to maximise their lifetime expected utility subject to an inter-temporal budget constraint. The optimal

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[70]   For more details, see Section 3.2.

[71]   Prepared by Sonia Costa, William Gatt, Christophe Piette and Filippo Scoccianti.

solution is that consumers facing a rising age-income profile will try to smooth their consumption through time by borrowing when young and repaying their debt later in their life-cycle. Therefore a household is expected to borrow and dissave at a young age, accumulate resources during middle age and dissave again after retirement. Hence age, demographic structure and real disposable income, i.e. earnings plus investment income[72] and government transfers, are generally considered as important variables in shaping households' savings behaviour.

Public insurance schemes also influence households' savings (Feldstein (1985)). In particular, the availability of generous government-provided retirement income programs should substantially reduce the incentive for younger households to save. Indeed, in the presence of a "pay-as-you-go" pension system households could consider their retirement benefits as a substitute for their working-age savings and as a result could tend to reduce their pre-retirement savings. It must be noted though that such a depressing effect on private savings stems from a very restricted form of the life-cycle hypothesis, in which intergenerational private transfer schemes are not taken into account.

Simple versions of the life-cycle model assume that individuals are far-sighted and that future variables such as income, interest rates, family composition, rate of survival and date of death are known with certainty. This so-called certainty equivalence assumption was relaxed towards the end of the 80's (Blanchard and Mankiw (1988) and Zeldes (1989)), and the effect of uncertainty, in particular on income and on households' savings behaviour has been investigated. If income streams are stochastic, then risk-averse households will tend to show a precautionary behaviour in their consumption patterns by accumulating a buffer stock of wealth to insure themselves against possible negative shocks (Carroll (2001)).[73]

Other key assumptions and predictions of the basic version of the life-cycle model have not been supported by empirical evidence and have thus prompted a search for new mechanisms and variables that can be relevant in accounting for households' savings behaviour. In particular, although the basic model assumes perfect capital markets, so that households face no impediments in borrowing against their future income to finance current consumption, households in practice do face limits on their ability to borrow against their future resources. Young low-income households, in particular, may face liquidity constraints that prevents them from consuming as much as they would like to, causing their consumption path to increase over the life-cycle[74] (see evidence in Campbell and Mankiw (1990); Carroll and Summers (1991).[75] Once the assumption of perfect capital markets is relaxed, the structure of credit institutions

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[72] Interest rates on savings can exert both an income effect and a substitution effect, as the interest rate can be viewed as the opportunity cost for consumption (see. e.g. Hüfner and Köske (2010). According to this article's estimates the substitution effect prevails in the countries analysed.

[73] Uncertainty is not limited to income, but can also comprise health shocks or the exact time of death. Precautionary behaviour linked to health shocks, in particular, has been invoked to justify the slow path of dissavings by retirees observed in the data for many developed economies.

[74] Together with a decreasing profile for the marginal utility of expenditure.

[75] This observation has to a certain extent reanimated the Keynesian Absolute Income Hypothesis, which placed emphasis on income as the key driver of consumption, and hence savings. Credit-constrained households have also been introduced in modern state-of-the-art models (see, inter alia, Kumhof et al. (2010) and Gomes et al. (2012).

becomes relevant. The majority of household's credit is linked to mortgages, hence consumers in countries with relatively limited access to credit must accumulate a larger down-payment, and accordingly save a higher fraction of their income, before they can purchase a home. Conversely, the higher the ratio of credit to disposable income in a country, the lower its households' savings rate is expected to be.

A growing literature has focused on the effect of a relaxation of borrowing constraints on consumption growth, finding this effect to be quantitatively sizable both in explaining increases in consumption – and thus ceteris paribus a decrease in savings – in periods of rapid credit growth (Carroll (2001), Muellbauer (2008)), as well as prolonged reductions in consumption following a credit crunch (Guerrieri and Lorenzoni (2011); Hall (2011). Muellbauer (2008), in particular, finds that the effects of changes in housing wealth effects on consumption are much stronger in periods of rapid credit growth and can even be greater than the effects related to changes in liquid wealth.

Chart 27

Households' gross debt-to-income ratio

(in percent)
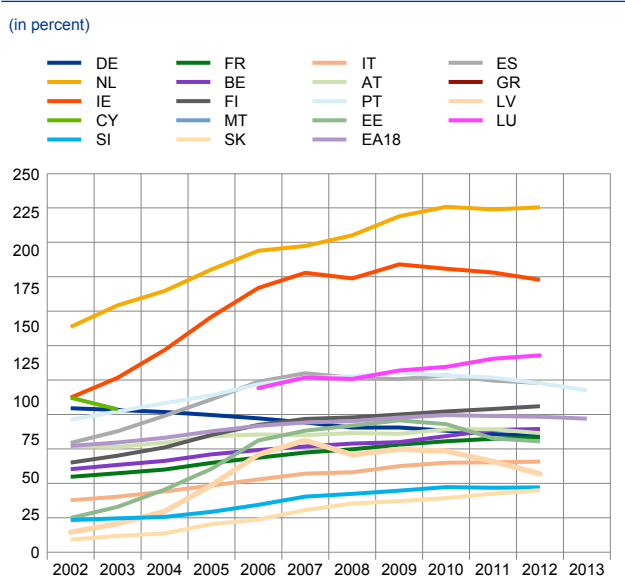
Source: Eurostat.

Given the sizeable increases in household sector debt observed across many countries (Chart 27) prior to the crisis and the need for balance sheet repair, recent studies[76] show that household debt reduction tends to be accompanied by increases in savings, partly linked to factors already considered above. A tightening in credit conditions, for instance, is typically accompanied by a reduction in debt and an increase in savings as households cannot borrow as easily as before to offset negative income shocks. Similarly, house price declines are associated with lower debt, as they reduce the availability of home-equity-based borrowing, leading to lower consumption. Beyond this, households may target a given level of leverage and reduce their consumption to restore assets in response to a negative wealth shock (Dynan (2012)) based on household-level data for the United States).[77] However, given that household deleveraging has so far remained limited, the available studies generally conclude that household balance sheet adjustment has not been an important factor behind the sluggish economic recovery. Macro-economic risks related to future household deleveraging nevertheless remain. According to a recent analysis by the European Commission, households in at least seven euro area countries exhibit a high likelihood of a need for further significant deleveraging.[78]

Finally, developments in fiscal policy could also influence households savings behaviour, in line with the insight provided by the Ricardian equivalence theory: after an increase in public debt, households would tend to save more in expectation of

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[76] See, for instance, Bouis et al. (2013), Cooper (2013), Cuerpo et al. (2013), McCarthy and McQuinn (2014) and Lydon (2013).

[77] Analysing countries' financial accounts could help identifying the part of higher savings related to deleveraging.

[78] See European Commission (2014).

higher taxes by the government in the future.[79] Hence, over the long run, countries characterised by relatively higher levels of public debt should also have higher accumulated savings by households.

3.2.2 The dynamics of credit to income growth

Given the relevance of the credit channel in the empirical findings reported below, we briefly document the relation between households' savings and the dynamics of household credit growth in some euro area countries between 2000 and 2013. In the pre-crisis period (2000-2007) some countries (especially Greece and Portugal and to a smaller extent Belgium, Finland and the Netherlands) have been characterised by declining households' savings rates on the backdrop of a marked increase in their respective loans-to-income ratios. Another group of countries (Austria, France, Ireland, Italy and Spain) did also experience a rapid expansion in credit, which, however, was not associated with a decline in households' savings (Table 2).

Table 2

Savings, income and credit dynamics

(in percent)

	Austria	Belgium	Germany	Greece	Spain	Finland	France	Ireland	Italy	Netherlands	Portugal
Absolute changes in households saving rate											
2001-2007	2.1	-0.4	1.8	-2.4	-0.7	-0.9	1.2	1.6	1.5	0.8	-3.6
2008-2013	-4.5	-1.5	-0.7	-15.6	0.1	1.8	1.3	1.0	-2.6	-1.6	5.7
2001-2013	-2.4	-1.9	1.0	-18.0	-0.6	0.9	2.5	2.6	-1.1	-0.9	2.0
Percentage changes in real disposable income											
2001-2007	14.2	8.7	5.0	30.9	26.6	25.9	17.3	31.8	8.2	2.3	7.2
2008-2013	-0.3	4.4	5.2	-18.7	-9.7	6.4	5.0	-7.5	-10.3	-6.9	-2.8
2001-2013	13.9	13.6	10.5	6.4	14.3	33.9	23.1	21.9	-2.9	-4.8	4.2
Percentage changes in consumption											
2001-2007	11.6	9.3	2.9	33.2	27.8	27.2	15.6	29.6	6.4	1.4	11.5
2008-2013	5.0	6.3	6.1	-5.5	-9.9	4.2	3.4	-8.5	-7.6	-5.2	-8.7
2001-2013	17.3	16.1	9.2	25.9	15.2	32.6	19.6	18.7	-1.7	-3.9	1.8
Absolute changes in loans-to-disposable income											
2001-2007	12.2	12.8	-10.6	46.5	60.5	34.2	16.4	87.0	23.1	21.2	44.0
2008-2013	1.2	15.7	-11.5	32.5	-6.1	13.5	14.1	2.2	9.8	29.8	-2.9
2001-2013	13.4	28.5	-22.1	78.9	54.4	47.7	30.5	89.1	32.9	51.0	41.0

Source: Eurostat.
Note: for Ireland data start in 2002; for the Netherlands they start in 2005; for Greece they end in 2011.

Germany represents a notable exception to the patterns outlined above. Indeed, it is the only country that has recorded a contraction in its loans-to-income ratio over the entire 2000-2013 period and in both the sub-periods before and after the financial crisis. Moreover, no clear pattern emerges between the pace of credit contraction and German households' consumption, which kept increasing over the whole period.

Since 2008, loans-to-disposable income has slowed down substantially in all the countries considered, and turned negative in some of them. Lower growth in credit-to-income has been associated everywhere with markedly lower households'

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[79]   For a comprehensive review of the literature on Ricardian equivalence see Seater (1993).

consumption growth, which however has not yet translated into significant increases in households' savings, owing to the offsetting negative developments recorded on the income side.

3.2.3 Empirical estimates of the determinants of the savings rate in selected euro area countries

In order to assess the respective impacts of some of the factors discussed above on the recent trends in households' consumption and savings in the euro area, an econometric analysis was performed based on a model estimated using a panel dataset comprising eleven euro area countries over a period spanning from the first quarter of 2000 to the last quarter of 2013. The model's dependent variable is private consumption rather than the savings rate, as it was not possible to estimate a model for savings rates in the euro area countries given that it turned out to be stationary over the sample period, while their determinants are not.

Table 3

Long run determinants of private consumption estimated elasticities

(Sample period 2000Q1-2013Q4)

Real disposable income (log.)	0.58***
Loans-to-income ratio	0.05***
Gross public debt (% of GDP)	-0.02
Real house prices (log.)	0.08***
Real share prices (log.)	0.02***
Real deposit rate	-0.15*
Unemployment rate	0.00

Elasticities are estimated on the basis of the pooled mean group estimator (Pesaran et al.,(1999)). See the Appendix to Chapter 3 A. for more details.
*, **, *** indicate significance at the 10%, 5% and 1% levels respectively.
Note: the dependent variable, i.e. the level of private consumption, is expressed in logarithmic form.

The impact of potentially important explanatory variables was investigated, namely real disposable income, the loans-to-income ratio (which was chosen as a measure for both households' indebtedness and their ease of access to credit), the gross public debt (to proxy the impact of Ricardian equivalence), real share prices and real house prices (both accounting for wealth effects), the real interest rate (as a measure for the opportunity cost of consumption) and the unemployment rate (as a proxy for uncertainty of future income). The equations are specified as an error correction model, making it possible to distinguish between the long-run relationship, which links the level of the dependent variables to that of the explanatory variables, and the short-run dynamics. The estimates for the long-run relationship are reported in Table 3. They were obtained using the Pooled Mean Group (PMG) estimator proposed by Pesaran et al. (1999), assuming that the elasticities from the long-run relationship are homogeneous across countries.[80] The reader is referred to Appendix to Chapter 3.A for more detailed information on the econometric approach.

All the variables included in the model have a significant impact on private consumption, with the exception of the unemployment rate and gross public debt, suggesting that uncertainty and the Ricardian effects were not at work during the period under analysis. The taxes-to-income ratio was also used as a proxy to test for this relationship (results not shown), which, however, gave similar conclusions. As expected, the elasticity pertaining to real disposable income is large, reflecting the fact that this variable was the main structural determinant of private consumption during the considered period. Real house prices and real share prices show that wealth effects are, ceteris paribus, positively related to consumption, and hence

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[80] Pesaran et al. (1999) used their PMG estimator to estimate consumption functions for 24 OECD countries. Another application of the PMG estimator can be found in de Serres and Pelgrin (2003), who used it to investigate the determinants of the savings grates in 15 OECD countries.

exert a negative effect on savings. The positive coefficient for the loans-income ratio implies that this variable proxies credit availability, as an increase in this ratio is associated with a decline in savings. An increase in the real deposit rate, which proxies an increase in the opportunity cost of consumption, is associated with an increase in savings.

In addition, detailed estimation results pertaining to the country-specific short-run dynamics (reported in Appendix to Chapter 3.A) highlight the importance of the persistence of consumption habits and of income uncertainty – proxied by the unemployment rate – on consumption and savings decisions. The estimates suggest that uncertainty had a significant impact on private consumption in Finland, Ireland, Italy, Portugal and Spain after the onset of the crisis in 2008 and the ensuing increase in unemployment.

Chart 28 breaks down the influence of the determinants of consumption from the estimated model on the basis of the long-run elasticities. In addition to disposable income, credit granted to households also appears to have been an important driver of consumption – and therefore on savings – in the stressed euro area countries, i.e. Greece, Ireland, Spain and Portugal, as well as in the Netherlands, in the pre-crisis period. The estimated wealth effects, through real estate assets, on consumption are important in many of the countries considered.

Chart 28

Estimated contributions to average consumption growth

(predictions based on the long-run elasticities reported in Table 3; the growth rate is calculated as logarithmic differences divided by the sample size)

(a) 2000Q2* - 2007Q4

- real disposable income
- loans-to-income ratio
- real house prices
- other variables
- observed private consumption growth

(b) 2008Q1-2013Q4

- real disposable income
- loans-to-income ratio
- real house prices
- other variables
- observed private consumption growth
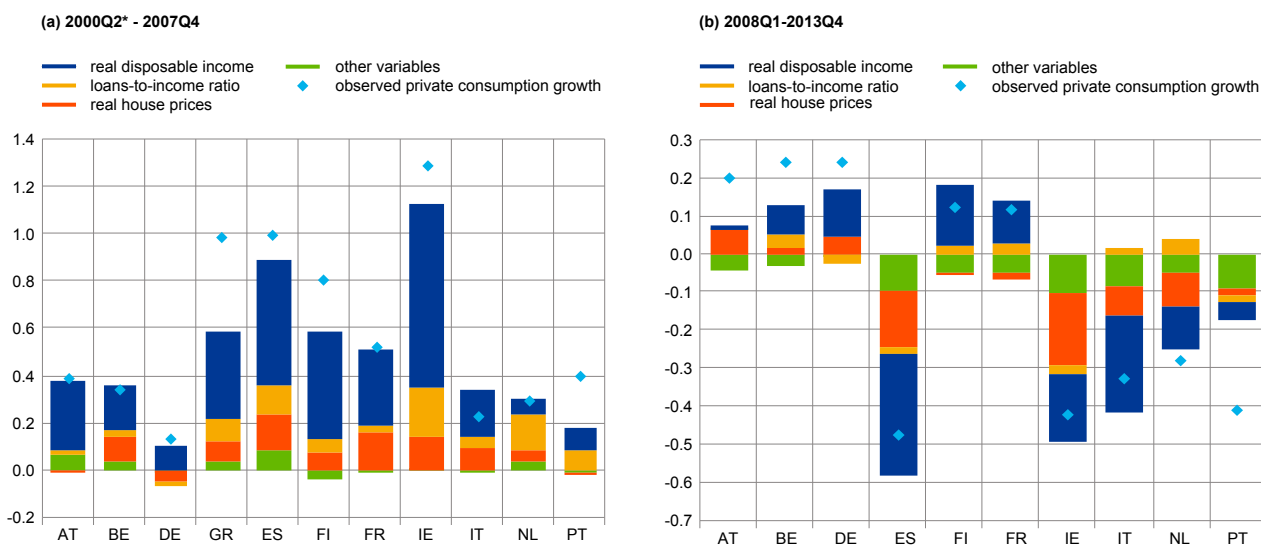
Source: Authors' calculation.
Notes: *Except for Greece, Ireland and Spain, for which the sample periods start in the second quarter of 2001, 2002 and 2003, respectively. Due to missing national accounts data, contributions over the period 2008Q1-2013Q4 could not be calculated for Greece. The difference between the model prediction and observed consumption growth is essentially attributable to the error term of the equation (by definition, the variables included in the short-run dynamics have only a negligible impact over a long period).

The negative developments in disposable income were naturally the main driving factors in the fall in private consumption between 2008 and 2013 in the stressed countries, and explain as well the weak consumption growth in the rest of the euro area, with the exception of Germany. The measured impact of the wealth effect that resulted from the decline in house prices experienced by some countries during that

period is also considerable, in particular in Spain and Ireland.

Overall, the empirical investigation using panel data for selected euro area countries provided evidence that household savings and consumption in euro area countries have, in line with theory, been largely driven by a consumption-smoothing motive, but credit constraints and wealth effects have also been (statistically) significant drivers of consumption and savings behaviour in a number of euro area countries.

3.2.4 Evidence from household surveys

Based on micro data, this subsection analyses households' savings behaviour in euro area countries, by first identifying some stylised facts relating to the savings distribution by households' characteristics and then by using data on self-reported savings motives in order to better understand the factors driving households' savings behaviour.

3.2.4.1 Distribution of savings in the population and by household characteristics

In order to understand the main stylised facts relating to households' savings, this subsection presents statistics on savings, consumption and income in some euro area countries. For comparison, Box 6 looks at the determinants of household savings decisions in Central, Eastern and Southeastern European (CESEE) countries which have not yet adopted the euro. This data were in most of the cases, calculated for the purpose of this Occasional Paper by the National Central Banks or the Statistical Offices.

The data sources are household budget and household wealth surveys and the time periods vary between 2008 and 2014 (see Appendix to Chapter 3.B for a description of the data). The concepts underlying the computations were to a certain extent harmonised for the purposes of this study. Nonetheless, given the different sources and time periods underlying the data, the results will be mainly used to infer broad patterns in savings behaviour.[81]

The micro data illustrates several stylised facts often found in the literature (Browning and Lusardi (1996)). First, there is high inequality in the distribution of savings. Most of the household savings in each country is generated by only 20% of the households and in most countries a significant proportion of households have negative savings (Chart 29). Second, the asymmetric distribution of savings seems to reflect to a large extent the distribution of income. In most countries, 20% of the population with the highest income is responsible for more than 60% of total savings (Chart 30).

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[81]   When analysing this data it is important to take into account the fact that the households' savings rate obtained from household surveys is in general higher than that from national accounts due to measurement errors and methodological differences. In household surveys both consumption and income are typically lower than in national accounts, but the discrepancy in consumption is generally higher (see Fesseau et al. (2013)).

Chart 29

Distribution of savings by savings percentiles

(in percent of total savings)
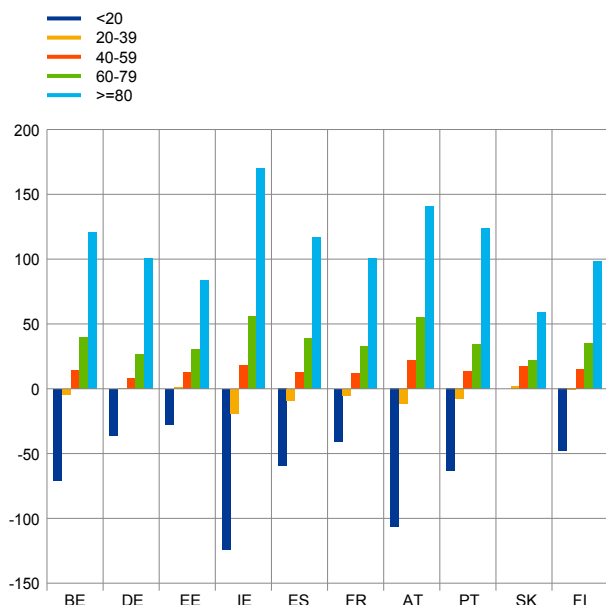
- <20
- 20-39
- 40-59
- 60-79
- >=80

Source: National household surveys (see Appendix to Chapter 3 B.).
Note: In Slovakia, negative savings are reported as zeros.

Chart 30

Distribution of savings by income percentiles

(in percent of total savings)

- <20
- 20-39
- 40-59
- 60-79
- >=80

Source: National household surveys (see Appendix to Chapter 3 B.).
Note: In Slovakia, negative savings are reported as zeros.

Chart 31

Median savings rate by income percentiles

(in percent of total savings)

- <20
- 20-39
- 40-59
- 60-79
- >=80

Source: National household surveys (see Appendix to Chapter 3.B).
Note: In Slovakia, negative savings are reported as zeros.

Third, the savings rate also increases with income (Chart 31). In fact, although households with higher income consume more, the increase in consumption is less pronounced than the increase in income. Part of the positive correlation between current income and savings might be due to the smoothing of consumption after transitory variations in income. Nevertheless, for the majority of countries, the median savings rate is highest among the households whose reference person has a high education level, which suggests savings might also be positively related to permanent income (Chart 32). This relation, which is often found in the empirical literature[82], contradicts the predictions of the standard life-cycle model, but can be reconciled when this model introduces precautionary savings against uncertain expenditures late in life, a bequest motive or wealth as a luxury good (Dynan et al.(2004) and Carroll (1998)).

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[82] For instance, Garbinti and Lamarche (2014), compute French households' permanent income using different methods and conclude that savings rates in France are positively related to both current and permanent income.

Chart 32

Median savings rate by education of the reference person

(in percent of total savings)

- primary or no education
- secondary
- tertiary

Source: National household surveys (see Appendix to Chapter 3.B).
Note: In Slovakia, negative savings are reported as zeros.

Chart 33

Median savings rate by age of the reference person

(in percent of disposable income)

- <35
- 35-44
- 45-54
- 55-64
- 65-74
- >=75

Source: National household surveys (see Appendix to Chapter 2 B).
Note: In Slovakia, negative savings are reported as zeros.

As expected, for most of the countries, the median value of income increases initially with the age of the reference person[83] and declines for the highest age classes (Chart 33). Consumption tends to track income closely, suggesting households do not fully smooth their consumption. Thus the hump-shaped profile of savings predicted by the baseline life-cycle theory is not very clear in the data. In fact, in some countries savings are relatively high for households with young reference persons. On the other hand, savings are positive and significant for the households whose reference person is older than 65 years and in several countries is even higher for the households with reference persons older than 75 years. Reflecting this behaviour, in most countries, the savings rate reaches its maximum value for the old-age households (Chart 34). This departure from the predictions of the standard model of consumer behaviour must be interpreted carefully given that the data is not corrected for cohort and time effects or for household composition.[84]

Additionally, in some countries there is probably an overestimation of the savings rates in the very old due to the exclusion from the survey samples of nursing home residents, who strongly dissave (Ziegelmeyer (2012)). Nevertheless, the observed distribution of savings by age, and in particular the "retirement savings puzzle" which is often found in the empirical literature, might also be partially explained by economic factors, as will be discussed in the second part of this subsection.

The above findings are also broadly confirmed with a multivariate logit estimation for the relation between probability of savings and the main households economic and socio-demographic characteristics, using information from the Household Finance and Consumption Survey (HFCS) (see Box 5).

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[83]   As described in Appendix to Chapter 2.B in most cases the reference person was defined as the household member with the highest income.

[84]   As illustrated by several authors the variation in consumption over the life cycle is largely the result of changes in family size and composition (Attanasio and Weber (2010)).

Chart 34

Median saving, consumption and income by age of the reference person

(in percent of disposable income)

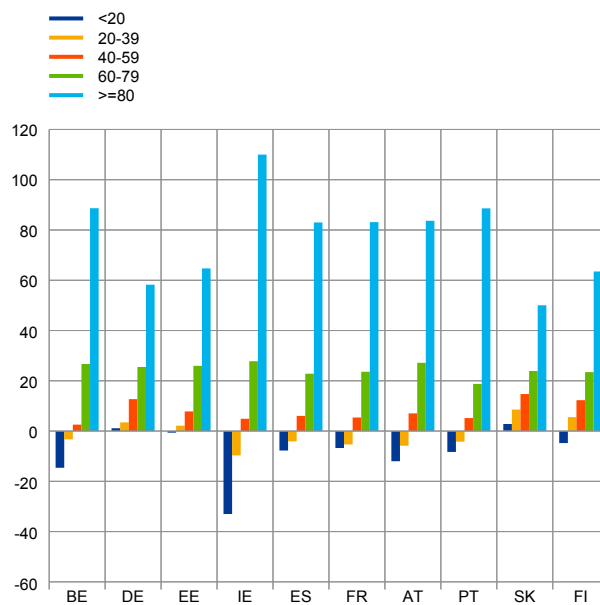- ▬ saving
- ▬ consumption (right-hand scale)
- ▬ income (right-hand scale)
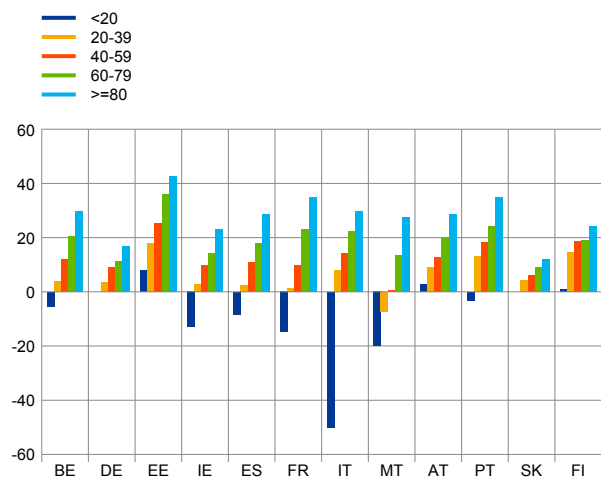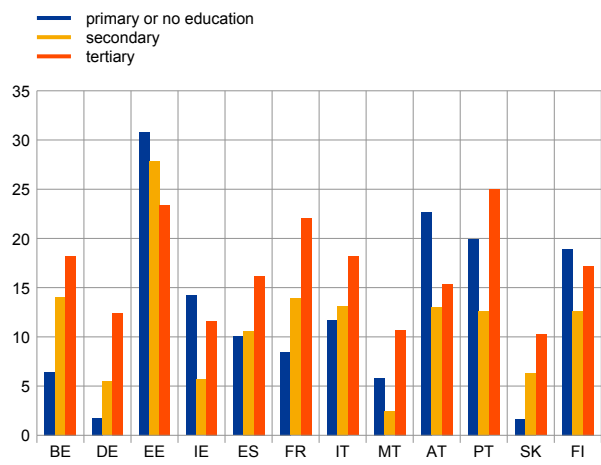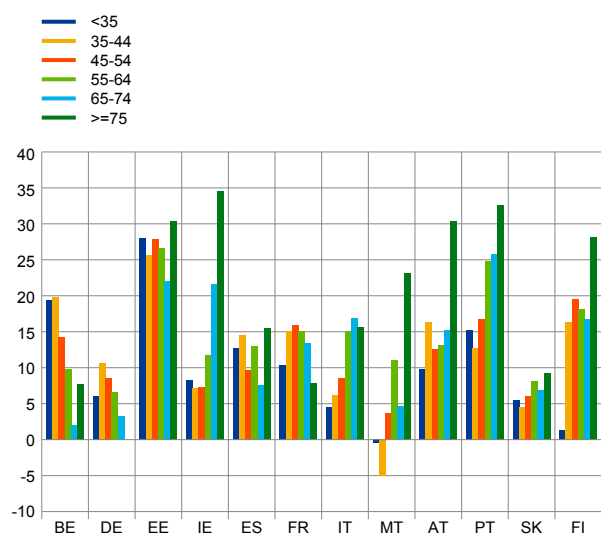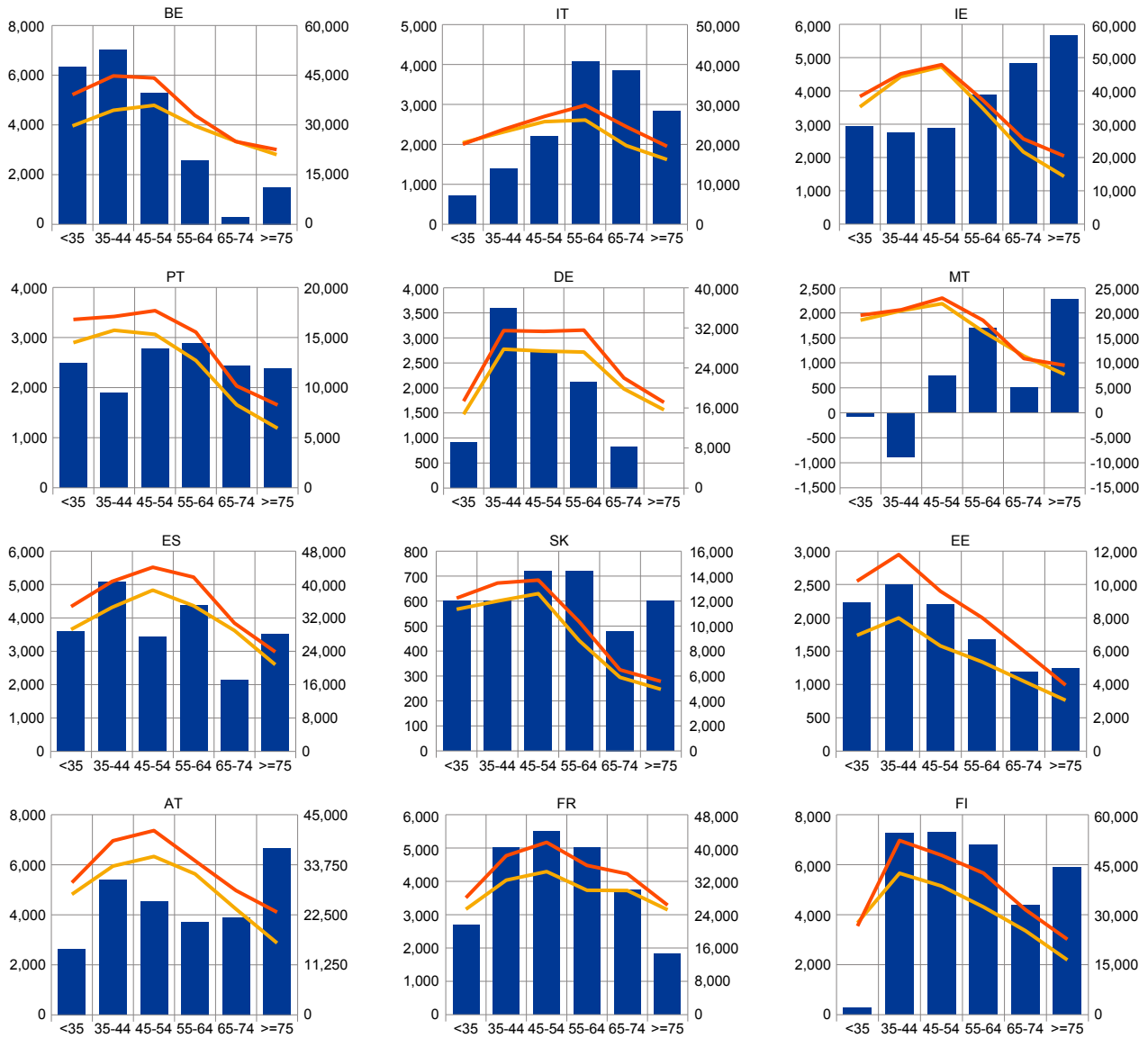
Source: National household surveys (see Appendix to Chapter 2 B).
Note: In Slovakia, negative savings are reported as zeros.

