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Analysis of developments in EU capital flows in the global context – third annual report

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Executive summary

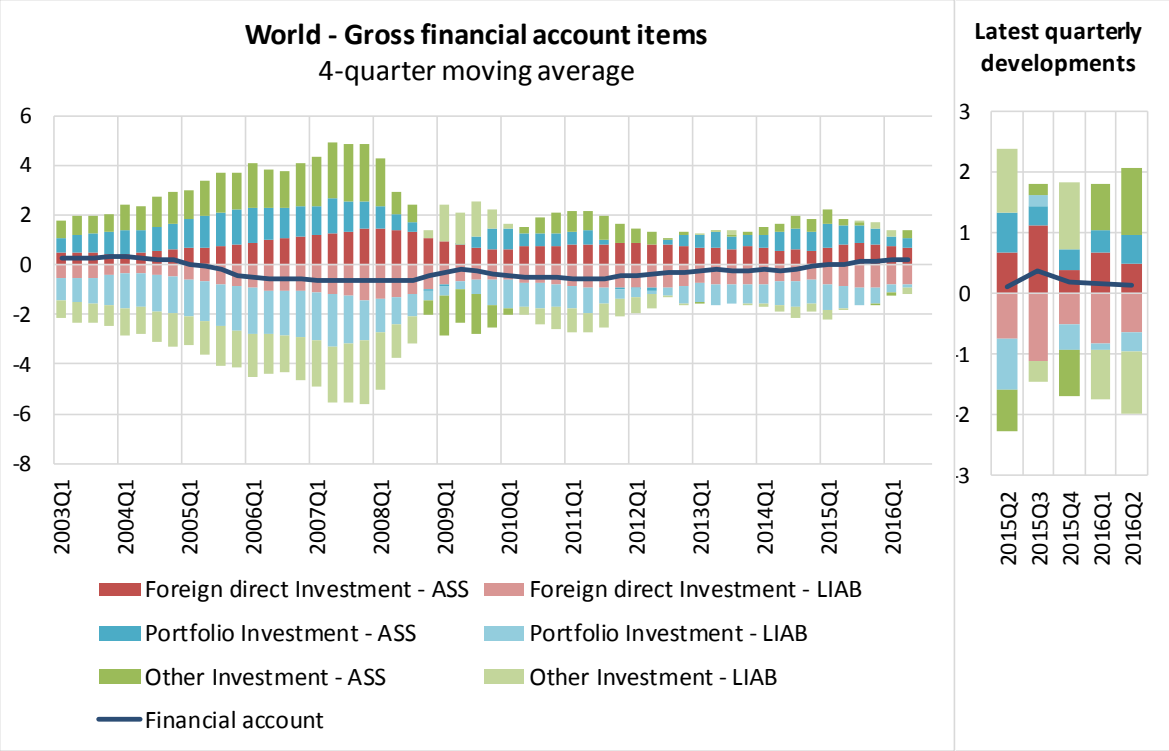
The purpose of our report is to provide a comprehensive overview of capital movements in Europe in a global context. Free movement of capital, which is one of the four fundamental economic freedoms of the European Union, can enhance welfare if it leads to better allocation of financial and productive resources. However, it can also be a source of vulnerability, with far-reaching spillovers. Monitoring and assessing capital flows is therefore crucial for policymakers, market participants and analysts.

Chapter one introduces the topic and presents the outline of our report.

Chapter two analyses global capital flows. We highlight several key developments.

- **Global gross capital flows continue remain at a subdued level compared to the pre-crisis period** (Figure 1). However, among the three main components, foreign direct investment (FDI) declined the least and while such flows are below the 2005-07 values, the 2013-15 average was actually higher than in 2002-04. In contrast, gross portfolio investment in 2013-15 was about half of what it was in 2005-07 and was also below values observed in 2002-04. Gross other investments (which mostly comprise cross-border loans) fell even more and in several quarters during 2012-15, there was a retrenchment of earlier other investment flows. These developments highlight **that FDI remained more stable than other capital flows during the global reduction of gross flows in the aftermath of the 2007-08 global financial and economic crisis**.
- However, **the latest three quarters at the time of writing (2015Q4-2016Q2) saw a reduction in global FDI flows. There was a significant retrenchment of other investments in 2015Q5, though in the first two quarters of 2016 other investments expanded again somewhat**. It needs to be seen whether these developments were a temporary setback to global capital flows, or the beginning of a major slowdown in global FDI and other capital flows.

Figure 1: Global gross financial flows (percent of GDP)



Source: Bruegel based on data from the IMF International Financial Statistics (quarterly capital flows) and IMF World Economic Outlook (annual GDP).
Note: the values shown are the aggregate of 77 countries, including all large economies. Therefore, the combined financial account of these countries (indicated by the solid line) should be close to zero and the significant deviations from zero in 2006-13 likely indicate reporting errors. The left panel shows the ratio of the 4-quarter moving average capital flows to the 4-quarter moving average GDP level (for which we first interpolated annual GDP data at the quarterly level, assuming smooth within-year changes). We use 4-quarter averages to reduce short-term noise and to be able to highlight key tendencies. The right panel shows the ratio of actual quarterly capital flows (i.e. no moving average) to the 4-quarter average GDP level. Thereby, the magnitudes in the two panels are comparable to the ratio of annual capital flows to annual GDP. Negative values for assets, and positive values for liabilities, indicate retrenchment of earlier investments.

- **The recovery of capital flows in different regions in the post-crisis period has been uneven.** By the first quarter of 2010, gross capital flows reached nearly pre-crisis levels in Latin America, in the ASEAN-4, and in Sub-Saharan Africa, but remained subdued in central and eastern Europe (CEE) and in Commonwealth of Independent States (CIS) countries. In 2015, gross flows into Latin America and Sub-Saharan Africa stabilised at high levels – much higher levels than before the crisis – while the Asean-4 and the BRICS experienced capital outflows in recent quarters, suggesting that **there is no general trend of capital outflows from emerging countries** and that two large regions even continue to experience large-scale capital inflows. In CEE, CIS and advanced countries, gross flows remain well below pre-crisis levels.
- **The euro area has been characterised by capital outflows** since the end of 2012, predominantly driven by bank-related outflows (loans and deposits) in 2013-14, which might have been the result of global bank deleveraging in relation to the euro-area's sovereign and banking crisis. However, this trend

reversed in 2014Q3 and other investment is flowing in again, including an unusually large inflow in 2016Q1, though in 2016Q2 such inflows moderated. The renewed inflow of other investments might be related to the improved soundness of financial institutions as a result of the preparation for, and the actual take-over by the European Central Bank of the single supervisory role in the euro area. On the other hand, in 2015 the euro area experienced portfolio investments outflows practically for the first time since 2001, reflecting to some extent the impact of the ECB's asset purchase programme. Thereby, total net capital outflow from the euro area has accelerated.

- The **CEE countries' net financial inflows** have receded substantially since the height of the financial crisis and these countries became net capital exporters in 2015-16. Net pre-crisis inflow of other investment switched to outflows, net portfolio inflows went down to zero, and FDI inflows reduced significantly.
- **In contrast to the euro area and CEE countries, Sweden, Denmark and the United Kingdom experienced substantial net capital inflows** from 2014 to our most recent observation of 2016Q1. This was driven by strong portfolio and FDI inflows, while bank-related outflows over the same period offset somewhat the observed inflows.
- In **non-EU advanced countries**, the relatively stable earlier FDI outflows suddenly halted in 2015, which might explain, at least partly, the recent decline in global FDI. Improved domestic economic outlooks might have played a role. Another major change is the switch from large portfolio investment inflows to outflows in 2015, which might have been reinforced by the changed behaviour of former reserve-accumulating central banks.
- **The global decline in foreign exchange reserves continues**, which has likely contributed to portfolio outflows from advanced countries. Significant further reserve depletion of global foreign exchange reserves might lead to interest rate increases in advanced countries.
- Central bank policies in advanced countries, as well as the vote in the United Kingdom's June 2016 Brexit referendum to leave the EU, have likely influenced **exchange rate movements**, which in turn will have an impact on capital flows.
- **Latin America and Sub-Saharan Africa** are the only two main emerging regions that continue to receive large capital inflows, larger than in the pre-crisis period. In Sub-Saharan Africa inflows are almost entirely composed of FDI, while in Latin America, FDI and portfolio inflows account for about half of net capital inflows.
- Official statistics on foreign asset positions are imprecise because of **unrecorded financial wealth held in tax havens**. Research shows, for example, that consideration of such unrecorded wealth would turn the reported negative net international investment position (NNIP) of the euro area positive.
- Nevertheless, official statistics show that **recent NIIP developments in EU countries differ from most non-EU country groups**. In the euro area, in the group of Denmark, Sweden and the United Kingdom (DESEUK), and in the group of CEE countries, a process of shrinking of both net assets and net liabilities started in 2015-16, along with an increase in the total net position. In

contrast, net assets and liabilities of Latin American and CIS countries have even increased recently.

- Among the three components of the NIIP, it is notable that earlier positive net FDI claims of the euro-area, the DESEUK group and non-EU advanced countries have fallen, and the earlier negative net FDI positions of CEE countries, Brazil and India, and to a lesser extent CIS countries have increased. These developments highlight that a **recent setback to global FDI linkages**.
- Large gross stocks are prone to major valuation changes, which can lead to significant shifts in the net stock position even if net flows are small. Therefore we assessed the **investment yields and valuation effects of foreign assets and liabilities**.
- Our analysis of the yields show that **larger EU countries such as Germany, France, Finland, the Netherlands, Sweden and the United Kingdom have succeeded in replicating to some extent the privileges of the US on equity returns** throughout the periods taken into consideration. In contrast, the **CEE region experienced large negative spreads on equity because of very high returns on their liabilities**, but they had the remarkable privilege of large positive spreads on debt-type foreign assets. It is also worthwhile highlighting that the **vulnerable euro-area countries where financial assistance programmes were implemented (with the exception of Greece) do not display largely negative tendencies on returns on foreign assets and liabilities** relative to other EU countries, because of the financial assistance programmes and Eurosystem Central Bank (ESCB) flows. Continued participation in the euro helped financial-assistance countries to manage their external accounts during the crisis years.
- **Revaluation effects also show sizeable heterogeneity both across countries, and through time.** Germany, Spain and Sweden suffer from the worst revaluation spreads in equity. In terms of debt revaluations, several EU countries report negative spreads. This could mainly be due to the 'other investment' component, which comprises inter- and intra-bank loans, reflecting the period of financial disintegration starting with the crisis.
- **The difference between the total return on assets and liabilities was especially large for equity in Greece**, because of the collapse of Greek liabilities. The United States has lost its positive overall return on equity, primarily driven by revaluation gains of foreign investors in the US, due to the strong US dollar and strong increase in US equity prices.
- **There is a striking difference between the gross foreign claims of EU and non-EU advanced country banks**: while claims of EU banks have declined significantly since 2007-08 (and have even halved for euro-area banks), claims of non-EU banks (after some volatility in 2007-09) continued to increase even after 2009.

The third chapter focuses on capital flows in the European Union, with a special focus on the possible impacts of capital controls in Greece, Iceland and Cyprus.

To highlight the main tendencies in the heterogeneous EU, among first twelve euro-area countries we make a distinction between debtors (Greece, Portugal and Spain) and creditors (Austria, Belgium, Germany, Luxembourg and the Netherlands) on the

basis of their net international positions, while France and Italy are explored separately. The rest of the EU Member States that are are divided into the North (Denmark and Sweden), Central and Eastern Europe (Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia) and the UK.

- **In the euro area, gross flows remain subdued** compared to the pre-crisis period across all groupings. However, there have been significant fluctuations over time, even if the level remains below the pre-crisis period. These fluctuations are correlated across country groups but their relative size differs substantially. Gross flows accentuated during the first quarters of 2012 and the end of 2014 and were relatively more important in creditor and debtor countries. Nevertheless, they had different implications with respect to the direction of the net changes.
- Similar dynamics emerge in **debtor countries** and **Italy**. These countries have over time turned into net exporters of capital. The intensification of gross flows during 2012 coincided with the most dramatic shift in their net financial account. Initially, portfolio net outflows were only partly compensated for by the inflow of other investment, which in turn also began flowing out from these countries. During 2015, these countries ended up running small overall surpluses. Net outflows in portfolio investment were somewhat counteracted by net inflows of other investment. Their NIIP has stabilised and began to rise as a result, while remaining in a debtor position. Almost the entirety of this position is made up of other investment claims in the debtor countries, while in Italy its composition has shifted once again after 2012 from portfolio to other investment.
- In **creditor countries**, the net financial account surplus widened up to 2015, as these countries became net exporters in every category of cross-border investment. After 2012, portfolio and direct investment net inflows turned into large net outflows. This is reflected in their NIIP positions and its composition: direct investment, a net asset, is increasing while portfolio investment, a net liability, is falling. After peaking in 2015, however, the overall net outflow has attenuated somewhat, owing to a complete reversal in the direction of other investment flows.
- **France** has experienced a significant attenuation in gross flows relative to the pre-crisis period that has, nonetheless, caused very little change to its net balance: the net financial account balance has remained close to zero. A decomposition of the balance shows a consistent surplus in other investment and a consistent deficit in the portfolio account, which was the primary reason for France's steadily negative NIIP.
- The magnitude of gross flows in **Northern Europe** and in **CEE** tends to be smaller than in the euro area. The **north of Europe** has been a net exporter of capital since the end of 2009. It runs a negative position of portfolio net liabilities, while other investments turn the overall position from negative to positive.
- **Central and Eastern European countries** experienced prolonged inflows, mainly of direct investment, in the run-up to the crisis. By the end of 2011 though, other investment started flowing out, reflecting a massive withdrawal

of banking funds from the region. **CEE** had turned into a net exporter of capital by 2013Q1, a trend that continues. **CEE** thus exhibits net liabilities in all instruments but more than half of NIIP liabilities are direct investment.

- In contrast, the **UK**, owing to its role as a major financial centre, experienced gross flows of up to 80% of GDP during the financial crisis. It experienced large inflows in 2007-08, mostly in terms of portfolio investment, which were then abruptly reversed in 2009. Large net portfolio inflows re-emerged in 2014, driving the net financial balance to a deficit of 20% of GDP, a trend which subsided in the course of 2015. The **UK** remains a debtor in NIIP components apart from direct investment.
- We focus on the three EEA countries that introduced **capital controls** – **Iceland** (in 2008), **Cyprus** (in 2013) and **Greece** (in 2015) – to assess their likely impacts. Overall, the imposition of capital controls in both Cyprus and Iceland led to a moderation of both portfolio and banking flows. Interestingly, as capital controls were lifted in April 2015 in Cyprus, a major increase in foreign bank claims was observed, as investment could flow again into the country without restrictions. In contrast, portfolio and banking foreign claims on Greece had already decreased substantially before capital controls were imposed. A recovery in banking claims on Greece started in late 2015 and continued into early 2016, suggesting some improvement in confidence in the Greek economy. The diminished uncertainty related to the implementation of the third financial assistance programme likely played a role in confidence building.
- Lacking a sufficiently comprehensive macro-financial model, we compare the three EEA capital control countries to other countries that underwent financial assistance programmes, both EU and non-EU, in order to gauge possible impacts of capital controls on economic performance. We find that developments in real GDP and unemployment developments in Iceland, Cyprus and Greece were no worse than in other EU Member States with financial assistance programmes and no capital controls. Moreover, relative to the initial programme assumptions, these three countries outperformed both their EU and non-EU counterparts that faced no restrictions on capital flows.

Chapter four presents the results of our in-depth study on institutional investors and risk sharing in Europe's Capital Markets Union.

- Institutional investors, as professional parties, typically hold geographically diversified portfolios of marketable securities. In that way, **institutional investors contribute to financial integration and risk sharing** in Europe's Capital Markets Union and beyond.
- Assets managed by institutional investors (defined as pension funds, insurance companies and investment funds) have increased significantly in the past fifteen years. Beyond the general increasing trend, the size of the funds managed by the three types of institutional investors and their increase over time varies significantly in different EU countries.
- **The key hypothesis we test** with panel regression estimates: the larger the assets managed by institutional investors, the smaller the home bias and thereby the greater the scope for risk sharing.

- We use a simple **indicator of home bias in portfolio investments** based on the International Capital Asset Pricing Model (ICAPM). We define an indicator measuring the **euro-area bias in portfolio investments**. The two indicators are calculated for equity and debt securities separately. Our new indicators show that in the euro area, Denmark, Sweden and the United Kingdom, home bias is lower than in the newer EU member states and non-EU advanced countries, while euro-area bias is comparably high in the euro-area and newer EU Member States, but low in the other three older EU Member States and in advanced countries. Furthermore, the euro area is unique in terms of debt securities: home bias is the lowest and euro-area bias is the highest among the country groups. Since non-EU countries are generally characterised by a higher degree of home bias than EU countries, we conclude that EU membership may foster financial integration and reduce information barriers, which sometimes limit cross-country diversification.
- We also calculate our **home bias indicators for the aggregate of the euro area as if the euro area was a single country**, by consolidating intra-euro area assets and liabilities. We report remarkable similarity between the euro area as a whole and the United States in terms of equity home bias, while there is a higher level of debt home bias in the United States than in the euro area as a whole.
- We create a new quantitative measure that we call '**Pension fund foreign investment restrictions index**' to control for the impact of prudential regulations on the ability of institutional investors to diversify geographically across borders. Our index suggests that most EU countries apply very limited, if any, restrictions on foreign investment. However, some EU countries imposed substantial limits in 2001 and have gradually relaxed these barriers in recent years (Denmark, Finland, Germany, Hungary, Romania and Sweden). In the EU, persistent barriers to cross-border investment are still present in Austria, Greece and Poland.
- To explore whether the size of the assets managed by institutional investors contributes to home bias, we run a set of **panel regressions** for 25 countries. We include a number or relevant controls, namely: GDP per capita, a proxy for capital markets development (the Financial Development Index of the World Economic Forum), a proxy for openness (share of exports of goods and services to GDP), availability of domestic securities (domestic market capitalisation relative to home GDP) and availability of foreign securities (foreign market capitalisation relative to home GDP). For euro-area countries, we also include euro-area home bias as a regressor. We use two functional forms, two versions of equity home bias and estimates with and without country and time fixed effects.
- Our **results provide strong support for our main hypothesis**: all 48 estimated parameters have a negative sign and most of them are statistically significantly different from zero.
- Most of the **control variables** also have statistically significant coefficients with the expected sign for economic interpretation.
    - Higher **GDP per capita** is strongly associated with lower home bias, as expected, given that it can serve as a proxy for several factors influencing the ability of a country to diversify its asset holdings, such

as economic development, institutional quality, investor protection or average education level in the country.

- Higher **trade openness** is strongly associated with lower home bias, as expected; this result is therefore consistent with the argument that cross-border trade integration drives financial integration.
- **Home market capitalisation** is positively related to home bias, as expected, highlighting that countries with a larger home stock of securities diversify less.
- The results of the **availability of rest of the world securities** are more mixed: while the estimated parameter tends to be negative (as expected), in a number of specifications the estimated parameter is actually positive.
- The parameter estimate of the **Financial Development Index** (which may capture effects similar to GDP per capita) is never significant and the sign of the estimated parameter varies. The most likely reason for this result is the strong correlation between the Financial Development Index and GDP per capita relative to the United States.
- Importantly, our estimates tend to suggest that **our new pension fund foreign restriction index is positively related to home bias**.
- Results for the **euro-area bias** are mixed: when fixed effects are not included, the parameter estimate of euro-area bias is always negative and statistically significant in most cases.

1. Introduction

This is our third annual report that analyses capital movements in Europe in a global context. Monitoring and analysing capital movements is crucial for policymakers, market participants and analysts, given that free capital movements can enhance welfare if they lead to better allocation of financial and productive resources, but they can also be a source of vulnerability, with far-reaching spillovers.

We do not repeat our reviews from previous reports (Darvas *et al*, 2014; Darvas *et al*, 2015) of the key theoretical aspects around capital flows, but start with an analysis of global capital flows in Chapter 2. In order to be able offer the big picture, we split countries into ten groups and highlight different patterns of capital flows throughout the world. We focus on more recent developments, while interested readers can find our analysis of pre-crisis developments in our previous report. We pay special attention to emerging market economies given the recent turbulence there. In Chapter 2 we also report our analysis of the returns on investment and valuation effects of foreign assets and liabilities, which show great variation between countries. This finding highlights the potential risks of large foreign asset positions, but also underline that cross-border positions enhance cross-country risk sharing.

Chapter 3 focuses on Europe. While we continue to focus on the euro area because of its unique characteristics, we also pay more attention to non-euro area EU countries. We analyse the different capital flow patterns and developments in international investment positions, including analysis of their compositions. An interesting picture emerges when we compare euro-area countries that received financial assistance programmes with central and eastern European (CEE) EU countries. The imposition of capital controls makes Cyprus, Iceland and recently Greece highly interesting cases for an analysis of capital flows under capital controls and the possible impact of capital controls on economic performance.

Finally, Chapter 4 presents the results of our in-depth analysis, which this year focuses on institutional investors (pension funds, insurance companies, investment funds) and risk sharing in Europe's Capital Markets Union. We document the substantial increase in assets managed by institutional investors in the EU, but also the great diversity of EU countries, both in terms of assets managed and the supply of securities. We calculate home bias indicators for portfolio equity and debt securities holdings, and a new pension fund foreign investment restriction index for a large number of countries. Our main hypothesis is that the greater the assets managed by institutional investors, the less the home bias and thereby the greater the scope for risk sharing, *ceteris paribus*. We use panel regression analysis to test this hypothesis, using several control variables, and find strong support for it.

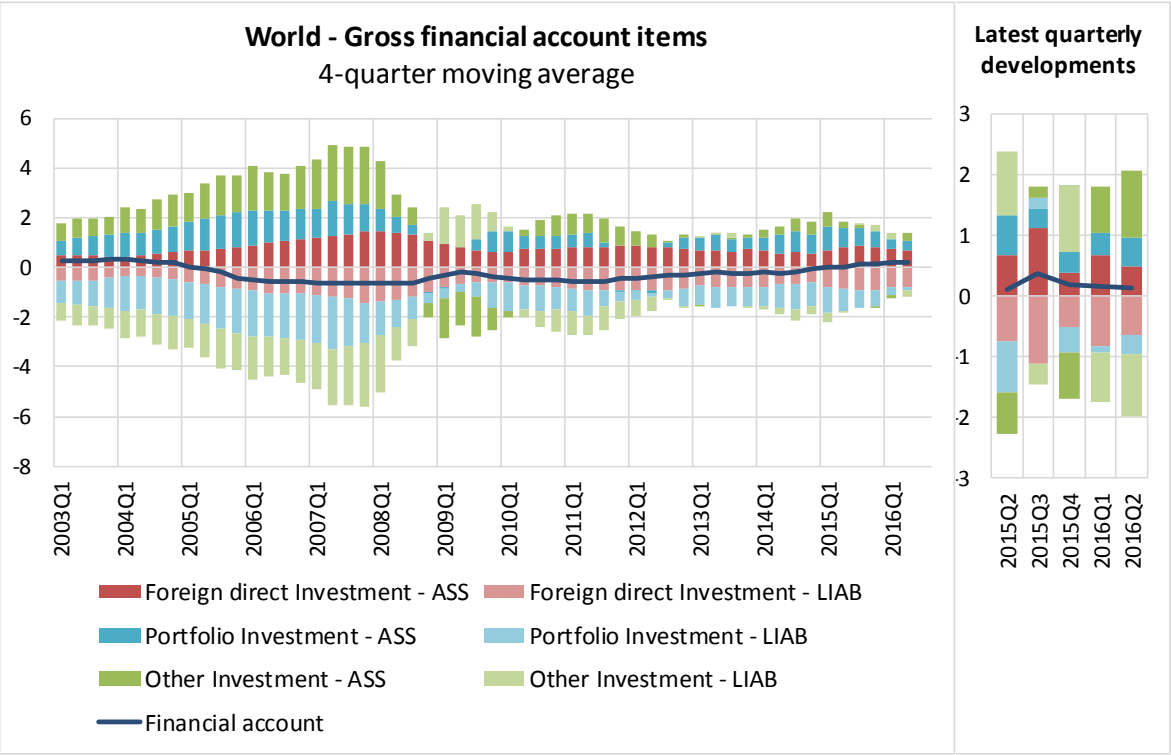
2. Global trends

We start our analysis by examining capital flows and stocks at the global level. In order to offer the big picture, Figure 1 shows the three main types of capital flows for a group of 77 countries.