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Box 5

Euro area households' probability of savings: a multivariate analysis based on the HFCS data[85]

This box uses the Household Finance and Consumption Survey (HFCS) first wave (2009/11) data to analyse the relation between the probability of savings and the main households' characteristics (see Appendix to Chapter 2.C for a description of the HFCS).

In the HFCS households are asked if their regular expenses (excluding the purchase of assets) were higher, lower or just about the same as their income during the 12-month-period prior to the survey. About 40% of households in the euro area reported that they saved, around 50% spent about the same as their income, and about 10% spent more than their income. These answers might reflect an overreporting of null savings, so it should be viewed as a rough approximation to the savings behaviour that mainly reflects sizeable deviations from equality of spending and income (Kennickell (1995)).

The answers to this question were used to construct a dummy variable, taking value one for the households reporting positive savings and value zero for the remaining ones, which was used as dependent variable in a logit model for the probability of savings.[86, 87] The regressors included the main economic and socio-demographic characteristics of the household (income, net wealth and number of household members) and of the reference person (age, marital status, gender, level of education, and work status).[88] A variable controlling for the existence of debt and two variables to control for temporary shocks on income and on expenditure were also included. The first one identifies households claiming that the income reported in the interview was unusually low compared to a normal year, while the second identifies those households reporting higher-than-normal regular expenses during the twelve months preceding the interview.

Regression results are presented in Table. The regression was performed using the data for all countries participating in the first wave of the HFCS, excluding France, Finland and Malta due to the unavailability of data for some variables. Households with unusually low income have a lower probability to save, which is consistent with consumption smoothing, and supports the positive relation between current income and savings after a temporary shock to income. As expected households with higher-than-normal expenses have also a lower probability to save.

There is also evidence of a positive relation between savings and permanent income. First, even after controlling for the deviations of income from its normal level, the effect of current income is statistically significant, with households in lower income percentiles having a relatively lower probability to save. Second, households whose reference person has a high level of education

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[85]   Prepared by Sónia Costa (Bank of Portugal).

[86]   Given the possible over-reporting of null savings, an alternative endogenous variable excluding this type of households was also defined, but the results obtained were qualitatively similar.

[87]   Le Blanc et al (2014) perform a similar regression using the HFCS data although focusing on households with negative savings. The conclusions obtained are similar to the ones presented in this box.

[88]   The household reference person was chosen according to the UN/Canberra definition which applies the following criteria until a unique person in the household is identified: 1) one of the partners in a registered or de facto marriage, with dependent children; 2) one of the partners in a registered or de facto marriage, without dependent children; 3) a lone parent with dependent children; 4) the person with the highest income in the household; and 5) the eldest person in the household.

Table

Median savings rate by age of the reference person

(in percent of disposable income)

	Marginal effects	(t-statistics)
Income percentile		
Between 20 and 40	0.07***	(3.53)
Between 40 and 60	0.12***	(5.85)
Between 60 and 80	0.18***	(7.93)
Between 80 and 90	0.25***	(9.81)
More than 90	0.3***	(10.3)
Net-wealth percentile		
Between 25 and 50	0.09***	(5.44)
Between 50 and 75	0.12***	(6.85)
Between 75 and 90	0.17***	(9.03)
More than 90	0.18***	(7.6)
Number of household members		
Two	-0.05***	(-2.72)
Three	-0.11***	(-5.01)
Four	-0.16***	(-6.55)
Five or more	-0.2***	(-7.21)
Age		
35-44	-0.03	(-1.51)
45-54	-0.06***	(-3.02)
55-64	-0.05**	(-2.02)
65-74	-0.06**	(-2.03)
75 and over	-0.01	(-0.29)
Education level		
Secondary	0.02	(1.59)
Tertiary	0.08***	(4.73)
Work status		
Self-employed	-0.03	(-1.34)
Unemployed	-0.12***	(-4.13)
Retired	-0.04**	(-2.13)
Other not working	-0.16***	(-5.33)
Gender		
Female	-0.03***	(-2.62)
Marital status		
Married/Consensual union	0.02	(0.95)
Widowed	0.03	(1.35)
Divorced	-0.05**	(-2.04)
Have debt		
Yes	-0.08***	(-6.4)
Income unusually low		
Yes	-0.08***	(-5.72)
Expenditures unusually high		
Yes	-0.11***	(-8.18)
Constant	0***	(-5.03)
Country dummies	Yes	
Number of observations	33,941	

Notes: The results must be interpreted against the omitted categories in the regression which are: the first quintile for income; the first quartile for net-wealth; one for the number of household members; less than 35 years for the age; below secondary for the educational level; employee for the work status; male for gender; single for the marital status; and no for the existence of debt and for situations of income unusually low or expenses unusually high. The symbols *, ** and *** indicate that the coefficients are statistically significant at 10, 5 and 1 per cent levels, respectively.

present a higher likelihood of savings. Finally, the level of net wealth, which, once age is controlled for, can also be seen as a proxy for permanent income, is also positively related with the probability to save.[89]

As regards the labour market variables, households where the reference person is an employee display a higher probability of savings relative to households whose reference person is retired, unemployed or in another inactive situation. These results are in line with the life-cycle theory, which predicts savings will decline after retirement as well as in situations of temporary lower income.

Finally, the self-employed's probability to save is not significantly different from that of employees. Given the high labour income uncertainty associated with self-employed occupations, one might expect these kinds of households to save more for precautionary reasons. Nevertheless, there are several findings in the literature pointing to the fact that risk-averse individuals might choose occupations associated with less risky income paths, while less risk-averse individuals might prefer occupations with higher income risk (see for instance, Fuchs-Schundeln and Schundeln (2005)).

The probability of savings is higher for households with only one member, in line with the increase in consumption needs with the number of individuals. This effect might also reflect some decline in income uncertainty with number of household members.

The likelihood of savings is lower for households holding debt. This effect has to be interpreted with caution given that it might be in

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[89] The endogeneity problem associated with the inclusion of net wealth as a regressor should be mitigated by the fact that the dependent variable is a dummy and because wealth is typically a slow moving stock that is unlikely to be strongly affected by only one partially overlapping period of savings.

part determined by the fact that households almost certainly do not include the repayment of loan principal as savings.[90]

Finally, households whose reference persons are between 45 and 74 years old have a lower probability to save than younger households. In interpreting this finding it is important to take into account the fact that most of the factors underlying the hump-shaped profile for savings by age predicted by the life cycle theory are already incorporated in other variables in the regression (for instance, income or work status). For the higher probability of savings among the younger households might contribute the existence of liquidity constraints, which are typically more severe for this age group.[91] Another related explanation might be higher income uncertainty at the beginning of working life. By contrast, households with reference persons in the oldest age class do not present a significantly different probability to save relative to young households. This is in line with the old-age puzzle identified in the main text.

Chart 35

Savings motives of euro area households

(In percent)

1 Provision unexpected events
2 Old age provision
3 Other major purchases
4 Travel/holidays
5 Education/support of children
6 Purchase own home
7 Paying debts
8 Bequests
9 Invest financial assets
10 State subsidies
11 Business/Investment
12 Other
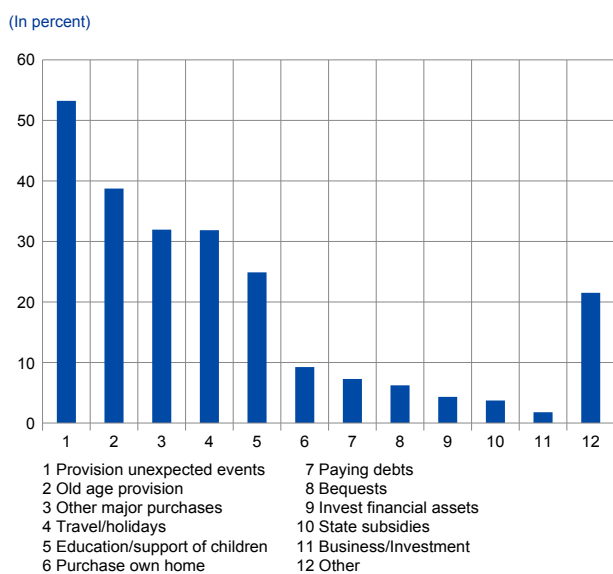
Source: National household surveys (see Appendix to Chapter 2 B).
Notes: The euro area aggregate includes data for all the euro area countries. Participating in the first wave of the HFCS, with the exception of Finland, France and Italy, where the question on saving motives is higher than 100 since each household might chose several motives.

3.2.4.2 Motives for savings

The previous analysis allowed for the uncovering of some robust stylised facts regarding the behaviour of savings in euro area countries. In order to understand the motives underlying these savings decisions and to have some clue as to the reasons for the deviations from the standard life-cycle model, this subsection takes advantage of the information included in the first wave of the HFCS. The HFCS, which was conducted in 15 euro area countries, in 2010/11 in most cases, includes data on the most important self-reported motives for savings (see Appendix to Chapter 3.C for more information on the survey). These data are collected with a multiple choice question, which means each household can identify several important reasons for savings. According to these data, in the euro area as a whole[92], the most important motive for savings is the provision for unexpected events, which captures the precautionary savings motive (Chart 35). The next most important motives are old age provision, major

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[90] As pointed out by Kennickell (1995), the answer to this type of question on savings is subject to classification errors. Besides not including the repayment of loan principal as savings, it is also highly unlikely that the depreciation in their physical capital is considered as dissavings.

[91] Including in the regression a dummy variable for the credit constrained households interacted with the age-classes, the conclusions are that younger households with credit constraints have a higher probability to save than credit-constrained households in the 55-65-year-old age class. This dummy takes value one for households that do not have a credit line or a credit card and, which in the three years prior to the survey had loan applications rejected or only partially satisfied or gave up making loan requests due to expected loan rejections.

[92] The euro area aggregate includes all the countries participating in the first wave of the HFCS, with the exception of Finland, France and Italy, where the question on savings motives is not asked.

Chart 36

Relative importance of different savings motives

(in percent)
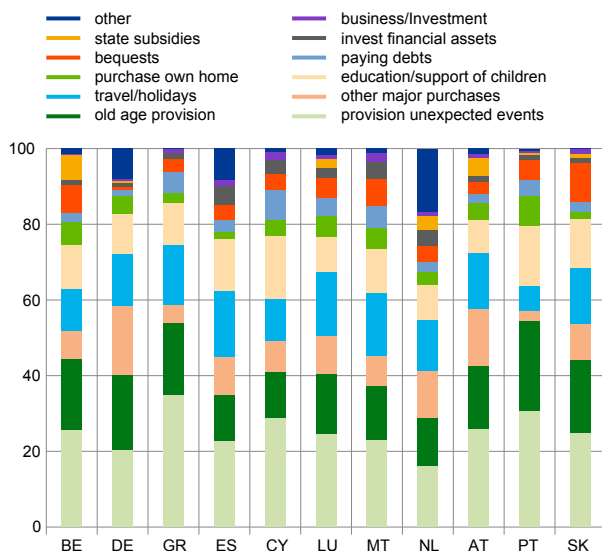
■ other	■ business/Investment
■ state subsidies	■ invest financial assets
■ bequests	■ paying debts
■ purchase own home	■ education/support of children
■ travel/holidays	■ other major purchases
■ old age provision	■ provision unexpected events

purchases other than own home (which includes, for instance, other residences, vehicles and furniture), travel/holidays and the education or support of children or grandchildren.[93] The relative importance of the different motives is rather similar across countries (Chart 36).

The data on savings motives are useful to better understand the savings behaviour of different households. With that aim, Chart 37 a,b,c present the percentage of households choosing each of the most important motives, by age class of the reference person, by income percentile and by net-wealth percentile, respectively.[94]

In the case of age, the percentage of households choosing savings for old-age provision as an important motive increases until the retirement age and declines afterwards. This kind of hump-shaped profile is not found in the other motives for savings, which might explain the deviations in the savings behaviour from the predictions of the standard life-cycle model. For the provision for unexpected events, which is the most important motive across all age classes, the percentage of households choosing this motive does not change much with age.

This behaviour might reflect the existence of different reasons justifying precautionary savings in different age groups, for instance in the oldest, the health risk and in the youngest, the accumulation of a precautionary buffer of wealth at the beginning of working life. Savings for education/support of children and grandchildren are slightly more important for the 35-45 age class, in line with the predominance of households with children in this age group, but does not present also a significant age profile. By contrast, the importance of savings for bequests keeps an upward trend with age and thus might contribute to justify the persistence of high savings rates in old-ages (see for instance Lockwood (2012)). On the contrary, savings for major purchases and for travel/holidays decline with age and in a more pronounced way in very old ages. Savings for own-home purchases also decline with age and are particularly important for the youngest households.[95]

The greater importance for the youngest of the motives associated with larger expenses might be in part justified by the existence of liquidity constraints in this age group. In fact, according to the HFCS data, there is a higher incidence of credit

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[93] The relative importance of the savings motives does not change if one analyses separately households reporting positive and negative savings. Nevertheless, some small differences exist. For instance, paying off debts seems to be slightly more important for households with negative savings than for households with positive savings (Le Blanc et al, (2014)).

[94] The relations identified by this bivariate analysis are broadly confirmed by the results of Le Blanc et al. (2014), obtained with the HFCS data in a multivariate context.

[95] This behaviour is in line with the age profile of homeownership, which, as shown in HFCN (2013), increases with age until the age class of 55-64 years old and then drops slightly.

Chart 37

Importance of savings motives of euro area households
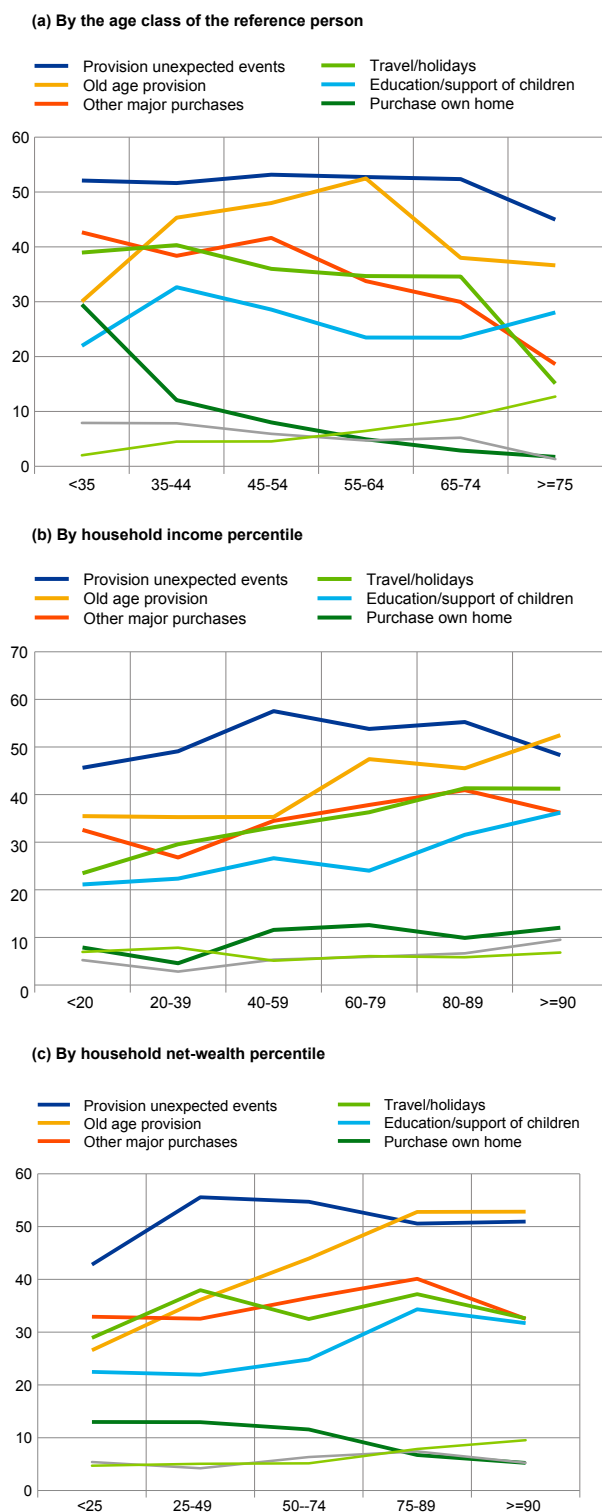
(a) By the age class of the reference person

Legend:
- Provision unexpected events
- Old age provision
- Other major purchases
- Travel/holidays
- Education/support of children
- Purchase own home

(b) By household income percentile

Legend:
- Provision unexpected events
- Old age provision
- Other major purchases
- Travel/holidays
- Education/support of children
- Purchase own home

(c) By household net-wealth percentile

Legend:
- Provision unexpected events
- Old age provision
- Other major purchases
- Travel/holidays
- Education/support of children
- Purchase own home

Source: HFCS first wave (2009/11).
Note: The euro area aggregate includes data for all the euro countries participating in the first wave of the HFCS, with the exception of Finland, France and Italy, where the question on savings motives is not available.

constrained households among the youngest (HFCN (2013) and Le Blank et al. (2014). Finally, savings for paying off debts present a declining trend with age, in line with the decline in the participation in debt markets (HFCN (2013) and Bover et al. (2013)).

As regards income and net wealth, the positive relation to the probability to save seems to a large extent associated with savings for old-age provision and savings for the education/support of children and grand-children. The importance of savings for bequests, which is one of the reasons often cited in the literature for the higher savings rates of the richest individuals, increases for the highest net-wealth percentiles, although it remains always a relatively minor motive for savings. The importance of savings for travel and for other major purchases is positively related with income but not with net-wealth. This might suggest these motives are particularly important in cases of temporary changes in income. Finally, the importance of savings for provision for unexpected events initially increases with income and net wealth, but then shows some decline. The fact that the importance of precautionary savings is the lowest among the poorest might reflect the existence of social insurance programmes directed for these groups (Hubbard et al. (1994)) and Huggett and Ventura (2000)). On the other hand, the decline in the relevance of precautionary savings for the wealthiest is consistent with the idea that a sufficiently large stock of wealth is a form of insurance against future economic constraints. In general, there is a high homogeneity across euro area countries regarding the importance of different savings motives. Savings for unexpected events are the most reported motive in all countries and across almost all types of households. The importance of precautionary savings might have been amplified by the recent crisis. In fact, there is both micro and macro evidence supporting the increase in the importance of the precautionary savings during the recent crisis (Mody et al. (2012)) and Bricker et al. (2011)).

Although the lack of suitable data, namely comparable panel data at household level, hinders the exploration of differences across countries, institutions and idiosyncratic macroeconomic factors play an important role in shaping households' savings. Börsch-Supan and Lusardi (2003) show that, all other things being equal, savings before retirement should be higher among

countries with low public pension replacement rates[96], early retirement ages and high exposure to income risk (due, for instance, to the high probability of unemployment or low generosity in the unemployment insurance scheme). Additionally, high borrowing constraints (for instance, high down-payment requirements) should contribute to higher savings at younger ages. Finally, in countries with low capital taxation (for example, low wealth and inheritances taxes) households should save more.

The evidence obtained for the euro area countries with some recent papers that use HFCS data, support the existence of some substitution effects between private savings and public pension schemes or public insurance mechanisms. Fessler and Schürz (2014) find that public expenditures on pensions, health and social security have a negative correlation with household net wealth levels. Le Blanc et al (2014) conclude the importance of savings for old-age provision declines with the replacement rate from the first public pillar and that the importance of savings for precautionary reasons decreases with the average income taxes. Finally, Bover et al. (2014), analysing the role of several institutional aspects and credit conditions, show that in countries with longer duration of foreclosures, the fraction of households with secured debt is smaller, the youngest households borrow lower amounts and the mortgage interest rates paid by low-income households are higher. One possible interpretation of these results is that in countries where legal processes delay the recovery of collateral in the case of non-repayment, households face stronger liquidity constraints and thus a higher need to save early in life.

Box 6

The determinants of households' savings decisions in Central, Eastern and Southeastern Europe[97]

This box looks at the determinants of household savings decisions in Central, Eastern and Southeastern European (CESEE) countries which have not yet adopted the euro. The main data source is the OeNB 20 Euro Survey of households, which is conducted semi-annually in six EU member states (Bulgaria, Croatia, Czech Republic, Hungary, Poland and Romania) and four (potential) EU candidate countries (Albania, Bosnia and Herzegovina, the former Yugoslavian Republic of Macedonia – FYROM – and Serbia). In each country the target population comprises residents aged 15 years or older and interviews are carried out face-to-face at the respondent's residence. Per country the final sample contains about 1,000 respondents. The survey collects information from individuals about the household's savings and borrowing decisions and the importance of the euro in these decisions. It elicits respondents' evaluations and expectations of the current and future economic conditions, personal experience of banking and currency crises, as well as socioeconomic information on respondents.[98] The countries covered by the survey are important to the euro area in terms of financial stability, as between 75% (Serbia) and 95% (Bosnia and Herzegovina) of the banks are foreign owned (EBRD (2012)), a significant percentage of which are based in the euro area. Furthermore, in the medium to long term, several countries in the region may join the euro area. As with households in the euro area since the beginning of the crisis, households in CESEE have had to take their savings decisions against an adverse

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[96]   Pension replacement rates correspond to the percentage of a worker's pre-retirement income that is paid out by a pension program upon retirement.

[97]   Prepared by Elisabeth Beckmann (AT).

[98]   For more information about the survey, see: http://www.oenb.at/en/Monetary-Policy/Surveys/OeNB-Euro-Survey.html

Chart A

Bank deposits to GDP

(in percent)
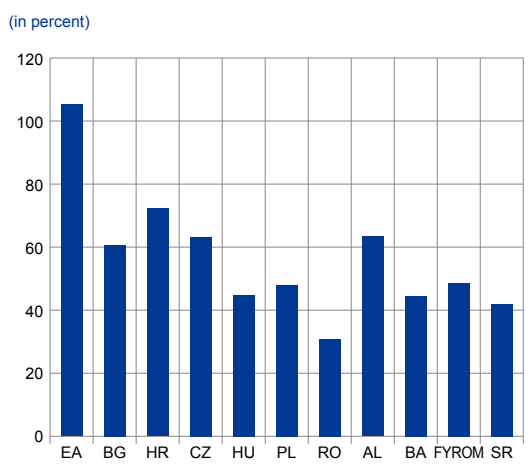
Source: World Bank Global Financial Development Database, 2011.
Notes: Total assets held by deposit money banks as a share of GDP. Assets include claims on domestic real nonfinancial sector which includes central, state and local governments, non-financial public enterprises and private sector. Deposit money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits. Demand, time and savings deposits in deposit money banks as a share of GDP, calculated using the following deflation method: $\{(0.5)*[F_t/P\_e_t + F_{t-1}/P\_e_{t-1}]\}/[GDP_t/P\_a_t]$ where F is demand and time and savings deposits, P_e is end-of period CPI, and P_a is average annual CPI.

macroeconomic backdrop. However, having gone through banking crises, currency crises and periods of hyperinflation during transition in the 1990s, CESEE countries provide a case study of the long-run impact of economic crises on households' savings behaviour.

As a rough proxy for the differences in stocks of financial wealth, Chart A shows that the differences in the share of deposits to GDP between CESEE countries are significant, ranging from 30% in Romania to 72% in Croatia; compared with the euro area at 105%, these values are still rather low.

One obvious reason for these differences in the stock of financial wealth could be the differences in income – GDP per capita is between 25% (Bosnia and Herzegovina) and 70% (Czech Republic) of the euro area GDP. In addition, similarly to the euro area (section v2.1) the crisis affected CESEE households' savings behaviour due to developments in disposable incomes. Across all the countries surveyed, only an average of 40% of households currently have any financial wealth[99]. Since 2008, 40% of households have had to reduce the amount of savings and 23% have had to utilise their financial wealth or sell assets in reaction to the economic crisis. Only a minority of respondents is currently able to save (Chart B).

Turning to the long-run impact of previous economic crisis on households' savings decision and looking at the savings behaviour of households who do have financial wealth, Chart C shows the percentage of savers that hold one or more savings instruments. Cash is the most widespread savings instrument in all countries, followed by current accounts or savings deposits. Life insurance, pension funds and other savings instruments such as stocks, mutual funds and bonds are much less frequent. A comparison with values from the euro area is not directly possible, but participation in life insurance and pension funds is considerably higher in the euro area. Despite these differences, there are also common features of savings behaviour. Utilising the survey evidence on who has financial wealth (Chart B) and in which form (Chart C), Beckmann et al. (2013) show that age (as predicted by the life-cycle hypothesis), education and income drive the propensity to save. Age also plays a role in the choice of savings instruments, with younger persons having a higher propensity to own life insurance policies. The high incidence of financial wealth in cash could be evidence of low access to financial services.

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[99] The definition of savings is based on the question posed to all respondents in the Euro Survey: "There are several ways in which one can hold savings. For example, one can hold cash, use bank accounts, have life insurances, hold mutual funds, pension funds, etc. Do you currently have any savings?".

Chart B

Households' current ability to save

(in percent)

- currently have any financial wealth[1]
- are currently able to save
- had to reduce money set aside for savings since 2008 due to economic crisis
- had to utilise financial wealth[1] or sell possession since 2008 due to economic crisis
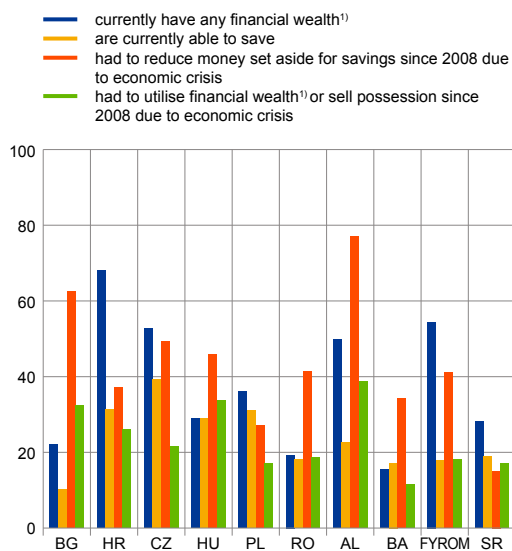
Source: OeNB Euro Survey, Autumn 2013.
Notes: 1) Please note the exact wording of the question "savings"; to match the definitions in the remainder of the report we will refer to "financial wealth" for stocks.

Chart C

Savings instruments

(in percent)

- cash
- current account
- savings deposits
- Life insurance
- pension funds
- other (including stocks, mutual funds and bonds)
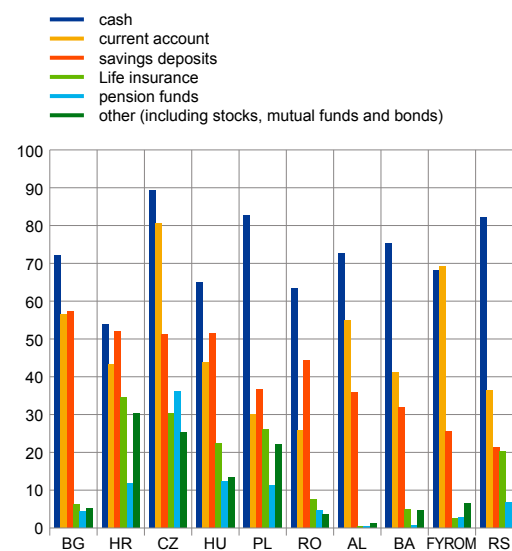
Source: OeNB Euro Survey, Autumn 2013.
Notes: * The exact wording of the questions is "savings" to match the definitions in the remainder of the report we will refer to "financial wealth" for stocks.

Chart D

Foreign currency preference vs deposit substitution

(in percent)

x-axis: deposit substitution index "from monetary statistics"
y-axis: share of respondents with a "foreign currency preference"

Sources: Brown and Stix (2015).

Based on Euro Survey data, Stix (2013), however, reveals that lack of financial access does not suffice to explain widespread preferences for savings in cash. Changing from a monobank system to a two-tier banking system in the early 1990s, the CESEE region went through numerous banking crises (Laeven and Valencia (2008)). Until now, between 15% (Czech Republic) and 45% (Serbia) of banked respondents with savings prefer to hold cash rather than a savings account. Weak tax enforcement and dollarisation is shown to increase the probability of savings in cash, while lack of trust in banks reduces the probability of savings deposits ownership (Stix (2013)).

Deposit insurance systems were installed, but still confidence levels were lastingly affected by previous banking crises in a number of CESEE countries. Contrasting Croatia and Austria, which both increased deposit insurance coverage in October 2008, Prean and Stix (2011) show that while the stock of deposits in Austria remained broadly stable, it dropped by 3.4% in Croatia.

In addition, currency crises during the 1990s had a lasting effect on the currency of savings. Chart D shows the extent of deposit substitution, i.e. the percentage of deposits denominated

in foreign currency. Deposit substitution indices from monetary statistics are highly correlated with survey-based evidence on households' preferences regarding the currency of their savings deposits. Brown and Stix (2015) show that lack of trust in the stability of the domestic currency partly drives preferences for foreign currency deposits. In turn, trust in the stability of the local currency is still strongly influenced by households' experiences of currency crises during transition. Brown and Stix (2015) also show that households which expect the euro to be adopted in their country are somewhat more likely to prefer foreign currency deposits. Preference for foreign currency deposits, however, is also related to foreign currency borrowing (Beckmann and Stix (2015)). The majority of foreign currency loans to households in CESEE is denominated in euro; Swiss franc loans are relevant in Croatia, Hungary and Poland.

To sum up, the savings behaviour of households in CESEE is mainly affected by cash versus deposits and foreign currency versus domestic currency decisions. Households' ability to save has been affected by the current crisis. However, the choice of savings instruments is also still determined by the experience of economic turbulence during early transition 20 years ago. Expectations of accession to the euro area only play a limited role.

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3.3 Household investment and indebtedness[100]

3.3.1 Trends and cross-country differences in household investment

This subchapter observes trends and differences in households' investments in euro area countries. The aim is to analyse the factors driving household investment and explain the differences in investment levels across euro area countries. The main focus is on looking at the relationship between household investment with incomes and household wealth (including housing wealth), but also with credit market factors (including household indebtedness) and demographic trends.

In general, households finance their investments by using their current incomes, which is considered to be the most important determinant of household investment, or by borrowing from the credit market or using their accumulated savings. Households invest mainly in housing. Therefore home-ownership and developments in residential real estate markets could be expected to influence household investment behaviour. As the need for housing also depends on the demographic structure of the population, demographic trends should influence investment as well. Since investment decisions depend on confidence, it could be assumed that the more certain households are about the future, the more investments they are willing to make.

3.3.1.1 Household investment activity in the euro area

At the start of the 2000s, household investment increased by 4-5% in nominal terms in the euro area, and by 1-2% in real terms, i.e. at about the same rate as growth in disposable household income. The exception was 2001, when the bursting of the dot-com bubble saw a halt to growth in household investment, probably because of increased uncertainty.

During the years leading up to the financial crisis, growth in household investment grew at a rate that was notably higher than disposable household income growth. Households had to borrow the additional funds needed for investment, and this led household debt to increase significantly (see Chart 38 and Appendix to Chapter 3.D). The euro area households' gross investment rate increased significantly, peaking at 11.3% in 2007. Investment growth varied between countries and is partly explained by differences in the initial levels of living conditions. For example, investment growth in 2005-07 was higher in countries which had a higher overcrowding rate[101], i.e. in countries with a higher share of households that do not have at their disposal a given minimum number of rooms (e.g. Estonia, Slovakia and Latvia). However, these developments were unsustainable. From 2008 there was a dramatic change and household investment started to fall sharply. Although this happened in most euro area countries, it was particularly evident in those countries that had previously seen very rapid growth in investment, such as Latvia, Estonia, Cyprus, Ireland and Greece.