The figure shows that **global gross capital flows continue to be subdued compared to the pre-crisis period**. However, of the three main components, foreign direct investment (FDI) declined the least and while such flows are below the values observed in 2005-07, the 2013-15 average is actually higher than in 2002-04. In contrast, gross portfolio investment in 2013-15 was about half the 2005-07 level and was also below 2002-04 values, while gross other investments (mostly comprising cross-border loans) fell even more and in several quarters of 2012-15 there was a retrenchment of earlier other investment flows. These developments highlight **that FDI remained more stable during the global reduction of gross flows in the aftermath of the 2007-08 global financial and economic crisis**.

However, we also note that **the latest three quarters (2015Q4-2016Q2) saw a reduction in global FDI flows. There was a major retrenchment of other investments in 2015Q4, though in the first two quarters of 2016 other investments expanded again somewhat**. It needs to be seen whether these developments were a temporary setback to global capital flows, or the beginning of a major slowdown in global FDI and other capital flows.

Figure 1: Global gross financial flows (percent of GDP)



Source: Bruegel calculations based on data from the IMF International Financial Statistics (quarterly capital flows) and IMF World Economic Outlook (annual GDP).
Note: the values shown are the aggregate of 77 countries, including all large economies. Therefore, the combined financial account of these countries (indicated by the solid line) should be close to zero and the significant deviations from zero in 2006-13 likely indicate reporting errors. The left panel shows the ratio of the 4-quarter moving average capital flows to the 4-quarter moving average GDP level (for which we first interpolated annual GDP data at the

quarterly level, assuming smooth within-year changes). We use 4-quarter averages to reduce short-term noise and to be able to highlight key tendencies. The right panel shows the ratio of actual quarterly capital flows (i.e. no moving average) to the 4-quarter average GDP level. Thereby, the magnitudes in the two panels are comparable to the ratio of annual capital flows to annual GDP. Negative values for assets, and positive values for liabilities, indicate retrenchment of earlier investments.

2.1 Major country groups

In order to highlight differences between the world's main regions, we aggregate countries into ten groups: euro area 17, eight central and eastern European EU countries (CEE8), the three other EU countries (UK, Denmark and Sweden), 11 non-EU advanced economies, four countries from the Association of Southeast Asian Nations (ASEAN-4), Latin America 13, four Sub-Saharan African countries (SSA4), the Commonwealth of Independent States excluding Russia (CIS 8 (excl. Russia)), Middle East and North Africa 5 (MENA5), and the aggregate of Brazil, Russia, India, China and South Africa (BRICS). The time period we consider is from 2000Q1 to the latest data available, which is the first quarter 2016 for all but one country group[1].

Figure 2 shows the evolution of gross and net capital flows for our country groupings. In the run-up to the crisis, data indicates there were net capital inflows into most country groups[2] (especially CEE8, Non-EU advanced, CIS8 and the BRICS), while the euro area was characterised by capital outflows.

The eruption of the financial crisis in 2007 resulted in a collapse of gross financial flows into all country groups. In the CEE8, the Other EU 3 and the non-EU advanced countries, net flows fell to zero for a few quarters, before rebounding by the end of 2009. Sizeable net capital outflows were registered from the CIS8 (excl. Russia), the BRICS, Latin America and the ASEAN-4.

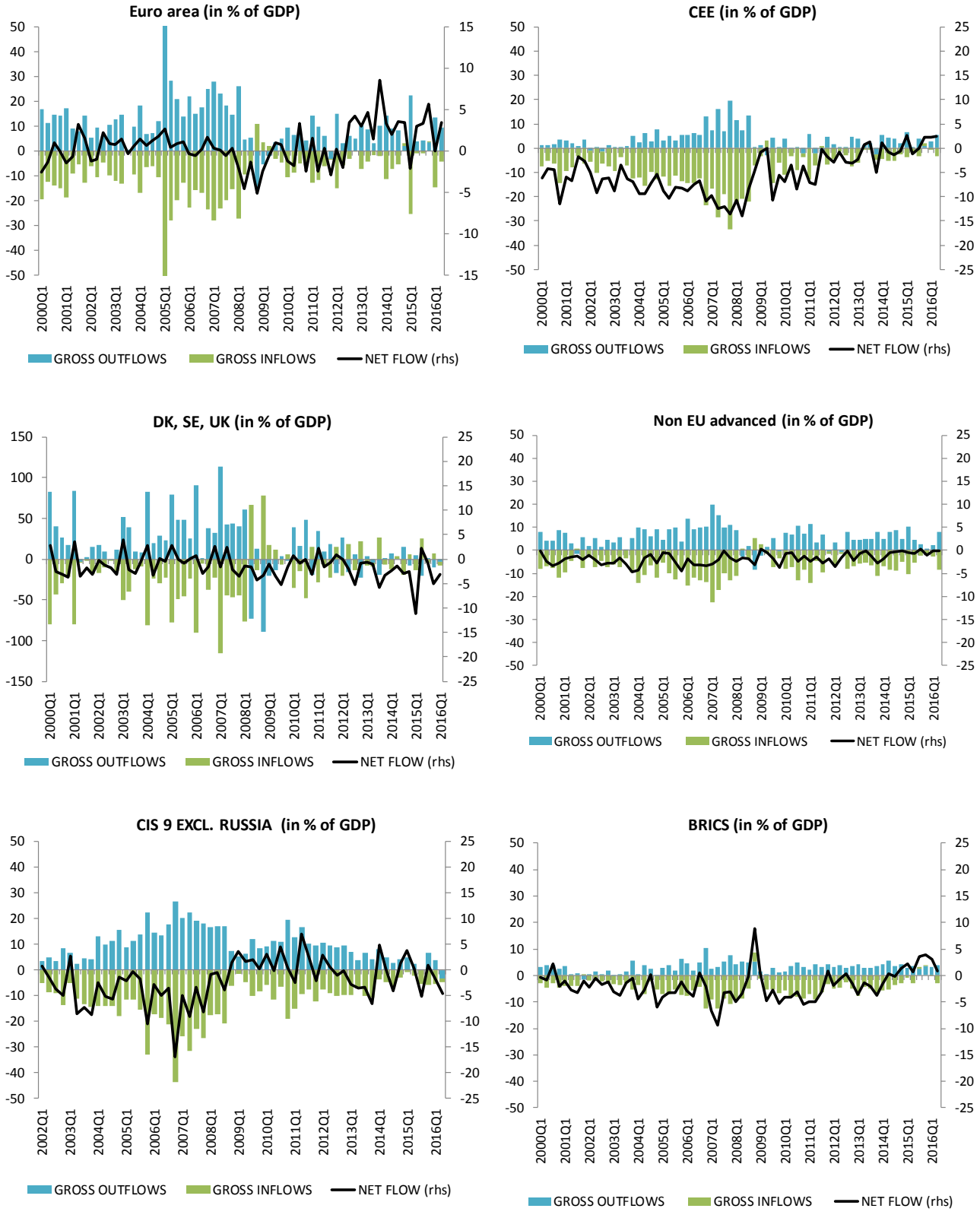
The recovery of capital flows in the post-crisis period has been uneven in different regions. By the first quarter of 2010, gross capital flows reached nearly pre-crisis levels in Latin America, in the ASEAN-4, and in Sub-Saharan Africa, but remained subdued in central and eastern Europe and in Commonwealth of Independent States (CIS) countries. Latin America and Sub-Saharan Africa in particular experienced increasing capital inflows between 2009 and 2016, while ASEAN-4 was characterised by more overall volatility. The BRICS also experienced renewed capital inflows between 2010 and 2013, a trend that has reversed over the last two years.

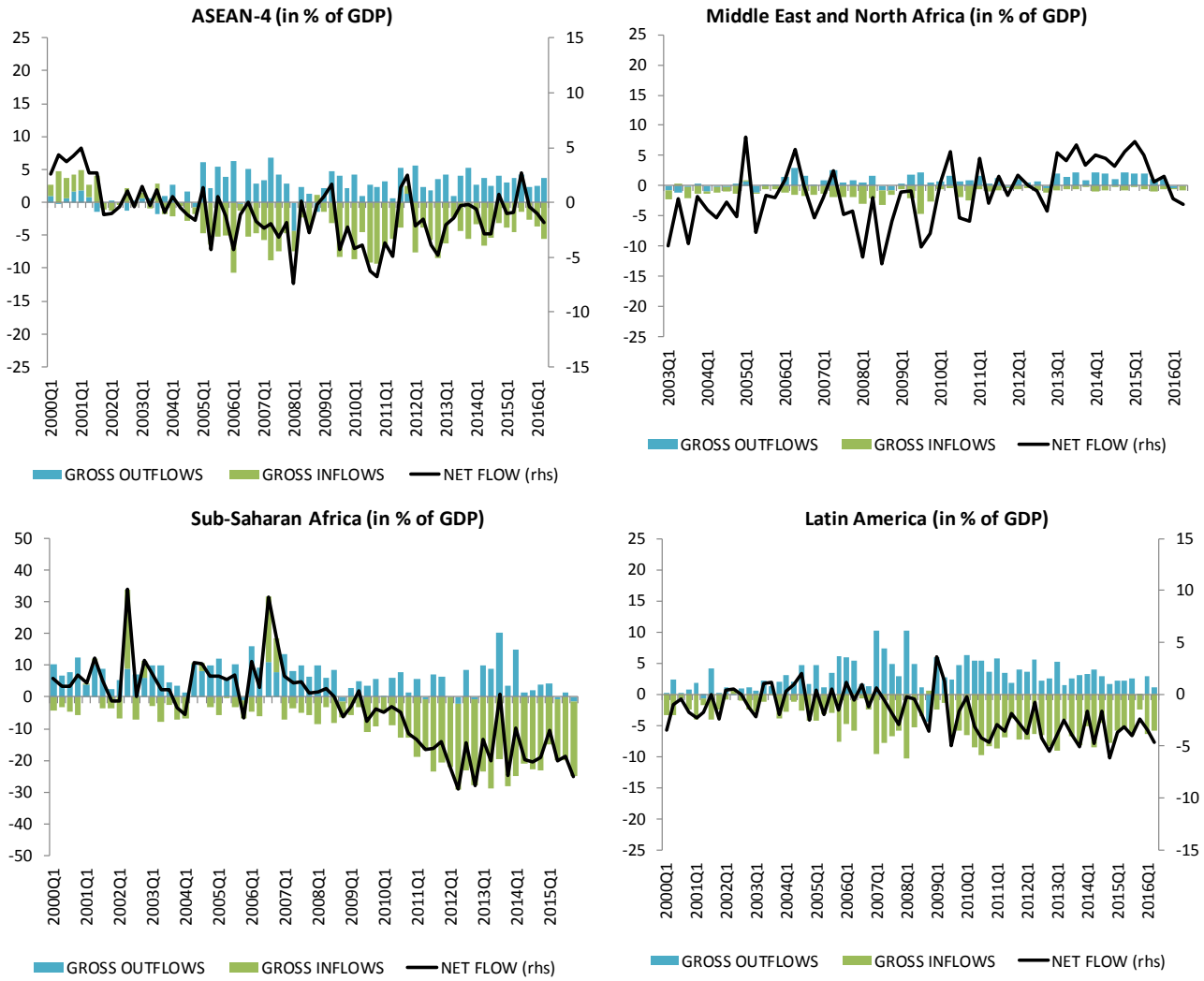
In 2015, gross flows into Latin America and Sub-Saharan Africa stabilised at high levels – much higher levels than before the crisis – while the Asean-4 and the BRICS experienced capital outflows in recent quarters, suggesting that there is no general trend in capital outflows from emerging countries, and two large regions even continue to experience large-scale capital inflows. In CEE, CIS and advanced countries, gross flows continue at well below pre-crisis levels.

[1] This report follows the sign conventions set out in the 6th edition of the IMF's Balance of Payments Manual. For more detail, see Box 1 in last year's capital report, which presents a short overview of major changes introduced with the changeover from IMF 5th BMP manual to IMF 6th BMP manual.

[2] We highlight the findings by Zucman (2013), which show that official statistics substantially underestimate the net foreign assets position (and consequent flows) of rich countries, since they fail to capture most of the assets held in offshore tax havens.

Figure 2: The evolution of gross and net capital flows in the world (percent of GDP)

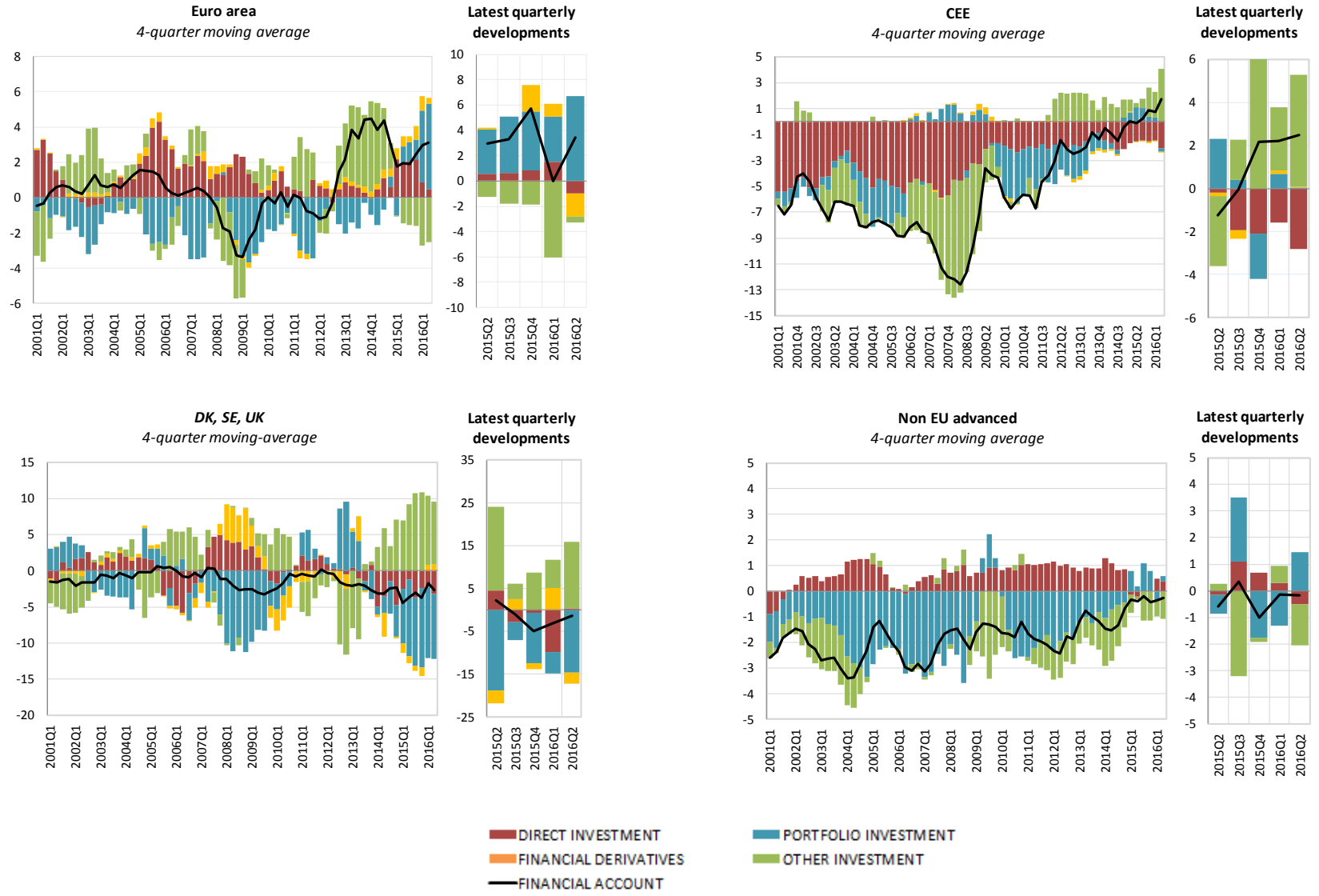


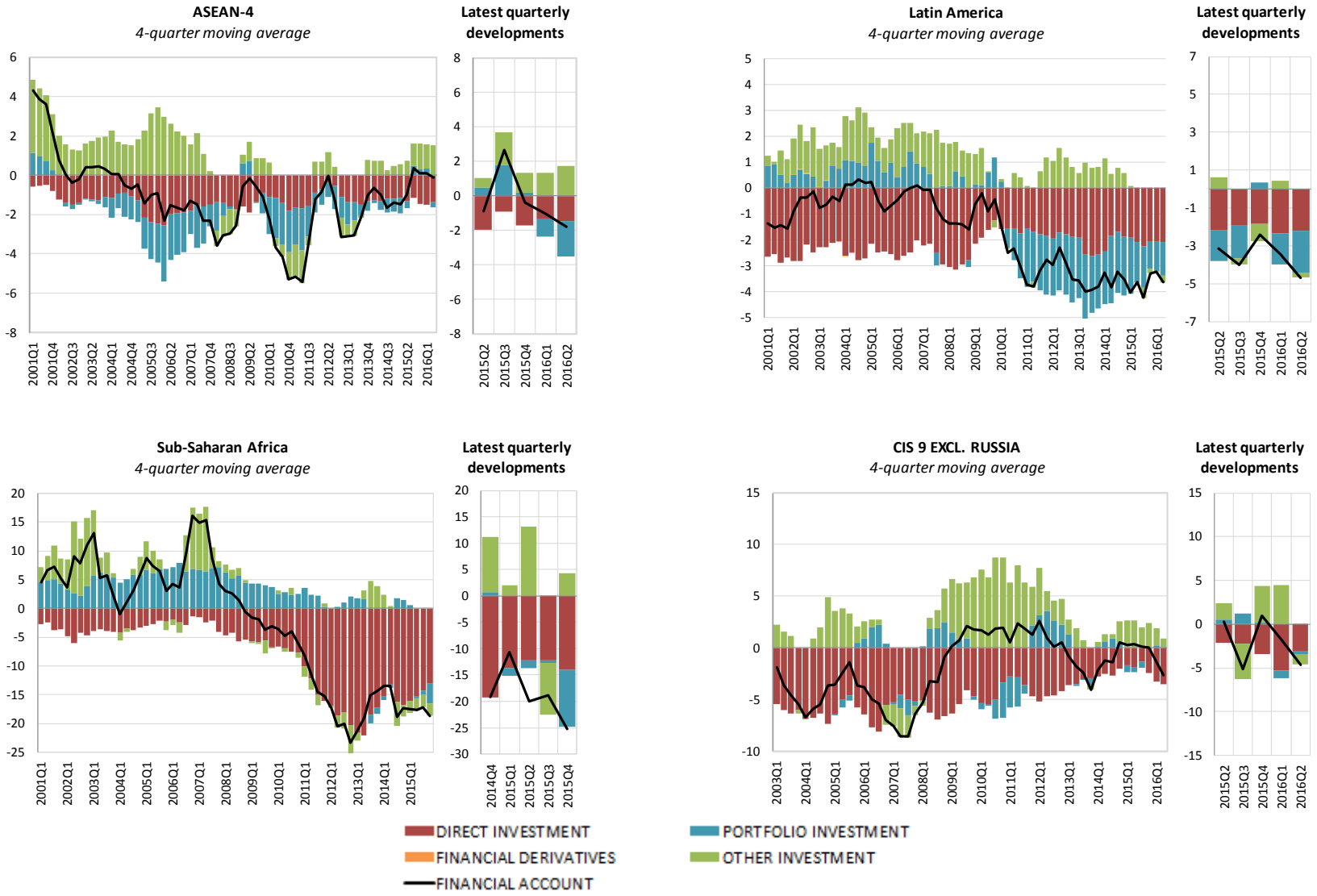


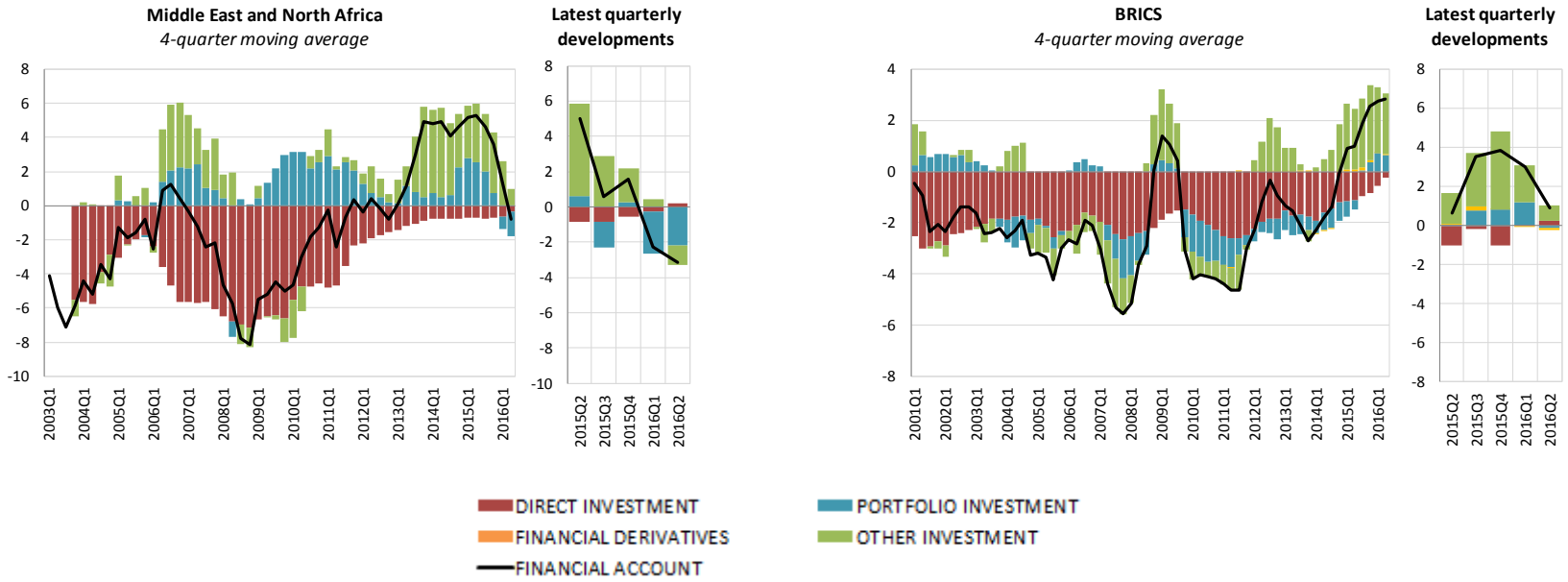
Source: IMF IFS (quarterly capital flows); WEO (annual GDP). Note: The country groups are as follows: Euro area = EA 17; other EU 3 = United Kingdom, Sweden, Denmark; CEE8 = Bulgaria, Czech Republic, Croatia, Latvia, Lithuania, Hungary, Poland and Romania; non-EU advanced = Canada, Japan, United States, Australia, Hong Kong, Iceland, Israel, Korea, New Zealand, Norway, Switzerland; BRICS = Brazil, Russia, India, China, South Africa; CIS 9 (excl. Russia) = Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Tajikistan, Ukraine; Latin America = Argentina, Bolivia, Chile, Costa Rica, Colombia, El Salvador, Guatemala, Panama, Venezuela, Mexico, Uruguay, Middle East and North Africa = Jordan, Lebanon, Morocco, Saudi Arabia, Yemen; Sub-Saharan Africa = Cabo Verde, Lesotho, Mozambique, Namibia; ASEAN-4 = Indonesia, Philippines, Thailand, Vietnam; Gross inflows/outflows are calculated as the sum of the liabilities/assets of the following instruments: direct investment, portfolio investment and other investment, where gross inflows are reported with a negative sign. Net flow is the net financial account. See Box 1 for the definition of capital flow components. Note that gross flows can be negative, which means disposing earlier cross-border investments. Changes in official reserves and NEO are excluded from the financial account for better readability.

While Figure 1 reported the composition of gross flows at global level, to conserve space we do not report data on the composition of gross flows in the various country groups. Instead, we report the composition of net flows, which allows us to highlight a number of interesting observations about recent developments in capital flows (Figure 3).

Figure 3 Composition of net capital flows in major regions of the world (in percent of GDP)




ASEAN-4
4-quarter moving average
Latest quarterly developments
Latin America
4-quarter moving average
Latest quarterly developments
Sub-Saharan Africa
4-quarter moving average
Latest quarterly developments
CIS 9 EXCL. RUSSIA
4-quarter moving average
Latest quarterly developments
DIRECT INVESTMENT
PORTFOLIO INVESTMENT
FINANCIAL DERIVATIVES
OTHER INVESTMENT
FINANCIAL ACCOUNT



Source: IMF IFS (quarterly capital flows) and WEO (annual GDP). Note: see the definition of the country groups in the note to Figure 2. On the left panels, the 4-quarter moving average capital flows are divided by the 4-quarter moving average GDP level (for which we first interpolated annual GDP data at the quarterly level, assuming smooth within-year changes). We use 4-quarter averages to reduce short-term noise and to be able to highlight key tendencies. The right panels show the ratio of actual quarterly capital flows (i.e. no moving average) to the 4-quarter average GDP level. Thereby, the magnitudes in all panels are comparable to the ratio of annual capital flows to annual GDP.

Figure 3 shows that in terms of **net position and components**[3], the **euro area** was characterised by capital outflows after the end of 2012, predominantly driven by bank-related outflows (loans and deposits) during 2012-14 that amounted to about 5% of euro-area GDP. This might have been the result of global bank deleveraging in response to the euro area's sovereign and banking crisis of 2012-13. It is notable that this trend reversed in 2014Q3 and other investment is flowing in again, which might relate to the improved soundness of financial intuitions as a result of the preparation for, and the actual take-over by the European Central Bank of the single supervisory role in the euro area. In 2015, the euro area experienced net portfolio investment outflows practically for the first time since 2001, **reflecting to some extent the impact of the ECB's asset purchase programme**. Thereby, the total net capital outflow from the euro area has accelerated. Foreign investors lost interest in euro-area debt markets because euro-area government and corporate bond yields were compressed. In this context, Hüttl and Merler (2016) look at the impact of quantitative easing on sovereign debt holdings in the euro area. They find that increases in central banks holdings of sovereign debt are offset by decreases in holdings of other institutional sectors. In Germany and France in particular, non-resident holdings are diminishing. To the extent that nonresidents from the perspective of Germany and France are also non-residents from the perspective of the euro area as a whole, the decline in non-resident holdings of French and German sovereign debt contributed to the net outflow of portfolio investment from the euro area.

The CEE countries' net financial inflows have receded substantially since the height of the financial crisis and these countries became net capital exporters in 2015-16. The reduction of cross-border lending by foreign banks operating in the region since 2011 was a major factor in this development. The deleveraging averaged about 2% of CEE GDP in 2011-16 and there does not seem to be a major change in this trend. Eller *et al* (2016) show that the global financial cycle explains by far the largest share of capital flow volatility in this region. Portfolio investment inflows decreased significantly over the same period and turned into outflows by 2014Q2, a trend that continued in 2015. Moreover, FDI net inflows have also diminished in 2015-16, **contributing to the financial account surplus in the CEE**.

In contrast to the euro area and CEE countries, Sweden, Denmark and the United Kingdom experienced **substantial net capital inflows** from 2014 to our most recent observation of 2016Q1. This was driven by strong portfolio and FDI inflows, while bank-related outflows over the same period offset somewhat the observed inflows.

In **non-EU advanced countries,** the relatively stable earlier FDI outflows at around 1% of GDP between 2008-14 suddenly halted in 2015, which may explain, at least partly, the recent decline in global FDI flows as reflected in Figure 1. We cannot exclude that improved domestic investment opportunities, as a consequence of improved economic outlook, played a role. It is really notable that the earlier large portfolio investment inflows were gradually reduced and in fact turned into outflows in 2015. A likely factor that might explain the change from portfolio inflow to outflow in non-EU advanced countries is the changed behaviour of the former reserve-accumulating central banks of China, Middle East and many other emerging countries.

A rather marked trend change can be observed for the stock of **foreign exchange reserves held by central banks**. Up to 2013, there was a very rapid process of reserve accumulation by central banks, as shown in Figure 4: the share of foreign currency reserves in world GDP increased from about 3 percent in the early 1990s to 15 percent by 2013, during a period in which world GDP also increased rapidly. A large literature has analysed the reasons for such reserve accumulation (such as precautionary reserve accumulation as a kind of self-insurance against future capital outflows, the

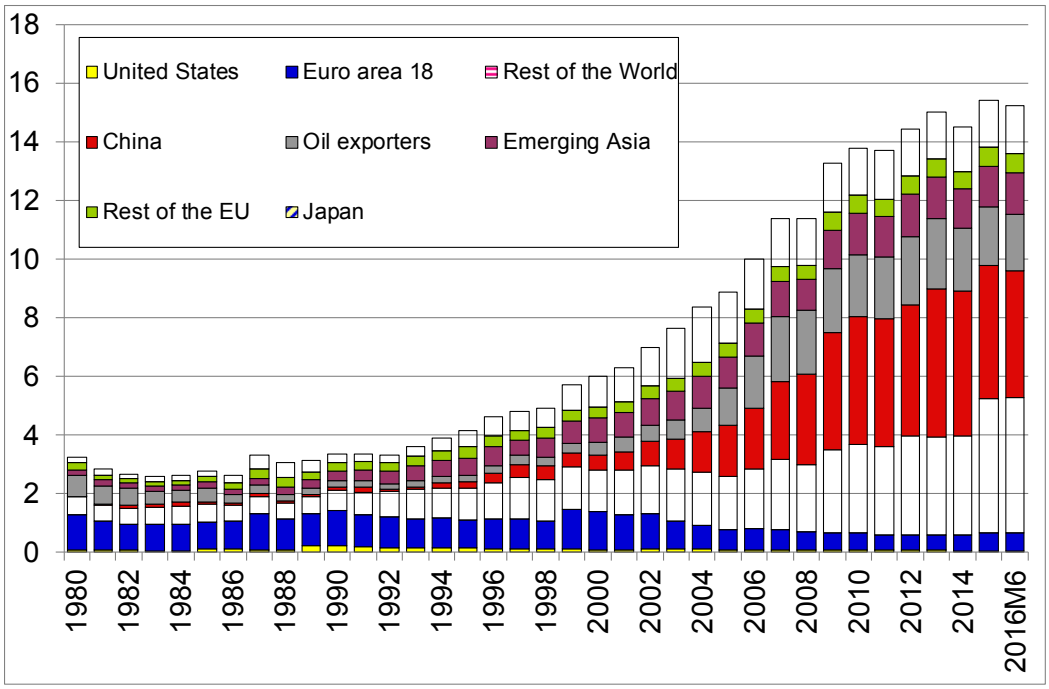
[3] See Box 1 for more detail.

desire to keep the currency exchange rate weaker to support export growth, or saving large revenues from commodity sales, such as oil exports) and the consequences of it (such as welfare losses for reserve-holding countries); see for example Angeloni *et al* (2011).

The trend clearly changed after 2013, when reserves started to decline both nominally (measured in US dollars) and as a share of GDP, while in 2015-16 the ratio of reserves to GDP remained broadly stable. A fall in reserves indicates that net capital inflows to reserve-holding countries are smaller than their current account deficits (in absolute terms). Related to monetary policy tightening in some advanced countries, like the US 'tapering' in 2013 and the more recent expectations of an interest rate increase, capital outflows from emerging economies accelerated. Central banks of reserve-holding emerging countries decided to dampen the depreciating impact of capital outflows on the exchange rate by selling their foreign exchange reserves. The November 2016 election of Donald Trump as the next president of the United States of America has led to an increase in US government bond yields and there are widespread expectations that US yields will continue to rise. This may lead to further capital outflows from emerging and developing countries.

It needs to be seen whether the depletion of foreign exchange reserves is a temporary phenomenon, which will end once capital outflows moderate, or if a new trend has started in which central banks that hold large reserves reassess their strategies. Even in the short-run, reserve depletion can have impacts on advanced economies: a large share of reserves are held in liquid financial assets such as government bonds of advanced countries, and to reduce reserves, those government bonds should be sold first. This in turn can lead to interest rate increases in advanced countries[4].

Figure 4 Stock of foreign exchange reserves (as share of world GDP)

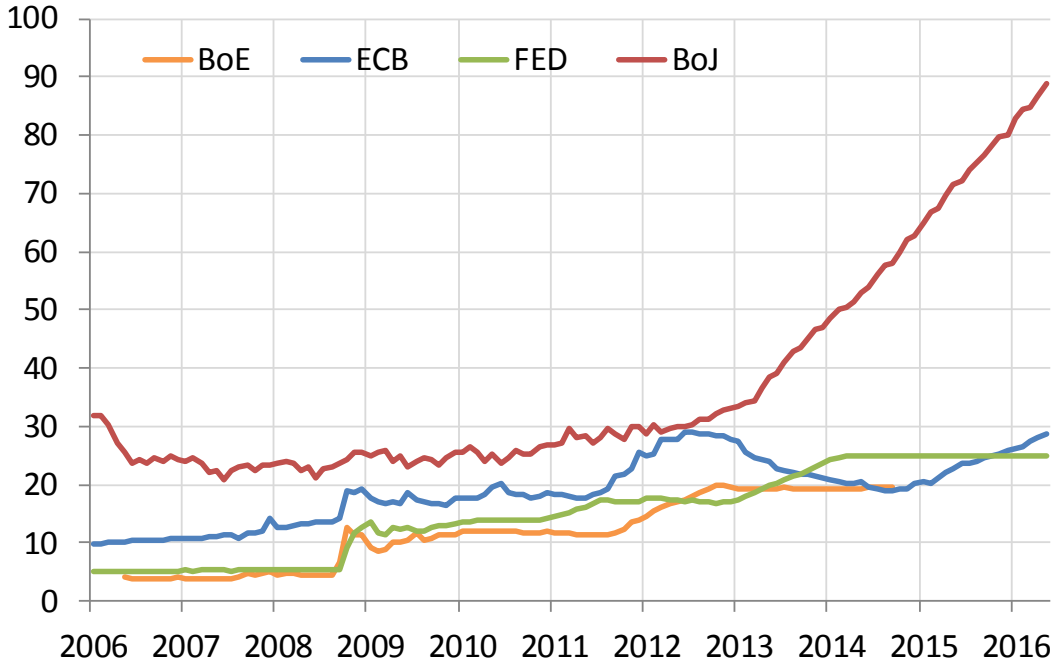


Source: IMF IFS (foreign exchange reserves) and IMF WEO April 2016 (GDP).

[4] See Cohen-Setton (2015) for a survey of the debate in the blog-sphere on this issue.

The **ASEAN-4** and **the BRICS** have been subject to increased capital inflows since the global financial crisis. Most likely, accommodative monetary policies in advanced economies (as reflected in the increase of major central banks' balance sheets, shown in Figure 5) and the resulting global search for yields have played a role in these inflows. This is reflected in increased portfolio funding since 2010 in both regions. Since May 2013, when the Federal Reserve discussed for the first time its plans for tapering unconventional monetary policies, these emerging markets have experienced receding or even reversing capital inflows at the same time as their domestic economic activities have slowed. In the BRICs, the net financial account strengthened further during 2014, as other investment switched to net outflows in 2014Q2 – suggesting foreign investors' withdrawals of deposits and loans from banks located in the BRICS. The ASEAN-4 was characterised by a similar picture during 2013-14, experiencing portfolio and bank-related outflows during 2015. Interestingly, both regions had turned into net capital exporters by 2015.

Figure 5: Expansion of Central Bank's balance sheets (in % of GDP)

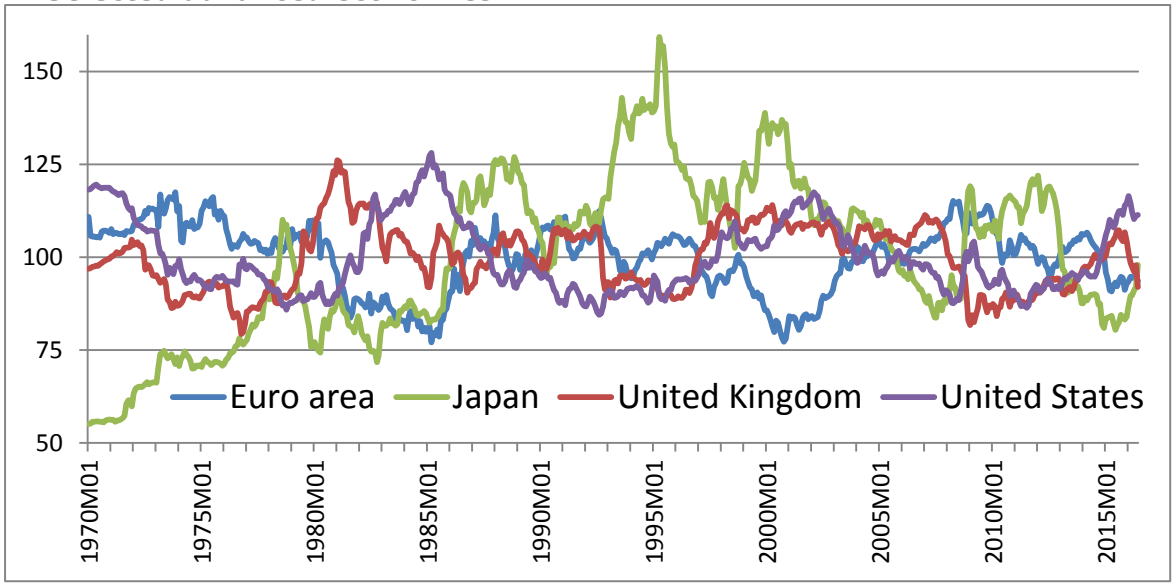


Source: FRED and WEO; BoE data discontinued as of September 2014

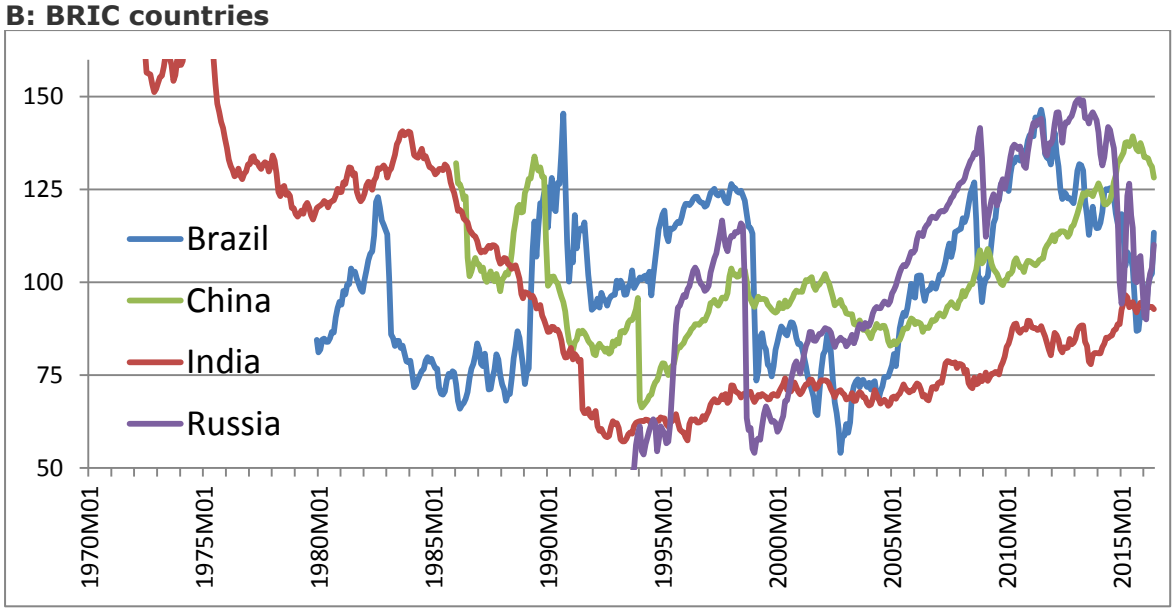
We also note that the divergent monetary policies of advanced countries, with the Federal Reserve having already increased its interest rate, while the European Central Bank and the Bank of Japan continue large-scale asset purchases, have likely also influenced exchange rate developments (Figure 6). Moreover, the 23 June 2016 UK referendum on EU membership, which resulted in a victory for the campaign to leave the EU, also sent shockwaves to currency markets and might have led to a 'flight to safety' of capital flows.

Figure 6: Real effective exchange rate developments, January 1970 – June 2016 (average of 1970-2016 = 100)

A: Selected advanced economies



B: BRIC countries



Note: To better capture the impact of the Brexit referendum, we use the 29 June 2016 exchange rate for June 2016 (monthly average exchange rates are used for all other months). A higher value indicates a stronger home currency.
Source: Bruegel real and nominal effective exchange rate dataset and author's calculations.

Interestingly, the Japanese yen was on an appreciating path in 2016, despite the massive asset purchases by the Bank of Japan. The yen gained further in value after the Brexit referendum. The Brazilian real and the Russian rouble also appreciated significantly after the Brexit referendum, though these currencies have been rather volatile in the past few years, partly because of domestic economic problems in Brazil and Russia, but also because of the monetary policy of advanced country central banks.

In this context, IMF research showed that in 2013, emerging markets were hit by outflows indiscriminately at first, but over time there was greater differentiation, and good macroeconomic fundamentals helped dampen the market reaction (IMF, 2014a).

Furthermore, much of the decline in inflows in the recent past can be explained by the narrowing of the differences between emerging and advanced economy growth prospects (IMF, 2016).

The vector-autoregressive model estimates reported in our last year's report (Darvas *et al*, 2015) indicated that capital inflows to emerging countries increase when advanced country GDP is higher, the GDP of emerging countries is higher and when the VIX index is lower. In turn, capital inflows increase the GDP of emerging countries. By assessing the three main types of capital flows, we also found that FDI flows to emerging economies are not influenced by the VIX index (and consequently all factors that influence the VIX index), while portfolio and other investments respond to changes in the VIX index in a broadly similar way. This is in line with Coerdacier *et al* (2015), who found that the emerging world invests in advanced economies to insure against income volatility.

Among the main emerging country regions, only inflows to **Latin America** and **Sub-Saharan Africa** seem to have held up (Figure 3). In Latin America, FDI and portfolio inflows account for about half of net capital inflows, while in Sub-Saharan Africa inflows are almost entirely composed of FDI. In both of these regions, current inflows are much higher than in the pre-crisis period.

An interesting picture emerges for **Sub-Saharan Africa**, which has benefitted from massive direct investment inflows since 2010, highlighting the attractiveness of this region in recent years, especially to China (World Bank, 2015). In 2015, FDI receded somewhat (standing at 10% of group GDP in 2015 Q4), while increasing portfolio investment inflows contributed to an even higher financial account deficit in 2015 Q4. Looking ahead, it will be interesting to see the impact of slower growth in China on this region.

CIS 8 (excl. Russia) experienced cross-border deleveraging of banks operating in the area between 2008 and 2013, a trend which slowed in 2013, before picking up again in 2014. At the same time, portfolio funding has been coming back to the region, contributing to increasing net financial inflows at end 2014.

The Middle East and North Africa have experienced receding FDI inflows since 2011, a trend that stabilised during 2015. Over the same period, large outflows of portfolio and banking-related instruments were recorded, contributing to an increased financial account surplus, standing at 8% of group GDP by 2015 Q1.

Box 1: Components of capital flows

Capital flows are defined as cross-border financial transaction recorded in a country's external financial accounts, which produce a change in the assets and liabilities of residents' vis-á-vis non-residents and can be broken down into the following components:

- *Foreign direct investment:* records financial flows between resident and non-resident firms that are under a direct investment relationship. A direct investment relationship is established when a resident firm holds at least 10% in the share capital of a non-resident firm, or vice versa.

- *Portfolio investment:* records financial flows related to transactions between residents and non-residents that affect their assets and liabilities vis-à-vis each other related to securities and derivatives. Securities are distinguished between equities and debt securities, namely bonds and money market instruments.

Residents' net investment in securities issued by non-residents are recorded under 'Assets', whereas non-residents' net investment in securities issued by residents are recorded under 'Liabilities'.

- *Other investment:* records financial flows stemming from transactions between residents and non-residents related mainly to cross-border loans and deposits. Financial flows related to loans granted by residents to non-residents, as well as residents' deposits with non-resident monetary financial institutions are recorded under "Assets". Financial flows related to loans granted by non-residents to residents, as well as non-residents' deposits with resident monetary financial institutions are recorded under "Liabilities".

- *Financial derivatives:* records financial flows stemming from financial derivative contracts, which is a financial instrument that is linked to another specific financial instrument/indicator or commodity and is traded in their own right in financial markets. These transactions are treated as separate transaction rather than as integral parts of the values of the underlying transactions to which they are linked.

- *Reserve assets:* are those external assets that are readily available to and controlled by the monetary authorities for meeting balance of payments financing needs, for intervention in exchange markets to affect the currency exchange rate, and for other related purposes. Given the data limitations on a global scale, we do not include reserve assets in Figure 2 and Figure 3.

The **net international investment position** (NIIP)[5] reflects the accumulated stock of capital flows and changes in valuation of the earlier stock whenever the price of different assets and liabilities changes. NIIP is relevant for monitoring the external wealth of an economy. It is important to note that large gross stocks are prone to major valuation changes, which can lead to significant shifts in the net stock position even if net flows are small. As an example, net valuation losses for Germany amounted to 20% of German GDP in 2011. Large parts of these loses were already being realised in 2007-08 as a result of the implosion of the US subprime mortgage debt market, reflecting the high past exposure of German banks to US securities (European Commission, 2012). For a more detailed discussion, please refer to section 2.2 on revaluation and return on investment effects.

As shown in Figure 7, the net position of the **euro area** was relatively stable between 2008-13 at about minus 10 percent of GDP. However, according to the estimates of Zucman (2013), around 8 percent of the global financial wealth of households is held in tax havens, three-quarters of which goes unrecorded. If unrecorded assets are accounted for, the euro area turns into a net creditor and not a net debtor to the rest of the world as indicated by official statistics. Therefore, we should interpret cautiously the reported net position of the euro area. Still, it is important to highlight that in 2015-16, a process of shrinking both net assets and net liabilities has started, along with a slight increase in the net position. The components of net positions highlight that the reported negative net position is largely due to accumulated negative net portfolio investment stocks, while the euro area is a net investor in the rest of the world in terms of foreign

[5] The international investment position is a measure of the assets that a country owns abroad and the assets that foreigners own in the country in question. In the graphs, the negative bars indicate an increase in the claim of non-residents on a country in question, while the positive bars indicate an increase in the claims of the country in question on non-residents.

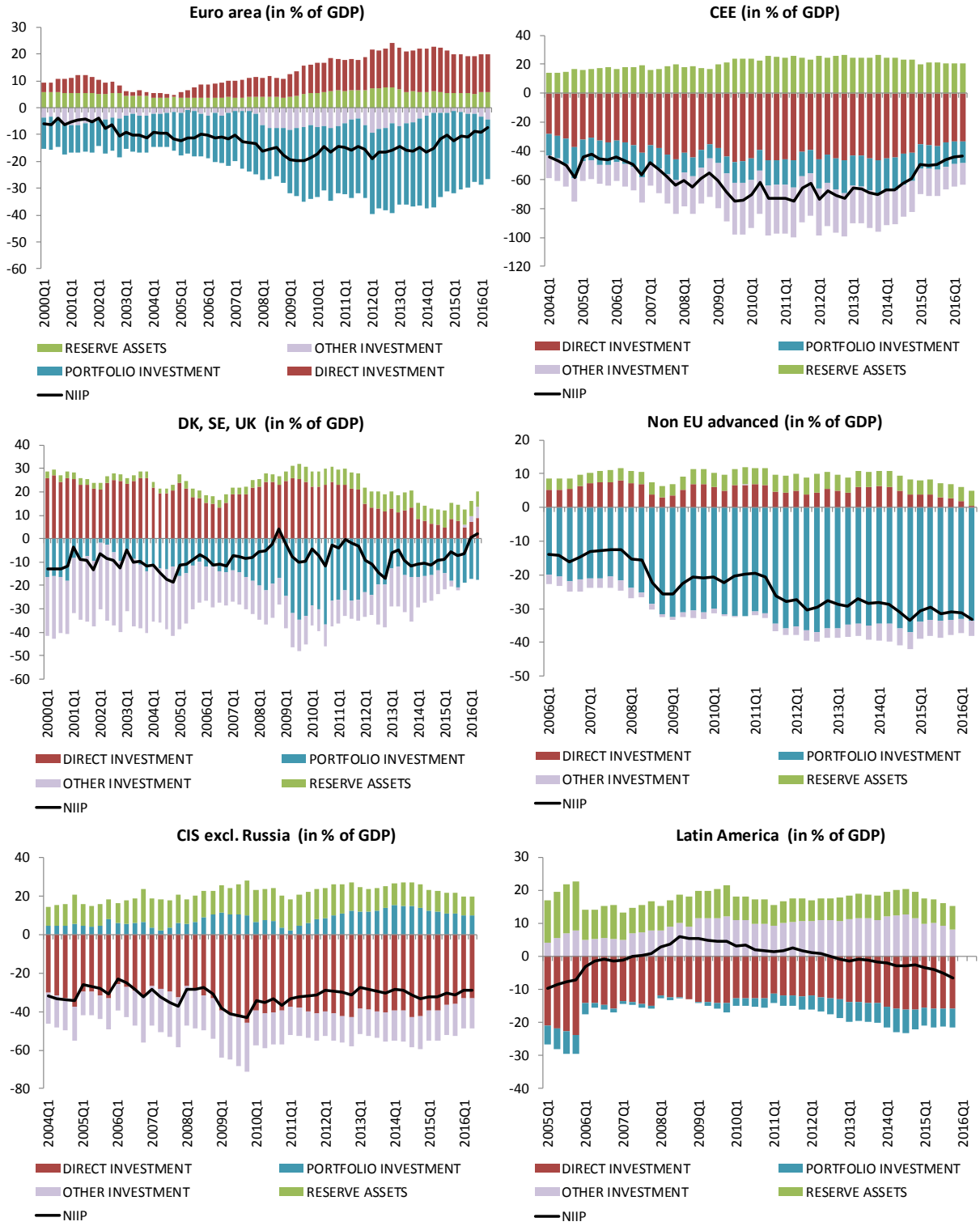
direct investment (FDI). The increasing share of net FDI claims on the rest of the world (including other EU countries, such as central and eastern European Member States) was a clear trend from the mid-2000s up to 2013, as euro-area firms used FDI to penetrate new markets or to achieve efficiency gains through splitting the value chain of production (European Commission, 2012). However, the net FDI claims of the euro area started to fall in 2014, with the decline continuing up to 2016Q1, our most recent observation. In Chapter 3, which takes a closer look at Europe, we assess the contribution of flows to this development, namely whether the main reason is lower euro-area FDI in the rest of the world, or increased foreign FDI in the euro area.