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[100] Prepared by Nicolás Albacete, Liina Malk and Taavi Raudsaar.

[101] For details on the definition see Eurostat, http://ec.europa.eu/eurostat/statisticsexplained/index.php/Glossary:Overcrowding_rate.

Chart 38

Nominal fixed capital formation and nominal gross disposable income of households and the investment rate in the euro area

(annual percentage growth rates)

- gross disposable income (left-hand scale)
- gross fixed capital formation (left-hand scale)
- investment rate (right-hand scale)
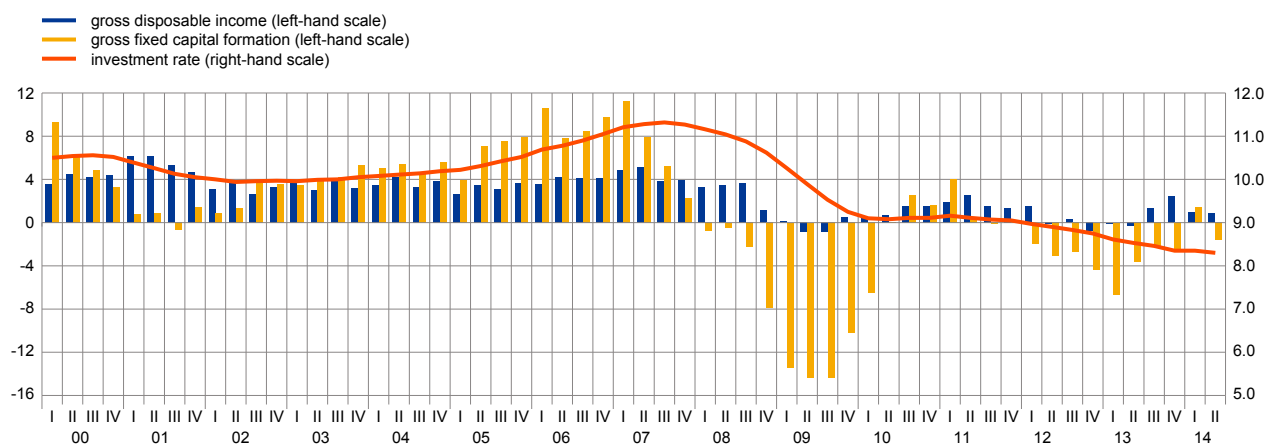
Source: Eurostat.

In recent years household investment has continued to decline across the euro area as a whole. Investment fell by 3.7% at constant prices in 2013, and ended up 18% lower than in 2000. The picture has been varied across countries, however, and investment has increased in recent years in Germany, Estonia, Latvia and Slovakia (see Appendix to Chapter 3.D).

In addition to the rapid growth in household indebtedness, there has also been a boom in housing prices based on unsustainable trends in the housing market. For example, Estonia, Ireland, Greece, Spain, Cyprus, Latvia, Slovenia and Slovakia experienced a housing boom and subsequently a bust (Table 4). In the case of Estonia and Latvia, the downward adjustment was particularly sharp in 2009. In contrast, the housing markets of Belgium, Luxembourg, Austria and Finland followed a different cycle, with house prices increasing modestly in 2005-2007, and they have continued to rise ever since. In Germany, house prices have been on an upward trend since 2008.

According to the European Union Statistics on Income and Living Conditions (EU-SILC), 67% of euro area households own their main residence (Chart 39). However, owner-occupancy rates in euro area countries vary significantly. For example, Germany is an outlier with a rate of 53% and in Austria and France, the rates are also relatively low (around 60%), lower than the euro area average. In the contrast, the highest home ownership, over 80%, is in Slovakia, Estonia, Malta and Latvia.

Table 4

House price trends

(cumulative percentage changes over respective periods)

	2005-2007	2008-2013
Latvia	111.4	-32.8
Estonia	80.5	-14.5
Malta	45.0	-1.4
Slovenia	44.4	-17.9
Slovakia	29.0	-19.0
Spain	26.7	-34.4
Cyprus	25.0	-21.6
Ireland	23.2	-44.6
Greece	19.9	-31.6
Luxembourg	19.0	18.4
France	18.6	1.5
Belgium	18.3	10.4
Finland	13.3	15.2
Italy	11.0	-8.9
Netherlands	9.3	-19.3
Austria	9.0	32.3
Portugal	3.4	-13.5
Germany	-2.5	12.4

Source: Eurostat.
Note: For Slovakia, the earliest available observation is 2006.

Chart 39

Distribution of households by home ownership

(in percent)

- tenant
- owner, no outstanding mortgage or housing loan
- owner, with mortgage or loan
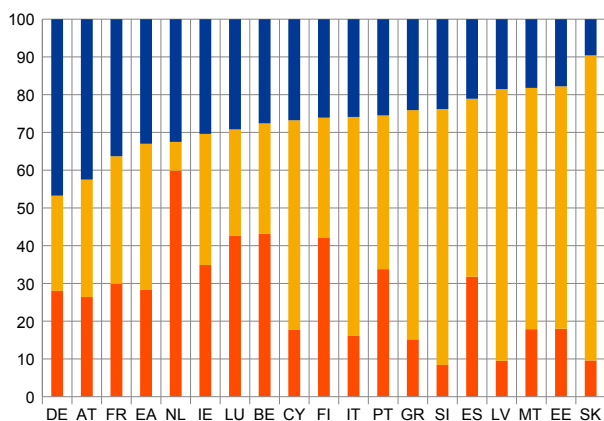
Source: Eurostat, EU-SILC.
Note: The data refer to the year 2012.

Chart 40

Gross investment rate of households

(average over respective periods)

- 2000-2004
- 2005-2007
- 2008-2010
- 2011-2013
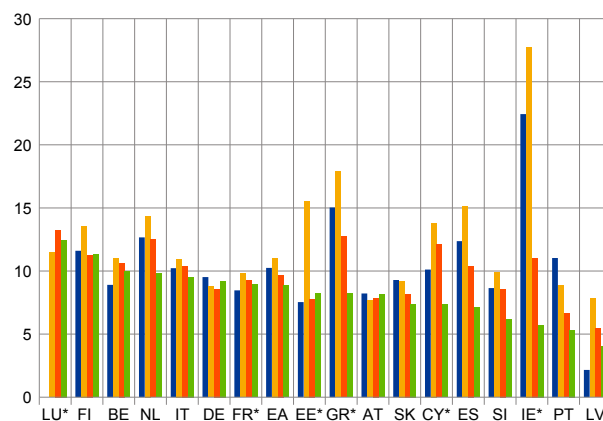
Source: Eurostat.
Note: * For these countries the data are based on ESA95.

Household investment levels vary a lot across euro area countries, ranging, for example, from 4-5% in Latvia to around 10% in Luxembourg, Finland and Belgium in 2011-13 (Chart 40). However, these differences do not seem to be related to differences in home-ownership levels across countries. Possible reasons for this might be that home ownership does not include ownership of secondary houses, or that households became owners many years ago, sometimes without having invested (e.g. through bequest or privatisation). In general, the decision to hold real estate results from a dual role of this asset for households: as a generator of housing services and being an asset. It is also driven by investment decisions. In addition, housing wealth also represents debt collateral. National specificities about the functioning of the mortgage markets and housing market conditions therefore play an important role.[102] Household credit conditions vary across the euro area (Bover et al. (2013)) and mortgage markets exhibit differences in many aspects (European Commission (2011)). In particular, in some countries the use of mortgage markets to finance purposes other than acquiring the collateralised housing asset is widespread, while in other countries this phenomenon is quite rare. The share of debt secured on housing assets used for other purposes than financing a new home varies from less than 1% in Luxembourg to 30% in Greece (ECB (2009)).

3.3.1.2 Empirical estimates of the determinants of household investment in euro area countries

This section analyses the trends in household investments in euro area countries from a macroeconomic perspective. An econometric analysis is being carried out in order to assess the impact of different factors on household investment in the euro

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[102] For further empirical evidence also see Arrondel et al. (2014).

area. The analysis is based on a fixed-effect model estimated using a panel dataset of euro area countries over the period from 2000 to 2012.

The model's dependent variable is the household investment rate. The explanatory variables include: income (measured by real GDP per capita); creditworthiness (household debt-to-disposable income); borrowing (growth in household debt); wealth effects and the possibility of using liquid financial assets for non-financial investment (growth rate of households' liquid financial assets as a share of disposable income); cost of credit (real interest rate); uncertainty (consumer confidence index); demographic structure (share of working-age population); home-ownership (share of homeowners).

Table 5

Determinants of household investment rate: estimations of the fixed-effect model for the euro area

(sample period: 2000-2012)

Real GDP per capita	0.001***
Growth of liquid financial assets	-5.974**
Households' debt-to-disposable income	-0.024*
Growth of households' debt	2.957*
Real interest rate	-0.120
Consumer confidence index	0.051**
Working age population-to-total population	245.381***
Share of home-owning households in total population	0.117**

Source: Own estimations.
Note: *, **, *** indicate significance at the 10%, 5% and 1% levels respectively.

As expected, a positive relationship between income level and investments could be seen (Table 5). The effect of growth of liquid financial assets on household investment appears to be negative. This gives some evidence on the use of liquid financial assets for financing household investment. The estimations show a negative relationship between household indebtedness and investment. This may indicate difficulties for indebted households to finance their investment through borrowing additional funds from credit market. However, the positive impact of growth in households' debt shows the importance of using credit as one source for financing household investments.

Although the effect of real interest rates on household investment appears to be negative as expected, it turns out to be statistically insignificant. Finally, the estimates give evidence on the positive effects of the shares of working-age population and home-owners on the household investment. The positive effect of home-ownership stems rather from the changes across time rather than differences between countries.

3.3.2   Household indebtedness and vulnerabilities

Differences in household indebtedness across countries are also important to explain diverging net external positions of countries. Having looked at the potential impacts of household deleveraging on savings rate developments, this section focuses on the vulnerability of indebted households to macroeconomic and financial shocks. If the latter are concentrated in certain countries, imbalances may amplify in the future.

As aggregated data on household indebtedness neither reflects loan maturities or interest rate levels, nor does it take into account household wealth or the distribution of indebtedness across household groups, household level data from the HFCS is used to have a closer look into household indebtedness and vulnerabilities (see Appendix to Chapter 3.C for a description of this data).

Chart 41

Participation in debt components

(in percent)
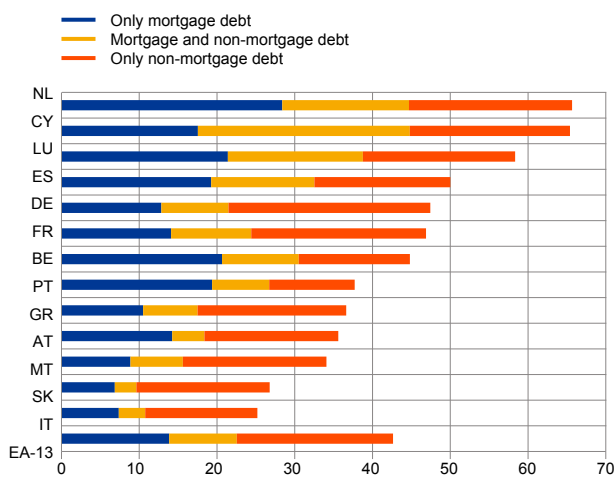
Legend:
- Only mortgage debt
- Mortgage and non-mortgage debt
- Only non-mortgage debt

Source: HFCS first wave (2009/11).
Notes: The euro area aggregate includes data for all the euro area countries participating in the first wave of the HFCS, with the exception of Slovenia due to a small sample size and Finland, where the questions on mortgage debt for other properties than the household's main residence, on credit line/overdraft debt and on credit card debt are not available.

The first result is that not every household is indebted. We can see that less than half (43%) of euro area[103] households hold debt[104] (Chart 41). The Netherlands, Cyprus[105] and Luxembourg are the only euro area countries with household debt market participation above 50%. On average in the euro area, non-mortgage debt is more frequent than mortgage debt (29% vs 23%). Exceptions are Luxembourg, the Netherlands, Belgium, Portugal and Spain.

According to Table E (Column 2) in Appendix to Chapter 3.D, household income seems to be an important factor for debt market participation in the euro area. Although only 23% of households in the lowest income quintile hold debt, this share amounts to more than 60% in the highest income quintile. On the demand side, holding debt creates certain costs that can be better covered the higher a household's income is. This effect is more pronounced in the case of mortgage debt participation than with non-mortgage debt participation (Columns 3 and 4) because the amounts of non-mortgage loans are usually much lower. On the supply side, low income households could be credit-constrained. The age of the reference person is another important factor in debt market participation.

The younger the reference persons of households, the higher the household debt market participation because the necessity to finance consumption is higher as savings and income are comparably low at this stage of the life cycle. For mortgage debt participation there is a peak at the age of 35-44 when the demand for home ownership is highest in a typical household life cycle. Finally, one factor which clearly shows opposing patterns in mortgage and non-mortgage debt participation is net wealth. While mortgage debt participation tends to increase across net wealth quintiles, non-mortgage debt decreases. Poorer households seem to select the latter type of debt because it might be easier to access than mortgage debt. Among those households holding debt, for most of them the debt burden is rather low. Chart 42 (right) shows that about 90 percent of indebted households in the euro area have a debt service-gross income ratio lower than 40%. This is a commonly used threshold in the literature to indicate financial vulnerability.[106] The median debt service-income

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[103] In the remaining section, the euro area aggregate includes all euro area countries participating in the first wave of the HFCS, with the exception of Finland, where the questions on mortgage debt for other properties than the household's main residence, on credit line/overdraft debt, on credit card debt and on non-mortgage loan payments are not available.

[104] The definition of debt includes mortgage and non-mortgage debt. Mortgage debt consists of debt owed by households on all properties they own. Non-mortgage debt consists of credit lines or overdrafts, outstanding balance of credit cards for which the owner of the card is charged interest, and other loans, such as car loans, consumer and instalment loans and loans from relatives, friends, employers etc.

[105] Although household debt participation in Cyprus is over 50%, it should be noted that the majority of indebted households also have deposits, which are underreported in the HFCS (confirmed by MFS and National Accounts data). From the 68% of households who have at least one type of loan, 88.4% also hold one form of financial asset.

[106] See Albacete and Lindner (2013) for a survey on this literature.

Chart 42

Distribution of debt service-income ratio

(lhs: medians in %, rhs: percentage distribution of debt-service to income ratio across households)
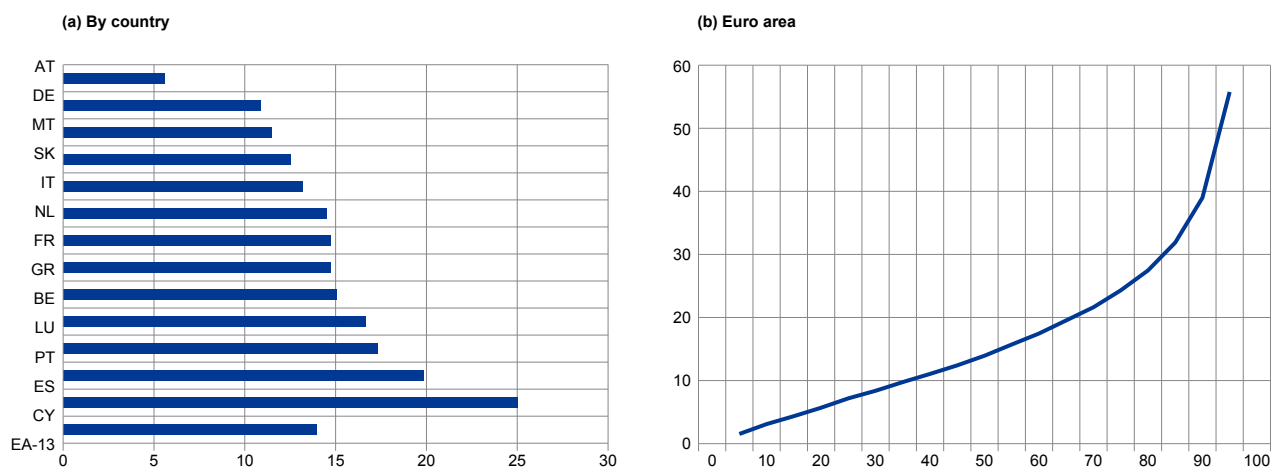
(a) By country

(b) Euro area

Source: HFCS first wave (2009/11).
Note: The euro area aggregate includes data for all the euro countries participating in the first wave of the HFCS, with the exception of Slovenia due to a small sample size and Finland, where the questions on mortgage debt for other properties than the household's main residence, on credit line/overdraft debt, on credit card debt and on non-mortgage loan payments are not available.

ratio of indebted households in the euro area is 14%. Still, the heterogeneity across countries is quite large (Chart 42, left). While Cyprus and Spain have the highest median debt service-income ratios in the euro area with 25% and 20%, respectively, Austria has the lowest with only around 6%. The reason for such a low median debt service-income ratio in Austria is the relatively large proportion of households holding bullet loans, where the amortisation part of the debt service is only paid back at the end of the loan period.

Looking at the household characteristics associated with a higher debt burden, Table E in Appendix to Chapter 2.C (Column 5) shows that debt burden decreases with gross household income. While the lowest income quintile holds debt with a median debt service-income ratio of 26%, the highest income quintile has a ratio of only 11%. The debt burden also decreases with age. Households with a reference person younger than 35 have almost double the median debt service-income ratio of those with a reference person older than 74. With respect to the employment status of the reference person, the self-employed and unemployed have the highest median debt service ratios with about 17% of gross income.

Although most households have a relatively small debt burden, there are still some with relatively large debt ratios at the right tail of the ratio distribution (Chart 42, right). For the rest of this section we focus on these potentially vulnerable households and see whether they can pose risks to financial stability in the euro area. Therefore, we define a household as vulnerable if it has a debt service-gross income ratio of at least 40%. Furthermore, we distinguish whether this vulnerable household has enough financial wealth to cover its total debt or not. And if not then we distinguish whether this vulnerable household has enough total wealth (financial assets + real assets) to cover its total debt or not. The idea behind such a classification is to differentiate between households with different degrees of default risk. Although households being in the "not vulnerable" group are considered to have a low risk of default, those in the

Chart 43

Distribution of households and their debt across vulnerability status by country

(left-hand scale: medians in percentage, right-hand scale: percentage distribution of debt-service to income ratio across households)
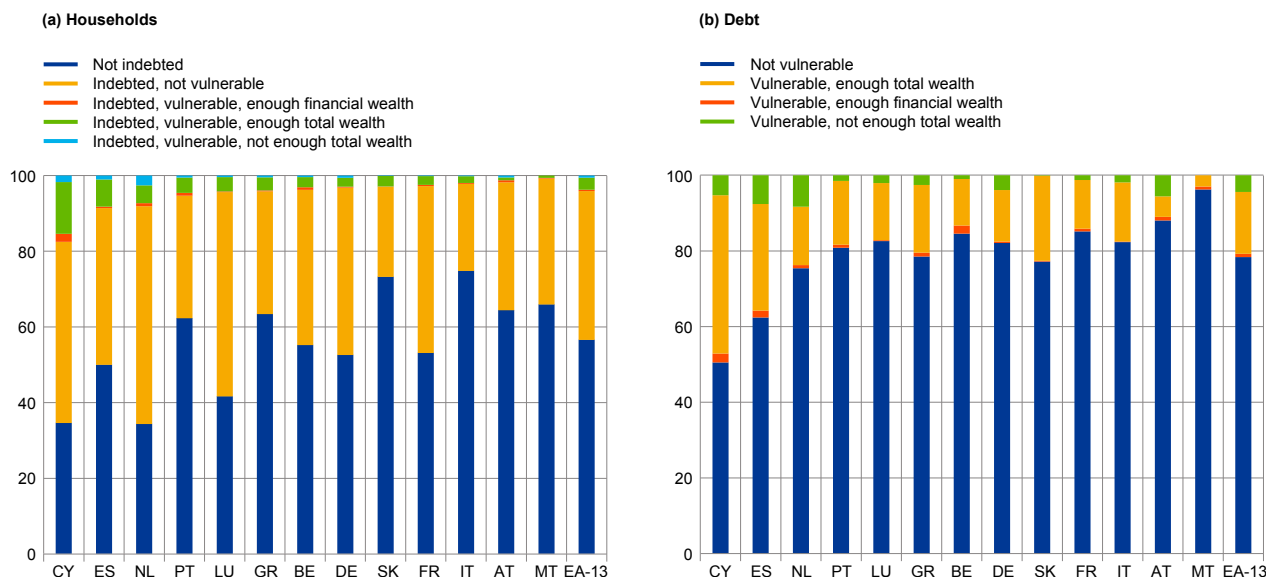
(a) Households

- Not indebted
- Indebted, not vulnerable
- Indebted, vulnerable, enough financial wealth
- Indebted, vulnerable, enough total wealth
- Indebted, vulnerable, not enough total wealth

(b) Debt

- Not vulnerable
- Vulnerable, enough total wealth
- Vulnerable, enough financial wealth
- Vulnerable, not enough total wealth

Source: HFCS first wave (2009/11).
Note: The euro area aggregate includes data for all the euro countries participating in the first wave of the HFCS, with the exception of Slovenia due to a small sample size and Finland, where the questions on mortgage debt for other properties than the household's main residence, on credit line/overdraft debt, on credit card debt and on non-mortgage loan payments are not available.

"vulnerable without enough total wealth" group are considered to have the highest default risk. The results[107] are shown in Chart 43. More than the half (57%) of all euro area households do not hold debt (left panel), with therefore no risk of default. A further 39% of all euro area households hold debt with limited risk of default, as they are not considered as vulnerable according to the measure described above. Only the remaining 4% of euro area households are vulnerable. The fewest of them (0.4 percentage points) have financial wealth in excess of their total debt. Although most of them (3 percentage points) have total wealth larger than their total amount of debt, financial wealth is not sufficient. A small share of them (0.6 percentage points) have negative net wealth, i.e. their total wealth is lower than their total debt. The risk of default for the latter group should be the highest among these three vulnerable groups.

In order to quantify the aggregated risks stemming from the household sector, Chart 43 (right panel) shows the share of debt of total debt held by each one of the above mentioned household groups. Looking at the euro area as a whole, a large proportion (78%) of household debt is held by non-vulnerable households, while the share of total debt held by vulnerable households amounts to 22%. Nevertheless, the risk to financial appears relatively low given that the vast majority of households in all euro area countries have enough total wealth, basically real wealth, to cover their debt.[108] Less

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[107] A qualification to this analysis is that it is based on income, wealth and debt figures at one time point which may change with economic conditions. In countries where adjustable interest rate loans are more common than fixed ones, or where foreign currency loans are popular among indebted households, the debt burden may be quite sensitive to changes in interest rates, exchange rates, or stock markets. See Ampudia et al. (2014) for a similar analysis with simulations of different scenarios.

[108] This is also in line with other measures of vulnerability used in the literature such as the debtasset ratio which is relatively low in most countries (see ECB 2013).

Chart 44

Euro area households with expenses above income and how they get extra income, by vulnerability status

(bottom axis: in % of responses, rhs axis: in % of households)
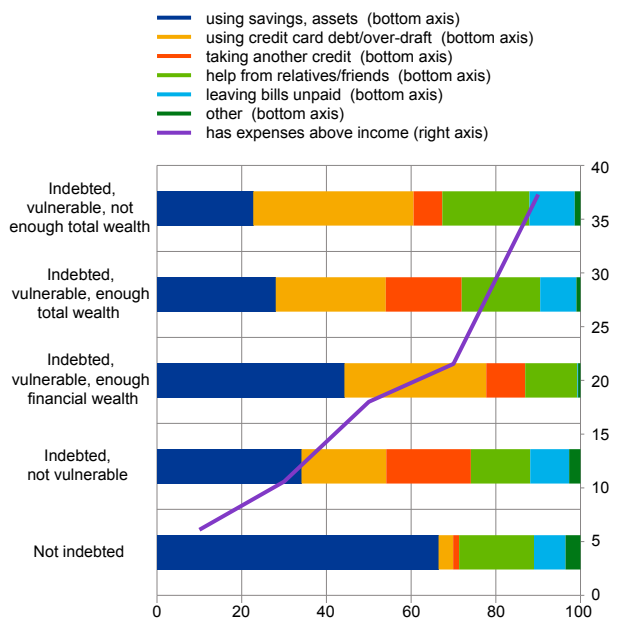
Legend:
- using savings, assets (bottom axis)
- using credit card debt/over-draft (bottom axis)
- taking another credit (bottom axis)
- help from relatives/friends (bottom axis)
- leaving bills unpaid (bottom axis)
- other (bottom axis)
- has expenses above income (right axis)

Source: HFCS first wave (2009/11).
Notes: The euro area aggregate includes data for all the euro area countries participating in the first wave of the HFCS, with the exception of Slovenia due to a small sample size and Finland, where the questions on mortgage debt for other properties than the household's main residence, on credit line/overdraft debt and on credit card debt are not available.

than 5% of total debt is held by vulnerable households with negative net wealth. The countries with the highest exposure to vulnerable households with negative net wealth are the Netherlands and Spain (both with around 8 percent of total debt).

One of the segments of the population with the highest proportion of vulnerable households with negative net wealth are households with non-mortgage debt (Table E, Column 6). Although on average 0.5% of euro area households are vulnerable households with negative net wealth, this proportion increases to 1.9% when looking at non-mortgage debt holders only. One important factor for this type of vulnerability seems to be income. The lowest income quintile has a three times higher proportion (1%) of such vulnerable households than the highest income quintile (0.3%). A similar pattern can be observed with age. And unemployment (1.7%) seems to be a further strong determinant of this type of vulnerability.

It is important to stress that although the risk of default among the above constructed five household groups is interpreted to be the highest for the group of indebted vulnerable households with negative net wealth, this does not mean that these households have defaulted or will necessarily default in the future. Most of them will probably go on and pay back their debt without any problems. Chart 44 (right axis) shows that when asked about whether the expenses in the past 12 months exceeded the income, a minority of indebted, vulnerable households with negative net wealth answer in the affirmative (37%). Thus, the remaining 63% have enough income to cover their expenses, including their debt service. The proportion of households with less income than expenses decreases for the other household groups, which indicates that the constructed vulnerability measure works well.

Furthermore, Chart 44 (bottom axis) shows that even most of those households with expenses above income find alternative income sources to meet all their expenses. The most important source of extra income for the households without debt, the indebted non-vulnerable households, and even the indebted vulnerable households with enough financial wealth is using savings or assets in general. Sources such as credit card debt/an overdraft or help from relatives/friends become more important for the remaining two household groups (vulnerable with enough total wealth, but not financial wealth and vulnerable with negative net wealth). The option of just leaving bills unpaid which might be seen as the closest situation to default is only used by a small proportion of households.

4 The role of non-financial corporations in savings-investment trends[109]

Chapter 2 revealed that the adjustment in the net lending/borrowing of stressed euro area countries was largely associated with a strong decline in investment, and that there was a general decline in investment across all euro area countries in the course of the Great Recession. This chapter will look particularly at investment by non-financial corporations (NFC), and will do so from three angles. Section 4.1 focuses on structural and long-term determinants of investment from a macro perspective. It also briefly looks at corporate savings. Section 4.2 investigates the extent to which the recent financial crisis had an adverse impact on NFCs' investment decisions, while looking in particular at the role of firms' profitability and balance-sheet considerations across firms of different sizes. Section 4.3 looks at the role of capital flows and FDI for investment dynamics across the euro area countries, which has become increasingly important.

4.1 Structural determinants of business investment[110]

Firms' investment decisions are not only driven by current economic developments and future prospects, but they also depend on the particular business environment they are operating in, including institutional setups. The aim of the analysis in this section is twofold. First, it illustrates with stylised facts some economic and institutional characteristics that affect firms' investment decisions and, second, an empirical assessment is conducted on whether and how the importance of these characteristics has changed after the 2008-2009 crisis. To understand the net lending/borrowing of firms, this subchapter also briefly discusses developments of corporate savings.

4.1.1 Long-term trends in investment

In the long run, the level of firms' desired capital stock is determined by profit expectations or planned production levels and cost of financing according to the neoclassical theory (Jorgenson (1963), Cantor (1990)). More recent contributions introduced the impact of financing structure. The financial accelerator model by Bernanke et al. (1999) features capital markets operating under imperfect information, resulting in firms' preference of retained funds to finance investment projects. During the recent crisis other factors have also figured as having depressed investment, such as uncertainty (Bloom et al. (2007)), corporate and banks' deleveraging needs (Goretti and Souto (2013)) and foreign direct investment abroad

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[109] Coordinated by Malin Andersson (ECB).

[110] Prepared by Robert Zorko, Uros Herman (both SI), Malin Andersson, Stéphane Dees and Ivan Jaccard with input from Annalisa Ferrando and Desislava Rusinova (all ECB).

Chart 45

Business investment ratios in selected countries since the 1970s
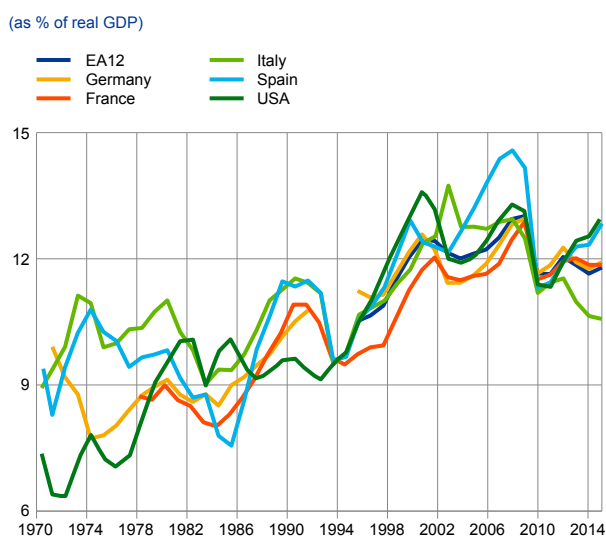
(as % of real GDP)

- EA12
- Germany
- France
- Italy
- Spain
- USA

Sources: Own computations on European Commission data (AMECO).
Notes: Real private investment adjusted for investment in dwellings at 2010 constant prices to real GDP. German data for 1970 to 1991 refer to West Germany and data are missing for the period 1992 to 1994. The corporate savings ratio refers to net savings to value added. For data on other euro area countries, see Charts 4.A.1 to 4 in the Appendix to Chapter 4.The last observation, 2014, partly constitutes a projection.

Chart 46

Business savings ratios in selected countries since the 1970s
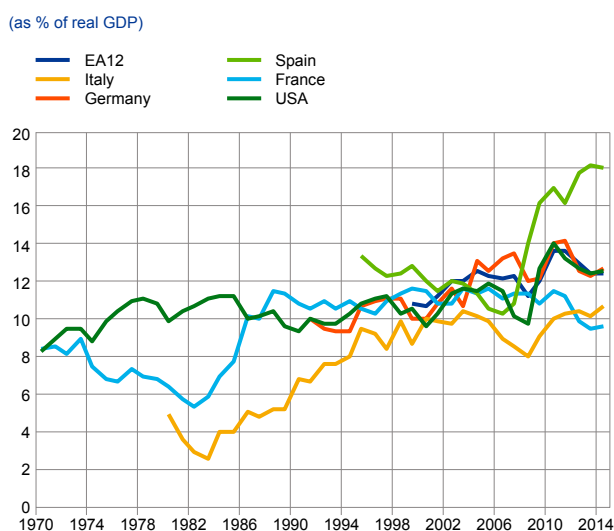
(as % of real GDP)

- EA12
- Italy
- Germany
- Spain
- France
- USA

Sources: Own computations on European Commission data (AMECO).
Notes: Real private investment adjusted for investment in dwellings at 2010 constant prices to real GDP. German data for 1970 to 1991 refer to West Germany and data are missing for the period 1992 to 1994. The corporate savings ratio refers to net savings to value added. For data on other euro area countries, see Charts 4.A.1 to 4 in the Appendix to Chapter 4.The last observation, 2014, partly constitutes a projection.