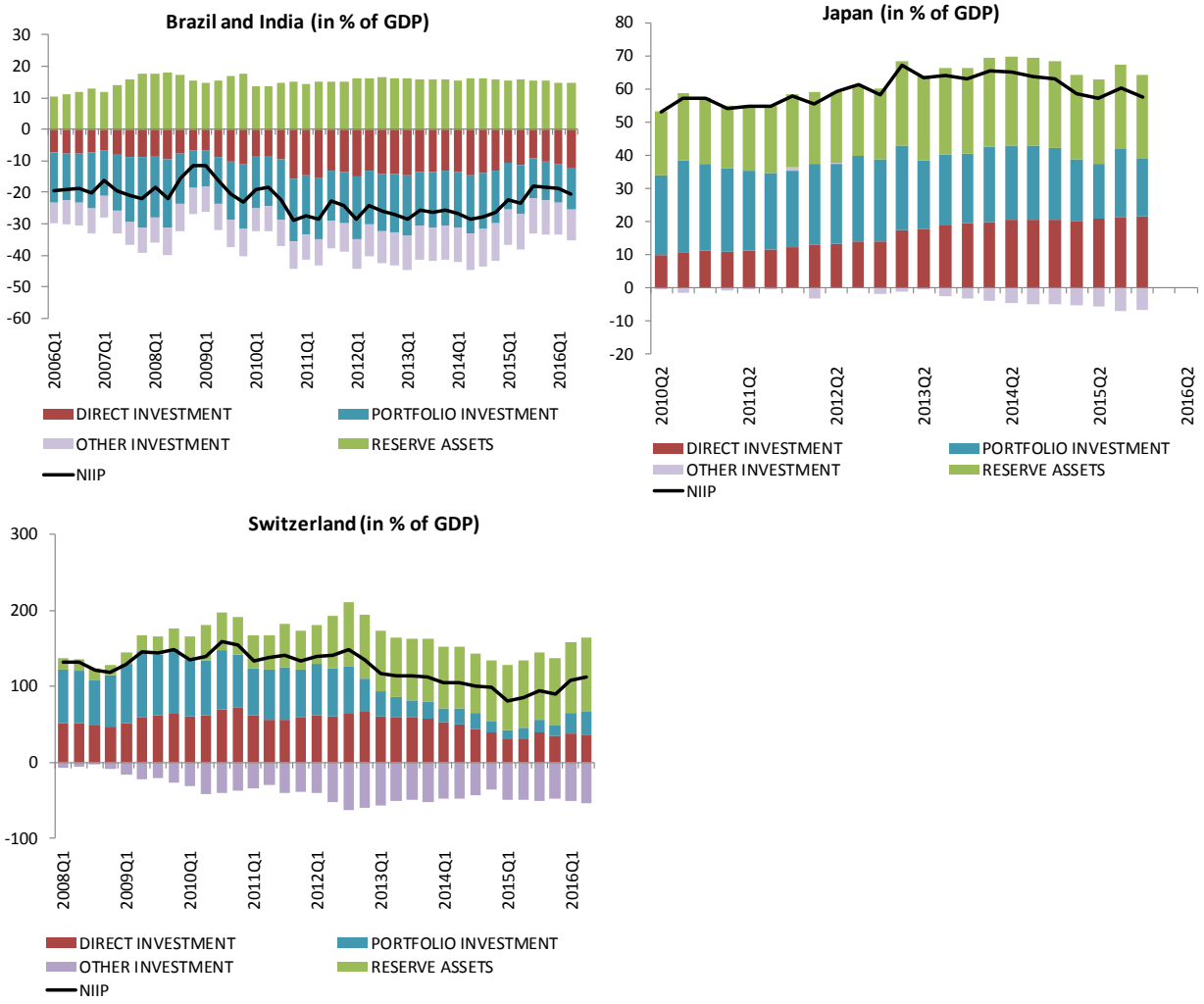
It is notable that two other EU groups (**Denmark, Sweden and the UK** on the one hand, and **CEE countries** on the other hand), display the same pattern of reducing net assets and net liabilities in the past two years, while the overall net position is improving. In CEE countries, liabilities shrank in 2015-16, most notably FDI, while in the Nordic non-euro members, practically all components of both net assets and net liabilities have shrunk recently.

Beyond the EU, we observe only some shrinkage of liabilities in **Brazil and India** (data for China and Russia is unfortunately not available), but a reduction in various components of net foreign assets and liabilities is not happening in **all other non-EU country groups**. Moreover, these other non-EU countries also differ from EU countries by not undergoing an increase in their NIIP, and in fact in Latin America NIIP is gradually deteriorating, which is in line with the continued strong capital inflows into these countries, as shown by Figure 3.

Japan and Switzerland are special cases, with high positive net positions of 60 percent of GDP and 90 percent of GDP as of 2015Q4, respectively. Therefore, we separated Japan and Switzerland out of the non-EU advanced county group. Little change can be observed in Japan in recent years, suggesting that a very expansionary monetary policy (which is conducted by the Bank of Japan) need not necessarily show up in foreign assets and liabilities. Switzerland, on the other hand, experienced a fall in net portfolio and net FDI claims on the rest of the world, which was partially compensated for by increased accumulated sizeable positive reserve asset stocks, stemming from intensified interventions in the foreign exchange rate market by the Swiss National Bank, especially during the period when the Swiss Franc was not allowed to appreciate relative to the euro beyond the rate of 1.2 (September 2011-January 2015). Swiss reserve assets have increased only marginally since January 2015, when the exchange rate floor was abandoned. Another notable observation for Switzerland is the increased net liabilities on other investment by foreign investors in Switzerland, suggesting that Switzerland is increasingly important as a safe haven. A similar, albeit small and steady, increase in net other investment liabilities can also be observed in Japan in 2013-15, suggesting confidence in the Japanese financial system and economy.

Figure 7: Net international investment positions (in percent of GDP)





Source: IMF IFS (quarterly IIP) and WEO (annual GDP). Note: country groups are defined in the note to Figure 2, but due to data limitations, the following changes occur: non-EU advanced: Hong Kong is included only since 2010; CEE7: Bulgaria is included only since 2007; Latin America: without Argentina, Ecuador, Mexico, Uruguay; CIS 8 (EXCL. RUSSIA): without Azerbaijan, Kyrgyz Republic, Tajikistan and Ukraine; No data availability for ASEAN-4, Middle East and North Africa and Sub-Saharan Africa.

2.2 Investment yields and valuation effects of foreign assets and liabilities

When looking at foreign assets and liabilities, it is important to answer the question of whether the savings invested abroad actually deliver the expected returns (see also European Commission, 2012). This can be done by looking first at **external yields**, which are the difference between the income stream from foreign assets and the income stream to holders abroad. These income streams are measured as a share of the stock of outstanding assets. Second, we look at **valuation effects**, or the change in the value of the net stocks of foreign assets through holding gains or losses. To get the full evaluation of the investment abroad, we then consider **total returns**, which combine both the external yield and price (valuation) effects.

External annualised yield

We calculate the **external annualised yield** by dividing the income flows (interest or dividend) by the stock of outstanding assets or liabilities. For the United States, for example, we find that the cost of servicing its liabilities (which to a great extent comprise fixed income assets, partly reflecting the dominant role of the US dollar in the international monetary system) is much lower than the return on US investment abroad (which typically takes the form of various equity-type investments). This is expressed as a positive spread between assets and liabilities. Thereby, some authors have named the US the 'World Venture Capitalist' (Gourinchas and Rey, 2005).

Table 1 allows us to assess if some European countries share similar privileges. There are significant differences between countries in spreads between total returns on foreign assets and liabilities. **Focusing on equity**, we find that in the pre-crisis period (2005Q1-2006Q4), countries from CSEE like Poland, the Czech Republic and Romania, experienced non-negligible negative spreads for equity. The reason for this is that foreign investors made unusually large returns on their investment in the CEE region, around 10 percent per year in some cases. Investments abroad did not pay off as much. Positive spreads on equity could be found in France, Germany, Finland, Spain and the United Kingdom before the crisis, suggesting that investment opportunities abroad paid off more than at home. During the crisis and the recovery, the CSEE became less attractive as capital flowed out of the region, contributing to more moderate returns on liabilities in different countries. From a global perspective, the positive equity spreads of the US are well above the positive spreads of EU countries during 2007-15. A similar picture emerges for Japan. **On the debt side**, the US experienced zero spread during 2007-15. By contrast, most EU countries also received positive spreads in all three periods, though these spreads are typically small except in central and eastern European countries.

Overall, larger EU countries such as Germany, France, Finland, the Netherlands, Sweden and the United Kingdom succeeded in replicating to some extent the privileges of the US on equity returns throughout the periods taken into consideration. In contrast, the CEE region experienced large negative spreads on equity because of the very high returns on their liabilities, but they had the remarkable privilege of large positive spreads on debt-type foreign assets. It is also worthwhile highlighting that the vulnerable euro-area countries which received financial assistance programmes (with the exception of Greece) do not display largely negative tendencies in terms of returns on foreign assets and liabilities relative to other EU countries, because of financial assistance programmes and Eurosystem Central Bank (ESCB) flows. Continued membership of the euro helped financial-assistance countries to manage their external accounts during the crisis years.

Revaluation effects

The valuation of assets and liabilities changes because of changes in market value or exchange rate movements. The accumulated revaluation effects are calculated as follows. At any point in time, the current stock can be decomposed into the initial stock at some earlier period, 0, and the accumulated sum of flows and the accumulated sum of revaluations. A counterfactual series of the accumulated flows is created (starting from the first actual observation of stocks), and the percentage difference between the actual series (which includes all revaluation effects) and counterfactual (which by construction ignores revaluations) is taken to be the accumulated revaluation effect. We then calculate the average annualised percent revaluation effect. The components are grouped into debt and equity; a further breakdown is unfortunately not feasible.

Table 2 presents the annualised revaluation effects in a similar structure to Table 1 on investment performance, with breakdowns by instrument type – debt (sum of debt

instruments and other investment) and equity (sum of equity and FDI) – and by time period (2006Q4-2010Q4 and 2011Q1-2015Q4).

Revaluation effects are significantly different for different countries, and over time. Table 2 shows that Germany, Spain and Sweden suffer from the worst revaluation spreads in equity over the whole period. Over the two sub-periods, we see that these losses for Germany are largely a consequence of events in during 2007-10, while Spain and Sweden suffered losses in the subsequent period (2011-15). In terms of debt revaluations, several EU countries report negative spreads. This could mainly be because of the other investment component, which comprises inter- and intra-bank loans, reflecting the period of financial disintegration starting with the crisis.

Total returns

Total returns are calculated as the simple addition of annualised revaluation effects and annualised yield on investments. Of the larger economies in the EU, Germany and Poland suffered the most from negative total returns on their equity. Poland's result is driven by extremely outsized returns on foreign investment in the country, while Germany suffered from revaluation of its assets during the financial crisis.

Interestingly, Greece shows extremely large positive total equity returns (in spreads) during the two periods taken into consideration. Greece has benefited from a collapse in value of its liabilities. From 2011-15, Greek liabilities fell in value by 16.6% per year, while the yield on equality liabilities was minus 2.4%, leading to a minus 19.0% annualised total return on equity liabilities during 2011-15. This implies a substantial loss in value of equity liabilities.

It is notable that the United States lost its overall positive total return on equity in 2011-14, which is entirely a result of revaluation changes. The annualised yield on US equity assets abroad (5.5%) exceeded the yield foreign investors made in the US (2.8%), but revaluations changed the results: the US gained only 0.7% per year, while foreign investors gained 7.3% per year. These revaluations most likely reflect a stronger US dollar (which reduces the total return from the perspective of the US and increases the total return from the perspective of foreign investors investing in the US) and the substantial increase in US equity prices from 2011-15.

Table 1: External annualised yields for 26 EU countries and United States, Japan and Switzerland, in %

	Equity									Debt								
Countries	**2005Q1-2006Q4**			**2007Q1-2010Q4**			**2011Q1-2015Q5**			**2005Q1-2006Q4**			**2007Q1-2010Q4**			**2011Q1-2015Q5**		
	A	L	**S**	A	L	**S**	A	L	**S**	A	L	**S**	A	L	**S**	A	L	**S**
Austria	5,3	5,2	0,1	4,4	3,6	0,8	4,6	4,6	0,0	3,4	3,5	-0,1	3,2	3,5	-0,3	2,0	2,4	-0,4
Belgium	4,6	5,4	-0,8	3,4	4,3	-0,9	2,4	3,0	-0,6	3,4	3,3	0,0	3,2	3,0	0,2	1,9	1,7	0,2
Czech Republic	7,8	11,8	-3,9	7,5	11,7	-4,2	3,9	10,3	-6,4	9,5	5,9	3,6	5,2	3,2	2,0	2,7	2,4	0,3
Denmark	7,4	6,9	0,5	5,7	4,5	1,1	4,5	3,7	0,8	4,0	3,3	0,7	3,5	2,8	0,7	2,6	1,6	1,0
Estonia	10,7	9,8	1,0	6,9	9,8	-3,0	4,8	8,1	-3,3	3,1	2,6	0,5	3,4	2,9	0,5	1,0	0,9	0,1
Finland	5,7	4,7	0,9	5,0	4,3	0,6	3,9	4,5	-0,6	3,4	3,5	-0,1	2,6	3,0	-0,4	1,2	1,5	-0,3
France	4,9	3,2	1,7	4,1	2,9	1,2	3,9	2,9	1,1	3,8	3,6	0,2	3,4	2,9	0,5	1,8	1,7	0,2
Germany	5,4	4,4	1,0	4,6	4,0	0,6	4,4	3,7	0,8	3,8	3,6	0,2	3,5	3,1	0,4	2,2	1,6	0,6
Greece	3,3	3,7	-0,5	2,0	2,2	-0,2	1,6	-2,4	4,0	2,4	3,5	-1,1	2,2	3,5	-1,3	1,3	1,7	-0,4
Hungary	8,6	8,3	0,3	5,8	6,7	-0,9	3,8	5,3	-1,5	5,4	3,9	1,5	3,3	3,9	-0,6	1,6	3,5	-1,9
Italy	2,4	4,5	-2,1	3,9	4,0	-0,1	3,3	3,4	-0,1	4,1	3,4	0,7	3,1	3,2	-0,2	2,0	2,3	-0,3
Luxembourg	3,3	3,4	-0,2	3,0	3,3	-0,3	3,1	3,2	-0,1	2,7	2,0	0,7	2,8	2,1	0,7	2,5	2,1	0,5
Netherlands	5,5	5,1	0,4	5,1	5,0	0,0	4,4	4,6	-0,1	3,1	3,5	-0,4	2,8	3,2	-0,4	1,8	2,0	-0,2
Poland	3,1	10,4	-7,3	1,0	8,7	-7,6	2,8	7,5	-4,7	4,6	3,5	1,1	2,9	3,6	-0,7	1,3	3,0	-1,7
Portugal	4,9	5,4	-0,5	5,1	5,7	-0,6	3,4	3,4	0,0	3,0	3,0	0,0	3,1	3,2	-0,1	1,7	2,0	-0,2
Romania	-8,1	14,2	-22,4	1,1	5,4	-4,3	1,6	3,7	-2,1	7,6	5,4	2,2	1,2	3,7	-2,5	0,9	3,0	-2,0
Spain	5,2	4,1	1,1	5,2	4,2	1,0	4,7	3,1	1,5	2,8	3,6	-0,7	2,8	3,4	-0,6	1,9	2,0	-0,2
Japan	-	-	-	-	-	-	7,3	3,1	4,2	-	-	-	-	-	-	2,6	0,7	1,9
United States	-	-	-	6,1	3,1	3,0	5,5	2,8	2,7	-	-	-	3,2	3,3	-0,1	1,9	1,9	0,1
United Kingdom	7,1	4,9	2,2	5,9	5,0	0,9	4,5	4,3	0,2	3,5	3,6	-0,1	2,8	2,9	-0,1	1,1	1,5	-0,3

Source: Bruegel calculations using IMF BOP. Note: 'Equity' groups together 'Direct Investment' and 'Portfolio investment – equity', while 'Debt' consists of 'Other investments' and 'Portfolio investment – debt'; A = Assets, L = Liabilities, S = Spread between assets and liabilities; data up to 2015Q4; no data for Croatia, Cyprus, Ireland, Lithuania, Malta, Slovakia, Slovenia and Sweden;

Table 2: Annualised revaluation effects for selected countries

	Equity									Debt								
Countries	**2006Q4-15Q4**			**2006Q4-10Q4**			**2011Q1-15Q4**			**2006Q4-15Q4**			**2006Q4-10Q4**			**2011Q1-15Q4**		
	A	L	**S**	A	L	**S**	A	L	**S**	A	L	**S**	A	L	**S**	A	L	**S**
Austria	0.2	0.1	**0.1**	-1.7	-1.9	**0.2**	1.8	1.7	**0.0**	0.1	0.6	**-0.5**	-1.0	0.2	**-1.2**	1.1	1.4	**-0.3**
Belgium	1.4	0.0	**1.4**	3.6	-0.5	**4.0**	0.6	0.4	**0.2**	-0.3	-0.4	**0.2**	0.4	-0.2	**0.6**	-0.9	-0.9	**0.0**
Czech Republic	0.8	-1.0	**1.9**	18.5	12.9	**5.6**	-11.0	-11.5	**0.5**	-2.3	-1.8	**-0.5**	5.7	6.9	**-1.2**	-9.5	-9.3	**-0.2**
Germany	-0.1	0.9	**-1.0**	-4.0	-1.7	**-2.3**	3.0	3.5	**-0.5**	-0.3	0.0	**-0.4**	-1.5	-0.7	**-0.8**	0.4	0.7	**-0.2**
Estonia	-1.4	-1.7	**0.3**	-7.6	-8.2	**0.6**	3.0	2.7	**0.3**	3.4	1.8	**1.7**	0.1	1.0	**-0.9**	8.4	3.4	**4.9**
Greece	-0.9	-12.6	11.6	6.4	-16.1	22.4	-6.9	-16.6	**9.7**	-1.5	-0.9	-0.6	-2.1	-2.0	-0.2	-2.0	-0.6	**-1.4**
Spain	-1.9	-1.0	**-0.9**	-3.1	-3.8	**0.6**	-1.9	0.7	**-2.6**	-1.3	-0.4	**-0.9**	-3.7	-1.7	**-2.0**	-0.1	0.3	**-0.4**
Finland	0.5	-1.5	**2.0**	-1.1	-6.8	**5.7**	2.2	2.0	**0.1**	-1.2	-1.0	**-0.1**	-1.5	-2.5	**1.1**	-1.6	-0.4	**-1.2**
France	-0.3	-0.4	0.2	-3.9	-4.7	0.8	2.6	2.9	-0.3	0.8	1.1	**-0.3**	0.0	0.1	**-0.1**	1.9	2.7	**-0.8**
Croatia	-3.4	-6.9	3.5	-0.3	-4.2	**3.9**	-7.7	-12.8	5.1	-3.9	-2.7	-1.2	-2.3	2.4	**-4.8**	-7.4	-8.2	0.8
Hungary	-4.3	-4.7	**0.4**	-1.7	-1.5	**-0.2**	-8.8	-9.9	**1.2**	-7.5	-4.2	**-3.2**	-9.6	-1.5	**-8.1**	-10.0	-8.7	**-1.3**
Italy	0.3	-0.7	1.0	-2.0	-5.8	**3.8**	2.3	3.0	-0.7	-0.8	-0.3	-0.5	-3.1	-2.5	**-0.6**	0.6	1.2	-0.7
Lithuania	0.9	-0.9	**1.8**	0.3	-4.1	**4.3**	1.9	1.1	**0.8**	1.7	0.9	**0.9**	-2.5	-0.1	**-2.4**	6.4	2.2	**4.2**
Luxembourg	4.0	1.5	2.5	-1.0	-0.7	**-0.3**	10.8	4.3	6.4	-3.4	-0.9	-2.5	-3.6	-6.2	**2.6**	-5.3	2.9	-8.1
Latvia	2.2	0.7	1.5	6.9	-1.9	**8.8**	-0.2	3.1	-3.3	2.3	0.6	1.8	-0.6	-0.1	**-0.5**	6.2	1.5	4.8
Netherlands	0.4	0.0	**0.4**	-1.1	-1.7	**0.6**	1.9	1.5	**0.4**	0.3	1.0	**-0.8**	-1.6	0.7	**-2.2**	1.9	2.0	**0.0**
Poland	-1.7	-3.1	**1.4**	6.2	4.9	**1.3**	-8.5	-10.7	**2.2**	-6.3	-2.9	**-3.5**	-5.1	1.7	**-6.9**	-10.9	-8.0	**-2.9**
Portugal	-1.4	-1.5	**0.0**	-1.9	-1.9	**-0.1**	-1.9	-2.1	**0.2**	-0.7	-0.1	**-0.6**	-2.3	-1.7	**-0.5**	0.1	1.2	**-1.0**
Romania	-4.5	-5.4	**0.9**	-7.5	-5.8	**-1.8**	-4.8	-8.3	**3.5**	-2.3	-3.7	**1.4**	-0.7	-0.5	**-0.2**	-5.0	-8.3	**3.3**
Sweden	-2.2	-1.8	**-0.4**	3.6	3.0	**0.6**	-7.9	-6.4	**-1.4**	-4.1	-2.6	**-1.4**	-1.3	1.7	**-2.9**	-8.6	-7.4	**-1.1**
United	-2.3	-3.5	**1.2**	-8.8	-10.9	**2.2**	1.7	0.6	**1.0**	-2.3	-3.0	**0.7**	-4.5	-5.5	**0.9**	-1.9	-2.8	**0.9**
Japan	1.2	-0.6	1.9	10.0	4.1	6.0	-4.6	-4.6	**0.0**	-1.4	0.1	-1.4	15.0	17.9	-3.0	-13.5	-12.3	**-1.2**
Switzerland	4.7	6.7	**-2.0**	14.3	13.4	**0.9**	0.4	5.7	**-5.3**	2.9	2.7	**0.2**	10.9	9.6	**1.2**	-1.3	-0.8	**-0.4**
United States	-0.4	1.9	**-2.2**	-2.0	-3.2	**1.2**	0.7	7.3	**-6.5**	1.5	0.1	**1.4**	4.0	0.3	**3.7**	0.3	-0.1	**0.4**

Source: Bruegel calculations using IMF BOP. Note: 'Equity' groups together 'Direct Investment' and 'Portfolio investment – equity', while 'Debt' consists of 'Other investments' and 'Portfolio investment – debt'; A = Assets, L = Liabilities, S = Spread between assets and liabilities; data up to 2015Q4; no data for Bulgaria, Cyprus, Denmark, Ireland, Slovenia, Slovakia and Latvia;

Table 3: Total return (yield plus revaluation) for selected countries

	Equity						Debt					
Countries	***2007Q1-2010Q4***			***2011Q1-2015Q4***			***2007Q1-2010Q4***			***2011Q1-2015Q4***		
	A	L	**S**	A	L	**S**	A	L	**S**	A	L	**S**
Austria	3,0	1,7	1,4	6,4	6,3	0,0	-0,6	2,2	3,7	-1,5	3,1	3,8
Belgium	6,7	3,9	2,9	3,0	3,4	-0,4	0,2	3,7	2,9	0,8	1,0	0,8
Czech Republic	26,0	24,6	1,4	-7,1	-1,1	-5,9	3,1	10,8	10,0	0,8	-6,9	-6,9
Germany	0,7	2,3	-1,7	7,4	7,2	0,2	-0,2	1,9	2,3	-0,4	2,6	2,2
Estonia	0,2	1,7	-1,5	7,8	10,8	-3,0	2,2	3,5	3,9	-0,4	9,4	4,3
Greece	8,4	-13,9	22,3	-5,3	-19,0	13,7	-1,7	0,0	1,5	-1,5	-0,7	1,2
Spain	2,1	0,4	1,7	2,7	3,8	-1,1	-1,6	-0,9	1,7	-2,6	1,8	2,3
Finland	3,8	-2,5	6,3	6,1	6,5	-0,4	-0,3	1,2	0,5	0,7	-0,4	1,1
France	0,2	-1,8	2,0	6,5	5,7	0,8	-0,2	3,3	3,0	0,4	3,8	4,4
Hungary	4,0	5,1	-1,1	-5,0	-4,7	-0,3	-1,7	-6,3	2,4	-8,7	-8,4	-5,2
Italy	1,9	-1,8	3,7	5,6	6,4	-0,8	0,3	0,0	0,7	-0,7	2,6	3,5
Luxembourg	2,0	2,6	-0,6	13,9	7,5	6,4	-1,7	-0,8	-4,1	3,3	-2,7	5,0
Netherlands	4,0	3,3	0,7	6,3	6,0	0,3	-1,1	1,3	3,9	-2,6	3,7	4,0
Poland	7,2	13,6	-6,4	-5,7	-3,2	-2,5	-2,3	-2,2	5,3	-7,5	-9,5	-5,0
Portugal	3,1	3,8	-0,7	1,5	1,4	0,1	-0,6	0,8	1,4	-0,6	1,9	3,1
Romania	-6,4	-0,4	-6,0	-3,1	-4,6	1,5	3,6	0,5	3,2	-2,7	-4,1	-5,3
Sweden	3,6	3,0	0,6	-7,9	-6,4	-1,4	-1,4	-1,3	1,7	-2,9	-8,6	-7,4
Japan	-	-	-	2,7	-1,5	4,1	-	-	-	-	-	-
United States	4,1	-0,1	4,2	6,2	10,1	-3,9	7,3	3,6	3,6	3,6	2,3	1,8
United Kingdom	-2,9	-6,0	3,1	6,2	4,9	1,3	0,5	-1,7	-2,5	0,8	-0,8	-1,4

2.3 Global trends in the banking sector

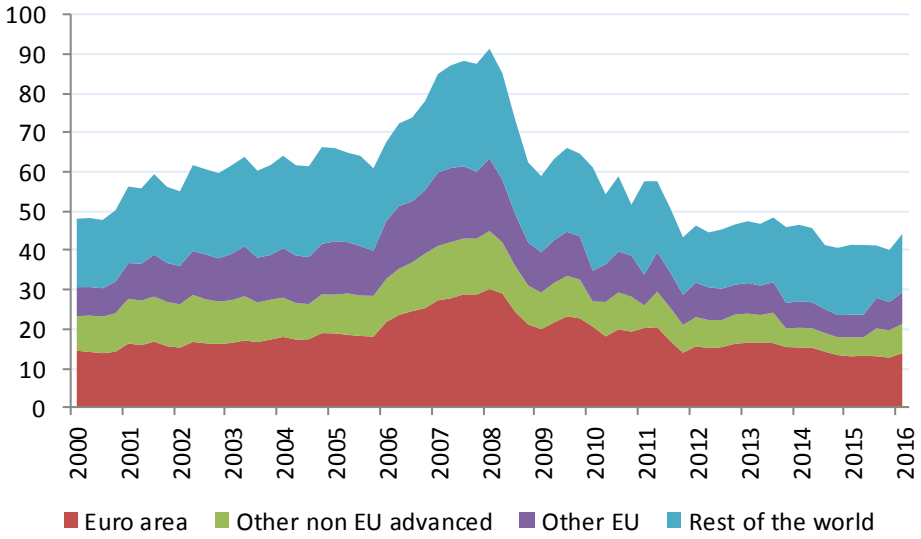
The banking system is of crucial importance in Europe, and so we look at capital flows from the perspective of the banking sector via international banking claims, as reported by the BIS banking statistics. This allows us to analyse cross-border bank integration (or disintegration)[6].

There is a striking difference between gross foreign claims of EU and non-EU advanced country banks: while claims of EU banks declined significantly since 2007/08 (even halved for euro area banks), claims of non-EU banks (after some volatility in 2007/09) continued to increase even after 2009.

Figure 8 shows the consolidated foreign claims on the rest of the world by country grouping up to the first quarter of 2015. **Euro area banks** (Panel A in Figure 8) exhibit the largest claims on other Euro area banks (amounting to 12% of group GDP in 2016Q1), followed by claims on other non EU advanced countries (6% of group GDP). The deleveraging of Euro area banks with respect to all other country groupings which could be observed since the financial crisis in 2008/09 seems to have reached a plateau at a lower level in mid-2012, a trend which continued throughout 2013 and into the second half of 2014. However, from mid-2014 to end 2015, a further slowdown of claims on the rest of the world can be observed, while claims on other non EU advanced as well as other EU have slightly increased in recent quarters, yet total gross foreign claims still remain at a level of about half the 2008 peak.

Figure 8: Gross foreign claims of domestically owned banks on the rest of the world (percent of group GDP)

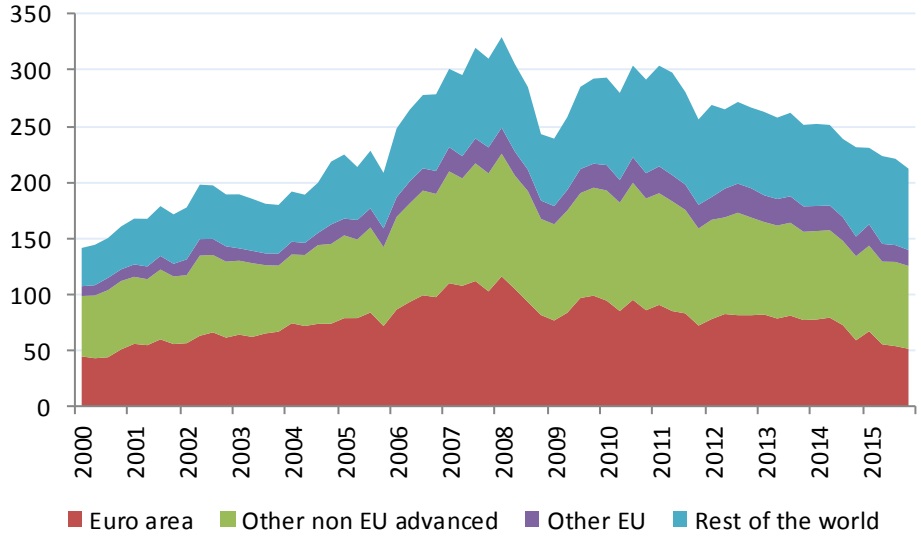
Panel A: Euro area 10



Source: BIS consolidated banking statistics (series: immediate borrowing basis, domestically owned banks, Foreign claims) Eurostat and Bruegel calculations; Note: On the reporting country side, Euro area is made up of AT, BE, DE, ES, FR, IT, IE, NL, PT, FI. On the counterparty side, The Euro area is all 19 member states of the single currency.

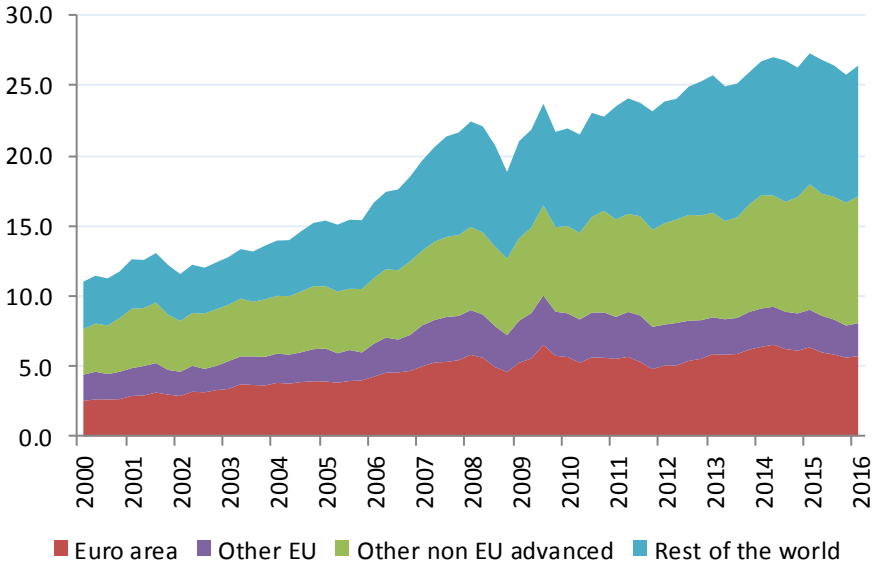
[6] One should note however, that not all countries are BIS reporting countries, even in Europe.

Panel B: non-Euro EU 3: Denmark, Sweden, and United Kingdom



Source: as above; Note: among the non-euro area EU countries, only Denmark, the United Kingdom and Sweden are BIS reporting countries.

Panel C: Non-EU Advanced 6: Australia, Canada, Japan, South Korea, Switzerland, US



Source: as above.

The non-Euro area countries **Denmark, Sweden and United Kingdom** (Panel B in Figure 8) report most claims on other non EU advanced. A financial retrenchment process is ongoing, and claims on the Euro area have fallen from highs of over 46% of group GDP in 2012 to 26% of GDP currently.

Finally, in contrast to the European regions, the banks located in the **six non-EU advanced economies** of Australia, Canada, Japan, South Korea, Switzerland, and US (Panel C in Figure 8) continued to increase their exposure to banks in the rest of the world until the end of 2015, while claims on both European groups have fallen slightly over 2014 and 2015.

3. A closer look at Europe

The previous section assessed capital flows and stock from a global perspective, presenting data on the euro area as a whole and on some non-euro area country aggregates. However, the euro area is rather heterogeneous and therefore it is important to analyse the different patterns within the euro area. In this section, we take a closer look at the euro area and the European Union. Instead of reporting data for all 28 EU Member States, we define some country groups to facilitate drawing conclusions on key tendencies across countries. We also show data separately for three large EU countries, which would be difficult to combine with other countries.

We group the first twelve euro-area countries based on their net international investment position (NIIP) in other investments, which primarily includes banking claims. Countries with a positive NIIP in other investment are regarded as "creditors", while countries with a large negative NIIP in other investments are called "debtors" (i.e. lower than 25% of GDP). We note that the same groups perfectly coincides with a grouping based on pre-crisis (2000-2008) current account developments: "deficit countries", where the current account balance as a share of GDP was on average below -2 percent of GDP are the same as "debtor countries" as we define above, while "surplus countries", where the current account balance was on average was over 2 percent of GDP are the same as "creditor countries". Such correspondence between pre-crisis deficit/surplus countries and current debtor/creditor countries is quite straightforward, given that current NIIP is to a large extent a legacy of pre-crisis capital flows.

Both possible classifications leave two countries in between: France and Italy. Since capital flow developments in France and Italy were rather different from each other, as highlighted by for example Hobza and Zeugner (2014a, 2014b), and also different from both creditor and debtor countries, we show data on both of these large countries separately.

Therefore, we consider the following country groups and countries:

- **Euro area (EA) Creditor countries**: Austria, Belgium, Finland, Germany, Luxemburg and the Netherlands;
- **Euro area (EA) Debtor countries**[7]: Greece, Portugal and Spain;
- **France** is considered individually in light of its small negative NIIP and its difference from creditor and debtor countries and also from Italy;
- **Italy** is considered individually in light of its small negative NIIP and its difference from creditor and debtor countries and also from France;
- **North**: Denmark and Sweden;
- The **UK** is considered individually in light of its special role for financial intermediation and capital flows;
- **Central and Eastern Europe**[8]: Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

While countries included in a particular group have major similarities, there is certainly a large degree of heterogeneity within most of the groups. However, increasing the number of groups further would risk losing the key tendencies in country-specific details

[7] Ireland is excluded given its outstanding role as a financial sector.

[8] Cyprus, Bulgaria and Malta are also excluded due to data availability reasons. We also note that five CEE countries and Cyprus and Malta joined the euro area: Slovenia in 2007, Cyprus and Malta in 2008, Slovakia in 2009, Estonia in 2011, Latvia in 2014 and Lithuania in 2015. We include these countries in the CEE group, and not in the euro-area debtor or creditor groups, because the first twelve euro-area members were characterised by special developments since their early entry to the euro area.

The data sources for all the charts presented in this section is Eurostat balance of payments and international investment statistics and the BIS locational banking statistic, unless stated otherwise. All aggregate group figures are obtained by dividing the group's totals for each of the instrument presented by the group's GDP (in a manner to show ratios commensurate with annual GDP, that is quarterly flows are divided by quarterly GDP, while stock are divided by annual GDP).

3.1 Gross financial flows

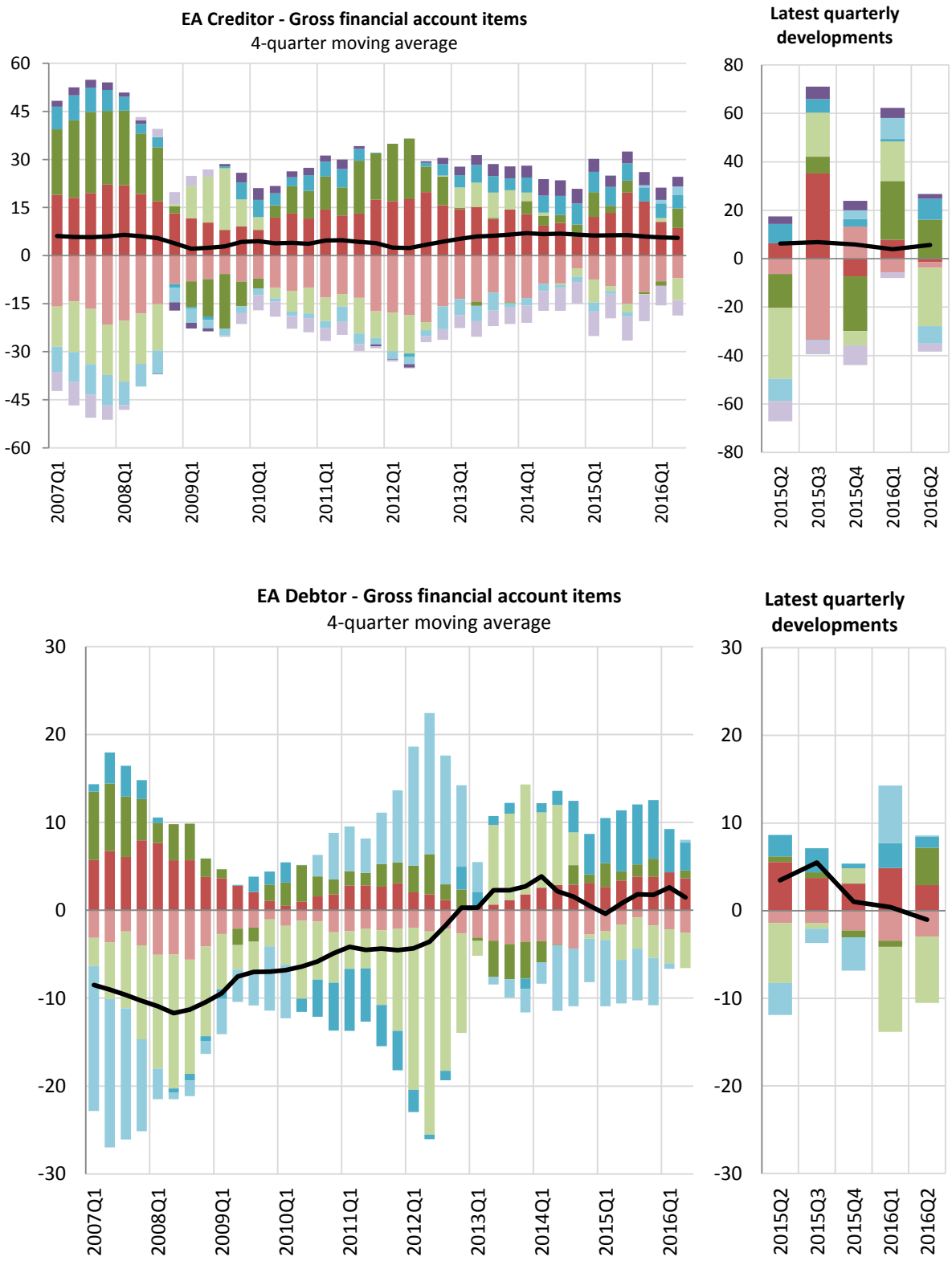
The euro area is a special case for the study of capital flows, and deserves major attention. For this reason, Figure 9 reports gross capital flows (both assets and liabilities) for the **euro-area groups**, broken down by instruments, i.e. foreign direct investment, portfolio investments and other investments. The black line represents the net financial account as percent of the group GDP. A problem with the analysis of gross flows is, however, that in the absence of bilateral statistics, the intra-group positions cannot be netted out, thus inflating the numbers when countries are grouped.

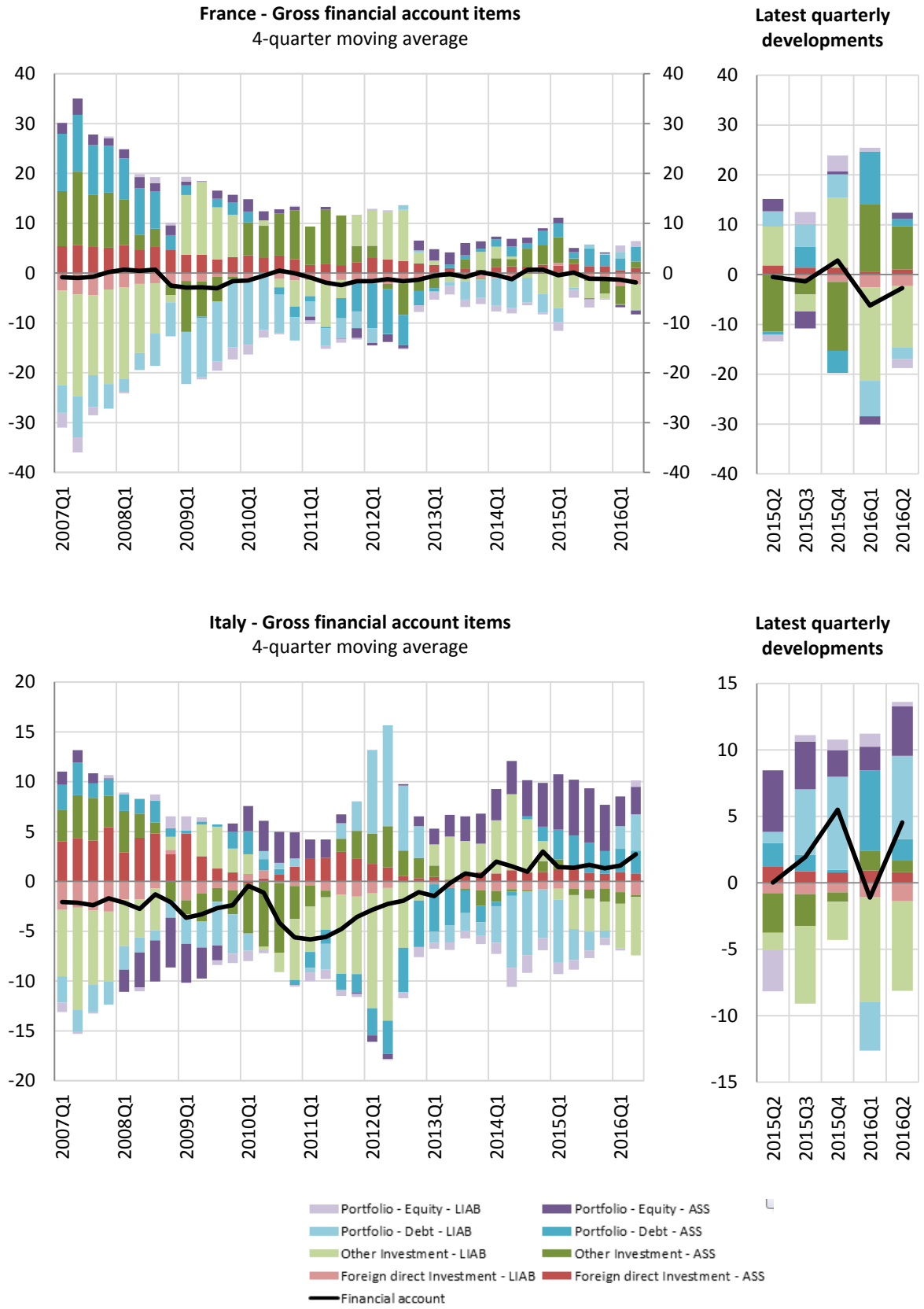
The contraction in gross flows is most evident in the **euro area debtor countries**, where gross flows contracted both during the financial crisis in 2008Q3, and after a short recovery phase, again in 2013Q1. By that time, these former debtor countries have turned into a net exporter of capital, on the back of gross other investment and portfolio debt outflows. It is quite remarkable that gross flows increase substantially by early 2015 and contract again in the next few quarters. On the other hand, among the components of capital flows, the inflow of other investment (mostly banking flows) increased substantially in 2016Q1.

In the **euro area creditor countries**, gross flows have also declined somewhat after 2008, but remained more stable after the financial crisis, albeit at a significantly lower level compared to pre-crisis times. Since 2015, the euro area creditor countries increased their position as net exporter of capital again, on the back of better economic conditions. More recently, Gross flows decreased significantly over 2015Q4 – 2016Q1.

There was a really large contraction in gross flows in **France**, a country which had a major role in intermediating capital flows from euro-area surplus and rest of the world countries to euro-area debtor countries before the crisis, according to Hobza and Zeugner (2014a, 2014b). **Italy**, on the other hand, where gross flows to GDP were well below values observed in France and many other countries, shows similar fluctuation in gross flows to debtor countries: there was a reduction after 2008, a temporary rebound in 2012 followed by a contraction again, and a more recent recovery. It is also notable that other investment (i.e. mostly banking) liability flows returned in 2016Q1, despite the worries about the Italian banking system as reflected in several media reports.

Figure 9: Gross financial flows in euro-area groups (percent of GDP)



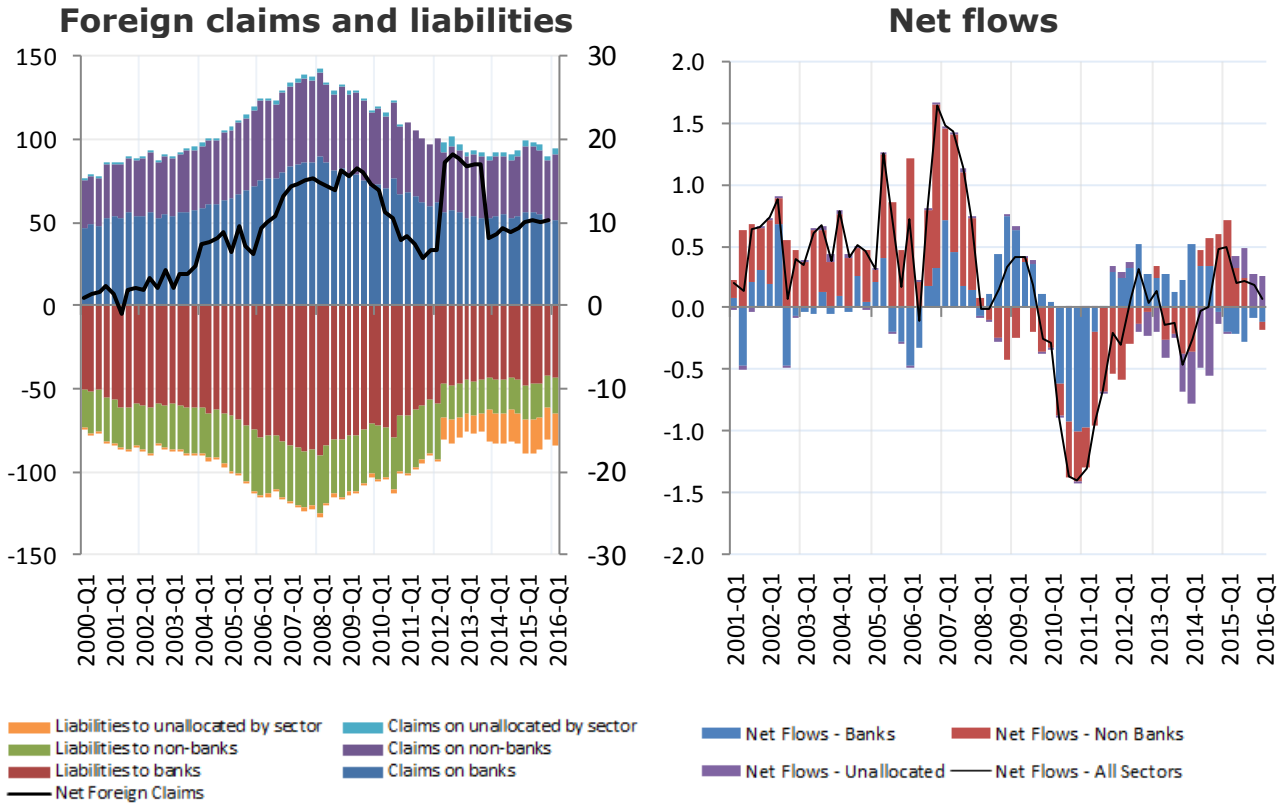


Source: Eurostat and Bruegel calculations.