(Stevens and Lipsey (1992)). Weaker incentives for investment in the crisis were also associated with demand factors, such as overall weak activity, higher competition and consumers' higher price sensitiveness in some countries, which adversely impacted firms' pricing power and profitability in these countries as well as supply factors, such as potential growth. Despite lower nominal interest rates during the crisis, the overall decline in inflation and the zero lower bound for the nominal interest rate held up the implied real interest rates, particularly in some countries, which also may have weighed on business investment (IMF, (2014a)).

Real business investment ratios to GDP have trended upwards since the 1970s in the euro area as well as in the US (Chart 45). This may reflect a combination of lower cost of finance[111], increases in replacement investment and technological progress in the investment goods sector (and growing importance of computers, semiconductors and software) leading to a fall in the relative price of investment goods. In some countries the increase could also mirror higher expected marginal return on investment related to an increase in the underlying trend growth rate of the economy, or, on the contrary, 'over-investment' resulting in an 'excess capital stock' on the back of unrealistic expectations of firms' marginal returns, particularly on ICT and housing[112]. The Great Recession implied a generalised fall in the business investment ratio followed by very heterogeneous developments across countries, with for instance recoveries in Spain and the US, and further declines in Italy.

Turning to corporate savings ratios to GDP, they have generally been trending upwards at a pace that seemed to accelerate further in some countries during the crisis (Chart 46). Together with the investment dynamics, this resulted in corporate net lending positions in the euro area as mentioned in Chapter 2. Corporate savings were mainly driven by increasing profit shares in most countries, possibly related to wage moderation and lower interest charges. Recent research suggests that the shift in income distribution towards profits can be ascribed to globalisation, competition, technological

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[111] In turn, reflecting factors such as lower inflation-related risk premia, financial liberalisation and increased competition.

[112] See ECB (2013) and Baldi et al (2014).

Chart 47

Global Competitiveness Index in selected countries: Structural sub-indicators 2014-2015

(1-7 (best))
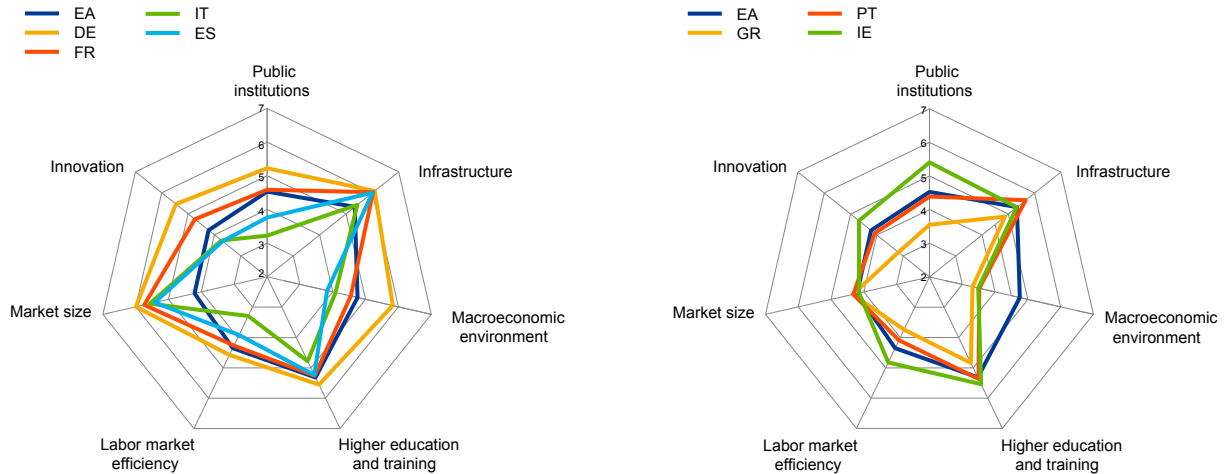
Sources: WEF; Eurosystem calculations.
Note: Other countries are exposed in the Appendix to Chapter 4 (Chart 4.A.5).

change and wage moderation.[113] The reduction in private credit flows, as well as precautionary motives and increasing funding needs for R&D could also have spurred corporate savings (IMF (2014b)).

Institutional factors might also affect business investment through taxation, regulation or business environment (Alesina et al. (2005)). The World Economic Forum Global Competitiveness Index (GCI), which is based on business executives' surveys, shows that for 2013 (Chart 47), Germany and Ireland appear to outperform the euro area average in a wide range of structural areas (except the macroeconomic environment for Ireland). On the other hand, in Italy and Greece there is significant scope for improvement, in particular in the areas of public institutions, macroeconomic environment and innovation capacity.

Chart 48

Business investment and ease of doing business indicators

(annual percentage change and ranking in 2008)

Change in non-housing investment since 2008Q1

$y = -1.26x + 18.5$
$R^2 = 0.43$
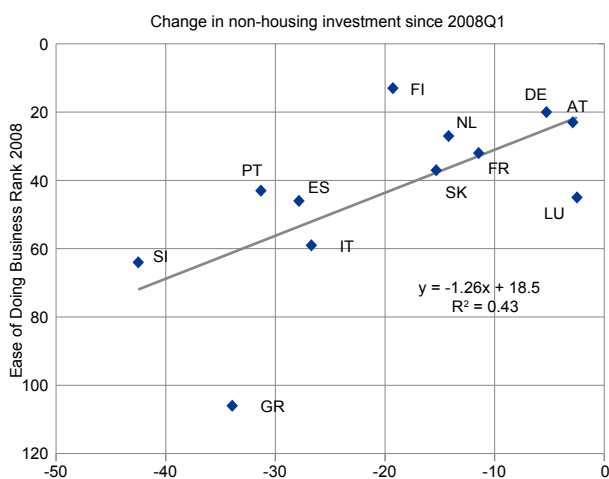
Sources: Eurostat and World Economic Forum.
Note: Data for Belgium, Cyprus, Estonia, Ireland, Latvia and Malta are missing.

Ease of doing business exhibits a visible correlation with business investment. For instance, a higher (lower) ranking of ease of doing business in 2007 coincided with a smaller (larger) decline in business investment in the period since 2008Q1 across the euro area countries (Chart 48).

Sufficient infrastructure investment is also crucial to creating an attractive environment for firms to invest in (see Box 7 on Infrastructure investment in the euro

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[113] OECD (2008). Dividends generally did not rise in line with profits, and in some cases even fell relative to profits. In a few countries, corporate profits were channelled to shareholders via share buybacks.

Table 6

Investment gaps in selected countries

(as a percentage of nominal GDP)

	Lewis et al. (2014) 2013	Baldi et al. (2014) 2010-2012
Euro area		-2.0
Belgium	-2.0	0.7
Germany	-1.0	-3.7
Estonia	4.0	
Ireland	-5.0	-9.4
Greece	-2.0	-3.0
Spain	3.0	-1.1
France	-3.0	0.3
Italy	-5.0	-0.5
Luxembourg	0.0	
Netherlands	-5.0	-4.8
Austria	-2.0	-0.6
Portugal	1.0	-4.1
Slovenia	-2.0	
Finland	-3.0	-2.0
US	2.0	-1.9

Sources: Baldi et al. (2014) and Lewis et al. (2014).
Notes: A negative figure indicates an investment gap. Available countries in the respective papers are exhibited.

area). Finally, decisions to invest in more liquid assets other than domestic physical capital, and foreign direct investment in particular, may have been a partial substitute for domestic fixed capital formation.

Following the protracted fall in the investment ratio to GDP during the Great Recession, investment gaps have built up in many countries. These are recent empirical results from several institutions, which use past averages and/or projected future steady-state levels as benchmarks (Lewis (2014), Baldi et al. (2014)). Though these measures are associated with large uncertainties across euro area countries, it appears that a negative gap can be identified in most of the selected countries (Table 6).[114] There are however several caveats to these calculations. An important one is that investment gaps may result from the unwinding of excess capital stock accumulation in the pre-crisis period.[115]

4.1.2   Empirical estimations of determinants of business investment

In view of the heterogeneity across euro area countries and the fact that investment decisions are affected by country-specific (unobservable) characteristics, a regression with country and time effects has been estimated.[116] In addition to macroeconomic variables, some business environment indicators encompassing country specific-characteristics are also included in the estimation (Table 7 Baseline). In addition, a post-crisis dummy and interaction terms are introduced to investigate whether and how the importance of different variables has changed after the crisis (Table 7 Post crisis).

The results presented in Table 7 show that, first, lagged capacity utilisation[117] has a positive and statistically significant effect on business investment. This is in line with the accelerator model (Chenery (1952)), whereby firms' investment spending

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[114]   The Spanish estimations may have been influenced by the strong recovery in non-housing investment over recent years.

[115]   The use of pre-crisis averages to assess investment gaps assumes that potential output growth rates have been the same over time, which might not be true in light of slower labour force growth due to population ageing in some countries. However, also a calculation of steady state to potential output ratio confirms the picture of gaps in such countries.

[116]   The basic equation is $logGFCF_{i,t} = c_i + \beta X_{i,t} + v_t + \varepsilon_{i,t}$ where c_i represents country effects variables, v_t time effects and $X_{i,t}$ independent variables. The sample with annual data spans over the period from 2003 to 2013 and includes 16 euro area countries, while Malta and Cyprus are missing.

[117]   Lagged values are used to allow for a delay in the adjustment process. For example, after a positive demand shock, firms adjust their capacity utilisation in the short run, and only when they observe that this shock is more permanent do they increase investment (due to high adjustment costs).

Table 7

Determinants of business investment

(difference in 2014)

Variables	Baseline	Post crisis
Rate of capacity utilisation (%) – lag	0.01*	0.00
	(0.01)	(0.01)
PostD*Rate of capacity utilisation (%) – lag		0.01***
		(0.00)
log(rNet retained earnings – NFC) – lag	-0.02	-0.01
	(0.04)	(0.04)
PostD*log(rNet retained earnings – NFC) – lag		0.01
		(0.02)
Index of notional stocks – NFC	0.00	0.00
	(0.00)	(0.00)
PostD*Index of notional stocks – NFC		0.01**
		(0.00)
Real Interest rates on NFC loans > 1mio EUR	-0.14***	-0.03
	(0.03)	(0.06)
PostD*r Interest rates on NFC loans > 1mio EUR		-0.04
		(0.05)
Tobin Q	0.19	0.29*
	(0.15)	(0.16)
PostD*Tobin Q		0.11
		(0.10)
Real ULC	-0.01	-0.01
	(0.01)	(0.01)
PostD*real ULC		-0.01*
		(0.01)
Share of manufacturing in total VA (%)	0.02	0.01
	(0.01)	(0.01)
PostD*Share of manufacturing in total VA (%)		-0.01
		(0.01)
Openness - Export and Import in GDP (%)	0.00	0.00
	(0.00)	(0.00)
PostD*Openness - Export and Import in GDP (%)		0.00
		(0.00)
Corruption Perceptions Index	0.03	-0.02
	(0.05)	(0.05)
PostD*Corruption Perceptions Index		0.01
		(0.02)
PostD		-0.85*
		(0.46)
Constant	10.16***	10.92***
	(0.81)	(0.91)
Time effects	YES	YES
Observations	117.00	117.00
Number of countries	16.00	16.00
R-squared	0.76	0.84
Robust standard errors in brackets		
*** p<0.01, ** p<0.05, * p<0.1		

Source: Own computations on European Commission data.
Notes: PostD – a post crisis dummy, with a of value 1 after 2008 and 0 otherwise.
Data on MT and CY are missing.

increases in case of a relatively high level of output to productive capacity.[118] The cost of external financing[119] is an important factor in the model, where higher real interest rates weigh on investment activity.[120]

A post-crisis dummy is negative and significant suggesting changes in the relationship after 2008. The lagged rate of capacity utilisation remains important also in the post-crisis period. Bank loans to corporates are significant after the crisis, suggesting that higher loan growth foster investment activity. Tobin's Q is positive and significant at 10%, implying that the higher the assets' market value relative to the replacement costs, the more likely firms are to engage in investment activity (Tobin (1969)). Gains in competitiveness, expressed as lower real unit labour cost, boosted exports and output which supported business investment in the post-crisis period.

The same analysis is applied for stressed[121] and programme[122] countries, respectively, and the results remain in line with the baseline specification (Table 4.A.1 in the Appendix to Chapter to Chapter 4). Looking at the stressed countries, past capacity utilisation, the flow of bank loans to corporates and competitiveness matter. Also, the lower the perception of corruption (i.e. the higher the corruption perception index), the higher the investment activity after the crisis. Higher costs of external financing and lower degree of industrialisation hinder investment, yet only for non-stressed countries. Intuitively, a larger tradable sector fosters business investment in non-stressed countries. As for the programme countries, results are mostly insignificant.

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[118] Internal sources of financing, i.e. lagged retained earnings, do no seem to play an important role in this specification. Similarly, the flow of bank loans into the corporate sector has the expected sign, but is insignificant. The impact of all the other explanatory variables in the model are an expected sign, but insignificant. Leverage and demographics, the latter proxied by the labour force participation rate, were also included in the baseline estimation, but they were insignificant.

[119] Proxied by real interest rates for new business loans to NFCs over €1 million.

[120] Openness and an indicator of industrialisation, the latter measured as the share of manufacturing value added in total value added, are not significant.

[121] Stressed countries are EE, IE, GR, ES, LV, PT, SI and SK.

[122] Programme countries are IE, GR, ES and PT.

Box 7

Infrastructure investment in the euro area[123]

Infrastructure investment is necessary for an economy to function as it provides the basic physical and organisational structure needed for the operation of a society as well as of its enterprises and services. Investment in infrastructure, comprising telecommunication, energy networks, transport, education, research, innovation, renewable energy and energy efficiency, is a key element in investment.[124] It also promotes growth, employment and competitiveness in the medium and long run by increasing the productive capacity and growth potential of the economy. Given the issues related to data availability and the fact that the definition of infrastructure is not unique, public investment is often used as a proxy. Public investment can crowd in private investment, and may be particularly growth-enhancing during periods of subdued activity.[125]

Chart

Real total and public investment

(2003=100)
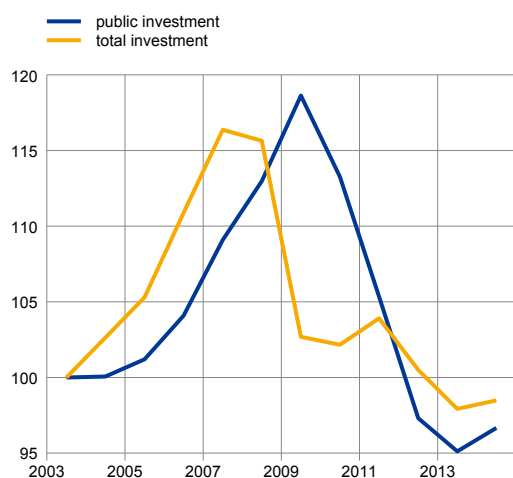
Source: European Commission.
Note: 2014 is partially a projection.

The decline in overall investment observed in the euro area since the onset of the financial crisis has been partly driven by significant cuts in public investment.[126] In 2013, the level of public investment was about 20% lower than its peak level in 2010 (Chart). Also as a share of GDP, real public investment has gradually declined in Europe over the past few decades. In this context the European Commission identified in 2013 an infrastructure investment gap of about 1 trillion EUR by 2020 in the EU.[127]

One major reason behind the fall in infrastructure investment is the lack of sufficient financing, which has been restrained by two main factors. First, the high levels of public debt, predominantly in those euro area countries that were most affected by the Great Recession, imply that the issuance of public debt to finance infrastructure spending was less of an option. Second, the ongoing deleveraging process in the banking sector has led to a significant reduction in the availability of bank credit, which is traditionally by far the most important source of infrastructure funding. Furthermore, the new capital rules that will be implemented in the context of the Basel III accords are also expected to reduce banks' provisions of long-term loans required to finance such projects.[128]

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[123] Prepared by Ivan Jaccard and Malin Andersson with comments from Annalisa Ferrando (all ECB).

[124] For a review of the academic literature, see for instance Gramlich (1994).

[125] IMF (2014b).

[126] See also Valla et al. (2014).

[127] See full online report: European Commission (2013c).

[128] See World Economic Forum (2014a).

One alternative way to finance infrastructure investment – beyond bank lending and public finances – is through partnerships between the private and the public sector in what is known as a public-private partnerships (PPP).[129] The PPP is based on a contract between the government and one or more private sector companies under which the private company provides a public good or service in exchange for a financial remuneration, such as the revenues generated by the project or a government fee.[130] PPPs would allow the coverage of parts of the infrastructure costs by issuing debt instruments such as project bonds. Although they provide additional funding and expertise that could lead to efficiency gains and potentially reduce the cost of operating the project[131], these types of partnerships could come at a substantial cost. Infrastructure investment typically implies very large initial fixed costs, followed by a low marginal cost of providing the goods or service. This so-called natural monopoly could result in the private sector firm charging a price that is above its marginal cost to make a profit, which, however, from a social point of view, will generate a quantity of output that may be lower than the socially efficient level.

Recent initiatives at national and EU level to provide credit to firms via the development of capital market options for SME financing such as the securitisation of SME loans or government guarantees for loans by national development banks should also facilitate access to finance for investment purposes, particularly for SMEs.

In addition to restricted financing, infrastructure investment has also been held back by regulatory, management and administrative impediments. Opaque procedures for deciding and evaluating projects, barriers to foreign direct investment, uncertain legal frameworks, inadequate management capacity and slow approval processes are some examples of these bottlenecks. Also the quality of infrastructure is an issue.[132]

Recently, European initiatives have been taken to identify projects of common interest and to reduce the obstacles. In Europe, an Investment Plan aiming at mobilising up to €315bn for public and private investment in the next three years has been launched. As part of the package, a new Fund for Strategic Investments will be backed by guarantees from the EU budget (€16 billion) and capital from the European Investment Bank (EIB) (€5 billion) and is to be leveraged by private funding. Capital contributions to the Fund by Member States are also a possibility. A Task Force comprising EU member states, the European Commission and EIB will identify economic, regulatory and other bottlenecks to investments.

At the global level, the G20 has agreed on a Global Infrastructure Initiative to increase quality investment though a multi-year infrastructure agenda, including a consolidated database of infrastructure projects, connected to national databases, to help match potential investors with projects.

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[129] See Engel, Fischer and Galetovic (2011) for a review of the pros and cons of PPPs.

[130] PPPs typically involve the creation of a Special Purpose Vehicle (SPV) or a Project Company whose role is to plan, finance, build and operate the infrastructure project. For a detailed review of PPPs, see for instance EIB (2010).

[131] See Engel, Fischer and Galetovic (2011).

[132] According to the World Economic Forum global competitiveness report, the overall quality of infrastructure is a particularly important issue for Greece and Italy, which are respectively ranked 57th and 56rd out of 144. By contrast, other European countries score higher. See World Economic Forum (2014b).

In sum, strengthening the role of European Union's financing institutions (EIB, EIF) should be an essential part of the process to ensure the development of efficient and well-functioning infrastructure networks. A recovery in infrastructure investment would also require reforms to reduce regulatory, management and administrative impediments. Provided implementation is fast and priority is given to growth and productivity-enhancing projects as well as a credible commitment to ambitious structural reforms, the current initiatives could serve their purpose.

4.2 The impact of the financial crisis on NFC investment decisions[133]

To analyse investment developments during the Great Recession, microeconomic data shed light on how shocks spread in the corporate sector depending on firm-specific characteristics (size, profitability, growth prospects, indebtedness and liquidity) as well as non-firm specific characteristic (country, sector and risk perception at a country level).

4.2.1 The impact of the financial crisis on NFC investment decisions[134]

The financial crisis in 2008 was characterised by a negative shock to the supply and demand of external finance for non-financial corporations. The bursting of the real estate bubble in some euro area countries led to a deterioration of the collateral value against which firms borrow, and therefore, a reduction in the firm's net worth. This financial accelerator channel (Bernanke et al. (1999)) created additional or exacerbated existing financing constraints.

Using the BACH (Bank for the Accounts of Companies Harmonised) database, which provides data for the average representative firm of each sector for five of the largest euro area countries (Germany, France, Italy, Spain and Belgium)[135], a similar pattern to that in the aggregate euro area business investment is observed (left panel in Chart 49): investment in fixed tangible assets to the total fixed assets ratio declined across all sectors in 2009, although with different profiles. The drop was more pronounced for firms in the construction sector, driven by the housing market bust, and it was not exclusive to capital-intensive sectors (i.e. manufacturing). The intensity of the drop was different across subsectors (Chart 4.A.6 in the Appendix to Chapter 4). In the aftermath of the crisis, although investment in manufacturing recovered slightly in 2010 and remained stable later on, it continued to decline in the construction sector and remained broadly stable in services. The construction sector was one of the most highly leveraged sectors and attracted more investment in relation to other sectors in the years before the financial crisis owing to the relatively

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[133] Prepared by Matthias Burker (FR), Anna Strachotova (SK), Annalisa Ferrando, Marie-Hélène Felt, Lorena Saiz (all ECB).

[134] See Table 4.A.2 in the Appendix to Chapter 4 for a literature overview.

[135] More detailed information can be found in the Appendix to Chapter 4.

Chart 49

Investment ratios by sector and firm size in the euro area

(investment in tangible assets over total fixed assets, percentage)

Legend (left panel):
— manufacturing (C)
— construction (F)
— market services (G-J, L, N)

Legend (right panel):
— small
— medium
— large
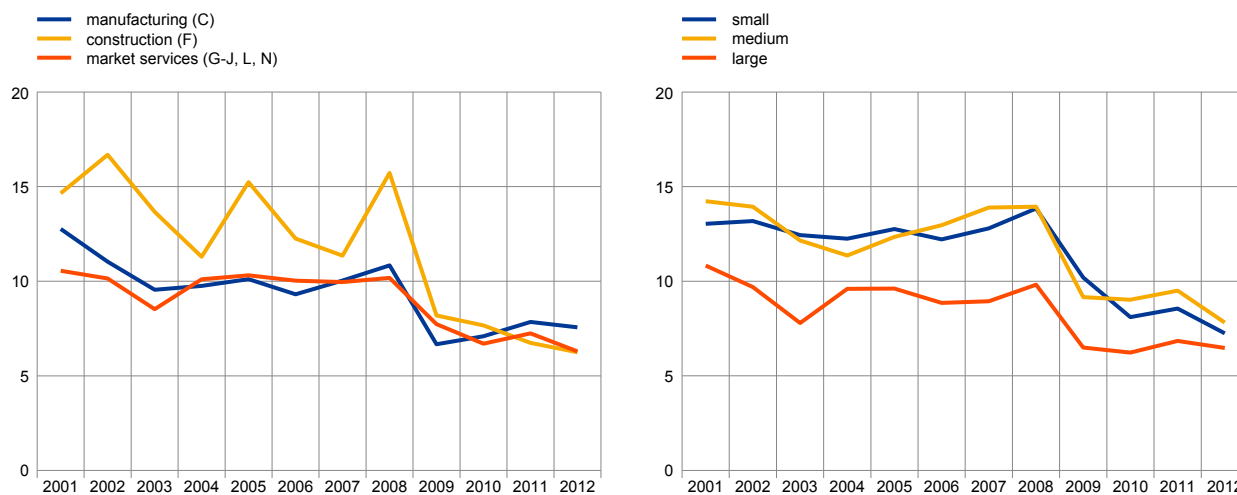
Source: BACH database.
Notes: The investment ratios are obtained as the ratio of the average investment in tangible fixed assets and the average total fixed assets for five of the largest euro area countries (i.e. Germany, France, Italy, Spain and Belgium). The sectors are defined as follows: manufacturing as NACE section C, construction as NACE section F, and Market services as NACE sections G, H, I, J, L and N. The definition of firm size is based on the turnover. Small firms have a turnover lower than EUR 10 million, medium-sized firms have a turnover between EUR 10 and 50 million, and large firms have a turnover higher than EUR 50 million.

looser financing conditions in this sector (i.e. less severe collateral constraints, see Arce et al. (2013)). This also explains that later when the financial conditions tightened and the housing prices declined, the adjustment in the construction investment ratios was sharper.

Investment ratios also fell in 2009 across all firm sizes (in terms of turnover, see right panel in Chart 49). In the post-crisis period investment remained relatively stable in large firms, while it further declined in 2012 in small and medium-sized firms.

Firm size, industry affiliation and country characteristics are key determinants of the level of corporate investment[136]. Chart 50 illustrates the results from two regressions of the investment ratio on a set of country, sector and year fixed effects. The first regression includes the years 2001-2008 (blue dots), while the second spans over the period 2009-2012 (yellow dots).

There are substantial differences in corporate investment rates of firms across countries. Once the effects of sector, firm size and year are netted out, on average firms in Belgium, Spain, France, and Italy invest significantly less than their German counterparts (Chart 50, first panel). The gaps in the investment ratio range from 9.9 pp for enterprises in France to 15.9 pp for Italian firms, suggesting that country characteristics are quantitatively important for corporate investment. After 2009, the average distance in corporate investment to German firms widened further for firms in Spain and Italy, reflecting the ongoing economic difficulties in Southern European countries. By contrast, cross-sectoral differences in corporate investment are much smaller in magnitude and often statistically not different from investment ratios in

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[136]   See ECB (2013).

Chart 50

The role of country, size and sector effects on investment

(estimated coefficients and 95% confidence interval of fixed effect regressions over 2000-2008 (blue dots) and 2009-2012 (yellow dots) in percentage points)
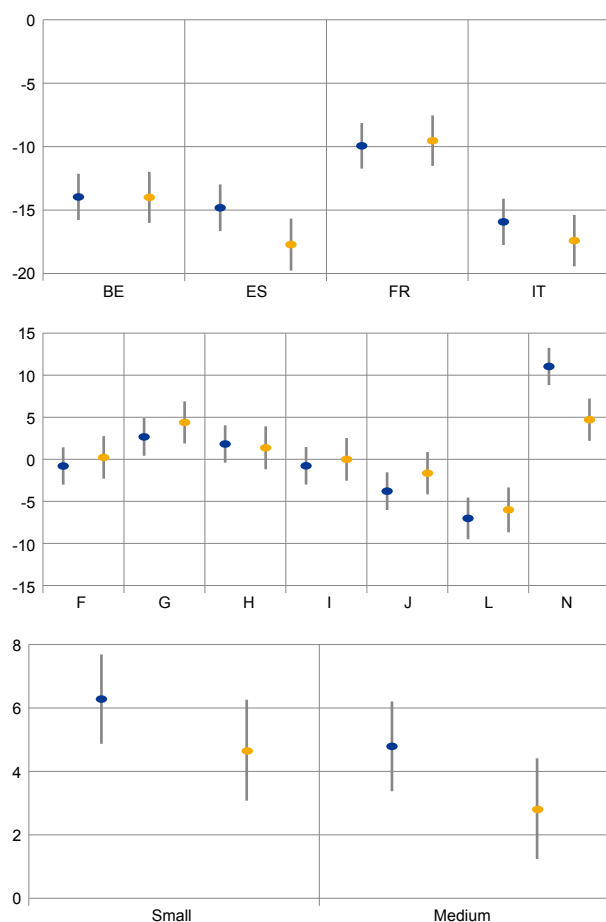
Sources: Own calculations based on BACH database.
Notes: The dots in the chart show the estimated coefficients of country fixed effects (first panel), sector fixed effects (second panel) and firm size fixed effects (third panel); the vertical line through each dot represents the range of the 95% confidence interval for each estimate. The estimated coefficients stem from two OLS regressions: the first covers the period 2001-2008 (blue dots), and the second the years 2009-2012 (red dots). In each regression the investment ratio is regressed on a set of country fixed effects (five countries, with Germany as reference group), industry fixed effects (Manufacturing (the reference group), Construction (F), Trade (G), Accommodation and food services (I), Transportation (H), Information and communication (J), Real estate (L), and Administrative and support service activities (N)), firm size (Small SMEs, Medium SMEs, Large firms (the reference group)) and year fixed effects. The chart reads as follows (first panel): controlling for sector, firm size and year fixed effects, the investment ratio in Belgian firms during 2001-2008 is on average 14 percentage points lower than that of German enterprises. The coefficient is statistically different from zero at the 5% level. See the main text for a description of the dependent variable. The estimated coefficient of the real estate sector in the middle panel has to be interpreted with caution as data is incomplete in several countries.

manufacturing (second panel). During 2001-2008 investment rates in only four sectors differ significantly from manufacturing. The same analysis for 2009-2012 shows that differences in investment across sectors have further decreased except in trade. Regarding firm size fixed effects, the third panel shows that SMEs[137] invest significantly more in relation to their fixed assets than large firms. However, these differences diminish after 2009. Overall, the analysis suggests that differences in corporate investment across countries have widened after 2009 while gaps between sectors and firms of different size have diminished.

Turning to the indicators of the firms' financial positions, SMEs tend to be more liquid than large firms in all countries, most probably due to their more restricted access to external finance, with a remarkable high level of liquidity maintained by the French firms which contrasts with the low level of the Italian firms (Chart 51). Since 2009 firms held slightly higher levels of liquidity than before, with the exception of Italian SMEs and French large corporations[138]. SMEs tend to have higher levels of cash flow over fixed assets in all cases, although with important differences across countries. The cash flow deteriorated substantially with the crisis in almost all countries and categories[139]. Remarkable is the resilient cash flow levels of German firms and the sharp fall in the Spanish case, reflecting the different effects of the crisis across countries.

Concerning leverage, all the firms except large German firms had a level of debt above 50% of their total assets before the crisis, partly as a result of the credit boom in the pre-crisis years that made it easier for firms to raise cheaper external funds. In the post-crisis period a very slow process of deleveraging is visible. Finally, the interest payments burden was structurally higher in SMEs given their higher dependence on bank credit. However, with the crisis, the firms that suffered higher profitability deterioration had more difficulties servicing

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[137] SMEs are defined as non-financial corporations with a turnover of less than €50 million. Accordingly, large firms have a turnover higher than €50 million.

[138] In contrast to the other countries, the increase in liquidity since 2009 in Spanish SMEs is driven by higher holdings of other financial assets. Given the difficulties in getting external finance, Spanish and Italian SMEs have maintained on average lower levels of cash holdings since the crisis (i.e. cash and bank over total assets).

[139] Similar results are obtained when considering other common measures of profitability such as return on assets (i.e. net operating profit over total assets).

Chart 51

Firms' financial characteristics by country and size

(in percentages)

(a) Liquidity

■ 2000-2008
■ 2009-2012

(b) Total debt

■ 2000-2008
■ 2009-2012

(c) Profitability

■ 2000-2008
■ 2009-2012

(d) Interest payment burden

■ 2000-2008
■ 2009-2012
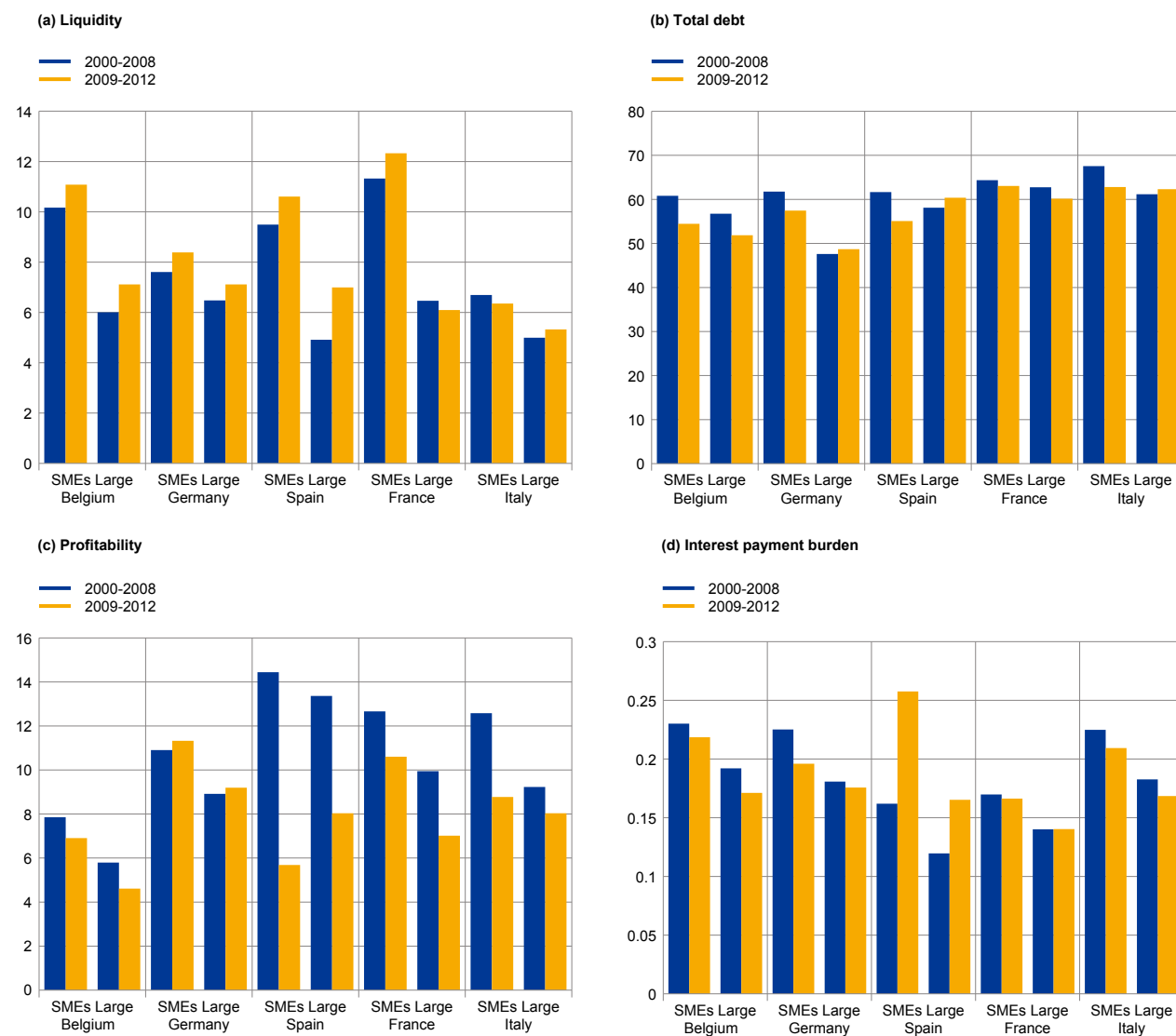
Source: BACH database.
Notes: The ratios are calculated as the ratio of the averages for each category (i.e. country and size). The liquidity ratio corresponds to the cash, bank and other financial assets over total assets. The leverage ratio is obtained as total debt over total assets. The profitability ratio is cash flow over fixed assets. The interest payments burden is the interest over earnings before interests, taxes, depreciation and amortisation (EBITDA). More details on the variables definition can be found in the Appendix to Chapter 4.

debt, particularly Spanish firms, regardless of their size. The decline in the interest burden over profits in Italian, German, Belgian and French firms is mainly driven by lower interest rates, which more than offset the effect of lower profits. However, in the case of Italian SMEs it masks the fact that the amount of interest payments is higher than for other countries, given their high dependence on bank debt[140]. In contrast, Spanish SMEs diversify more the sources of financing to other creditors.

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[140] Italian SMEs also use more trade credit in comparison to SMEs in other countries.

Table 8

Main determinants of investment decisions before and after the crisis

(regression coefficients)

Regressors	SMEs						Large firms					
	Before 2009			After 2009			Before 2009			After 2009		
	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)
log(turnover to capital)(lag)	6.36**	6.50**	9.30***	6.03**	6.58***	8.54***	9.58***	8.85***	9.64***	8.92***	7.73***	7.92***
Sales growth	0.36***	0.22***	0.20***	0.12*	0.15***	0.10	0.21***	0.14**	0.09*	0.16***	0.12**	0.10**
Cash flow to capital (lag)	0.17*	0.18*	0.12	0.11	0.09	0.09	-0.06	-0.04	0.03	-0.05	-0.04	0.02
Cash holdings to assets (lag)	-0.17	-0.06	-0.15	0.16	0.04	0.19	-0.14	-0.02	0.03	0.16	0.20	0.08
Total debt to assets (lag)	-0.06	0.02		-0.09	0.08		0.01	0.03		0.00	0.03	
Bank debt to assets (lag)		-0.32*			-0.49**			-0.14			-0.19	
Total debt to assets (lag) * (Total debt to assets (lag) > τ)			-0.09			0.05			0.14			-0.05
Total debt to assets (lag) * (Total debt to assets (lag) ≤ τ)			0.20			-0.16			-0.14			-0.05
Bank debt to assets (lag) * (Total debt to assets (lag) > τ)			-0.61**			-0.83***			-0.14			-0.24
Bank debt to assets (lag) * (Total debt to assets (lag) ≤ τ)			-0.44*			-0.69**			-0.15			0.12
Number of observations	1,268	1,268	1,268				1,109	1,109	1,109			
Number of instruments	93	103	126				95	105	128			
R squared (levels)	0.22	0.34	0.21				0.25	0.26	0.25			
Hansen test (p-value)	0.08	0.14	0.08				0.61	0.61	0.36			

Source: Own computations.
Notes: Difference GMM estimations using orthogonal deviations. All the regressions include country-year dummies and seven lags as instruments. The complete set of estimated coefficients is reported in the Appendix. The threshold used is defined in terms of the total debt to assets ratio as the 25th percentile of the total distribution (all years), and stands at a value of 37 for SMEs and 33.6 for large firms. More detailed results on the regressions can be found in the Appendix. *** / ** / * indicate statistical significance at 1%, 5% and 10%, respectively. The basic set-up in column A contains lagged investment, sales growth, cash flow, liquidity stock and corporate debt. In set-up B bank debt is added, which matters for SMEs. In set-up C level effects on investment are controlled for. R squared in the equations estimated by difference GMM refers to the squared correlation coefficient between actual and predicted levels of investment ratios. For explanation on variables, see Appendix to Chapter 4.

To further check the heterogeneous impact of these factors on investment decisions of firms, we perform a set of dynamic investment regressions. Empirical evidence[141] shows that sales growth, capturing demand or accelerator effects, is statistically significant and the coefficient is positive for all firm sizes, both before and after the crisis (Table 8, column A). Cash flow has a positive and statistically significant effect only on SMEs investment plans during the pre-crisis period. Liquidity and leverage seem to be not significant in any of the periods.[142]

However, the composition of corporate debt might play a role, because some debts can be easily renegotiated unlike other forms of debt. This could have implications for investment. Irrespective of pre-crisis or post-crisis periods, SMEs tend to hold more bank debt and therefore are more dependent on bank credit in all sectors (Chart 52). Large firms are less dependent on bank credit than SMEs, regardless of the sector considered. For some sectors such as trade services, trade credit is a more important source of external financing than bank credit. Real estate is the sector which is the most dependent on bank credit (between 60 and 70% of total debt) regardless of the firm's size. In view of its importance and in line with Buca and Vermeulen (2012), bank debt was included in the regression (Table 8, column B), and its coefficient was negative and statistically significant in both periods for SMEs, with

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[141] The dynamic investment regressions are based on the error correction model by Bean (1981) which combines long-run equilibrium relationship of the capital stock with short-run investment dynamics. The regressions feature as regressors: lagged investment ratio, cash flow to capital ratio, sales to capital ratio (error correction term), sales growth and total debt to assets, country-time dummies, and interacting them with pre-crisis period (2001-2008) and post-crisis period (2009-2012) dummies.

[142] Nevertheless, as seen in Tables 4.A.4 to 4.A.7 in the Appendix to Chapter 4, there is a significant differentiated impact of the crisis on most of the determinants of investment. For instance, there are some signs that accelerator effects in SMEs somehow lost importance in the post-financial crisis period or that the effect of liquidity on corporate investment became more important.

Chart 52

Level and composition of corporate debt by sector and size

(in percentages)

Pre-crisis period (2001-2008)
(a) Small and medium-sized firms

- other debt
- trade credit
- bank debt
- ◆ total debt to assets

(b) Large firms

- other debt
- trade credit
- bank debt
- ◆ total debt to assets

Post-crisis period (2009-2012)
(c) Small and medium-sized firms

- other debt
- trade credit
- bank debt
- ◆ total debt to assets

(d) Large firms

- other debt
- trade credit
- bank debt
- ◆ total debt to assets
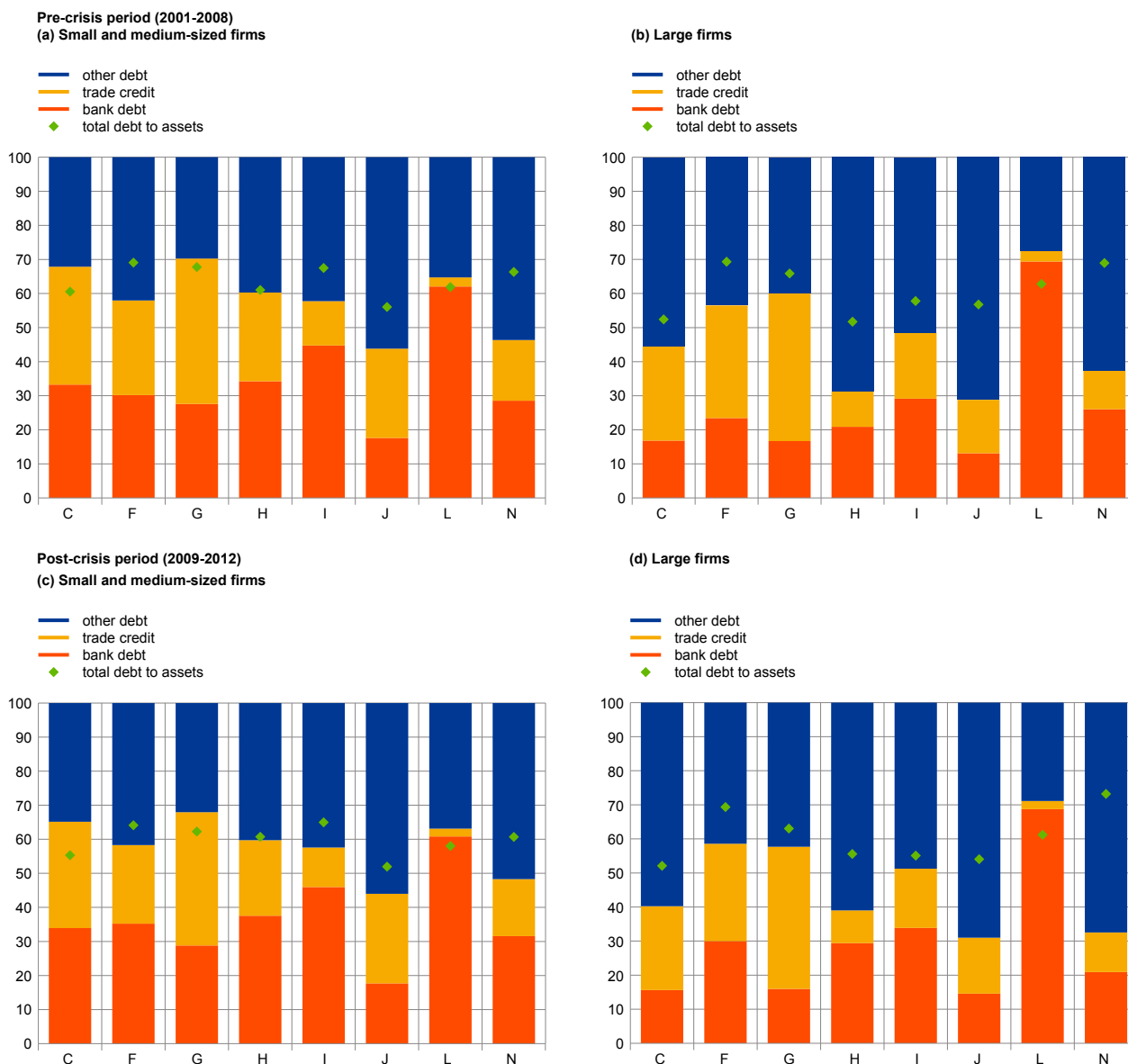
Source: Bach database.
Notes: The sectors are defined as NACE sections: C: Manufacturing, F: Construction, G: Trade services, H: Transportation services, I: Accommodation services, J: Information and communication services, L: Real estate, and N: Administrative services.

a larger effect (in absolute value) since the crisis. But it is not statistically significant for large firms. Investment dropped more in firms more dependent on bank debt, which could indicate additional constraints coming from the supply side.

This is even clearer when we investigate the possible asymmetric effect[143] of total debt on investment in the two periods. An extended version[144] of the previous

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[143] The threshold is set as the first quartile of the representative firm of a given size in the sample.

[144] We follow the approach of Goretti and Souto (2013) who provided empirical evidence in the period 2000-2010 for the euro area of asymmetric or threshold effects between investment and debt overhang. The authors found that low levels of leverage had a positive impact on investment, while for high levels the effect was negative.

regressions shows that before 2009 bank debt has a statistically significant and negative impact on investment by small firms when total debt values are below the threshold. The effect turns even larger (in absolute terms) when the total debt level exceeds the threshold (Table 8, column C). Since 2009 the coefficients below and above the threshold have also been larger (in absolute terms). By contrast, these threshold effects are not statistically significant when considering total debt and for large firms regardless of the type of debt considered. This result would indicate that SMEs were already financially constrained before the financial crisis and therefore more vulnerable to changes in the external financing conditions, especially to bank credit conditions. With the financial crisis and the tightening of external financing conditions, the threshold effects became much stronger[145], indicating the presence of additional financial constraints which acted as impediments on the investment decisions of the SMEs.

Overall, the results show that since 2009 investment in SMEs became more sensitive to the level of bank debt. This is in line with the findings of Buca and Vermeulen (2012) who found that investment in manufacturing industries was sensitive to bank debt at the time of the investment collapse in 2009. This effect was largest for small and medium-sized firms and Southern countries (Italy, Portugal and Spain).

4.2.2 Demand side effects on investment and the role of uncertainty (risk perception)

Demand-side effects also played an important role in addition to supply constraints on external financing. Firms decreased their investment spending as a result of the lower level of demand for production as well as the low confidence and heightened uncertainty about firms' prospects (Kahle and Stulz (2011)). In the aftermath of the financial crisis, investment ratios have remained low and far below pre-crisis levels in most of the sectors.

Regarding uncertainty, in the economic literature there is no agreement on the sign and persistence of its impact on the real economy. Following Bloom et al. (2007), due to the irreversibility of real investments, the interaction between high uncertainty and non-smooth adjustment frictions (i.e. fixed costs) may lead firms to postpone hiring and investment[146]. Other works in the literature stress the interaction between uncertainty and financial frictions. According to Gilchrist, Sim and Zakrajsek (2014) higher risk translates into rising bond premia and, therefore, the rising cost of capital which negatively influence investment activity. The uncertainty can be associated

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[145] Alternatively, it could be the case that the threshold itself has changed instead of the coefficient. But given that the dataset refers only to the average representative firm for each category, the distributions of the debt and bank debt to assets before and after the crisis were pretty similar. This is also visible in Chart 52. The changes in the debt ratios and debt composition in both periods were not very sizeable in this dataset. In addition, the lack of statistical significance of profitability in the equation for SMEs when threshold effects are incorporated to capture financing constraints (column C) points to the existence of a link between profitability and financing constraints.

[146] Bachmann et al. (2012) find that a surprise movement in survey-based measures of uncertainty for Germany and US are associated with a significant reduction in production and employment. As to the case of Germany, production declines and rebounds fairly quickly following an increase in uncertainty, it suggests that German firms take "wait and see" approach to investment.

Chart 53

Factors affecting the availability of external financing for firms and risk perceptions of banks

(net percentages)

(a) SMEs

- credit history
- general economic situation
- firm-specific outlook
- risk perceptions of banks

(b) Large firms

- credit history
- general economic situation
- firm-specific outlook
- risk perceptions of banks
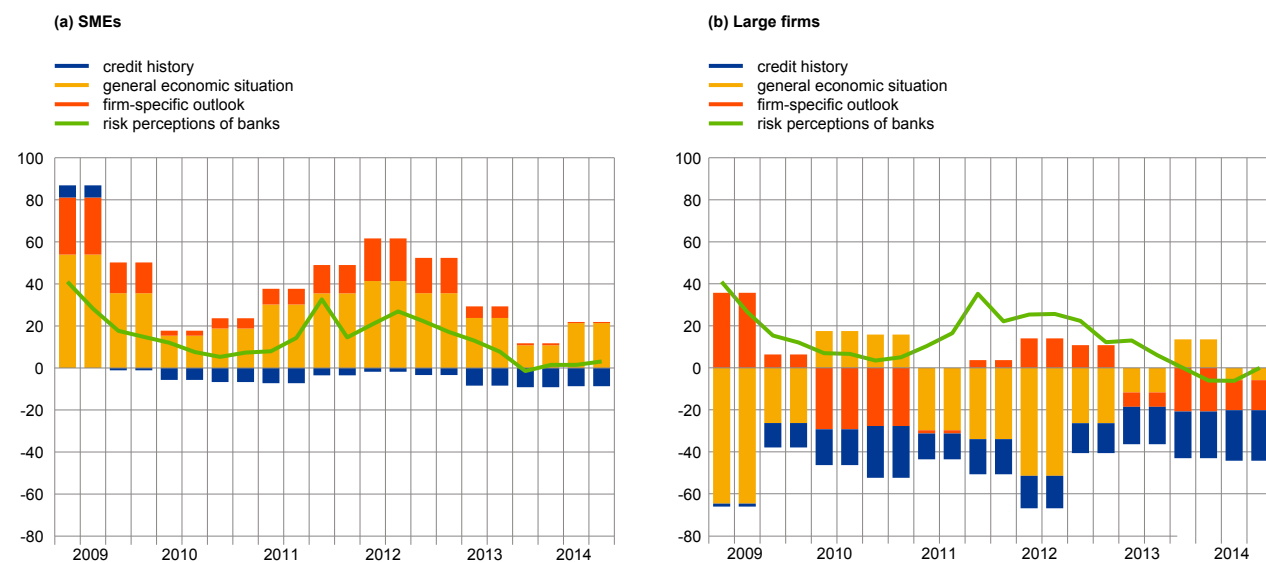
Sources: Eurosystem Bank Lending Survey (BLS) and SAFE; ECB calculations.
Notes: Risk perception as unweighted average of "exp. economic activity" and "industry-specific risk" as reported by banks, firm-specific outlook refers to changes in sales, profitability or business plan. SAFE data are biannual, hence figures are reporting twice in the two quarters covering the survey. A positive sign indicates a deterioration of the factor.

with different dimensions: demand, prices, taxation (economic policy), etc. Although shocks to uncertainty tend to be short–lived, several waves of different shocks in the euro area probably have turned uncertainty into more a persistent factor.

During the post-crisis period, information derived from survey data are helpful in understanding the role of uncertainty. Results from the Eurosystem Bank Lending Survey (BLS) indicate a re-emergence of higher risk perceptions as a factor explaining banks' tightening of credit standards at euro area level in 2011 (Chart 53, risk perception of banks). These risk perceptions then steadily declined following the easing of sovereign bond market tensions that started in summer 2012. Overall, banks did not seem to discriminate between large and SMEs. At the same time, evidence from the ECB and European Commission survey of access to finance of enterprises (SAFE) reveals marked differences across firm' sizes. More specifically, both the firm-specific outlook and firms' credit history – which broadly mirrors banks' perception of firms' credit risk – were factors which had a systematically more benign impact on large firms' borrowing conditions than on those of SMEs. These differences across firm size were particularly pronounced for firms' credit histories, suggesting more deeply-rooted structural differences in credit risk for euro area firms depending on their size class.

4.2.3   Cash holdings and uncertainty (risk perception)

Firms' decisions to hold cash are closely related to their investment decisions. Firms could either use cash (i.e. profitability) in financial or capital investment or distribute it to shareholders. In general, financially constrained firms tend to hold more liquid

Table 9

Role of uncertainty on investment decisions

(dependent variable: Investment to capital ratio)

Regression coefficients	SMEs	Large firms
Investment to capital ratio (lag)	0.15**	0.16**
Risk perception (lag)	0.01	0.07**
log (turnover to capital)(lag)	9.21***	7.19***
Sales growth	0.18***	0.11***
Sales growth* Risk perception (lag)	0.00	0.00
Cash flow to capital ratio (lag)	0.16	0.13*
Cash flow to capital ratio (lag)* Risk perception (lag)	-0.00**	0.00
Cash holidngs to assets (lag)	0.01	-0.17
Cash holidngs to assets (lag)* Risk perception (lag)	0.01**	0.00
Total debt to assets (lag)	0.03	0.08
Total debt to assets (lag)* Risk perception	0.00	-0.00*
Bank debt to assets (lag)	-0.49**	-0.16*
Bank debt to assets (lag)* Risk perception (lag)	0.00	0.00*
Number of observations	1,138	997
Number of instruments	146	129
R squared (levels)	0.24	0.27
Hansen test (p-value)	0.26	0.67

Source: Own computations.
Notes: Estimations by difference GMM using orthogonal deviations. All the regressions include country-year dummies and seven lags as instruments. Constant and dummies not reported. More detailed results of the regressions can be found in the Appendix to Chapter 4. *** / ** / * indicate statistical significance at 1%, 5% and 10%, respectively. R squared in the equations estimated by difference GMM refers to the squared correlation coefficient between actual and predicted levels of investment ratios.

assets for precautionary reasons. But in times of high uncertainty cash may serve not only as a financial buffer against liquidity shocks, but also as portfolio choice, replacing fixed investments. Akguc and Choi (2013) studied cash holding of European firms and found that euro area countries especially held more cash reserves than firms in other European countries at the time of the sovereign debt crisis.

In order to disentangle the role that uncertainty (perceived risk) may have played on investment decisions, a set of estimated dynamic investment equations[147], using a proxy for economic risk at the country level[148], show that the risk perception is statistically significant only for large firms, with a positive coefficient (Table 9). This indicates that, for these firms, higher perceived risk is not an impediment for investment plans. However, in the regression controlling for risk, the level of bank debt has a negative and statistically significant effect on investment for large firms, while in the previous regressions it was not significant. Interestingly, the interactions between risk and bank debt as well as risk and total debt are statistically significant. The coefficient is positive in the former and negative in the latter. Therefore, the interaction between high debt and high risk is an obstacle for investment plans in large firms. In contrast, for SMEs the interaction between cash flow and uncertainty has a significant and negative coefficient, while the interaction between cash holdings and uncertainty is positive. One possible interpretation is that, in moments of high uncertainty, SMEs, instead of investing in physical assets, tend to use the cash flow for other purposes, and those with more cash holdings use it for financing investment plans (likely owing to limited access to credit).

4.3 Investment, capital flows and foreign direct investment[149]

In addition to the standard determinants dealt with above, international financial flows play an increasingly important role in NFCs' investment decisions, particularly with respect to the relationship between total international capital flows (and FDI in particular) and NFCs' profitability and returns on investment.

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[147] The regression includes as explanatory variables the main determinants of investment considered above in Table 9, plus uncertainty and interactions of uncertainty with the main determinants.

[148] The proxy is the banks' perceptions of the general economic outlook obtained from the BLS. It is unfeasible to consider measures of economic uncertainty at industry and firm-specific levels (e.g. cross-sectoral dispersion of profit growth) given that the dataset uses the average representative firm in each sector, size category and country and the variability is much lower.

[149] Prepared by Mary Everett (IE), Anneli Peridon and Bahar Öztürk (both NL), Selin Özyurt (ECB) and Malin Andersson (ECB).

## 4.3.1 Do firm profitability and return on investment attract capital flows?[150]

Capital flows[151] channel savings inter-temporally between countries, allowing them to run (persistent) current account imbalances. The creation of EMU and the liberalisation of the capital account fostered substantial cross-border capital flows between member states, stimulated by the elimination of exchange rate risk and a reduction of liquidity risk. During 2004-2007[152], when cross-border capital flows surged, inflows exceeded outflows in Greece, Ireland[153], Italy, Portugal, and Spain (deficit countries), whereas outflows exceeded inflows in France, Germany, the Netherlands, Austria, Finland, Belgium and Luxembourg (surplus countries).

Chart 54

Return on capital employed (x-axis) and net capital inflows

(percent and percent of GDP, period averages)
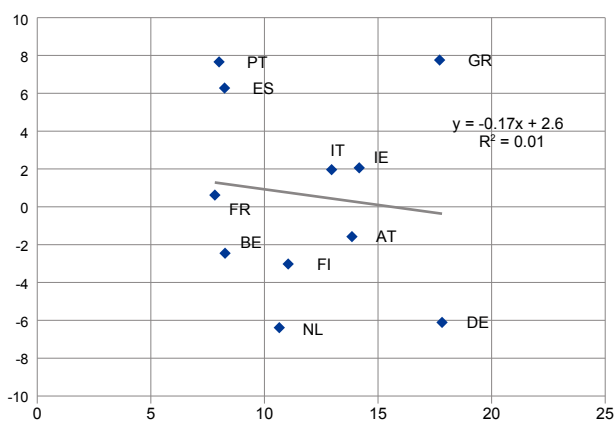
$$y = -0.17x + 2.6$$
$$R^2 = 0.01$$

Sources: Own calculations on Eurostat and SDW data.
Notes: The countries refer to the original 12 euro area countries. Data for Luxembourg are missing.

Such flows can be welfare enhancing, notably if used to fund productive investment or (sustainable) consumption smoothing. On efficiency grounds and for convergence to take place, investment should occur where expected profitability and the marginal productivity of capital are the highest, suggesting a positive correlation between net capital inflows and expected NFC profitability.

However, although expected NFC profitability is unobserved, there is no correlation across the euro area countries between realised NFC profitability (measured by the return on capital employed) and net capital inflows (Chart 54) during the boom period 2004-2007[154]. In some cases, for instance in Spain and Portugal, registered capital inflows were accompanied by lower average NFC profitability than in surplus countries. Similar results are obtained if profitability in the early years of EMU – when convergence dynamics could have been expected to be strongest – is used instead.

To the extent that past profitability provides an indication of expectations of future profitability or realised profitability is accurately forecasted, this suggests that international net lending or borrowing was not strongly associated with expected NFC profitability performance.

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[150] Prepared by Anneli Peridon and Bahar Öztürk (both NL).

[151] Capital flows consist of portfolio flows (debt and equity), foreign direct investment, other capital flows (bank and money market flows), and official reserves.

[152] The analysis in this section starts from 2004 due to the availability of data. The analysis does not extend beyond 2007 because after this point capital flows were strongly influenced by crisis dynamics.

[153] Capital flows to and from Ireland are strongly influenced by MNCs' behaviour and the presence of an international financial services centre (IFSC), which complicate their interpretation.

[154] We use net capital flows here as these are theoretically more closely linked to convergence-related factors and international savings and investment patterns, as well as macroeconomic outcomes (Ghosh et al. (2014)).

Chart 55

10-year bond yields (x-axis) and net capital inflows
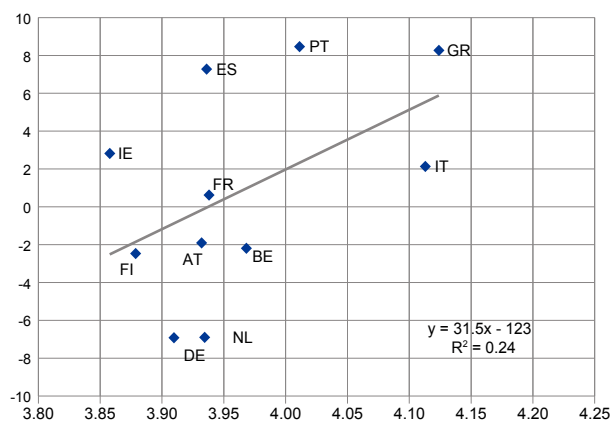
(percent and percent of GDP, annual averages)

$y = 31.5x - 123$
$R^2 = 0.24$

Sources: Own calculations on Eurostat and SDW data.
Notes: The countries refer to the original 12 euro area countries. Data for Luxembourg are missing.

Chart 56

Domestic credit growth in selected countries 2004-2007

(percent and percent of GDP, annual averages)
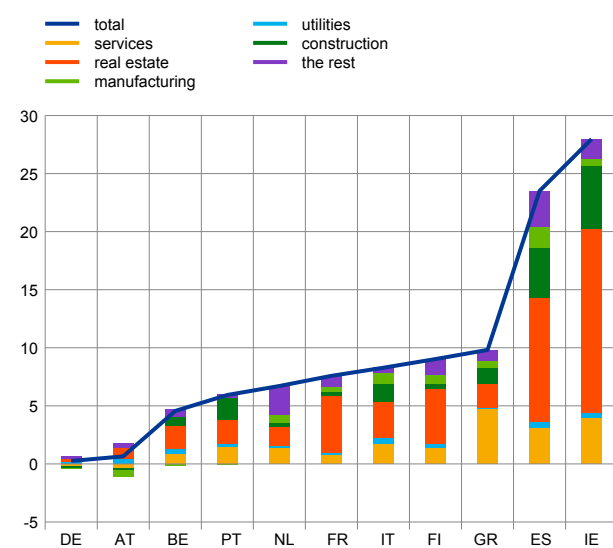
Sources: Own calculations on Eurostat and SDW data.
Notes: The countries refer to the original euro area countries. The analysis tries to link capital flows to domestic credit growth. As LU is considered in the capital flows literature as an outlier due to the size of its financial system, it is also not included in Chart 56 showing domestic credit growth. Table 10 only includes all ea-12 since the analysis is focused on the period before the crisis.

Also, total factor productivity developments at country level suggest that the allocation of capital within the euro area was not primarily associated with productivity considerations: total factor productivity growth was notably below the euro area average in Spain, Portugal and Italy, both during the 2004-2007 boom years and the preceding years. Empirical evidence suggests that, while this can partly be explained by fundamentals, other factors such as a perceived reduction in financial risk also played a role (Lane (2013)). Indeed, there was a positive correlation between bond yields and net capital inflows, suggesting that the allocation of capital between countries was more closely associated with financial returns (Chart 55). Also other factors may have played an important role determining the allocation of capital, including (i) the very loose monetary and financial conditions prevailing in many of the euro area countries at that time; (ii) the deficiencies in financial regulation, and (iii) the lack of a macroprudential supervisory framework.

If not underpinned by gains in productivity and export capacity, but rather directed towards investment in sectors with low productivity (growth), or used to finance excessive public and private consumption spending, capital flows can make the recipient country particularly vulnerable to "sudden stops", which typically causes a sharp recession.[155] Large net capital inflows can also induce a real appreciation of the exchange rate, thereby harming the competitiveness of the recipient country and aggravating external imbalances.

There is empirical evidence that international capital inflows are strongly associated with domestic credit growth in recipient countries (Lane and McQuade (2013)), which often precede financial crisis (Gourinchas and Obstfeld (2012)).[156] The strongest growth rates of credit to NFCs were observed in Ireland and Spain during this period, with yearly rates reaching beyond 20% (Chart 56). In contrast Belgium, Austria and Germany experienced relatively subdued or even zero credit growth during the same period.

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[155] Benigno et al. (2014) find that episodes of large capital inflows generally coincide with an economic boom, in which output, consumption, investment, employment, and domestic credit initially increase, but are followed by a recession as capital inflows subside and credit contracts. They also find that large capital inflows are associated with an expansion in non-tradable sectors, such as services and construction, at the expenses of the manufacturing sectors producing tradable goods.

[156] Lane and McQuade (2013) find that domestic credit growth in Europe is strongly related, particularly to net debt inflows.