Similar patterns can be observed when looking at the stocks and flows of foreign claims (including both gross and net), as reported by the **BIS locational banking statistics**

by nationality[9]. The left panel of Figure 10 shows the gross and net cross-border positions of a euro area aggregate of banks, without consolidating intra-group positions. The right panel tracks quarter to quarter changes in the stocks (quarterly flows) adjusted for exchange rate changes and breaks, as a share of GDP, a series estimated by the BIS. The **net foreign claims of euro-area banks** show a moderate accumulation, developing positively from 2000 until levelling off in late 2008 and into 2009, reaching a peak of just over 15 percent of GDP, before falling to approximately 5 percent in 2011. The sudden upward shift in 2012Q2 is likely due to methodological changes, as this shift which coincides with changes in the reporting requirements for the BIS international banking statistics and there is a sudden fall in early 2013. None of these shifts are noticeable in the adjusted flows (right panel), highlighting the role of methodological breaks in the sudden changes in stocks. After these sudden changes, net foreign claims increased slowly but steadily until our latest observation, 2016Q1. In the post-crisis period, **gross foreign claims of euro-area banks** declined steadily, reflecting deleveraging by the euro-area surplus country banks, from a peak of almost 150% of euro area GDP in 2008 to below 100% in 2013-16.

Figure 10: Euro area banks foreign claims based on locational banking statistics (percent of GDP)



Sources: BIS locational banking statistics by nationality, Eurostat and Bruegel calculations; Note: On the reporting country side, Euro area is made up of AT, BE, DE, ES, FR, IT, IE, NL, PT, FI due to data limitations. Flows are presented as four-quarter moving-averages. Latest data available: 2016Q1. In the left panel, gross foreign claims and liabilities are plotted on the left axis, while net claims on the right axis.

[9] The locational statistics provide information about the currency and geographical composition of banks' balance sheets. They capture outstanding claims and liabilities of banking offices located in the BIS reporting countries, including positions between related offices. The locational statistics are compiled using principles that are consistent with balance of payments. The availability of a currency breakdown facilitates the calculation of exchange-rate adjusted changes in amounts outstanding, as an approximation for flows. For additional information, see http://www.bis.org/statistics/about_banking_stats.htm

Figure 11 separates these developments for banks in euro area creditor countries, debtor countries, France and Italy, though we highlight that intra-group positions are not netted out (similarly to such groupings based on Eurostat statistics), given the absence of bilateral data. Hence gross flows are overestimated when grouping countries together.

These figures clearly show that the main source of the sudden shifts in euro-area net foreign claims in 2012-2014 is the developments in the creditor countries. A reduction in liabilities is documented simultaneously in 2012 of creditor, debtor countries and Italy, while claims remained broadly unchanged. On the contrary, liabilities drop precipitously in euro-area surplus countries and France in 2014. These acute changes are not borne by the adjusted flows series, pointing to the role of breaks.

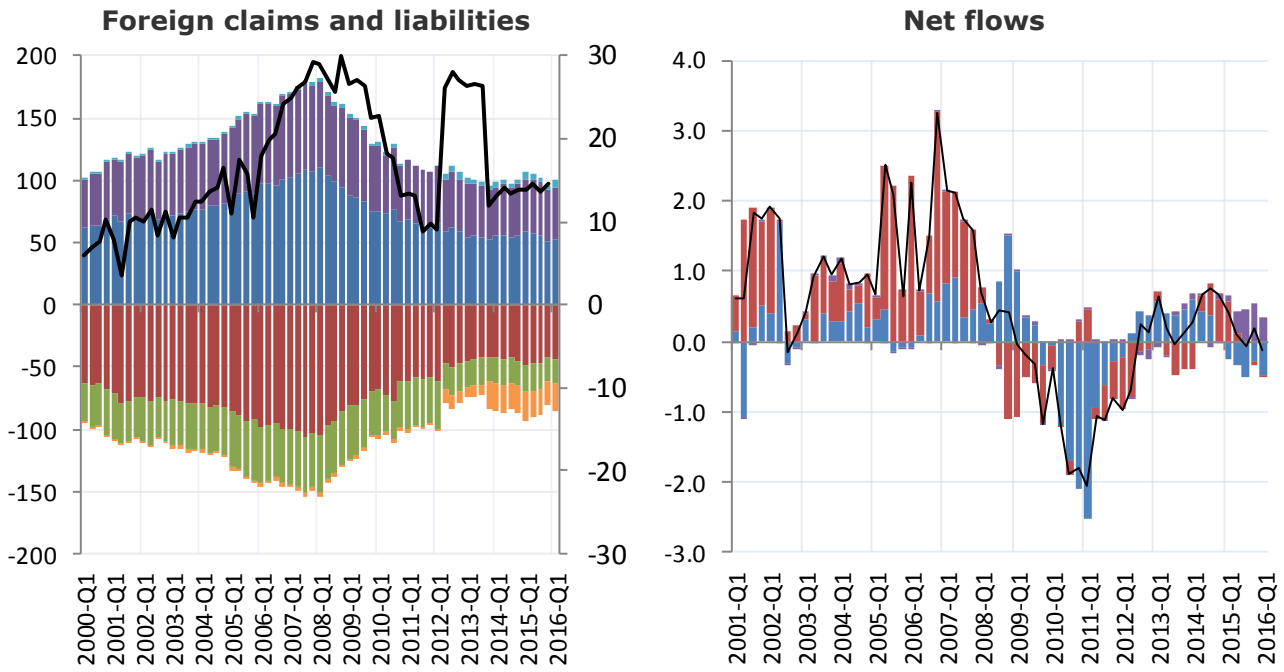
Still, developments before and after the 2012-13 breaks in stock statistics, as well as the break-adjusted flow statistics, offer several interesting conclusions. Starting in early 2008, banks in the **euro-area creditor countries** deleveraged significantly, reflected by a very significant decline in both foreign claims and liabilities. Net claims also fell from about 30% of group GDP in early 2008 to about 10% by early 2012. However, both the net stock position (if we disregard the breaks) and break-adjusted flows show that in the post 2012 period net flows increased somewhat, suggesting that the deleveraging period has ended. The notable observation for 2015 is that net claims on banks have actually increased, while overall net claims remained broadly unchanged. Therefore it seems cross-border lending to other banks of euro-area creditor country banks increased around the time the ECB took over the role of bank supervisor in the euro area, despite the increased turbulence on European banking markets, which is also reflected in increased credit default swap spreads of banks (Figure 12). However, since there were also net outflows from Italy and euro-area debtor country banks in most of 2015, creditor country banks' new loans were granted to other parts of the EU or the world.

It is notable that **Italian banks** received net inflows in the aftermath of the collapse of Lehman Brothers in 20084-2011Q2. In 2008 Q3-Q4 Italian banks continued accumulating liabilities, but decreased claims (hence the net inflow), and eventually in 2009 they started both decreasing (i.e. there was a lag in liabilities). However, up to 2012, claims have de-cumulated faster than liabilities, yielding inflows on the net. On the contrary, in 2012-2013 the change in the net flow is clearly driven by cross-border liabilities collapsing (the withdrawal of exposures on Italy).

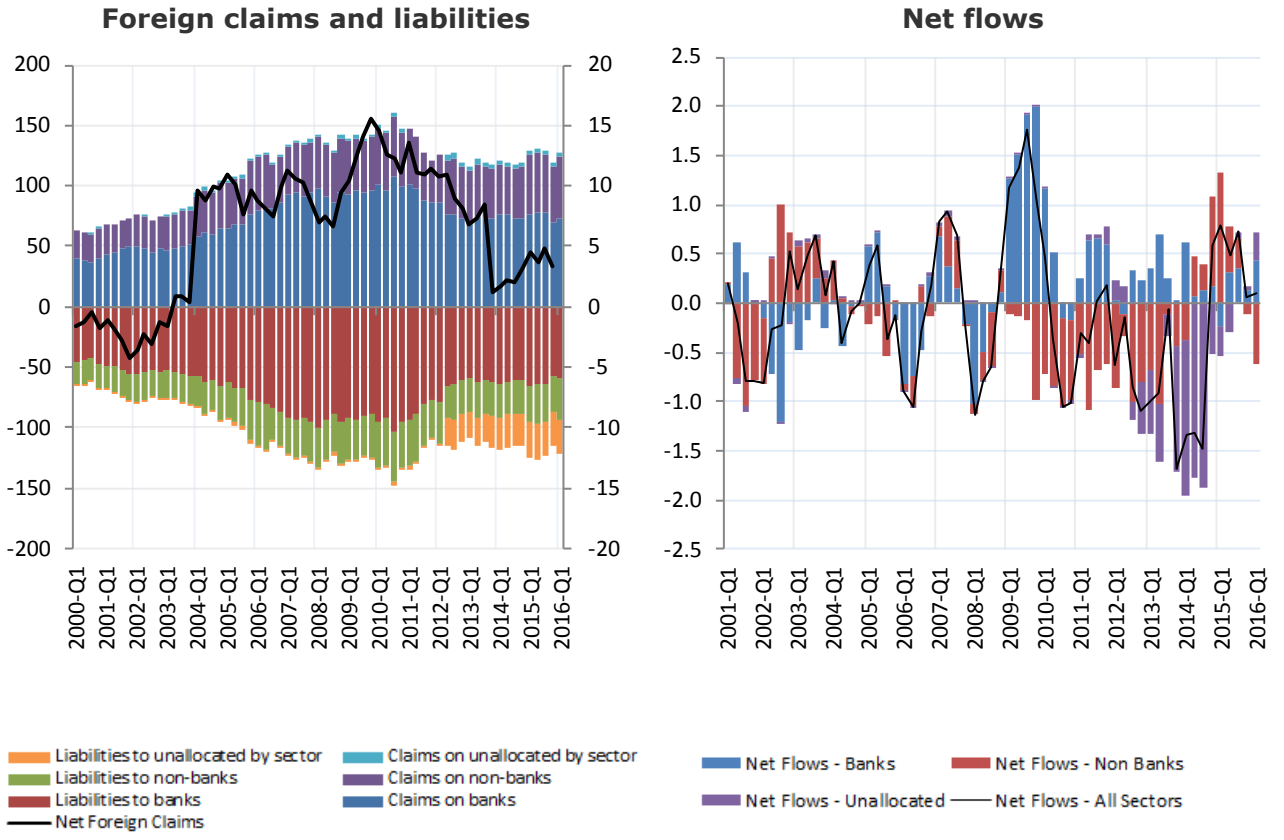
Debtor country banks also experienced large outflows over 2012-13, the most acute period of the euro-area crisis. It is also interesting to note that net foreign claims of **French banks**, **Italian banks**, and banks of **euro-area debtor countries** increased in 2014 and early 2015, suggesting increased cross-border activates.

Figure 11: Foreign claims of euro-area banks based on locational banking statistics (percent of GDP)

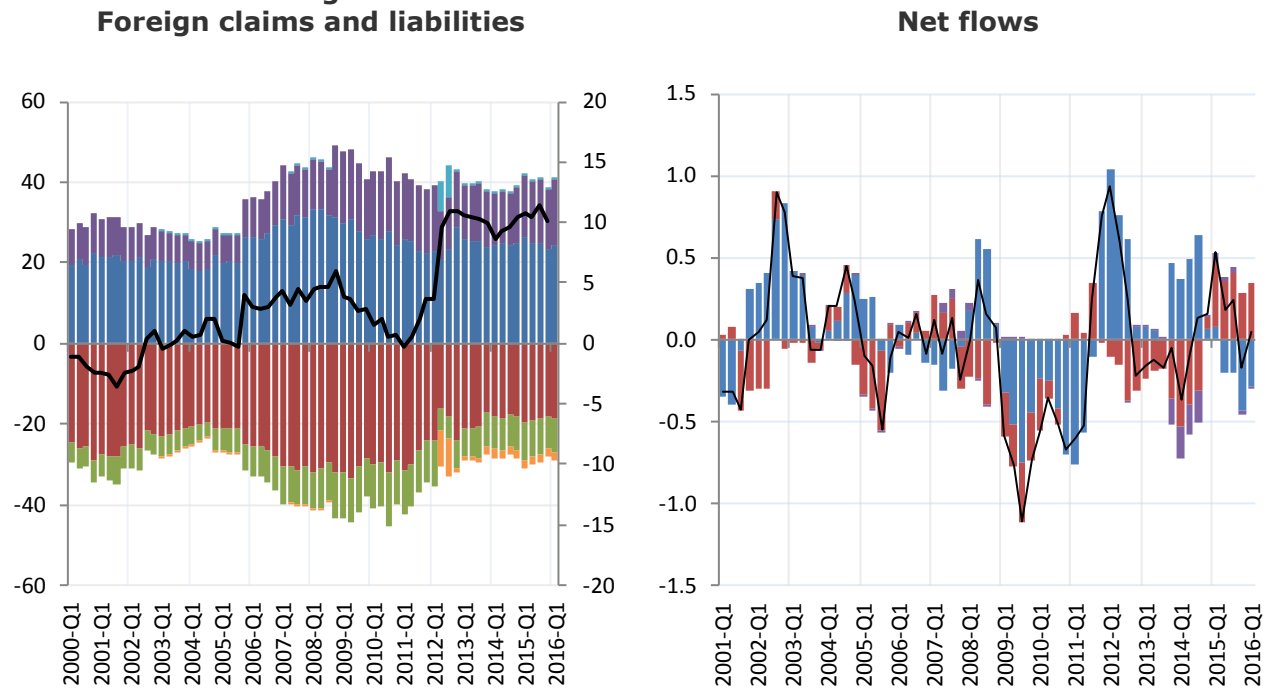
A: Euro-area creditor country banks' foreign claims



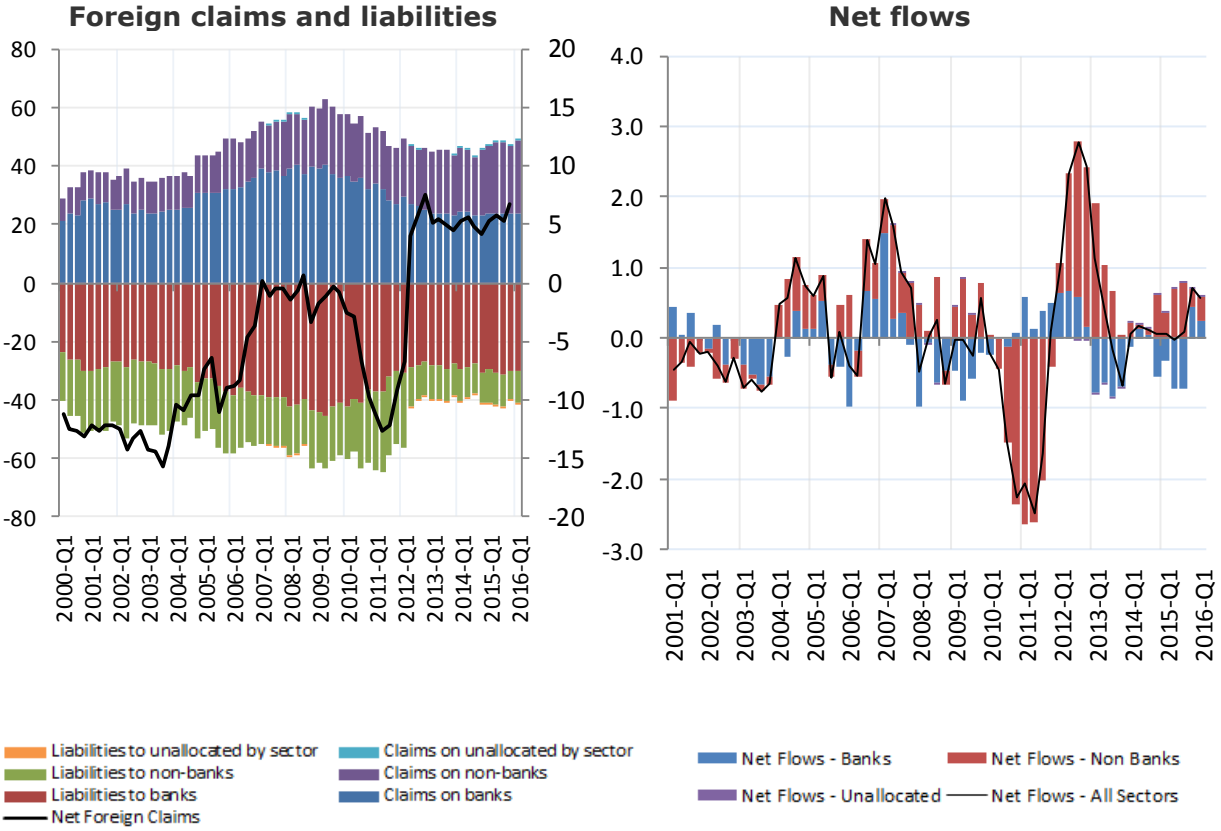
B: French banks' foreign claims



C: Italian banks' foreign claims

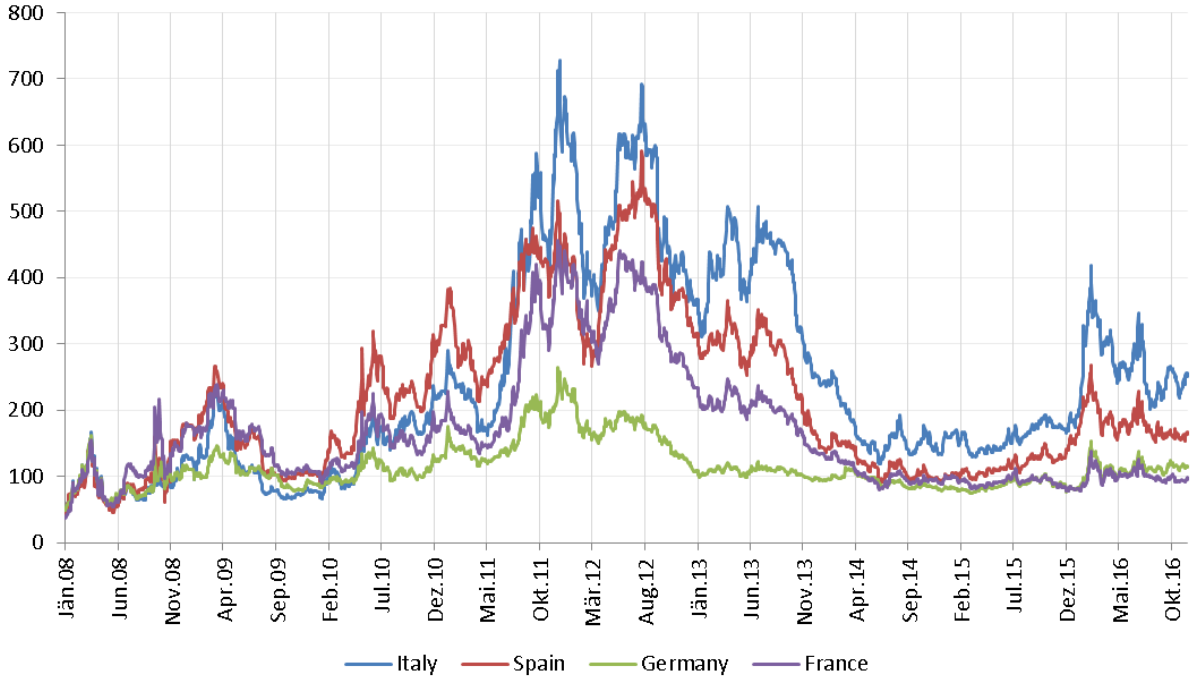


D: Euro-area debtor country banks' foreign claims



Source: BIS locational banking statistics; Note: Gross and net stocks (top); net flows (bottom); Net position (black line) on RHS scale. Creditor countries: AT, BE, DE, NL; Debtor countries: ES, PT; data available from 2000Q1 to 2015Q4, however frequently country level data is missing, so actual series may not extend this far. In the left panel, gross foreign claims and liabilities are plotted on the left axis, while net claims on the right axis.

Figure 12: Credit default swap (CDS) spreads of top financial corporations



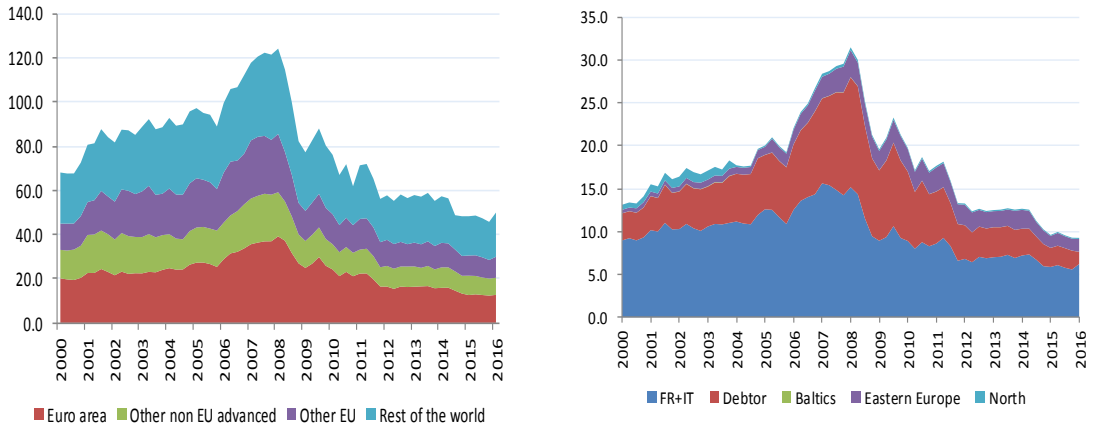
Source: Thomson Reuters Datastream Professional and Bruegel computations. Note: average of the top 5 banks for each country. The following banks are included: Italy: Unicredit, Unione di Banche Italiane, Banco Popolare, Intensa Sanpaolo, Banca Monte dei Paschi di Siena; Spain: Banco Santander, BBVA, Banco Popular Espanol, CaixaBank, Caja de Ahorros y Monte de Piedad de Madrid; France: BNP Paribas, Credit Agricole, Credit Lyonnais, Societe Generale, Natixis; Germany: Deutsche Bank, Commerzbank, Bayerische Landesbank, Nord LB, Unicredit Bank AG.

To overcome the problem of intra-group double-counting we present in Figure 13 the consolidated foreign claims for each euro area subgroup, as these statistics are disaggregated by individual counterparty and thus allow us to net out for each country group.

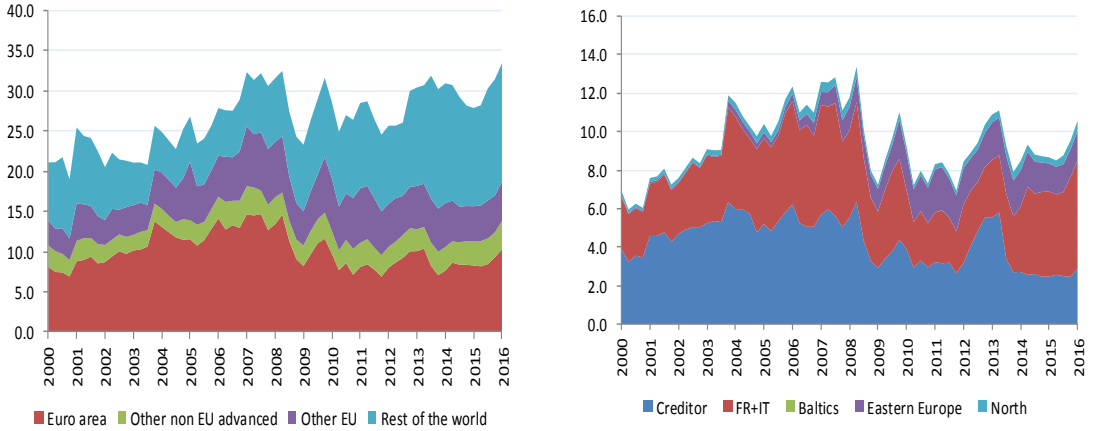
The right hand panel of Figure 13 with respect to the **creditor countries** allows us to observe the capital flow reversal experienced by the debtor countries from euro-area surplus country banks: at its peak in the first quarter of 2008 the euro-area surplus country bank exposure to the debtor countries reached 19.8 percent of GDP. At the end of 2013, this share stood at just 6.5 percent, and declined further in the last two quarters of 2014.

Figure 13: Foreign claims on different regions and euro-area subgroups based on consolidated banking statistics (percent of GDP)

Creditor countries



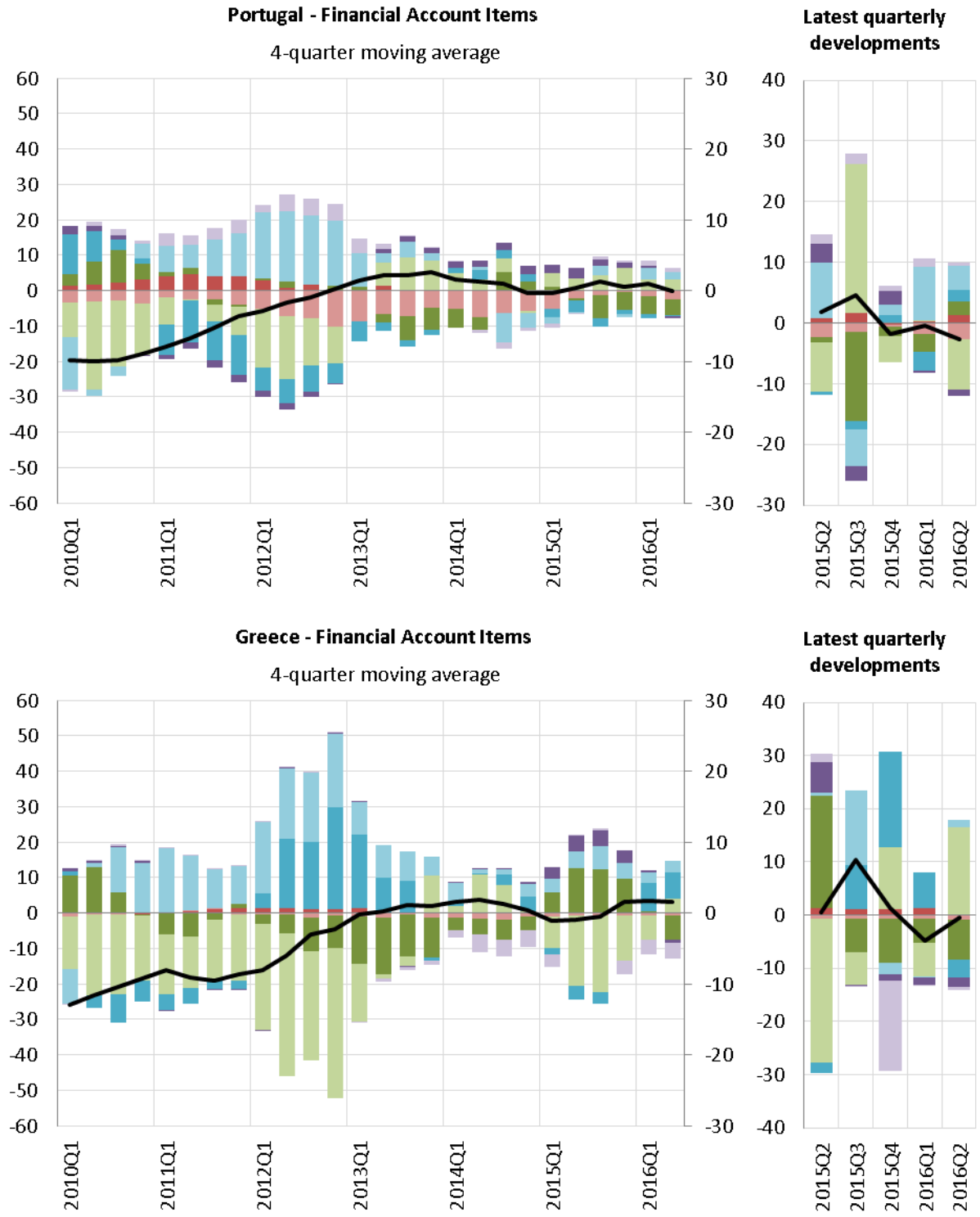
Debtor countries

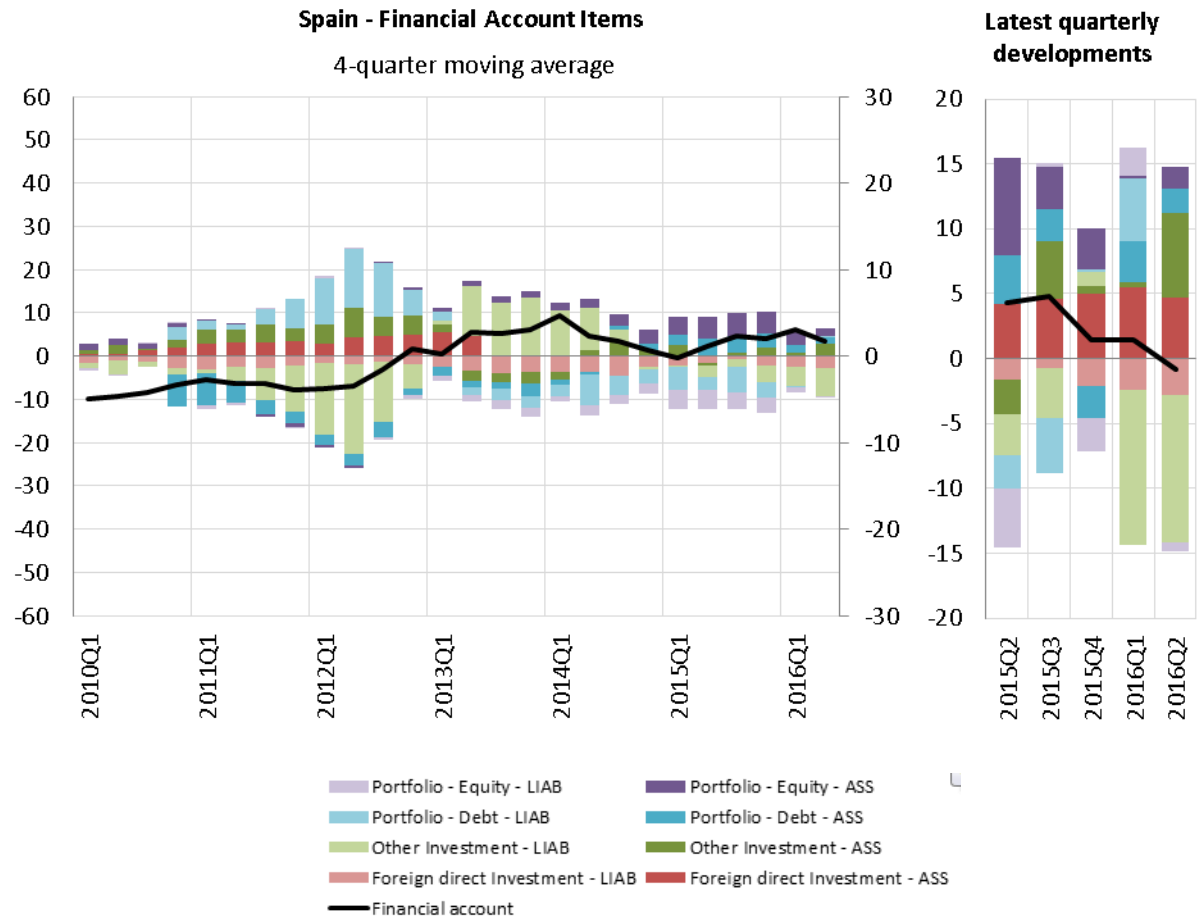


Sources: BIS consolidated banking statistics, OECD and Bruegel calculations. Note: Due to data availability the subgroups are formed as follows: Creditor countries: Austria, Belgium, Finland, Germany and the Netherlands; Debtor countries: Ireland, Portugal and Spain. Data is available from 1999Q1 to 2015Q4.

As discussed before, the debtor countries have been subject to increased capital outflows since the beginning of the European debt crisis in 2010. A look at gross flows in single countries in the post-crisis period shows that both Portugal and Greece turned into net capital exporters by the beginning of 2013 (see Figure 14). In Portugal, gross flows have remained stable since then, while Greece has experienced another peak in gross flows over 2015.

Figure 14: Gross financial flows in selected euro-area debtor countries (% GDP)





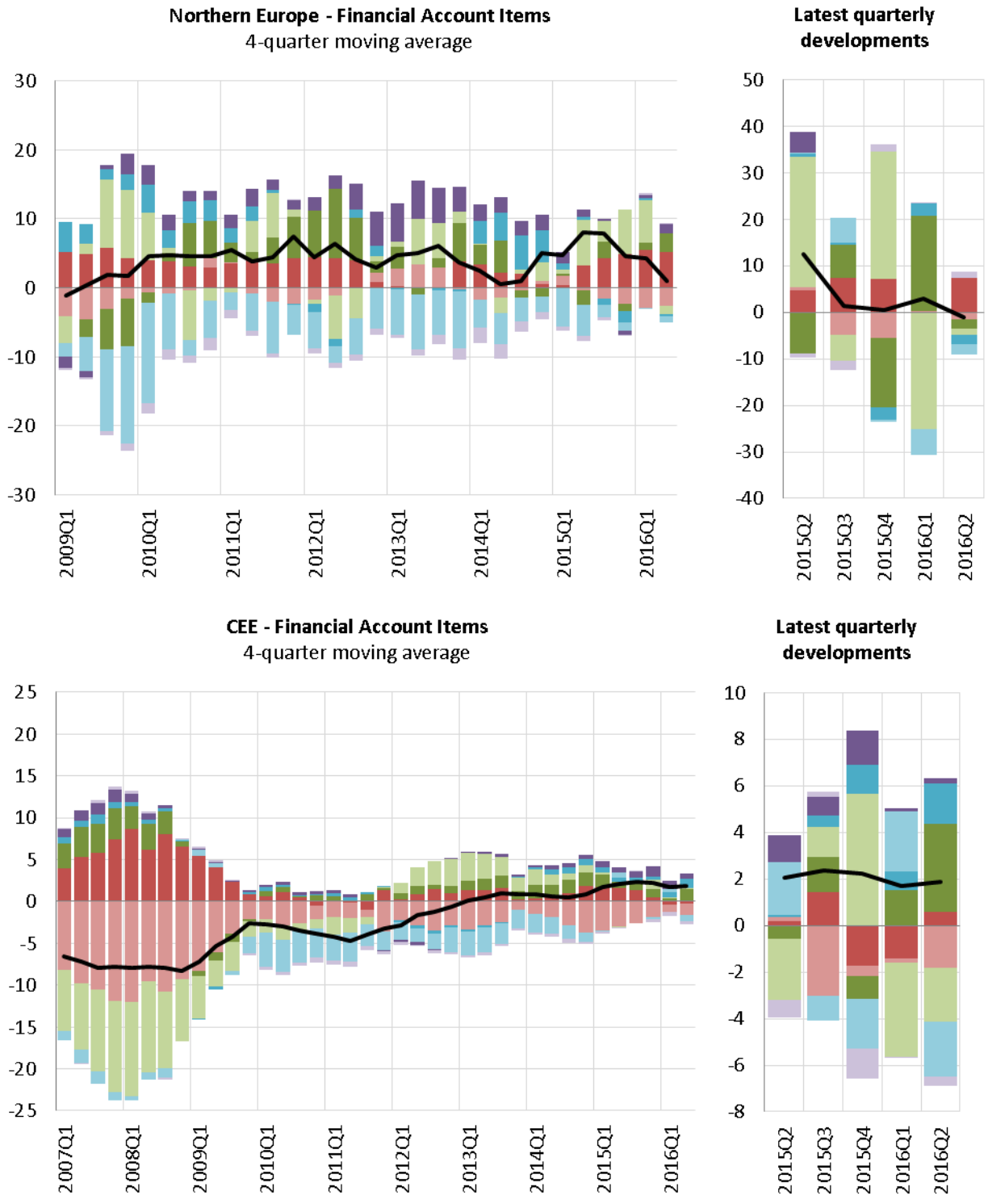
Source: Eurostat and Bruegel calculations. No data available for Ireland.

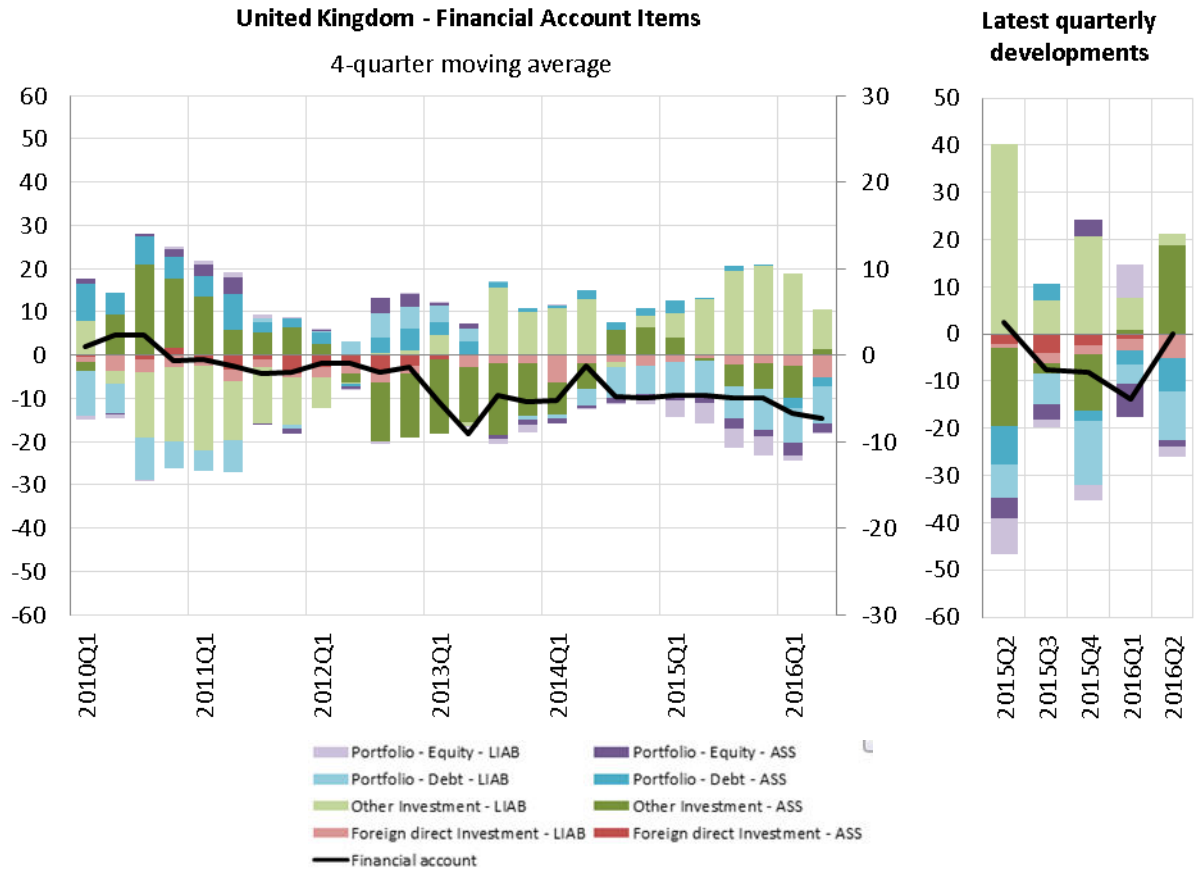
In terms of composition, Figure 14 shows that the flows in the three euro area groupings were overwhelmingly dominated by portfolio and other investments, two sources of financing that tend to be relatively more volatile than FDI. Foreign direct investment played a very marginal role, even in the euro area debtor countries. From an economic standpoint it is important to distinguish within the portfolio category between fixed income instrument such as bonds and equity, whose remuneration is far more sensitive to the economic developments, through valuation effects. This is what we do in the appendix at the level of the individual countries. Since the split between debt and equity is not always available, while the aggregate portfolio figure is, we prefer to represent only the aggregate at the group level to avoid introducing any bias in the results. Within portfolio, debt instrument normally played the major role.

Figure 15, which reports the other three groups, allows a comparison with non-euro European countries. The magnitude of **gross flows in Northern Europe as well as in CEE** tends to be smaller than in the euro area. As a share of GDP, **the UK**, which plays a special role as financial centre, experienced gross flows of up to 80% of GDP during the financial crisis. **In terms of compositions**, the three non-euro groups differ significantly from the euro area. **For the UK**, the other investment component massively dominates capital flows, and portfolio investments (especially debt) play a certain role too. Flows to Northern Europe are characterized by portfolio equity and debt, as well as other investment. In the CEE, FDI constitutes the bulk of inflows before the crisis together with other investments (which includes bank loans). In the post-crisis period, the magnitudes help up well in Northern Europe, were volatile in the UK and declined dramatically in the CEE (and continue to stay at much lower levels compared to the pre-crisis period).

In the case of **banks' foreign claims for Denmark, Sweden and the United Kingdom**, the stock accumulation on the build-up to the crisis was much steeper than in euro-area banks, but the deleveraging process has been less dramatic than for euro-area banks.

Figure 15: Gross financial flows in northern Europe, the UK and central and Eastern Europe (percent of GDP)



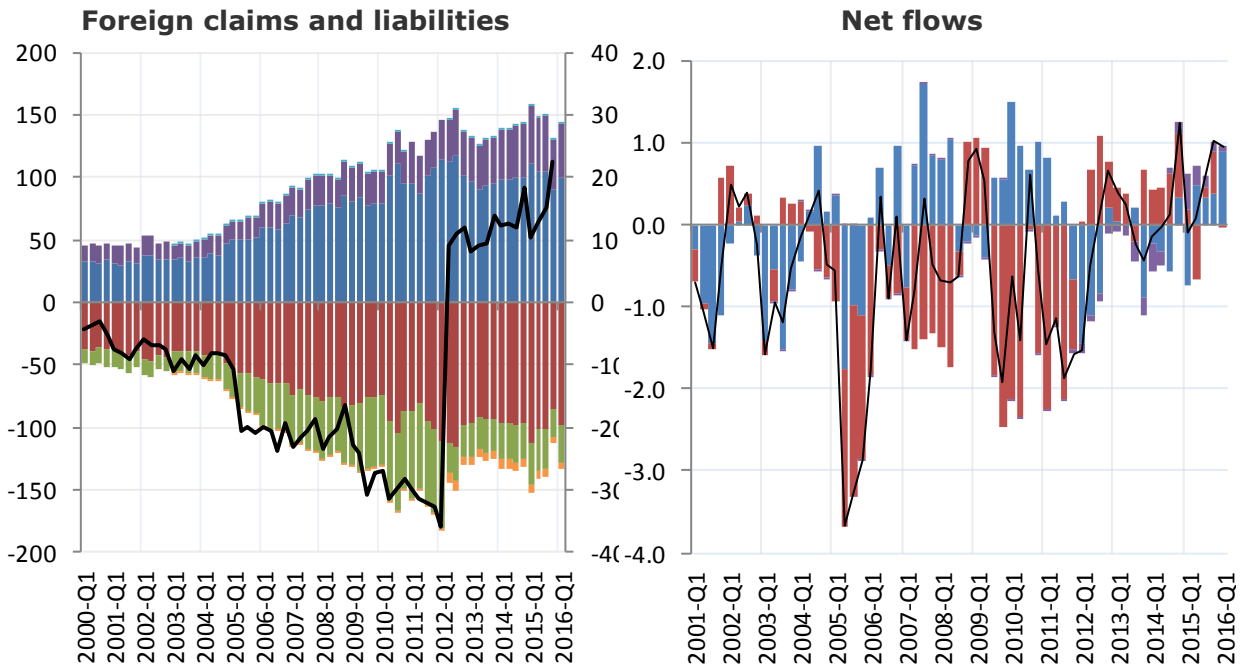


Source: Eurostat and Bruegel calculations.

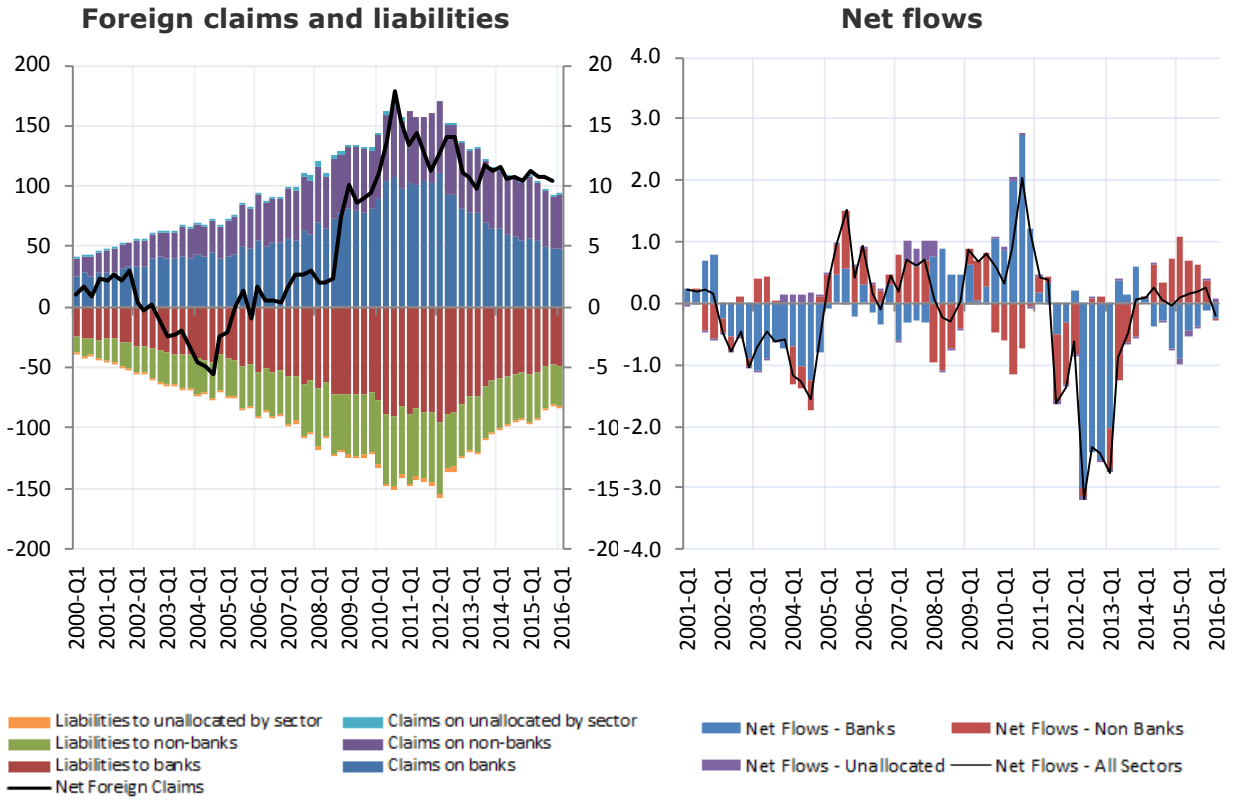
Figure 16 shows the respective claims of banks for the three countries in question.

Figure 16: Northern and UK bank foreign claims based on locational banking statistics (percent of GDP)

A: Danish and Swedish (North) banks



B: British banks



Sources: BIS locational banking statistics.