Table 10

Developments in public debt and labour productivity growth by sector (2004-2007)

(percentage and percentage of GDP, period averages)

	Cumulative change (in % of GDP)	Average annual growth (in %)	Average annual growth of productivity by sector			
	Public debt	Household final consumption expenditure	Manufacturing	Construction	Real estate activities	Total Productivity
EA-12	-3.2	1.7	4.3	-0.7	-1.5	1.4
BE	-10.0	1.5	3.3	2.6	-0.4	1.3
DE	-1.0	0.5	5.7	-1.4	0.8	1.8
IE	-4.5	6.1	2.8	-3.1	-3.6	1.1
GR	8.8	4.0	0.8	4.5	-5.4	2.5
ES	-10.0	4.0	3.3	-1.2	-5.9	0.8
FR	-0.7	2.2	3.8	-1.3	-0.4	1.3
IT	-0.4	1.1	2.2	-1.8	-2.1	0.7
LU	0.4	2.7	3.3	1.4	-4.5	2.2
NL	-7.1	0.8	5.2	1.7	na	2.2
AU	-4.5	1.7	5.4	0.1	1.1	2.3
PT	6.5	2.1	2.8	0.6	-3.2	1.4
FI	-9.2	3.6	8.2	0.5	0.7	2.9

Sources: Own calculations on Eurostat and SDW data.
Notes: The countries refer to the original euro area countries. The analysis tries to link capital flows to domestic credit growth. As LU is considered in the capital flows literature as an outlier due to the size of its financial system, it is also not included in Chart 56 showing domestic credit growth. Table 10 only includes all ea-12 since the analysis is focused on the period before the crisis.

In all countries experiencing strong net capital inflows, average domestic credit growth was strongest in the construction and real estate sectors over the period 2004-2007 (Chart 56)[157], and productivity growth the lowest. In fact, average productivity growth in both the construction and the real estate sectors was negative during the period 2004-2007 in most euro area countries (Table 10). In contrast, the annual average credit growth in the construction sector was negative in Germany and Austria, and relatively modest in the Netherlands, Belgium, France and Finland.

In almost all countries, the highest average productivity growth was observed in the manufacturing sector. Meanwhile, this sector experienced relatively little credit growth in the recipient countries. Yet, according to BACH data, profitability in the manufacturing sector, as measured by net operating profits in percentages of assets, was higher than profitability in real estate and construction sectors in Portugal, Spain and Italy.[158]

Data also suggest that capital inflows were partly used to finance increasing public deficits and private consumption in several recipient countries (Table 10). The former is notably true for Greece and Portugal. Moreover, household final consumption increased rapidly in Greece, Spain and Ireland, experiencing investment and/or consumption booms, aided by the private sector credit expansion. This provides a further indication that capital inflows were allocated less efficiently within the recipient countries.

Overall, a cautious interpretation suggests that capital flows were directed towards higher yielding sovereigns. Financial intermediaries did not allocate these resources

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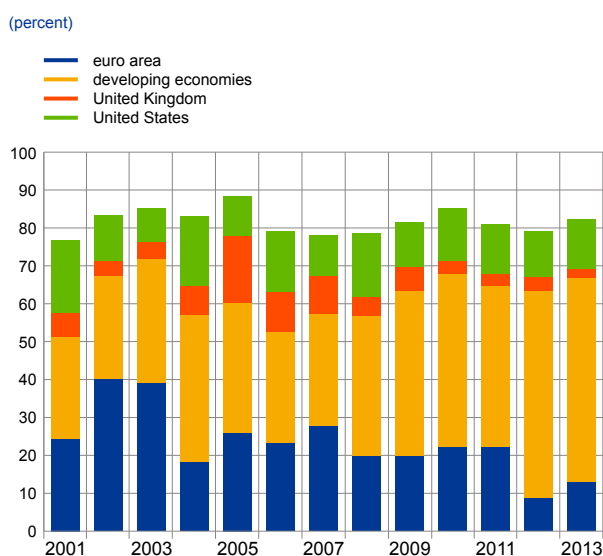[157] Data on domestic credit at sector level start for most of the euro area countries in 2003.

[158] BACH data on profitability are available only for these three countries among the recipient countries. BACH data are based on company accounts and therefore are not directly comparable with the profitability data used in Chart 54, which is based on national accounts.

according to relative productivity. Instead, credit was allocated to low-productivity non-tradable sectors during 2004-2007 (leading also to banks' increasing leverage and risk-taking), in turn supporting domestic demand.

4.3.2 Recent developments in euro area inward and outward FDI

Over the past ten years the euro area has witnessed lower inward FDI shares in favour of developing countries while the FDI shares of the US remained broadly stable.[159] Inward FDI is widely believed to enhance growth in host economies in a direct way by creating jobs and contributing to capital accumulation.[160] Financial funds brought by foreign investors may also help to ease credit constraints for local firms and boost productive investment. In addition, foreign direct investment may boost growth indirectly through productivity spillovers to host economies (Blomström and Kokko (1996)).[161]

Chart 57

Global FDI inflow shares

(percent)

euro area
developing economies
United Kingdom
United States

Sources: Own calculations on Eurostat and SDW data.
Notes: The countries refer to the original 12 euro area countries. Data for Luxembourg are missing.

Although in 2007 the euro area accounted for 28% of global FDI inflows, this share fell to 13% in 2013 (Chart 57). Looking at bilateral flows, the US remains the main investor in the euro area and represents the main investment destination.

The Great Recession differently affected FDI trends in the largest euro area countries. After 2009, FDI inflows to Germany and Spain picked up relatively strongly, whereas in France and Italy the improvements remained modest. Turning to FDI outflows, outflows of French companies reached their peak in 2007 and declined progressively to end up in negative territory (i.e. disinvestment from abroad) in 2013. Since 2010, German multinational companies have been investing abroad much more than their euro area counterparts, probably resulting in strong integration into the global value chain and hence the higher cost competitiveness of German exporting firms (Erber and Hagemann (2013))[162]. Key factors to attract foreign investment are not solely

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[159] While FDI flows may be volatile and not fully track changes in business conditions or cyclical economic developments, a strong and persistent reduction in inflows or outflows may reflect some structural competitiveness issues in the economy and could signal weakening integration into the global value chain.

[160] Although the merger or take-over of an enterprise, particularly through privatisation, may lead to a strong FDI inflow, the proceeds may not be used for enterprise investment purposes. Meanwhile, greenfield investments may have usually a strong link between FDI and capital formation, see Krkoska (2001).

[161] In this context, multinational companies (MNCs) tend to be more productive and profitable compared with their domestic counterparts and generally own superior technologies. 'Greenfield' investment where investors build capacity from scratch may generate stronger growth-enhancing effects than others.

[162] Running a simple regression between outward FDIs and exports in Germany, France, Italy and Spain between 2006 and 2013 we find that the growth of outward FDI is positively correlated with export growth in these countries.

Chart 58

Implicit tax rates on capital
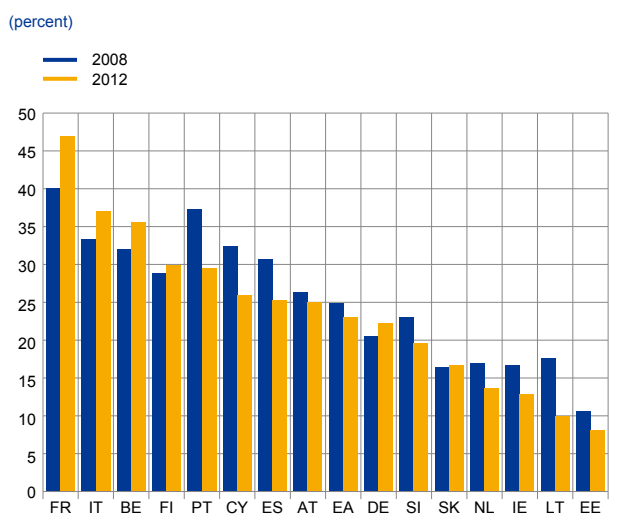
(percent)

- 2008
- 2012

Sources: Own calculations on Eurostat and SDW data.
Notes: The countries refer to the original 12 euro area countries. Data for Luxembourg are missing.

Table 11

Relationship between outward FDI and domestic investment for euro area countries

(estimated coefficients)

	(1)	(2)	(3)	(4)	(5)	(6)
Outward FDI	0.03***	0.03**	0.03**	0.04***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Inward FDI		0.00	0.00	-0.02**	-0.02**	-0.02**
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Savings			0.14***	0.10**	0.09**	0.08**
			(0.04)	(0.03)	(0.03)	(0.03)
Global GDP				-0.10	-0.11	-0.08
				(0.07)	(0.07)	(0.07)
GDP				0.35***	0.31***	0.29***
				(0.03)	(0.03)	(0.03)
Inflation					0.00***	0.003***
					(0.00)	(0.00)
Credit						-0.00**
						(0.00)
Observations	955	955	955	955	955	955
R²	0.38	0.38	0.40	0.55	0.57	0.57
Adjusted R²	0.37	0.37	0.38	0.54	0.56	0.56

Sources: Own calculations on Eurostat and SDW data.
Notes: The dependent variable is domestic investment scaled by GDP. The regressions are run on a panel dataset of euro area countries, with the exclusion of the Netherlands and Luxembourg, over the period 1999q1 to 2013q4. The motivation for excluding Luxembourg and the Netherlands relates to their large volumes of FDI which are related to their hosting of holding companies that intermediate FDI to other destinations. Country fixed effects are included in all regressions. All regressions are estimated with a constant (not reported). Standard errors appear in the parentheses. ***, **, * correspond to significance at the one, five and ten per cent levels, respectively.

economic, but also relate to institutions, taxation, infrastructures or human capital development, etc.[163] There is an extended empirical literature showing that expected return on FDIs and tax incentives are key to attracting foreign investors (Silva and Lagoa (2011), Devereux and Griffith (2002)). For instance, the implicit tax rate on corporate income in France and Italy was the highest tax rates in the euro area in 2012 (Chart 58) and they recorded the largest increase between 2008 and 2012.

4.3.3 Empirical assessment of outward FDIs

The theoretical and empirical literature points to both negative and positive effects on domestic investment from FDI. On the one hand, outflows of FDI can discourage domestic investment if firms fund their internationalisation with internal finance, resulting in a fall in domestic savings available to fund domestic investment (Stevens and Lipsey (1992)). Feldstein and Horioka (1980) show that for 17 OECD countries there is a trade-off between outward FDI and domestic investment, where a one dollar increase in outward direct investment leads to a reduction in domestic investment by a similar amount. On the other hand, if firms aim to increase their efficiency by tapping foreign markets through outward FDI to avail of lower cost inputs to production, outward FDI may increase domestic investment through firms' export of intermediate inputs (Stevens and Lipsey (1992); Hejazi and Pauly (2003)). Outward FDI has also been found to be beneficial to a domestic economy via positive effects for both the firm and its shareholders. Desai et al. (2005) provide evidence in support of these benefits, where for US firms, increases in outward FDI are associated with higher levels of investment in the US economy.

To explore the relationship between outward FDI and capital formation in the euro area the empirical analysis in this section is broken down into two

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[163]   According to Ernst and Young (2014), the main factors attracting FDI were stability and transparency of political, legal and regulatory environment, the country or region's domestic market, the potential productivity increase for their company, labour costs, transport and logistics infrastructure, local labour skill level, stability of the social climate, corporate taxation, telecommunication infrastructure and the flexibility of labour legislation.

Table 12

Relationship between outward FDI and domestic investment for Irish multinational firms

(estimated coefficients)

	(1)	(2)	(3)	(4)	(5)	(6)
Outward FDI	0.07***	0.07***	0.10***	0.03***	0.02***	0.02***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Inward FDI		0.07***	0.09***	0.02**	0,01	0,01
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Savings			-0.02***	-0.05***	-0.05***	-0.05***
			(0.00)	(0.00)	(0.00)	(0.00)
Global GDP				-0.01***	-0.00***	-0.02***
				(0.00)	(0.00)	(0.00)
Size				0.05***	0.05***	0.05***
				(0.00)	(0.00)	(0.00)
Debt					0.23***	0.22***
					(0.00)	(0.00)
Observations	268,671	268,671	236,541	236,541	236,541	236,541
R²	0,10	0,10	0,12	0,21	0,25	0,25
Adjusted R²	0,10	0,10	0,12	0,21	0,25	0,25

Sources: Own calculations on Eurostat and SDW data.
Notes: The dependent variable is fixed investment scaled by total assets. The regressions are run on a panel dataset of Irish-based multinational firms over the period 2004 to 2012. Firm fixed effects are included in all regressions, and time fixed effects are included in (6). All regressions are estimated with a constant (not reported). Standard errors appear in the parentheses. ***, **, * correspond to significance at the one, five and ten per cent levels, respectively.

strands. First, the macro-level application examines the effects of outward FDI on domestic investment across the 18 euro area member states. Table 11 presents the results of the specification for the country panel dataset.[164] Throughout the regression specifications, the results confirm that outward FDI positively affects domestic investment in the euro area. Where outward FDI enters as the sole explanatory variable (column 1), the results indicate that a one percentage point increase in outward FDI increases domestic investment by around 3 per cent.[165] The other noteworthy determinants of domestic investment are inward FDI and savings (columns 2 and 3). The, in most specifications, significant coefficient on inward FDI has an inverse relation with domestic investment, potentially suggesting some crowding out effects. The positive and significant coefficient sign on savings is consistent with the intuition that higher domestic savings are associated with higher domestic investment and is in line with findings in the literature (Desai et al. (2005)). When control variables are included (column 4 to 6), the positive and significant coefficient on outward FDI continues to hold. The savings variable continues to retain a positive and significant coefficient. Consistent with previous findings GDP growth is found to have a positive effect on domestic investment. High inflation rates, a measure of macroeconomic instability have a positive, albeit small, effect on domestic investment. Financial development, measured by credit is found to have a small and negative effect on domestic investment.

Next, to evaluate the relationship between outward FDI and domestic investment at the firm level, the micro analysis focuses on multinational[166] firms resident in Ireland. Ireland provides a pertinent setting for analysing the relationship between outward FDI and domestic investment at firm level due to the volume of multinational firms with a presence there. The estimates for Irish firms in Table 12 indicate that outward FDI has a positive influence on domestic investment. The results suggest that investment by Irish multinational firms is higher for those firms that engage in outward FDI. In addition, investment by outward FDI firms is higher relative to firms that are in receipt of inward FDI. In contrast to the macro-level results, in Ireland, inward FDI is positively related to domestic investment and savings are found to have a negative effect on firm investment, suggesting firms with relatively larger internal cash flows are employing these resources for alternative purposes. Firm size matters for investment as larger firms are found to have higher levels of investment. The positive and significant coefficient on debt suggests that for firms resident in Ireland,

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[164] See also Appendix to Chapter 4.

[165] In monetary terms, a €1 increase in outward FDI, increases domestic investment by 3 cent.

[166] In the period following the global financial crisis, investment by euro area multinational firms in locations outside of the euro area has been on average 21% of domestic investment, up from an average of 17% between 2002 and 2008.

the stock of external finance (sourced from both banks and financial markets) is important for their investment.

In summary the results confirm that outward FDI has a positive effect on investment in the euro area, and these findings are consistent across both macro and micro level studies[167]. In particular, the analysis disputes the common perception that increasing outflows of FDI reduces capital formation in the domestic economy.

[167] See for instance Desai et al. (2005).

5 Possible policy implications and challenges[168]

The global financial crisis and the euro area sovereign debt crisis have led to strong and abrupt adjustments in imbalances that had built up gradually within the euro area since the introduction of the euro. While the monetary union has supported economic and financial integration in the euro area, it has also been accompanied by severe imbalances in savings and investment, as reflected in some countries in credit and housing booms, and a misallocation of resources towards less productive sectors. External imbalances led to an accumulation in external liabilities to high levels, which, in turn, has weakened investment and therefore weighs on growth prospects and potential. This chapter first presents the key policy challenges implied by the analysis in this paper and derives some policy implications.

5.1 Main challenges

Structural rigidities, procyclical fiscal and supervisory policies conducted at national level played a key role in the build-up of imbalances and led to a costly adjustment in the form of large employment and output losses. This paper has shown that the adjustment in current accounts has been asymmetric: i.e. there has been an unwinding in current account deficits without a reduction in current account surpluses. This was largely due to the fact that deficit countries were in urgent need of adjusting, in view of loss of market confidence and debt sustainability concerns. At the same time surplus countries were not subject to market pressures to pursue structural policies aiming at enhancing flexibility, long-term productivity and employment growth. This implied that the latter countries are currently lagging behind in terms of rebalancing. Most recently, reform implementation has also stalled in stressed countries as a result of weaker pressures from financial markets and following the end of financial assistance programmes. Against this background, this Occasional Paper points to the following policy challenges.

1. Net foreign liabilities are very large in a number of euro area countries (see Chapter 2). The reduction of net foreign liabilities requires that large current account surpluses would need to be maintained for a protracted period of time. While it is expected that their net foreign liabilities will decrease somewhat in the coming years, several surplus countries are expected to continue accumulating net external assets. This asymmetric nature of the adjustment process makes it more complex.

2. The weakness in investment is largely a result of the still-ongoing efforts by both the private and the public sector in many euro area countries to strengthen their balance sheets by paying down debt and reducing budget deficits

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[168] Prepared by Stéphane Dees and Martin Bijsterbosch (both ECB).

(see Chapter 4). Consequently, private investment has generally remained weak. Also public investment has declined as governments consolidated their budgets in recent years. Looking ahead, structural policies should help in improving conditions for increasing private (non-residential) investment. Recent European initiatives such as the EU Investment Plan simultaneously aim at addressing bottlenecks with respect to funding, business environment and regulation.

3. The competitiveness adjustment requires not only an adjustment in domestic prices and costs in comparison with foreign prices and costs, but also involves an adjustment in non-tradable versus tradable prices and costs. Strengthening competitiveness entails a reallocation of resources towards the production of tradable goods and services, which can come through a relative decline in unit labour costs or a relative decline in prices in non-tradables. Such a reallocation does not only require flexibility in wages and prices, but also policies that lead to higher productivity or policies that allow a country to move up the product quality ladder. Depending on the specific situation of the country, the latter type of adjustment could be less deflationary than the adjustment process of recent years that relied more strongly on so-called internal devaluations.

4. Euro area economies with current account surpluses appear to exhibit persistently high savings and low investment rates. Whereas in Germany, all sectors contributed to a build-up of the surpluses, in other surplus countries, they have been largely due to the corporate sector. In surplus countries reforms should thus enhance the conditions for higher investment. For example, investment conditions in domestic services could be improved through the reduction of barriers to entry in these sectors, resulting in stronger competition in product markets. Moreover, the composition of public spending may be adjusted towards more efficient physical and human capital investment. Finally, barriers to cross-border labour mobility could be eased. The impact of such measures could also contribute to supporting aggregate demand – investment as well as consumption as a result of permanent income effects – and reducing current account surpluses.

5. The analysis in this Occasional Paper suggests that steps aimed at raising investment in the surplus economies and support economic growth in the euro area in general – including completing ongoing financial and corporate restructuring – would help to move imbalances between savings and investment in the right direction. In economies where current account deficits need to be reduced further, a pick-up in investment would require an increase in savings (e.g. through fiscal consolidation in line with commitments under the Stability and Growth Pact), although the need to raise national savings would need to be balanced against the need to avoid unduly suppressing economic activity. In addition, policies are needed that incentivise an efficient allocation of resources, e.g. by reducing barriers to investment in the tradable sectors, as well as policies that strengthen adjustment mechanisms in a monetary union.

5.2 Policy implications

Imbalances between savings and investment can only be corrected if different policies mutually reinforce each other, focusing on both the demand and the supply sides of the economy. In the remainder of this section, we discuss the role of the following policies in more detail: structural policies, policies aimed at access to and sources of financing, macro-prudential policies and fiscal policies.

5.2.1 Structural policies

Structural policies play a key role as they affect the supply side of the economy and can thus influence savings and investment decisions in a sustainable way. The regulatory environment can be made more favourable to investment and economic growth. Business activity would strongly benefit from an improvement in framework conditions, stronger competition in product markets and a better use of the available labour supply.

Despite improvements in particular in the stressed euro area countries, there are still major impediments in the business environment that are an obstacle to corporate activity, including investment. For example, high administrative costs and complex legal procedures are often serious obstacles to investment activity. In many cases, these obstacles weaken entrepreneurial spirits, especially of new, innovative firms that create most of the new jobs and which are highly sensitive to changes in investment opportunities. Streamlining administrative and tax provisions that discourage companies from growing and becoming more competitive would enhance productivity and investment. In all these areas, moving towards best practice in the euro area would mean radical improvements in the business environment.

Deregulating sheltered sectors can lift productivity and foster sustainable growth. Reducing entry barriers can help expand tradable industries. By lowering costs, reforms of services and network industries can depreciate the real exchange rate of countries that are still facing a competitiveness gap. Competitive pressures from entry can stimulate innovation and investment in existing firms in tradable sectors. Product market reforms can also lift productivity or cut costs in tradable and non-tradable sectors indirectly. Specifically, they can raise the quality and availability of intermediate inputs, particularly from services and network industries inputs.

In the labour market, reforms focusing on removing downward wage rigidities would increase the speed of adjustment and contain its costs in terms of job losses as wages would become more responsive to changes in economic conditions. This can be achieved by moving towards more firm-level agreements and by strengthening the link between firm-level and sectoral productivity and labour market conditions in wage-setting. Reducing labour market segmentation and strengthening active labour market policies can improve flows in and out of employment.

5.2.2 Improving access to and sources of financing

A second area of key relevance for investment is the need to overcome financial fragmentation and to diversify sources of financing.

The ECB comprehensive assessment has helped overcome bottlenecks in the supply of bank credit by strengthening the capital position of banks and reducing uncertainty about their financial position. As a next step, there is a need for more efficient debt restructuring and insolvency regimes for banks and firms, which at present vary widely between euro area countries. The effectiveness of the restructuring regimes is often hampered by outdated restructuring and bankruptcy legislation, a lack of new financing for viable companies undergoing restructuring, weak balance sheets of financial institutions and an overburdened judicial system. In countries where non-performing loans are high, there is an urgent need to modernise insolvency and foreclosure legislation to speed up the restructuring of non-performing loans. The latter is crucial to restore the banking system's intermediary role between savings and investment.

A further integration of corporate bond and equities markets is also essential to overcome the present financial fragmentation in the euro area and to ensure more robust cross-border lending and investment flows. To achieve this, there is a need to reduce differences between countries, for instance, in the legal protection of borrowers' and lenders' rights, and to ensure business-friendly taxation and insolvency procedures.

As concerns the need to diversify sources of financing, banks are the main source of lending to companies in the euro area. The crisis has shown the drawbacks of over-relying on a bank-centred lending model. There is therefore a need to further develop reliable sources of non-bank lending, such as equity and bond markets, securitisation, lending from insurance companies and asset managers, venture capital and crowdfunding. However, this should be done within a well-defined regulatory framework that mitigates potential financial stability risks associated with non-bank lending.

The need to overcome financial fragmentation underlines the importance of making further progress towards the creation of a single market for capital. A genuine single market for capital would not only help to strengthen the role of capital markets relative to banks, but also help strengthen equity funding relative to debt. This would also have positive structural effects on the euro area: cross-country integration through equity improves risk-sharing, and it could provide more resilience in a crisis than integration through interbank lending and fixed-income investment.

One area that deserves particular attention is the development of a well-functioning market for simple, transparent and real asset-backed securities (ABS). Increasingly, the focus has shifted towards financing small and medium-sized enterprises, which, in comparison with large firms, rely more on bank financing and in many cases temporarily struggled or continue struggling to retain access to credit. These companies may be small, but, taken together, they play a major role in the euro area economy, as they employ around three-quarters of the euro area's workforce.

The development of an ABS market would allow banks to still originate loans – notably to small and medium-sized enterprises (SMEs) – while preserving their balance sheet capacity. In order to achieve a well-functioning ABS market, it is important that the regulatory treatment of securitisation is proportional to the risk of ABS as well as simple and transparent. Moreover, the provision of public guarantees should be considered to support lending to SMEs, as is the case in other countries, such as the US.

5.2.3 Macroprudential policies

Macroprudential policies not only contribute to the stability of the financial system, but can also help to achieve an economically sound allocation of savings. In the current, post-crisis environment, macroprudential policies can be used to address issues related to non-performing loans, for example stemming from the ever-greening of loans. This practice may be worsened by a long period of low interest rates. Looking ahead, macro-prudential policies can seek to reduce overexposures to specific sectors and contain the build-up of systemic vulnerabilities by reducing the pro-cyclical feedback between asset prices and credit and by containing unsustainable increases in leverage and volatile funding. Tools that can be used in this regard include countercyclical capital buffers and provisions, sectoral capital requirements and caps on loan-to-value and debt-to-income ratios.

5.2.4 Fiscal policies

Fiscal policies can also contribute to reducing imbalances between savings and investment in euro area countries. Companies are more inclined to invest when there is confidence and certainty about the medium-term fiscal path, and ultimately about taxes. Governments can provide certainty to private sector agents through a consistent and credible application of the Stability and Growth Pact.

Within the existing framework, governments can find space to support productive investment (for example in infrastructure) and achieve a more growth-friendly composition of fiscal policies by lowering the tax burden and reducing unproductive current expenditures. More specifically, a more efficient and business-friendly corporate taxation regime could strengthen investment incentives. The efficiency of corporate taxation could be enhanced by reducing the tax bias towards debt-financing and streamline the administrative burden on businesses (especially SMEs). In this regard, there is also a complementary role to play at the European level in supporting the rebound in private investment. The European Fund for Strategic Investment (EFSI), which was approved by the European Council in December 2014, can support investment in infrastructure by investing in the riskier tranches of investment projects. The macroeconomic impact of this initiative depends on the amount of private sector funding, the efficiency of the projects chosen and the structural reforms undertaken to support new investment projects.

In deficit countries, governments can contribute to an increase in national savings by continuing their fiscal consolidation process in line with their commitments under the Stability and Growth Pact and by efficiently using allocated EU structural funds. Fiscal consolidation strategies should take into account vulnerabilities created by remaining fiscal imbalances, while minimising the negative impact on economic growth.

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Appendices

Appendix to Chapter 2

Financial inter-sector linkages in euro area countries

This appendix briefly describes the approach followed to estimate bilateral financial relations in euro area countries at sector level. The data used come mostly from national financial accounts (stocks), euro area accounts (stocks) and monetary and financial statistics[169]. Seven sectors are considered: non-financial corporations, monetary financial institutions[170], other financial institutions, insurance corporations and pension funds, the general government, households and the rest of the world. Seven instruments are considered: currency and deposits, debt securities (short and long term), loans (short and long term), insurance technical reserves, and other debits and credits. All euro area countries are covered except Latvia and Lithuania.

As a first step, country-level who-to-whom matrices are computed at instrument level by using the maximum entropy method suggested by Castrén and Rancan (2013). To enhance the accuracy of the estimated bilateral relations, several constraints were then imposed. Restrictions were imposed on bilateral positions in some instruments (e.g. monetary financial institutions' claims on the general government in loans) and on some aggregates of instruments (e.g. total rest of the world claims on the general government). All restrictions were imposed using an iterative procedure that demands all accounts to be constantly rebalanced until the restrictions are fulfilled. Estimates improve with the number of constraints imposed. The number of constraints imposed differs across countries, tough.[171] A similar procedure was done at the euro area level using integrated euro area accounts (seven sectors).

As a second step, country-level who-to-whom matrices were combined to form a unique euro area who-to-whom matrix for each instrument. Instruments were however aggregated into broader aggregates in order to avoid problems arising from some lack of harmonisation in statistical practices across countries. Further estimations were undertaken considering four instruments (deposits and loans, debt securities, insurance technical reserves, other debits and credits). In this matrix, the rest of the world for each country was ignored and the rest of the world from the euro area accounts was attached. In addition, an "other" sector was included in order to consider ECB/TARGET2 positions. This led to the creation of a 104 times 104 matrix for each instrument (six sectors per country plus the two additional sectors).[172] Similar

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[169]   Several adjustments are done in order to conciliate these sources of information.

[170]   For some countries the national central banks and other monetary financial institutions were considered separately.

[171]   The number of restrictions imposed was the highest for Austria, Slovakia, Malta, Spain, Portugal, Belgium, Slovenia, Greece, Finland and Estonia and the lowest for Ireland, Netherlands, Cyprus and Luxembourg.

[172]   In practice, an additional row/column was considered to take account of some adjustments that were needed since total assets and total liabilities in the system did not match when country information were joined with rest of the world data from Euro Area Accounts.

to the procedure followed for each country, the maximum entropy method was used first. Subsequently, estimations of country matrices were used as restrictions. In addition, the balance sheet items database was used to impose restrictions on some bilateral positions between sectors in different countries.

Unfortunately, national financial accounts statistics do not entirely match the euro area accounts as computed by the ECB, with the latter carrying out an independent bottom-up exercise. The third step in this procedure was thus to estimate the adjustments needed in order to obtain estimates compatible with those in euro area accounts. These adjustments were then incorporated in our who-to-whom accounts. Finally, our who-to-whom matrices were re-estimated taking into account these adjustments in addition to the restrictions that were already being imposed.[173]

Appendix to Chapter 3

A – An econometric analysis of private consumption in the euro area countries

This appendix briefly describes the approach followed to identify the main determinants of private consumption in the euro area countries over the past decade.

The model

Essentially, it is assumed that private consumption can be related to its determinants by means of a simple auto-regressive distributed-lag model (ARDL). That model, represented in equation (1), includes one lagged dependent, which accounts for habit persistence in private consumption, as well as one lag for each explanatory variable:

$$c_{i,t} = \lambda_i c_{i,t-1} + \delta'_{i,0} x_{i,t} + \delta'_{i,1} x_{i,t-1} + \mu_i + \varepsilon_{i,t} \quad (1)$$

whereby $c_{i,t}$ stands for the log of private consumption in country i during quarter t. $x_{i,t}$ is a vector that contains the values of the explanatory variables for the same country in the same period, and μ_i is a country-specific intercept. Provided private consumption and the variables included in x are non-stationary and that a long-run relationship exists between them, that is if $c_{i,t}$ and $x_{i,t}$ are cointegrated, the ARDL model can be re-formulated in the form of an error correction model (ECM):

$$c_{i,t} = \varphi_i (c_{i,t-1} - \theta' x_{i,t}) + \beta_i \Delta x_{i,t} + \mu_i + \varepsilon_{i,t} \quad (2)$$

where $\varphi_i = -(1 - \lambda_i)$, $\theta_i = (\delta_{i,0} + \delta_{i,1}) / (1 - \lambda_i)$ and $\beta_i = -\delta_{i,1}$.

The term in brackets on the right-hand side of equation (2) can be viewed as the long-run 'equilibrium' relationship between private consumption and its fundamental determinants. The coefficient φ_i, which should be comprised between -1 and 0, is the

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[173] Note that in the end not all restrictions were imposed due to data incompatibility.

error correction parameter that determines the speed at which private consumption steers back to its long-run trajectory when it deviates from it. Since φ_i is equal to $\lambda_i - 1$, an economic interpretation can be given to this parameter: an economy characterised by strong persistence in consumption habits, that is with λ_i close to 1 (φ_i close to 0), would react slowly to a change in one of the fundamentals, such as an increase or a fall in income.

The parameters of equation (2) can be estimated in different ways within a panel data framework. One approach, the mean group (MG) estimator, consists in running separate regressions for each cross section (each country), assuming different elasticities for both the long-run relationship and the short-run dynamics. In order to determine the significance of a specific variable, statistical inference can then be performed using a simple average of the coefficients for that variable obtained from the various regressions. Alternatively, the cross sections can be pooled into one single regression, in which all the slope coefficients are constrained to be the equal and only the intercepts are allowed to differ, which is known as the dynamic fixed effect (DFE) estimator. While this method provides more efficient estimates than the MG estimator, it also entails the risk of producing biased and inconsistent results if the 'true' elasticities are actually different for each cross section. In fact, while there might be valid reasons to expect the long-run elasticities to be equal, for example because all individuals face a budget constraint determined by their income or their financial wealth, there is less justification to impose such restriction in the short-run dynamics. In that perspective, Pesaran et al. (1999) proposed an intermediate approach, named the pooled mean group (PMG) estimator, in which only the long-run elasticities are restricted to be the same across groups. These three estimators are used in the regression analysis, which has been carried out using the codes from Blackburne and Frank (2007).

Data

The explanatory variables taken into account in the estimations were selected both on the basis of the theoretical arguments discussed in Section 3.2.1 and the data availability. Quarterly data was used to perform the estimations as this offered a larger number of observations than annual data. This is mainly because financial accounts data are only available as from the first quarter of 1999. Furthermore, a quarterly frequency allows for better estimation of the short-run dynamics. The variables that were used to explain private consumption are the following:

- **Real disposable income**, defined as the nominal gross disposable income, including the adjustment for the change in net equity in pension funds reserves, and divided by the deflator for private consumption. This variable is adjusted for seasonal and calendar effects.

- **The loans-to-income ratio**, calculated as the outstanding amount of loans – including mortgage loans – granted to households by the other institutional sectors, divided by their nominal gross disposable income. This variable, which is also seasonally and working days adjusted, is used to proxy both households' indebtedness and the extent to which they have an easy access to credit.

- **Gross public debt in percentage of GDP**. This variable is also seasonally adjusted.

- Indices of **real share prices and real house prices.** The nominal indices are deflated using the deflator for private consumption.

- The **real interest rate**, defined as the nominal effective deposit rate for new businesses less the inflation rate. The latter is calculated as the logarithmic difference of the deflator of private consumption compared to the corresponding quarter of the previous year.

- The **unemployment rate** (seasonally adjusted).

All the data described above are taken from Eurostat, except for the nominal house price and share price indexes, which are obtained from the OECD; the nominal effective deposit rates are available in the ECB Statistical Data Warehouse. In the specifications, real disposable income and the indexes of real share and house prices are log-transformed.

The number of euro area countries that could be taken into account in the regressions was determined by the data available for these eight variables. The main constraint related to the availability and span of the quarterly sector accounts, from which the series on gross disposable income are taken. These data are only available for twelve euro area countries, with Belgium publishing less detailed accounts than the rest. For most of these countries, the data sample covers a period spanning from the first quarter 2000, i.e. the first period for which quarterly public debt data are available, to the last quarter of 2013. However, the data coverage is not homogeneous across countries. The Netherlands, in particular, started to publish quarterly household accounts data only from 2005 onwards. Greece, on the other hand, ceased to release quarterly sector accounts after 2007. Generally, the gaps in the dataset do not pose a major problem within a pooled regression framework as it allows for the estimation of coefficients using unbalanced panel datasets. In total, the panel dataset used for the regression includes eleven euro area countries, namely Austria, Belgium, Germany, Greece, Spain, Finland, France, Ireland, Italy, the Netherlands and Portugal.

As indicated, the estimation of an ECM requires the variables included in the long-run relationship to be non-stationary (i.e. each of them must be integrated of order 1) and cointegrated. In order to verify that these requirements are met, three standard panel unit root tests[174] were performed on the seven variables listed above. All of the three tests do not reject the null hypothesis of a unit root in private consumption and most of the explanatory variables considered, with the exception of the real share price index and real interest rate, for which the null hypothesis of non-stationarity is not rejected by two tests only. Moreover, the null hypothesis of the absence of a cointegrating relationship between private consumption and the explanatory variables is rejected at the 1 % test level by Kao's test (1999).

While all the explanatory variables considered are non-stationary, the unit root tests

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[174] The unit root tests used are those proposed by Breitung (2000), Levin et al. (2002) and Im et al. (2003).

Table 3.A.1

Estimation results

(sample period: 2000Q1-2013Q4[1])

Dependent variable: private consumption (log. diff.)	MG	PMG	DFE
Long-run coefficients			
real disposable income (log.)	0,43***	0,58***	0,54***
loans-to-income ratio	0,20***	0,05***	0,07***
gross public debt (% gdp)	0,02	-0,02	-0,04
real house prices (log.)	0,05**	0,08***	0,09***
real share prices (log.)	0,01	0,02***	0,03***
real interest rate	-0,25***	-0,15*	-0,34*
unemployment rate	-0,10	0,00	-0,27*
Short-run coefficients			
error-correction term	-0,53***	-0,18***	-0,13***
real disposable income (log. diff.)	-0,04	0,04	-0,01
unemployment rate (diff.)	-0,36**	-0,63***	-0,75***
Intercept	2,71***	0,83***	0,66***
Hausman test statistic		5,35	

Sources: Own calculations.
Notes: *, **, *** indicate significance at the 10%, 5% and 1% levels respectively.
1) Using an unbalanced panel data set. The Hausman statistic measures the difference between the coefficients from the PMG estimator with respect to those obtained from the MG estimator. If this statistic is not significantly different from zero, the null hypothesis of homogeneous long-term elasticities is not rejected.

strongly reject (at the 1% test level) the null hypothesis of non-stationarity of savings and the savings rate over the sample period. This means concretely that they could not be used as the model's dependent without differentiating the explanatory variables, which would result in the loss of the information contained at their level, hence the choice of modelling private consumption instead.

Social contributions paid by households relative to their disposable income were also considered as an explanatory variable, serving as a proxy for the developments in social security schemes in the various euro area countries. However it also turned out to be stationary and could thus not be included along with the other right-hand side variables. The inflation rate was not included in the regressions for the same reason. This variable was used in many previous studies on consumption and savings as a proxy for uncertainty (Hüfner and Koske (2010)). Moreover, the inclusion of the tax-to-income and the old-age dependency ratio (calculated as the ratio of the population aged 65 years old and over to the population aged between 15 and 64 years old) were also investigated, but the estimates obtained for these variable did not yield significant and robust results.

Although the unemployment rate is not expected to be a unit root process in the long term, it was found to have a unit root in the relatively short sample by the tests mentioned above. Indeed the unemployment rate fell significantly at the start of the sample in some countries (Belgium, Finland, France and Italy) and rose significantly following the onset of the great recession (Greece, Ireland, Italy and Spain). On the other hand, it could be argued that a trend in the unemployment rate is consistent with the hysteresis hypotheses, in which temporary shocks to economic activity exert permanent effects in the labour market (Blanchard and Summers (1986)).

Estimation results

Table 3.A.1 reports the estimation results for equation (2) according to the three methods. In order to avoid a multicollinearity problem, the loans-to-income ratio was excluded from the short-run equations. In first difference, this variable is strongly and negatively correlated with the real disposable income in most of the ten countries considered, which can be easily explained by the fact that nominal disposable income is the numerator of one of these two variables and the denominator of the other.

For many countries, changes in unemployment rate, real house prices, real share prices and real interest rates also turned out to be strongly correlated with each other. This is not really surprising since all these variables might reflect the same economic conditions. It was preferred to keep only the unemployment rate in the

short-run equations for easiness of interpretation. Indeed, developments in the labour market are more the likely to influence households' income outlook and, thereby, their decision of consumption and savings.

Only four coefficients were found, on average, to be significant in the long-run relationship according to the MG estimates, namely those for the real disposable income, the loans-to-income ratio, real house prices and the real interest rate. Due to the gain in efficiency that results from the smaller number of estimated parameters in relation to the number of observations, more coefficients are found to be statistically different from zero according to the PMG estimates and have the expected sign. However, gross public debt and the unemployment rate remain non-significant. Furthermore, the Hausman test used to measure the significance of the difference between the estimates from the MG estimator and those from the PMG estimator suggests that the differences in the long-run elasticities are not systematic across countries, meaning that the PMG estimates may be regarded as consistent. It may also be noted that the DFE estimator, which entails the stronger assumption that also the short-run elasticities are homogeneous across countries, gives estimates that are relatively close to those from the PMG estimator, excepted for the unemployment rate.

The Hausman statistic measures the difference between the coefficients from the PMG estimator with respect to those obtained from the MG estimator. If this statistic is not significantly different from zero, the null hypothesis of homogeneous long-term elasticities is not rejected.

Table 3.A.2 provide details about the country-specific coefficients obtained for the short-run equations. The error correction parameters are significant for practically all countries, with the exception of Germany and Greece. Their values, which are in almost all cases closer to 0 than to 1, can be interpreted as an evidence of persistent consumption habits during periods characterised by changes in the 'fundamentals'. The contemporaneous quarterly growth in real disposable income, on the other hand, is only significant for Austria, Germany and the Netherlands. The first difference in unemployment rate is significant and has the expected negative sign for Spain, Finland, Ireland, Italy and Portugal.

Table 3.A.2

Short run coefficients from the PMG estimator

(sample period: 2000Q1-2013Q4[1])

	Error-correction	Real disposable income	Unemploment rate	Intercept	R^2	Observations
Austria	-0.05***	-0.01*	0.05	0.21***	0.28	56
Belgium	-0.14***	-0.04	-0.07	0.61**	0.22	56
Germany	-0.06	0.66***	-0.09	0.32	0.33	56
Greece	-0.04	-0.01	-0.37	0.21*	0.12	28
Spain	-0.17***	0.09	-0.96***	0.83***	0.65	44
Finland	-0.11**	-0.03	-1.76**	0.44**	0.21	56
France	-0.38***	-0.10	0.09	1.98***	0.38	56
Ireland	-0.28***	-0.01	-1.32***	1.13***	0.58	47
Italy	-0.10**	0.01	-0.84***	0.51**	0.42	56
Netherlands	-0.53***	-0.18***	-0.57	2.37***	0.55	35
Portugal	-0.13**	0.05	-1.08***	0.54**	0.37	56
Average	-0.18***	0.04	-0.63***	0.83***		

Source: Own calculations.
Notes: *, **, *** indicate significance at the 10%, 5% and 1% levels respectively.
1) Using an unbalanced panel data set.

B – Description of the statistics from national household surveys used on the first part of section 3.2.4

The sources of the data are the Household Budget Surveys in Belgium, Estonia, Ireland, Spain, Malta, Austria, Portugal and Finland. In Germany, Italy and Slovakia the sources are wealth surveys that correspond to the national versions of the Household Finance and Consumption Survey (HFCS): Panel on Household Finance in Germany; the Survey on

Table 3.A.3

HFCS reference period

(sample period: 2000Q1-2013Q4[1])

Country	Fieldword	Assets & Liabilities	Income
Belgium	04/10-10/10	Time of interview	2009
Germany	09/10-07/11	Time of interview	2009
Greece	06/09-09/09	Time of interview	Last 12 months
Spain	11/08-07/09	Time of interview	2007
France	10/09-02/10	Time of interview	2009
Italy	01/11-08/11	31/12/10	2010
Cyprus	04/10-01/11	Time of interview	2009
Luxembourg	09/10-04/11	Time of interview	2009
Malta	10/10-02/11	Time of interview	Last 12 months
Netherlands	04/10-12/10	31/12/09	2009
Austria	09/10-05/11	Time of interview	2009
Portugal	04/10-07/10	Time of interview	2009
Slovenia	10/10-12/10	Time of interview	2009
Slovakia	09/10-10/10	Time of interview	Last 12 months
Finland	01/10-05/10	31/12/09	2009

Sources: Own calculations.
*, **, *** indicate significance at the 10%, 5% and 1% levels respectively.
1) Using an unbalanced panel data set.

Household Income and Wealth (SHIW) in Italy; and HFCS in Slovakia.[175] In France the data is the result of a research project that uses both the Wealth Survey and the Household Budget Survey.[176] The data reference periods are 2008 in Malta, 2009/10 in Ireland and Austria, 2010 in Belgium, France and Italy, 2010/11 in Germany and Portugal, 2012 in Estonia, Spain and Finland and 2014 in Slovakia. In the case of Slovakia the data is preliminary.

Savings were calculated as the difference between total net income of the household and total consumption expenditure on goods and services (durables and non-durables), in all countries except in Slovakia and Germany. In Slovakia savings were collected directly in the survey (with a lower bound of zero). In Germany savings were obtained as the payments for the formation of assets plus the repayments of loans principal less the liquidation of assets. In both countries consumption is obtained as the difference between total net income and savings. In Austria, Belgium, Ireland, Malta, France and Spain income and consumption include some non-monetary components. In Spain the data for income and consumption have been corrected in order to avoid discrepancies with the National Accounts.

The reference person of the household corresponds to the household member with the highest income in Belgium, Estonia, Spain, France, Malta, Austria, Portugal, Slovakia and Finland. In Germany the reference person was calculated according to the UN/Canberra definition. In Italia, the reference person is self-declared in the SHIW questionnaire, and defined as the person primarily responsible for or most knowledgeable about the households' budget, and in Ireland it is the household member in whose name the dwelling is owned or rented.

C – Household Finance and Consumption Survey[177]

The source of the data used in the first part of subsection 3.2.4, in Box 5 and in subsection 3.3.2 was the first wave of the Household Finance and Consumption Survey (HFCS). The HFCS is a joint project of all of the central banks of the Eurosystem and some national statistical offices that collects household-level data in a harmonised way in the participating countries. The first wave of the HFCS was collected in most countries in 2010/11 and covers 15 countries, more precisely all euro countries excluding Estonia, Ireland and Latvia.

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[175] In Germany and Italy, the first wave of the HFCS was used, in the case of Slovakia the second wave.

[176] In this project total consumption for the Wealth Survey is estimated using data from the Household Budget Survey. We are grateful to Pierre Lamarche and Bertrand Garbinti for kindly providing the data for France.

[177] See the survey web site, http://www.ecb.int/home/html/researcher_hfcn.en.html, for detailed documentation of the HFCS.

The survey focuses principally on household wealth and its components, including detailed data on the different types of assets and liabilities that comprise the households' balance sheets. It also includes data on related economic and demographic variables, for instance, on income, pensions, employment, measures of consumption and qualitative information on savings. The wealth figures provided by the survey include the current value of households' private pension plans and life-insurance policies, but do not include the value of public and occupational pension schemes.

The total sample size of the HFCS is over 62,000 households, with varying samples sizes across countries. The HFCS uses advanced sampling and survey methods to ensure the best possible coverage of the assets and liabilities of households. Samples have been designed in each country to ensure both euro area and country representative results. When relevant data were available, an attempt was made to oversample relatively wealthy households. Another important methodological aspect of the HFCS is that all questions referring to households' income, consumption and wealth, that households could not or did not want to answer, have been imputed. In order to take into account the uncertainty associated with the imputation process, a multiple imputation technique was used. All statistics in this report are calculated using the final estimation weights (which allow all figures to be representative of the population of households in the respective country) and the five implicates of the multiple imputed database.

Cross-countries differences using the HFCS data should be interpreted with caution. First, in spite of the HFCS harmonised principles and methodologies, full harmonisation was not totally achieved. For instance, the survey fieldwork was not carried out at the same period of time in all countries, which originates some differences in the reference years for wealth and income (Table 1). Additionally, household characteristics (for instance, the household size), institutional factors and recent macroeconomic developments vary across countries, and thus should be taken into account when interpreting cross-country differences.[178]

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[178] See Fessler, Lindner, Segalla (2014) for how to take into account household characteristics and Ampudia et al. (2014) for how to take into account macroeconomic developments.

D – Additional tables

Table 3.A.4

Growth in household investment, disposable income and debt in euro area countries

(sample period: 2000Q1-2013Q4[1])

	EA	BE	DE	EE[1]	IE[1]	GR[1]	ES	FR[1]	IT	CY[1]	LV	LU[1]	NL	AT	PT	SI	SK	FI
Avarage annual growth of households' investment																		
2000-2004	0.7	-2.3	-4.1	22.3	11.7	8.7	6.0	1.3	3.7	4.2	11.8		-1.8	-3.8	-4.2	-1.7	3.8	1.5
2005-2007	2.9	6.6	1.3	24.2	5.2	8.6	3.3	4.7	2.5	10.5	36.9	25.1	5.5	0.3	-4.4	7.7	10.5	2.8
2008-2010	-6.3	-3.2	-1.9	-22.1	-26.1	-21.0	-11.4	-5.2	-4.3	-10.0	-33.1	-0.3	-12.1	-0.5	-9.2	-11.4	-2.5	-1.4
2011-2013	-2.7	-0.8	3.2	12.3	-4.3	-20.7	-13.4	-0.8	-5.9	-12.2	18.8	-27.6	-2.1	-0.2	-14.7	-10.2	0.0	-1.2
Avarage annual growth of households disposable income																		
2000-2004	1.8	0.9	0.9	6.5	4.7	3.6	3.6	2.5	1.2	3.8	9.2		1.3	1.3	1.7	3.1	3.0	3.0
2005-2007	1.7	1.8	0.6	11.1	6.4	7.1	2.8	2.2	1.0	4.4	14.2	4.4	0.8	2.8	1.4	4.2	6.1	2.7
2008-2010	-0.1	1.3	0.2	-3.0	0.9	-4.4	0.9	0.9	-1.6	2.9	-9.3	3.7	-0.1	0.1	1.6	0.5	2.9	1.9
2011-2013	-2.7	-0.8	3.2	12.3	-4.3	-20.7	-13.4	-0.8	-5.9	-12.2	18.8	-27.6	-2.1	-0.2	-14.7	-10.2	0.0	-1.2
Avarage annual growth of households' debt																		
2000-2004	4.4	1.8	0.1	39.2	19.0	29.7	13.1	4.6	8.8	3.3	51.7		7.4	3.7	8.8	6.2	28.9	8.8
2005-2007	6.1	7.0	-1.8	40.2	18.5	22.9	13.6	8.8	9.8	15.4	61.1	10.1	6.3	4.8	6.2	20.9	33.0	11.3
2008-2010	1.2	4.5	-1.5	-2.5	1.2	5.7	-0.5	4.5	2.9	8.1	-9.3	5.8	2.9	1.9	2.1	5.8	7.8	3.9
2011-2013	-1.6	2.6	-0.8	-4.8	-4.8	-6.1	-6.4	1.6	-2.3	0.2	-9.2	4.4	-1.9	-1.8	-5.3	-3.1	6.1	1.7

Sources: Own calculations.
1) For these countries the data are based on ESA95.

Table 3.A.5

Participation in debt and debt burden indicators

(percentages)

	Distribution of the population	Has debt	Has mortgage debt	Has non-mortgage debt	Median debt service-income ratio conditional on participation	Indebted, vulnerable, not enough total wealth
	1	2	3	4	5	6
All households	100.0	43.4	23.0	29.3	13.9	0.5
By income percentiles						
<20	20.0	22.7	6.6	18.2	26.1	1.0
20-39	20.1	34.9	12.5	26.6	16.5	0.4
40-59	20.0	43.5	20.3	30.9	15.0	0.5
60-79	20.0	55.5	32.8	36.7	14.0	0.5
>=80	19.9	60.7	43.1	33.8	11.2	0.3
By net wealth percentiles						
<20	20.0	43.8	5.3	41.9	10.4	2.8
20-39	19.9	37.6	14.5	29.8	13.2	0.0
40-59	19.9	45.8	32.4	27.0	17.9	0.0
60-79	20.0	44.8	31.1	24.3	14.4	0.0
>=80	20.2	45.1	31.8	23.3	12.7	0.0
By participation in mortgage debt market						
Yes	23.0	100.0	100.0	38.5	17.9	1.1
No	77.0	26.5	0.0	26.5	8.2	0.3
By participation in non-mortgage debt market						
Yes	29.3	100.0	30.3	100.0	12.8	1.9
No	70.7	20.0	20.0	0.0	15.5	0.1
By age of the reference person (RP)						
<35	15.6	54.8	22.0	41.9	15.5	1.3
35-44	19.7	61.6	37.0	40.1	16.1	0.6
45-54	19.8	55.4	32.2	36.6	13.0	0.5
55-64	17.0	42.8	22.5	27.2	11.7	0.4
65-74	14.5	23.6	11.8	15.2	12.1	0.2
>=75	13.3	7.6	2.7	5.4	8.3	0.0
By education level of the RP						
Low (ISCED 97=0,1,2)	34.5	30.2	13.7	21.9	15.1	0.5
Medium (ISCED 97=3,4)	41.2	48.4	23.1	34.3	12.8	0.6
High (ISCED 97=5,6)	24.3	53.7	36.2	31.2	15.2	0.6
By employment status of the RP						
Employee	47.9	57.5	32.3	38.3	13.9	0.5
SGRf-employed	9.0	56.5	35.0	35.2	16.8	0.8
Unemployed	4.7	46.1	14.3	37.4	16.5	1.7
Retired	31.8	19.3	8.9	12.8	11.2	0.1
Other	5.9	33.8	9.1	27.4	13.9	1.4
By household composition						
One adult (>=16 years old)	31.5	28.8	10.5	21.3	14.1	0.5
Several adults without children	37.0	39.4	20.7	26.0	11.9	0.5
Single parent with dep. children	4.6	52.9	20.1	39.8	16.2	1.1
Several adults with dep. children	27.0	64.3	41.3	41.2	15.5	0.5
By no. of household members						
1	31.5	28.8	10.5	21.3	14.1	0.5
2	32.1	39.3	20.6	26.0	12.6	0.6
3	16.6	55.3	31.1	37.0	14.0	0.5
4	14.2	63.2	40.7	39.3	14.6	0.4
>=5	5.6	63.7	38.4	44.5	15.8	0.9

Sources: HFCS first wave (2009/2011).
Notes: The euro area aggregate includes data for all the euro area countries participating in the first wave of the HFCS, with the exception of Slovenia due to a small sample size and Finland, where the questions on mortgage debt for other properties than the household's main residence, on credit line/overdraft debt, on credit card debt and on non-mortgage loan payments are not available.
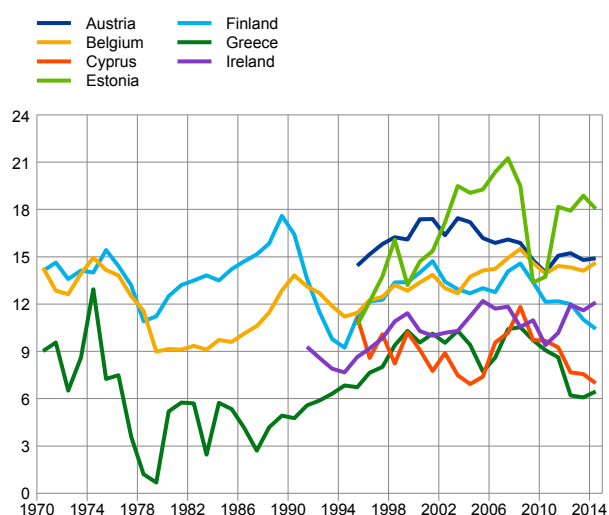
Chart 4.A.1

Business investment ratios in euro area countries since the 1970s

(as a percentage of real GDP)

Austria
Belgium
Cyprus
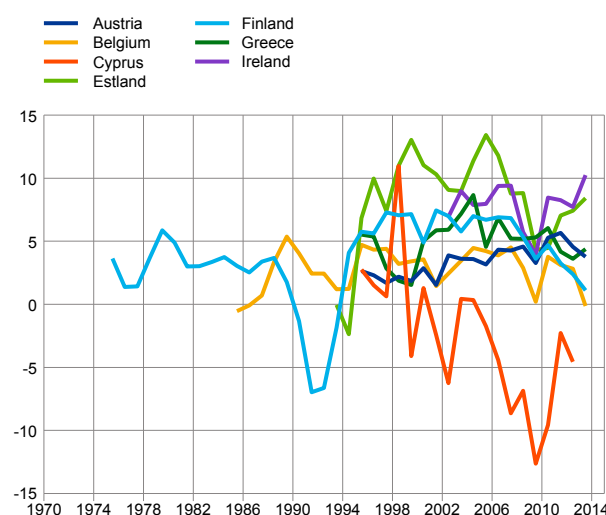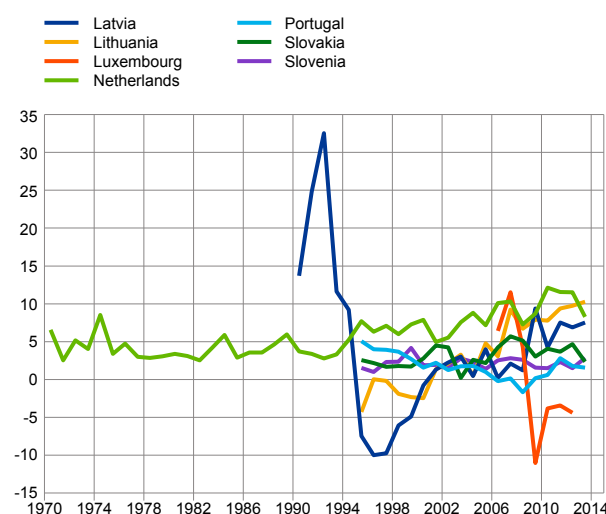Estonia
Finland
Greece
Ireland

Sources: Own calculations on European Commission data (AMECO).
Notes: Real private investment adjusted for investment in dwellings at 2010 constant prices to real GDP. Data on Malta are missing. Business investment data for Lithuania are missing.

Chart 4.A.2

Business savings ratios in euro area countries since the 1970s

(as a percentage of real GDP)

Austria
Belgium
Cyprus
Estland
Finland
Greece
Ireland

Sources: Own calculations on European Commission data (AMECO).
Notes: The corporate savings ratio refers to net savings to value added. Data on Malta are missing.

Chart 4.A.3

Business investment ratios in euro area countries since the 1970s

(as a percentage of real GDP)

Latvia
Luxembourg
Netherlands
Portugal
Slovakia
Slovenia
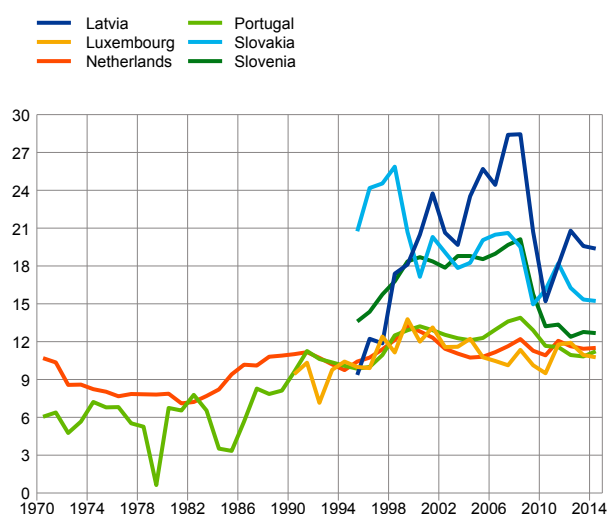
Sources: Own calculations on European Commission data (AMECO).
Notes: Real private investment adjusted for investment in dwellings at 2010 constant prices to real GDP. Data on Malta are missing. Business investment data for Lithuania are missing.

Chart 4.A.4

Business savings ratios in euro area countries since the 1970s

(as a percentage of real GDP)

Latvia
Lithuania
Luxembourg
Netherlands
Portugal
Slovakia
Slovenia

Sources: Own calculations on European Commission data (AMECO).
Notes: The corporate savings ratio refers to net savings to value added. Data on Malta are missing.

Chart 4.A.5

Global competitiveness index in selected countries: structural sub-indicators 2014-15
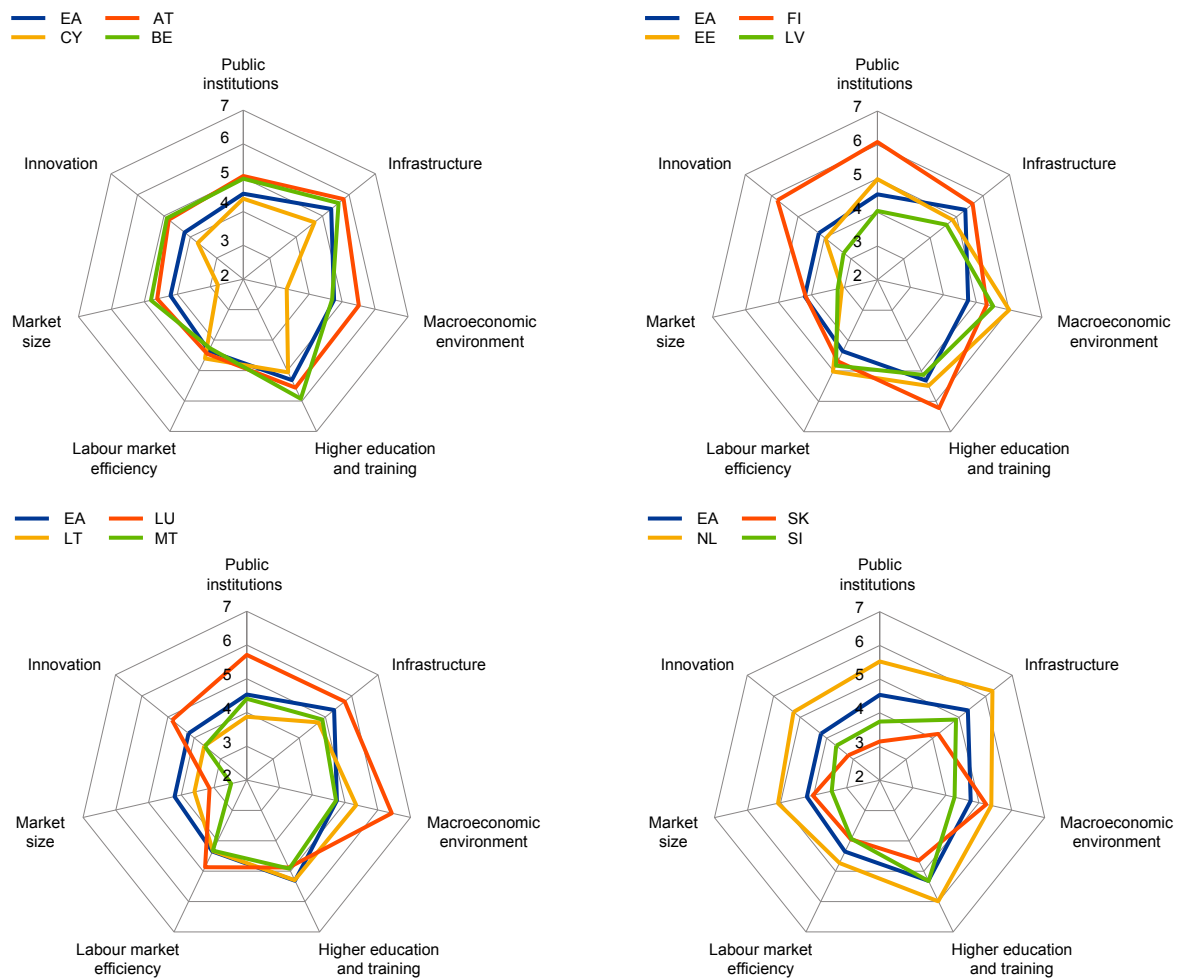
Table 4.A.1

Determinants of business investment for stressed and programme countries

VARIABLES	Stressed	Stressed with a post-crisis dummy	VARIABLES	Programme	Programme with a post-crisis dummy
Rate of capacity utilisation (%) – lag	0.008	0.004	Rate of capacity utilisation (%) – lag	0.011	0.006
StressedD*Rate of capacity utilisation (%) – lag	0.0127**		ProgrammeD*Rate of capacity utilisation (%) – lag	-0.004	
PostStressedD*Rate of capacity utilisation (%) – lag		0.01052**	PostProgramme*Rate of capacity utilisation (%) – lag		0.036
log(rNet retained earnings – NFC) – lag	0.008	0.030	log(rNet retained earnings – NFC) – lag	-0.021	0.008
StressedD*log(rNet retained earnings - NFC) – lag	-0.135		ProgrammeD*log(rNet retained earnings – NFC) – lag	-0.191**	
PostStressedD*log(rNet retained earnings – NFC) – lag		-0.07113**	PostProgrammeD*log(rNet retained earnings – NFC) – lag		0.089
Index of notional stocks – NFC	0.001	0.002	Index of notional stocks – NFC	0.004	0.003
StressedD*Index of notional stocks – NFC	0.000		ProgrammeD*Index of notional stocks – NFC	-0.002	
PostStressedD*Index of notional stocks – NFC		0.00811*	PostProgrammeD*Index of notional stocks – NFC		0.021
real Interest rates on NFC loans > 1mio EUR	-0.059**	-0.092**	real Interest rates on NFC loans > 1mio EUR	-0.162***	-0.195***
StressedD*r Interest rates on NFC loans > 1mio EUR	0.011		ProgrammeD*r Interest rates on NFC loans > 1mio EUR	0.030	
PostStressedD*r Interest rates on NFC loans > 1mio EUR		0.030	PostProgrammeD*r Interest rates on NFC loans > 1mio EUR		-0.002
Tobin Q	0.155	0.224	Tobin Q	0.285*	0.254
StressedD*Tobin Q	0.425**		ProgrammeD*Tobin Q	-0.120	
PostStressedD*Tobin Q		0.340	PostProgrammeD*Tobin Q		0.072
real ULC	0.010	-0.007	real ULC	0.000	-0.007
StressedD*real ULC	-0.025**		ProgrammeD*real ULC	-0.012	
PostStressedD*real ULC		-0.017***	PostProgrammeD*real ULC		-0.074
Share of manifacturing in total VA (%)	0.017**	0.011	Share of manifacturing in total VA (%)	0.019**	0.016*
StressedD*Share of manifacturing in total VA (%)	-0.034		ProgrammeD*Share of manifacturing in total VA (%)	0.047	
PostStressedD*Share of manifacturing in total VA (%)		-0.012	PostProgrammeD*Share of manifacturing in total VA (%)		0.122
Openness - Export and Import in GDP (%)	0.002	0.002	Openness – Export and Import in GDP (%)	0.001	0.000
StressedD*Openness - Export and Import in GDP (%)	-0.002		ProgrammeD*Openness – Export and Import in GDP (%)	0.004	
PostStressedD*Openness – Export and Import in GDP (%)		-0.001	PostProgrammeD*Openness – Export and Import in GDP (%)		0.003
Corruption Perceptions Index	0.013	0.004	Corruption Perceptions Index	0.039	0.023
StressedD*Corruption Perceptions Index	0.087		ProgrammeD*Corruption Perceptions Index	-0.084	-0.216
PostStressedD*Corruption Perceptions Index		0.091**			
PostD		-0.329*			
PostStressedD		0.275	PostProgrammeD		1.205
Constant	9.002***	10.289***	Constant	9.570***	10.159***
Time effects	YES	YES	Time effects	YES	YES
Observations	117	117	Observations	117	117
Number of countries	16	16	Number of countries	16	16
R-squared	0.866	0.886	R-squared	0.827	0.832

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table 4.A.2

Literature review to section 4.2

Study	Channels	Empirical evidence	Sample
Goretti and Souto (2013)	Leverage	Investment decisions are affected by balance-sheet positions (debt to equity ratio, capacity to repay debts), with threshold effects.	8 EA countries, 21 sectors BACH database 2000-2010
Buca and Vermeulen (2012)	Bank credit debt	Higher bank debt leverage linked to reduced investment during crisis in 2009.	BE, DE, ES, FR, IT, PT, BACH database 2000-2009
EC Product market review (2013)	Dependence on external finance	Value added growth in sectors more dependent on external finance hit harder by the crisis. Impact asymmetric in the core/periphery EA countries and differentiated across industries (manufacturing, non-manufacturing, services sectors).	BE, DE, ES, FR, IT, PT BACH database 2000-2011
EC Autumn Forecast (2013)	Financing conditions	SMEs operating in stressed countries underinvesting in comparison with firms from core EA countries. Investment limited possibly by factors as credit supply tightness due to financial fragmentation.	SMEs in DE, EL, ES, FI, FR, IT, PT Orbis database 2011
Arce, Campa, Gavilan (2013)	Financial frictions	Sector-specific debt-collateral constraints led to a hump-shaped relation between the investment ratio and the interest rate in the equilibrium model with financial frictions.	Sectoral investment 10 OECD countries OECD Annual National Accounts 1995-2006
Kahle, Stulz (2011)	Demand shock	Demand shock and rise in uncertainty linked to the drop in real spending, rather than credit supply shock.	US publicly traded firms 2009
Bachmann, Elstner, Sims (2012)	Survey-based economic uncertainty	Shocks to uncertainty measures associated with reductions in production that abate relatively quickly in Germany but lead to persistent reductions in production and employment in the US.	Manufacturing firms IFO-BCS 1980-2010 BOS US 1968-2011
Akguc, Choi (2013)	Cash holdings	EA firms hold more cash reserves in times of stress than firms in other European countries.	33 European countries including EA countries CIQ database 2002-2011

Data and variables

BACH (Bank for the Accounts of Companies Harmonised) database

BACH (Bank for the Accounts of Companies Harmonised) is a database managed by the European Committee of Central Balance-Sheet Data Offices[179]. BACH provides aggregated and harmonised accounting data of non-financial enterprises of several European countries over the 2000-2012 period, based on national accounting standards (individual annual accounts). The aggregation of firm-level data is made at the country – sector – firm size level. The dataset contains 22 indicators from the income statement (expressed in terms of net turnover) and 44 indicators of the balance sheet (expressed in terms of balance sheet total). Moreover, BACH includes 29 financial and profitability ratios. For each indicator in a given country – sector – firm size combination, the weighted mean, the median as well as the first and third quartile of the underlying distribution are given. Firm size is defined in terms of net turnover in the following way: small firms (<10 million EUR), medium firms (10-50 million EUR), large firms (>50million EUR)). Regarding the sectoral disaggregation, information is available for each of the 17 NACE sections and for each of the 81 NACE divisions.

The sectors considered in Section 4.2. are 8 NACE rev.2 sections: Manufacturing (C), Construction (F), Wholesale and retail trade (G), Accommodation and food services (I), Transportation and storage (H), Information and communication (J), Real estate (L) and Administrative and support service activities(N)). In the GMM regressions shown in Table 8 and Table 9 Manufacturing is considered disaggregated at the division (2 digits) level. SMEs and large firms are distinguished by a turnover below or above €50 million. For reasons of data availability, we have limited our sample to five euro area countries: Belgium, Germany, Spain, France and Italy.

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[179] Data downloaded from https://www.bach.banque-france.fr/?lang=en on September 26, 2014.

Variables definition

- **Investment capital ratio**: Acquisition of tangible fixed assets minus sales and disposals at time t / Book value of fixed assets (i.e. intangible, tangible and financial assets) at time t-1.

- **Sales growth**: Log of net turnover at time t minus log of net turnover at time t-1.

- **Sales to capital ratio**: Logarithm of the ratio of net turnover at time t-1 over book value of fixed assets at time t-1.

- **Cash flow to capital ratio**: Gross operating profit minus interest and similar charges minus taxes on profits at time t / book value of fixed assets at time t-1.

- **Debt to asset ratio**: Bonds and similar obligations plus amounts owed to credit institutions plus other creditors plus payments received on account of orders, current at time t-1 / total assets at time t-1.

- **Bank debt leverage**: Amounts owed to credit institutions at time t-1 / total assets at time t-1.

- **Cash holdings**: Cash and bank at time t-1 / total assets at time t-1.

The negative investment values as well as 1% outliers in the right tail of the distribution are removed.[180] The 1% outliers (both left and right tail) of the variables sales growth, cash flow to capital ratio and log of net turnover to capital were also dropped.
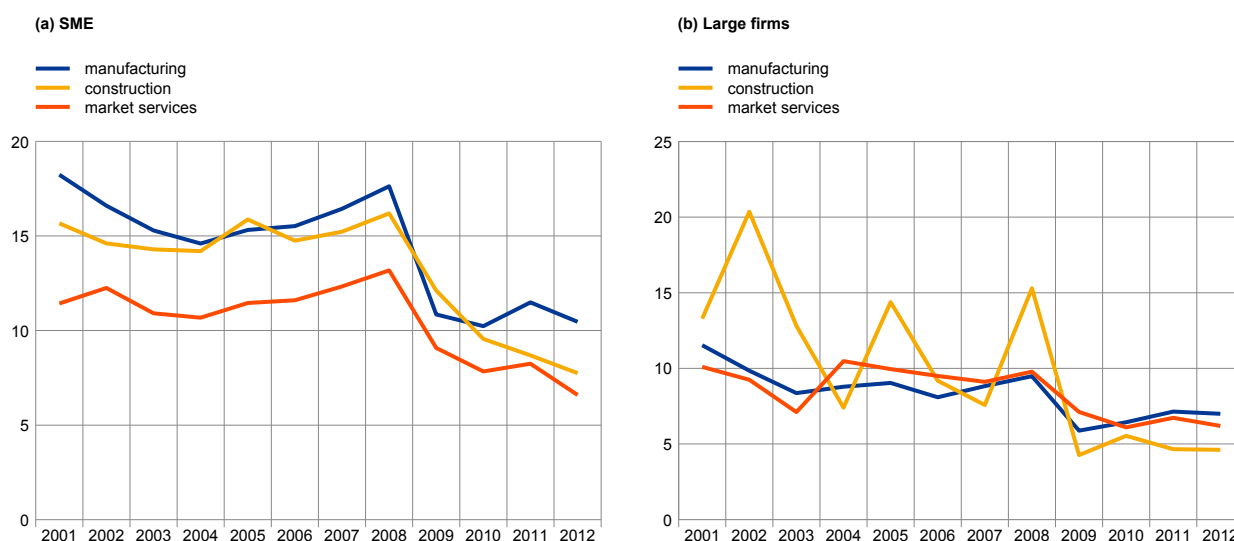
Table 4.A.3

Summary descriptive statistics

	SMEs					Large firms				
	Mean	**Standard Deviation**	**First quartile**	**Second quartile**	**Third quartile**	**Mean**	**Standard Deviation**	**First quartile**	**Second quartile**	**Third quartile**
Period 2000-2008										
Investment to capital ratio	**16.75**	**8.9**	**11.03**	**14.94**	**19.93**	**10.62**	**7.49**	**5.43**	**8.77**	**13.49**
Sales growth	2.67	9.61	-1.42	2.98	7.52	4.51	12.01	-1.86	4.92	11.93
Cash flow to capital	16.65	7.84	11.71	16.15	21.33	13.29	8.97	6.62	12.38	18.11
Cash holdings to asset ratio	6.47	2.11	5.21	6.26	7.42	3.32	2.42	1.71	2.78	4.21
Debt to asset ratio	41.81	7.77	37.42	40.5	44.96	40.92	10.83	33.95	39.02	45.79
Bank debt to asset ratio	19.06	7.34	13.73	18.94	23.77	12.6	8.76	6.41	10.59	17.08
Period 2009-2012										
Investment to capital ratio	**12.41**	**7.82**	**6.37**	**10.51**	**16.75**	**7.91**	**6.58**	**3.77**	**5.96**	**9.8**
Sales growth	-1.6	11.24	-8.01	-0.76	4.92	-0.79	15.01	-9.95	1.41	9.6
Cash flow to capital	13.25	7.83	8.14	12.18	16.88	11.21	8.57	4.52	9.79	16.96
Cash holdings to asset ratio	7.51	2.76	5.71	7.16	8.98	4.17	2.94	2.29	3.48	5.3
Debt to asset ratio	40.49	7.71	35.92	39.46	43.38	39.74	11.41	32.62	38.23	44.77
Bank debt to asset ratio	18	7.52	12.48	17.51	22.72	11.6	8.63	5.39	9.97	14.99

Source: BACH database.

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[180] Investment values for Italian SMEs in 2008 are influenced by the change in the accounting plan rules for SMEs. Results presented in this report were obtained after dropping them from the sample. Some robustness checks were also tried using different ways of imputing these observations (e.g. values in 2007) and the results are very similar.

Chart 4.A.6

Investment to capital ratio by sector and firm size

(a) SME

- manufacturing
- construction
- market services

(b) Large firms

- manufacturing
- construction
- market services

Model and estimation methodology

The baseline investment equation estimated is an accelerator error-correction model following Bond et al. (2003) and Bloom et al (2007) that specifies a long-run target level of the capital stock while allowing for flexible short-run investment dynamics. To the usual determinants of investment such as growth opportunities and cash flow, we add financial variables such as cash holdings and leverage.

$$IK_{it} = \beta_1 IK_{it-1} + \beta_2 lyk_{it-1} + \beta_3 SG_{it} + \beta_4 CFK_{it} + \beta_5 Cash_{it-1} + \beta_1 Lev_{it-1} + \mu_i + v_{it} \qquad (1)$$

where i denotes a country-sector-size combination (or cell) and t denotes years. μ_i is a cell-specific fixed effect and v_{it} is the idiosyncratic error term. Financial indicators such as cash and leverage are lagged one period so as to represent the balance sheet position at the beginning of the investment period t.

To investigate the impact of the financial crisis on investment determinants, we estimate a more flexible version of (1) where all the parameters - except that of the lagged dependent variable – are allowed to change after 2008. For that purpose we use a dummy variable equal to 1 in the years 2009 to 2012.

Arellano and Bond (1991) difference GMM estimator is particularly suited to estimating such a dynamic model with fixed effects in the context of a "small T, large N" (pseudo-)panel.[181] In this situation both the pooled OLS and fixed effects estimators suffer from a dynamic panel bias (Nickell (1981)) that makes them inconsistent. Difference GMM first transforms the data in order to expunge the fixed effects. To the usual first-difference transformation that magnifies any gap in an unbalanced panel, we prefer the forward orthogonal deviations (for more details

Source: BACH database.

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[181] As our data is not true micro panel data, we run in reality cell-based regressions using average firm characteristics in each cells. Also note that ratios at the cell level are computed by aggregating the data of the numerator on the one hand, and the data of the denominator on the other hand.

Chart 4.A.7
Investment to capital ratio in the market service sector

(a) All firms

legend: trade, accommodation, real estate, transport, info & commun., adm. services

(b) SMEs

legend: trade, accommodation, real estate, transport, info & commun., adm. services

(c) Large firms

legend: trade, accommodation, real estate, transport, info & commun., adm. services
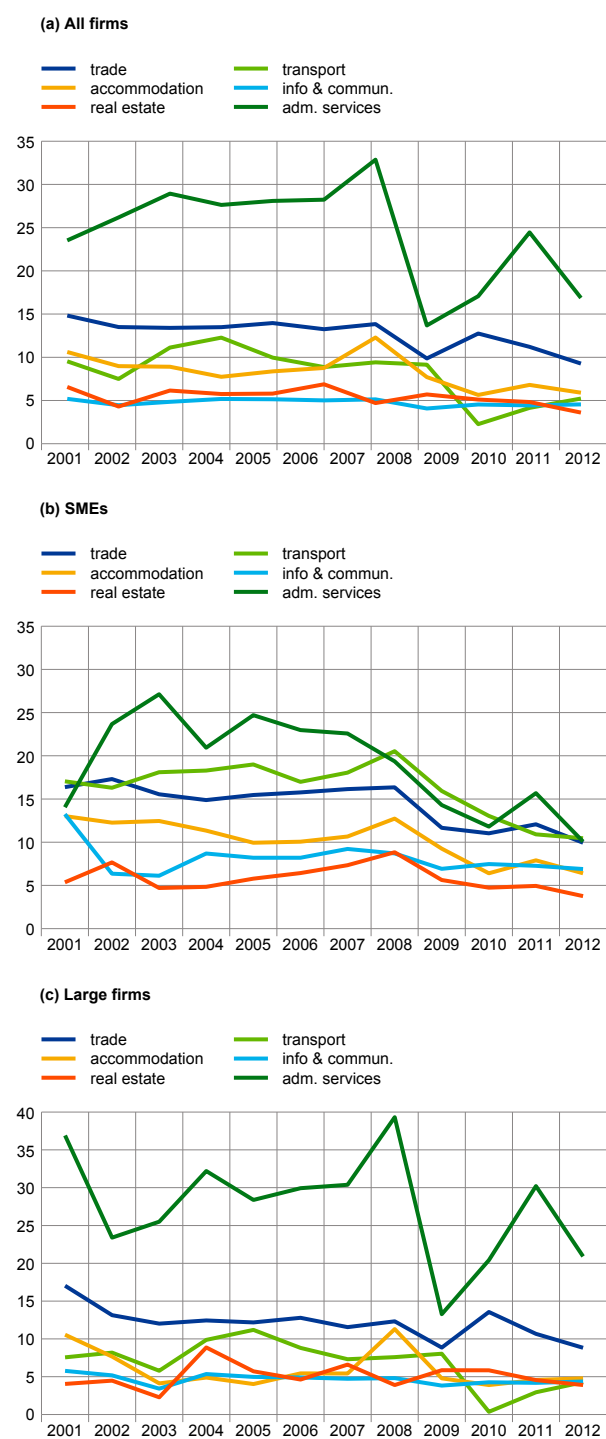
Source: BACH database.

see Roodman (2009b)). Following the transformation, the lagged dependent and any other predetermined variable become potentially endogenous. All endogenous variables are then instrumented using suitable lags of their own levels, so that all instruments are drawn from within the dataset.[182]

The choice of the number of lagged levels used in the instrument matrix is crucial. On one hand, Roodman (2009a) warns against the risk of instrument proliferation that would fail to expunge the endogenous components of the instrumented variables. On the other hand, using enough lags may help ensuring that instrumentation is not too weak. The standard Holtz-Eakin, Newey and Rosen (1988) instrument set contains a separate instrument for each time-period and lag depth, substituting zeros for missing observations. To limit the instrument count without restricting too much the lag range used, we use a "collapsed" instrument matrix with only one instrument for each lag depth; see Roodman (2009a) and Roodman (2009b) for details. We also check that our main results are robust to reducing the number of instruments.

Detailed results of the regressions

Our estimation results are summarized in Tables 4.A.4 to 4.A.7. We present the impact of various factors on investment before the financial crisis, as well as their additional effect during the 2009-2012 period. Pooled OLS and fixed effects estimates are also reported. According to Bond (2002), given their respective biases, a consistent point estimate on the lagged dependent variable should not be significantly higher than the former or significantly lower than the latter. Further tests are run to probe the validity of our results. First, autocorrelation in the idiosyncratic disturbance term would render some lags invalid as instruments. We test second order correlation of first differenced residuals using the Arellano-Bond test for autocorrelation. Second, the Hansen overidentification test checks the validity of the identifying moment conditions.

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[182] The related system GMM (Arellano and Bover (1995)); Blundell and Bond (1998)) additionally estimates the original equation, instrumenting for variables in levels using lagged differences. The original motivation for this estimator is highly persistent series that offer only weak instruments to the transformed variables of the difference GMM. None of our variables is very persistent. Also, in the context of this study, tests on the validity and strength of the level equation instrumentation cast too much doubt on the applicability of this estimator (see Roodman (2009a) on instrument validity and Bazzi and Clemens (2013) on instrument strength).

Table 4.A.4

Results: baseline regressions

Regressors	SMEs			Large firms		
	OLS	Fixed effects	Diff-GMM	OLS	Fixed effects	Diff-GMM
Investment to capital (lag)	0.54***	0.11**	0.10*	0.58***	0.10*	0.16**
log(turnover to capital)(lag)	1.36**	7.10***	6.50**	1.38***	6.83***	8.85***
log(turnover to capital)(lag) * dummy 2009-2012	0.63	0.49	0.08	-0.15	-0.46	-1.12*
Sales Growth	0.16***	0.13***	0.22***	0.10***	0.09***	0.14**
Sales Growth * dummy 2009-2012	-0.07*	-0.04	-0.07	-0.03	-0.01	-0.02
Cash flow to capital (lag)	0.22***	0.21***	0.18*	0.12***	0.08**	-0.04
Cash flow to capital (lag) * dummy 2009-2012	-0.12***	-0.10**	-0.09	-0.03	-0.04	0.01
Cash holdings to assets (lag)	-0.27**	-0.11	-0.06	-0.04	0.06	-0.02
Cash holdings to assets (lag) * dummy 2009-2012	0.25**	0.16	0.10	0.07	-0.01	0.21**
Debt to asset ratio (lag)	0.09***	0.00	-0.06	0.05*	-0.01	0.01
Debt to asset ratio (lag) * dummy 2009-2012	-0.02	-0.01	-0.04	-0.01	-0.02	-0.01
Bank debt to asset ratio (lag)	0.01	-0.07	-0.32*	0.05	-0.02	-0.14
Bank debt to asset ratio (lag) * dummy 2009-2012	-0.03	-0.08	-0.17	-0.01	0.00	-0.06
Number of observations	1,414	1,414	1,268	1,246	1,246	1,109
Number of cells		146	146		137	132
Number of instruments			93			95
R squared (levels)	0.79	0.49	0.22	0.64	0.33	0.25
AR2 (p-value)			0.22			0.41
Hansen test (p-value)			0.08			0.61

Source: Own calculations.
Notes: For pooled OLS and fixed effects regressions, robust standard errors are clustered by cell (country-sector-size combination). For difference GMM, the orthogonal deviations transform was used; two-step robust standard errors were computed using the Windmeijer correction; seven lags of instruments were used. All the regressions include country-year dummies. Constants are not reported. R squared in the equations estimated by difference GMM refers to the squared correlation coefficient between actual and predicted levels of investment ratios, which is more appropriate goodness of fit measure for instrumental variable regressions.

Table 4.A.5

Results: total and bank leverage

Regressors	SMEs			Large firms		
	OLS	Fixed effects	Diff-GMM	OLS	Fixed effects	Diff-GMM
Investment to capital (lag)	0.54***	0.11**	0.10*	0.58***	0.10*	0.16**
log(turnover to capital)(lag)	1.36**	7.10***	6.50**	1.38***	6.83***	8.85***
log(turnover to capital)(lag) * dummy 2009-2012	0.63	0.49	0.08	-0.15	-0.46	-1.12*
Sales Growth	0.16***	0.13***	0.22***	0.10***	0.09***	0.14**
Sales Growth * dummy 2009-2012	-0.07*	-0.04	-0.07	-0.03	-0.01	-0.02
Cash flow to capital (lag)	0.22***	0.21***	0.18*	0.12***	0.08**	-0.04
Cash flow to capital (lag) * dummy 2009-2012	-0.12***	-0.10**	-0.09	-0.03	-0.04	0.01
Cash holdings to assets (lag)	-0.27**	-0.11	-0.06	-0.04	0.06	-0.02
Cash holdings to assets (lag) * dummy 2009-2012	0.25**	0.16	0.10	0.07	-0.01	0.21**
Debt to asset ratio (lag)	0.09***	0.00	-0.06	0.05*	-0.01	0.01
Debt to asset ratio (lag) * dummy 2009-2012	-0.02	-0.01	-0.04	-0.01	-0.02	-0.01
Bank debt to asset ratio (lag)	0.01	-0.07	-0.32*	0.05	-0.02	-0.14
Bank debt to asset ratio (lag) * dummy 2009-2012	-0.03	-0.08	-0.17	-0.01	0.00	-0.06
Number of observations	1,414	1,414	1,268	1,246	1,246	1,109
Number of cells		146	146		137	132
Number of instruments			103			105
R squared (levels)	0.79	0.49	0.34	0.64	0.33	0.26
AR2 (p-value)			0.36			0.32
Hansen test (p-value)			0.14			0.61

Source: Own calculations.
Notes: For pooled OLS and fixed effects regressions, robust standard errors are clustered by cell (country-sector-size combination). For difference GMM, the orthogonal deviations transform was used; two-step robust standard errors were computed using the Windmeijer correction; seven lags of instruments were used. All the regressions include country-year dummies. Constants are not reported. R squared in the equations estimated by difference GMM refers to the squared correlation coefficient between actual and predicted levels of investment ratios, which is more appropriate goodness of fit measure for instrumental variable regressions.

Table 4.A.6

Results: asymmetric effects of leverage

Regressors	SMEs OLS	SMEs Fixed effects	SMEs Diff-GMM	Large firms OLS	Large firms Fixed effects	Large firms Diff-GMM
Investment to capital (lag)	0.534***	0.109**	0.101*	0.572***	0.0938*	0.141**
log(turnover to capital)(lag)	1.222**	7.030***	9.303***	1.496***	7.029***	9.642***
log(turnover to capital)(lag) * dummy 2009-2012	0.85	0.607	-0.759	-0.156	-0.767*	-1.720***
Sales Growth	0.153***	0.132***	0.204***	0.0996***	0.0882***	0.0925*
Sales Growth * dummy 2009-2012	-0.0649	-0.045	-0.105	-0.027	-0.011	0.003
Cash flow to capital (lag)	0.215***	0.204***	0.118	0.130***	0.0784**	0.029
Cash flow to capital (lag) * dummy 2009-2012	-0.126**	-0.0894*	-0.031	-0.0539*	-0.051	-0.009
Cash holdings to assets (lag)	-0.259**	-0.111	-0.151	-0.009	0.099	0.029
Cash holdings to assets (lag) * dummy 2009-2012	0.216*	0.160	0.336	0.046	-0.059	0.055
Above threshold :						
Debt to asset ratio (lag)	0.0637	0.000	-0.091	0.0675	0.028	0.141
Debt to asset ratio (lag) * dummy 2009-2012	0.022	0.046	0.141	-0.027	-0.0891*	-0.187**
Bank debt to asset ratio (lag)	0.003	-0.076	-0.614**	0.052	-0.023	-0.142
Bank debt to asset ratio (lag) * dummy 2009-2012	-0.023	-0.071	-0.225**	-0.012	-0.020	-0.093
Below threshold:						
Debt to asset ratio (lag)	0.149*	0.045	0.199	-0.106	-0.173**	-0.138
Debt to asset ratio (lag) * dummy 2009-2012	-0.112	0.062	-0.361	0.026	0.056	0.091
Bank debt to asset ratio (lag)	0.047	-0.018	-0.436*	0.042	-0.045	-0.147
Bank debt to asset ratio (lag) * dummy 2009-2012	-0.048	-0.152*	-0.248	-0.009	0.122	0.270
Number of observations	1,414	1,414	1,268	1,246	1,246	1,109
Number of cells		146	146		137	132
Number of instruments			126			128
R squared (levels)	0.79	0.49	0.21	0.64	0.34	0.25
AR2 (p-value)			0.19			0.29
Hansen test (p-value)			0.08			0.36

Source: Own calculations.
Notes: For pooled OLS and fixed effects regressions, robust standard errors are clustered by cell (country-sector-size combination). For difference GMM, the orthogonal deviations transform was used; two-step robust standard errors were computed using the Windmeijer correction; seven lags of instruments were used. All the regressions include country-year dummies. Constants are not reported. R squared in the equations estimated by difference GMM refers to the squared correlation coefficient between actual and predicted levels of investment ratios, which is more appropriate goodness of fit measure for instrumental variable regressions.

Table 4.A.7

Results: uncertainty

Regressors	SMEs OLS	SMEs Fixed effects	SMEs Diff-GMM	Large firms OLS	Large firms Fixed effects	Large firms Diff-GMM
Investment to capital (lag)	0.577***	0.129**	0.145**	0.586***	0.0814	0.164**
risk perception (lag)	-0.026	-0.040	0.014	-0.018	0.026	0.0702**
log(turnover to capital)(lag)	1.608***	7.514***	9.211***	1.305***	6.459***	7.190***
Sales Growth	0.125***	0.129***	0.178***	0.0928***	0.102***	0.108***
Sales Growth * risk perception (lag)	0.000	0.000	-0.001	0.000	0.000	-0.001
Cash flow to capital (lag)	0.150***	0.152***	0.162	0.114***	0.0607*	0.130*
Cash flow to capital (lag) * risk perception (lag)	0.000	0.000	-0.00258**	0.000	0.000	-0.001
Cash holdings to assets (lag)	-0.127	-0.0471	0.014	-0.012	-0.023	-0.174
Cash holdings to assets (lag) * risk perception (lag)	0.000	0.004	0.00744**	-0.002	0.001	0.002
Debt to asset ratio (lag)	0.0710**	0.029	0.035	0.0144	-0.014	0.076
Debt to asset ratio (lag) * risk perception (lag)	0.000	0.000	-0.001	0.00096**	0.000	-0.00135*
Bank debt to asset ratio (lag)	-0.010	-0.211	-0.491**	0.052	-0.010	-0.164*
Bank debt to asset ratio (lag) * risk perception (lag)	0.000	0.001	0.002	0.000	0.000	0.00109*
Number of observations	1,284	1,284	1,138	1,133	1,133	997
Number of cells		146	146		136	129
Number of instruments			125			127
R squared (levels)	0.80	0.50	0.24	0.65	0.31	0.27
AR2 (p-value)			0.37			0.11
Hansen test (p-value)			0.26			0.67

Source: Own calculations.

Subchapter 4.3

Macro and micro estimation on impact of outward FDI on domestic investment

The empirical analysis in sub-section 4.3.3 draws on both macro and micro data. The macro-level study employs a strongly balanced panel dataset for the 18 euro area countries over the period 1999Q1 to 2013Q4, sourced from Eurostat and the ECB's Statistical Data Warehouse. To examine the factors influencing investment by multinational companies in Ireland, an unbalanced panel dataset of approximately 31,000 firms is derived from the Bureau van Dijk Amadeus database between 2004 and 2012.[183]

To analyse how outward FDI influences domestic investment, following Desai et al (2005) and Al-Sadiq (2013) the specification considered is:

$$Investment_{it} = \beta_1 + \beta_2 ODI_{it-1} + \beta_3 IDI_{it-1} + \beta_4 Savings_{it-1} + \eta_i + Controls + \varepsilon_{it} \quad (1)$$

where Investment is the domestic investment of country i at time t, ODI is outward FDI flows, IDI is inward flows of FDI, and Savings denotes national savings. These variables are all scaled by GDP. Time invariant unobservable country specific factors are captured by η, and ε is the error term. A vector of time-varying country specific control variables, Controls, are also included to account for a country's level of economic activity, GDP, macroeconomic stability, Inflation, and financial development, Credit. Global GDP, Global_GDP, is included as a measure of global economic activity to control for global factors that may determine domestic investment.

A similar specification is considered for the micro-level study. For individual firms, Investment is empirically measured as fixed assets normalised by total assets of firm i at time t. The unavailability of dynamic firm-level FDI data necessitates the construction of a binary variable to empirically approximate FDI relationships. ODI is a dummy variable, taking a value of 1 if a firm (i) is categorised as being Irish, according to the ISO country code of the firm's global ultimate owner, (ii) is identified as a company whose global ultimate owner has a direct or indirect share of at least 50 per cent of the company's capital; and (iii) has one or foreign subsidiaries, and 0 otherwise.[184] Similarly, *IDI* is a dummy variable, assigned a value of 1 if its global ultimate owner is non-Irish, and has one or more foreign affiliates, i.e. either parent companies or subsidiaries, and 0 otherwise. Savings are proxied by the internal cash of firm i, measured by the log of its cash flow. Time invariant unobservable firm specific factors are captured by η. The control variables included are the size of a firm, Size, measured as the log of total assets, the external debt (loans and long-term debt) of the firm, Debt, and time fixed effects to account for time specific events which may affect investment. Global GDP, Global_GDP, is included as a measure of global economic activity to control for global factors that may determine domestic investment.

All regressors are lagged by one period to account for potential issues of endogeneity.

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[183]   Data are only available from 2004 onwards. The data sample ends in 2012 as data are only available for a selection of firms for 2013.

[184]   This is consistent with the OECD Benchmark Definition of Foreign Direct Investment, 4th edition, whereby direct investment enterprises are classified as corporations, as opposed to associates, where over 50 per cent of the voting power is held. This is the definition of direct investment underpinning the compilation of statistics on the Activities of Multinational Enterprises (or Foreign Affiliates Trade Statistics).

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