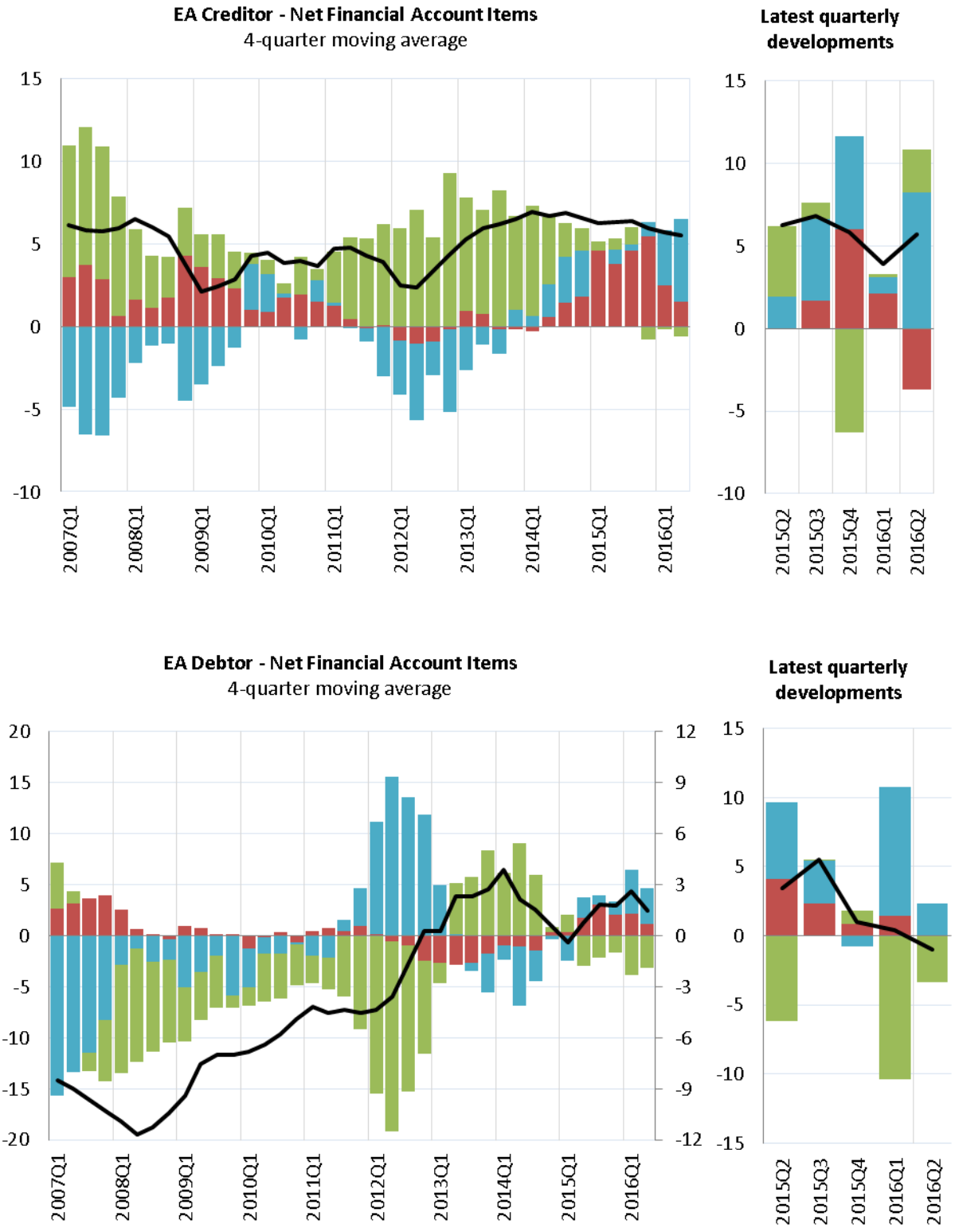
3.2 Net financial flows

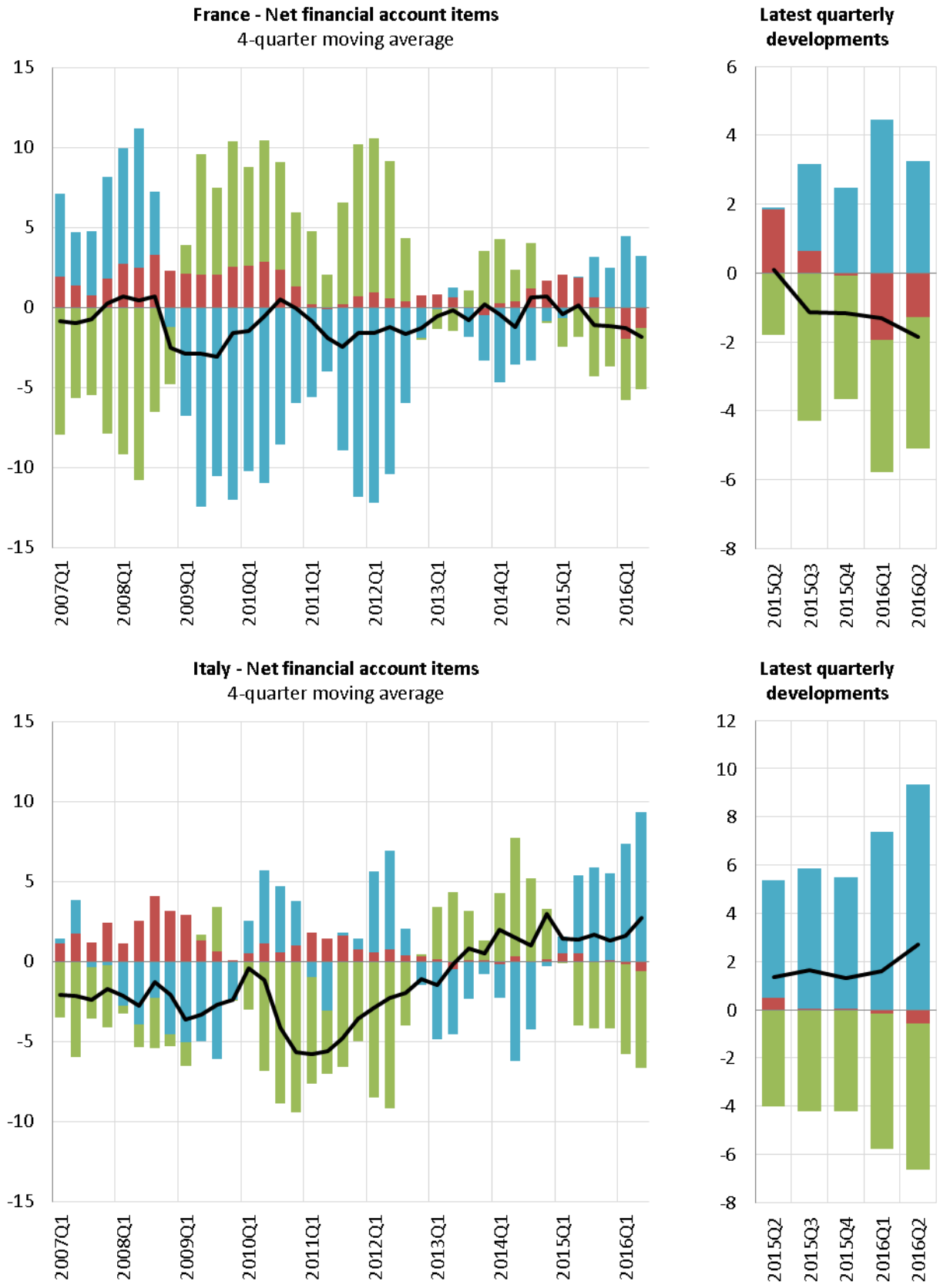
Figure 17 and Figure 19 show the **net position of the groups' financial account** according to the underlying components, offering a simpler picture of the composition of countries' and groups' net balances vis-à-vis the rest of the world. As recalled previously, the net financial account is an important variable to look at in order to understand countries' external borrowing requirements. The net flows for each of the financial account components can give an indication of where potential financing problems could come from.

Figure 17 shows that the persistent net financial inflows experienced by the **euro area debtor countries** before the crisis were largely accounted for by portfolio and other investment. From 2003 till 2008, portfolio net financial inflows were the most important component of the financial surplus, but they massively contracted in 2008 and became largely negative between summer 2011 and summer 2012. This captures the intensifying of the euro crisis, when foreign investors increasingly off-loaded debt issued by countries in the euro-area debtor countries. Interestingly, the effect of the disappearing (or negative) portfolio flows on the total net financial account appears to be neutralised by other investment flows of an opposite sign. This captures the flows related to financial assistance and to the ECB's liquidity provision, which provided a cushion against the withdrawal of private external funds. Over 2014, net outflows stabilized. The **euro area creditor countries** report persistent net financial outflows, mostly driven by other investment and to a lesser extent by FDI outflows. Portfolio investment instead shows net inflows for the euro area creditor countries, most likely driven by the presence of Germany and international appeal of the Bund during crisis times. The latest developments show a stabilization of net outflows over 2014, as rising net portfolio outflows are substituting receding other investment outflows. The **euro area centre** has been experiencing rising net outflows over 2014, which intensified by the end of the year on the back of increasing net portfolio investment outflows, and stayed at a higher level thereafter.

This outflow of capital observed in the euro area may have impacted risk premia in the corporate bond markets. Figure 18 shows a compression of corporate bond spreads after the ECB's OMT announcement in July 2012. The downward trend continued throughout 2013 and 2014, before picking up in 2015, on the back of deteriorating economic outlooks (ECB, 2016). Lately, corporate bond spreads have narrowed as a result of better macroeconomic data and the expansion of the ECB's purchases to euro-denominated bonds issued by non-bank corporations in March 2016. In this context, the impact of CMU on risk premia will materialize only in the long term. As Wolff and Véron (2015) highlight, CMU cannot be a short-term cyclical instrument to replace subdued bank lending, because financial ecosystems change slowly. Shifting financial intermediation towards capital markets and increasing cross-border integration will require action on multiple fronts, including increasing the transparency, reliability and comparability of information and addressing financial stability concerns. Some quick wins might be available but CMU's real potential can only be achieved with a long-term structural policy agenda.

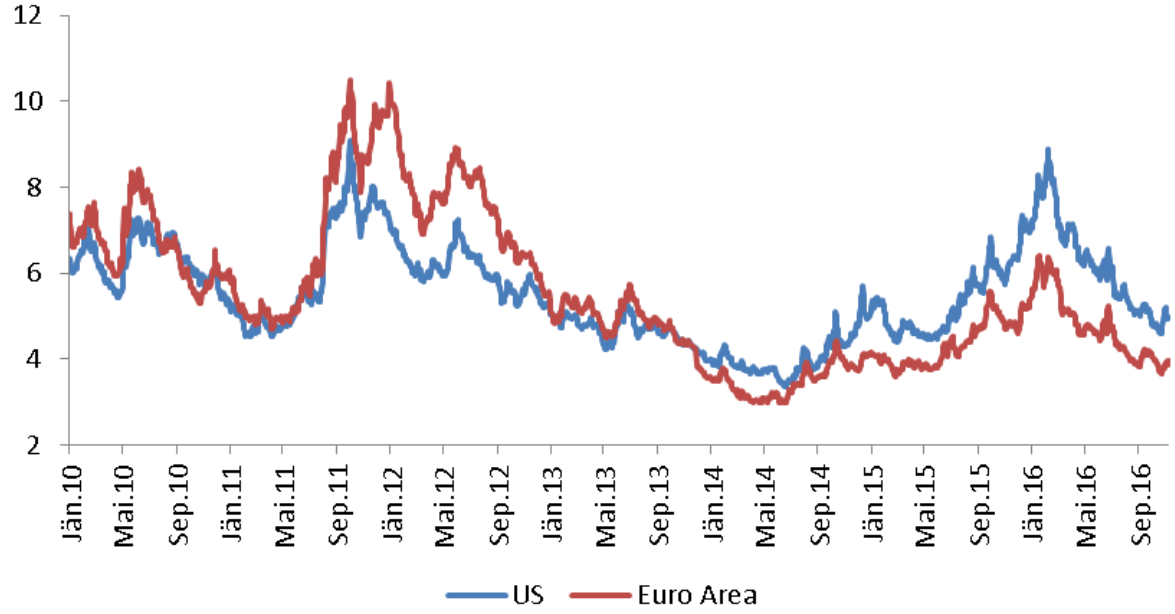
Figure 17: Net financial flows in the three euro-area groups (percent of GDP)





Source: Eurostat and Bruegel calculations

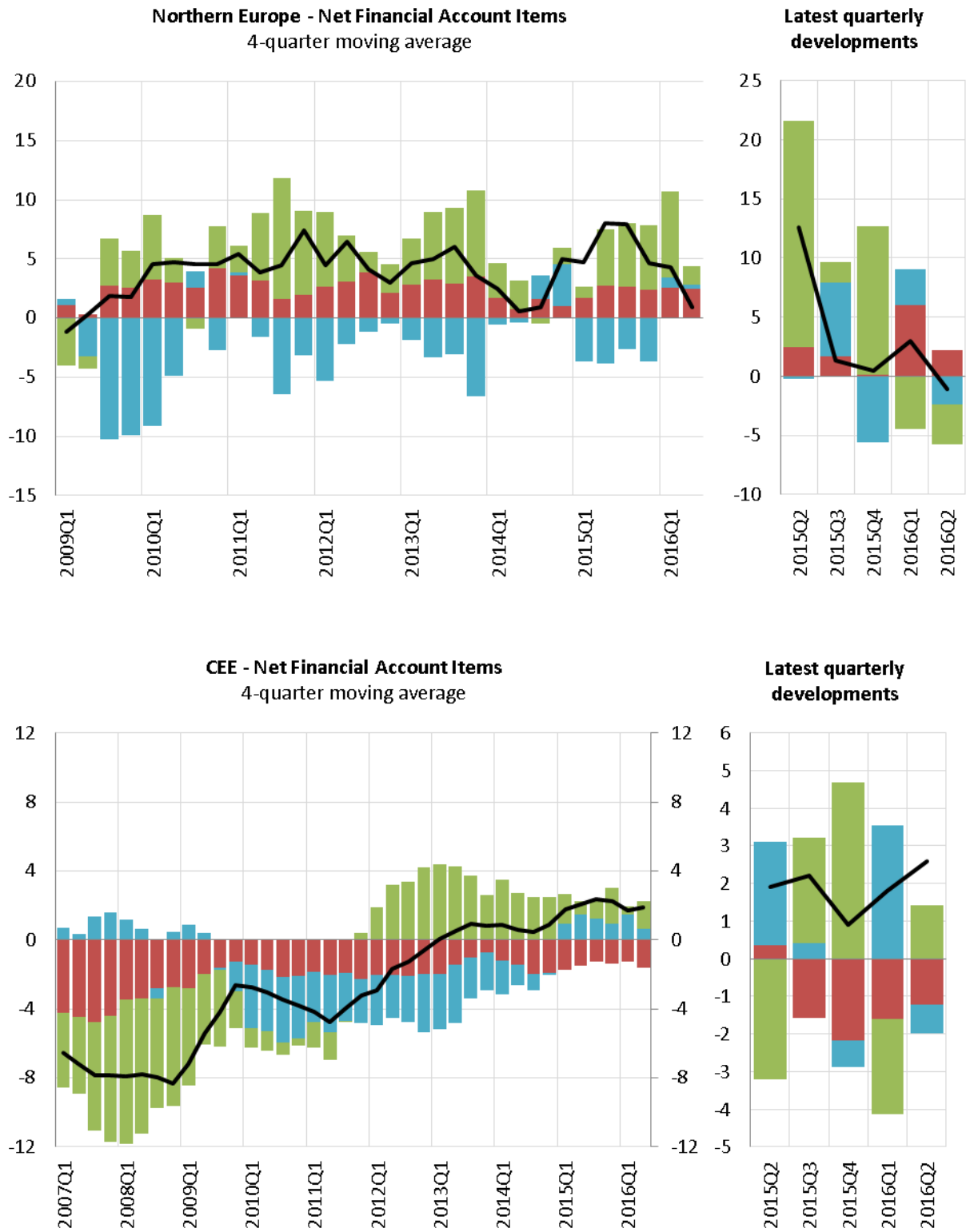
Figure 18: Risk premia in the euro area and the United States

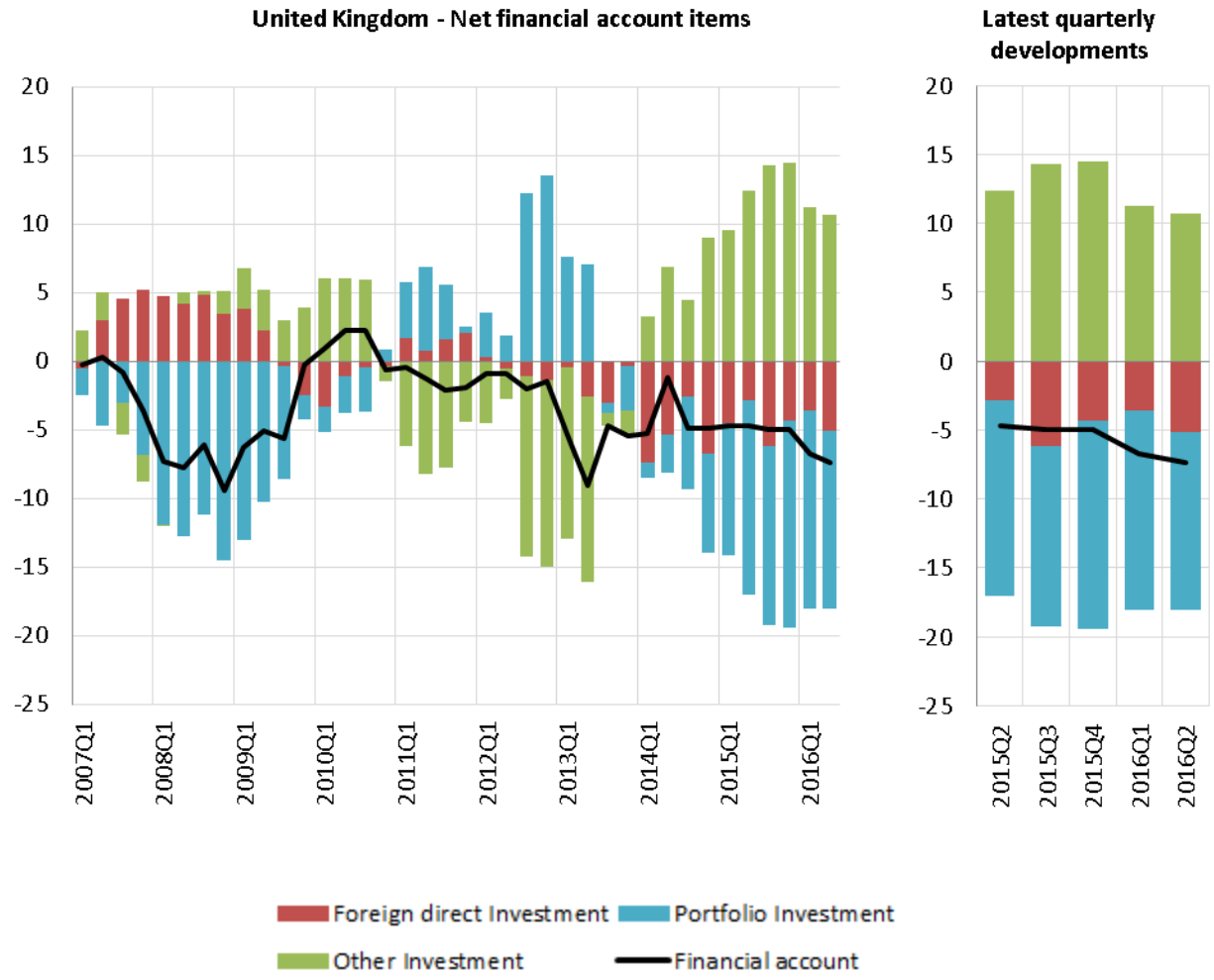


Source: BofA Merrill Lynch, BofA Merrill Lynch US High Yield Option-Adjusted Spread, FRED. Note: The BofA High Yield option-adjusted spread is defined as percentage point difference in yields between high yields bonds and Treasury bonds. Bonds rated equivalent to BB+ and below by Standard and Poor's and Fitch, and Ba1 by Moody's are classified as high-yield bonds, while bonds above this category are traded as investment grade bonds.

The **north of Europe** has been a net exporter of capital up until the end of 2007 (reflecting current account surpluses), a trend which reverted in 2008-2009 amid increasing inflows of capitals leaving the euro area in search of safety. This was particularly pressing for **Denmark** that eventually adopted monetary policy measures such as the negative rate on central banks deposits to curb the inflows it was undergoing (Hüttl, 2014). Over the latest period, net other investment outflows are decreasing in importance, while net portfolio investment turned from in- to outflows. The **UK** (Figure 19) experienced spiking inflows in 2007-2008, mostly in terms of portfolios, which were then abruptly reversed in 2009. Portfolio (and other) flows then disappeared for more than one year, finally coming back with the opposite sign. In 2014, portfolio investment inflows intensified; a trend which was reversed by 2015Q1.

Figure 19: Net financial flows in the three euro-area groups (percent of GDP)



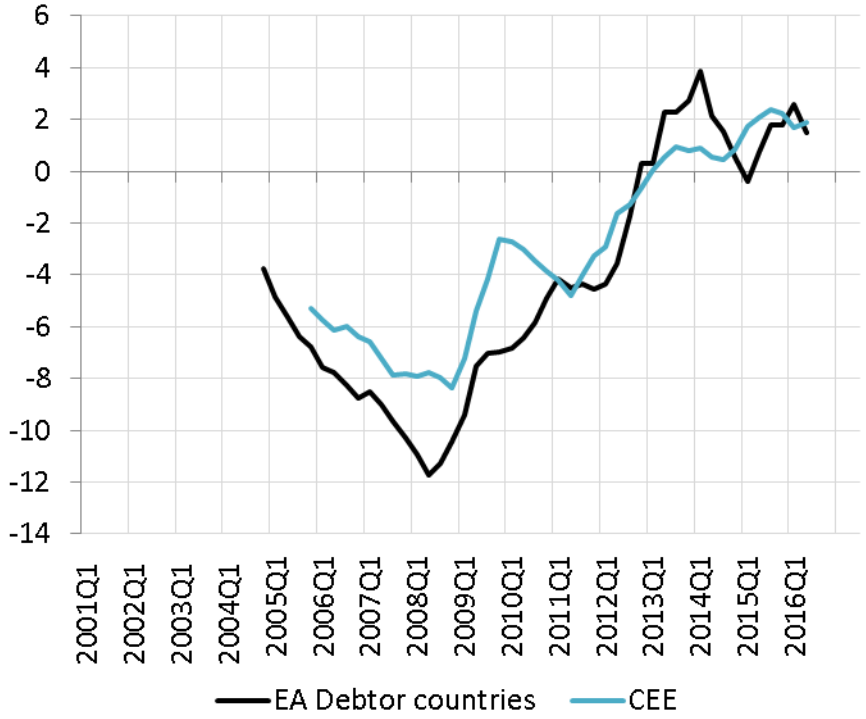


Source: Eurostat and Bruegel calculations.

Central Eastern Europe countries stand out as a different world. They experienced prolonged inflows of mainly direct investment, with capital moving 'downhill', mostly from rich EU15 countries to poorer CEE countries as highlighted by Becker et al. (2010). Parallel to this development, credit to the private sector increased rapidly before the crisis in the region too, fuelling a credit boom in the three Baltic States, Bulgaria and Romania (Darvas and Szapáry, 2008). By the end of 2011, other investment started outflowing, reflecting a massive withdrawal of banking funds from the region. CEE turned into a net exporter by 2013Q1, a trend which continued throughout the latest period.

The comparison with what happened in the euro area debtor countries (Figure 20) is striking. The euro area debtor countries accumulated a significantly larger financial account surplus before the crisis (almost 15 percent of the total group GDP), which then dropped during the crisis, though remained positive until late 2012. This was made possible by the provision of financial assistance and especially by ECB liquidity, which allowed a smoother adjustment on the external position than that which occurred in CEE countries, especially in the Baltics (Darvas, 2012a). Since 2013, the net financial account in the CEE stabilized somewhat, as other investment outflows stabilized, while the debtor countries continued to experience massive capital outflows. By the end of 2014, both regions saw falling net capital outflows, a trend which continued through 2015.

Figure 20: Net financial account of the euro-area debtor countries and Central and Eastern Europe (percent of GDP)



Source: Eurostat and Bruegel calculations. Note: the EA debtor countries include GR, PT, ES; CEE includes CZ, LV, LT, HU, PL, RO; SI and SK; Data is available from 1999Q1 to 2016Q2.

A major issue that arises is the composition of economic sectors in which debt-type capital inflows were actually unutilised in the euro-area debtor countries and in the new member states of the EU. For a further discussion of this topic and a survey of the literature, please refer to our last year's report (Darvas et al, 2015).

3.3 Net international investment positions (NIIPs)

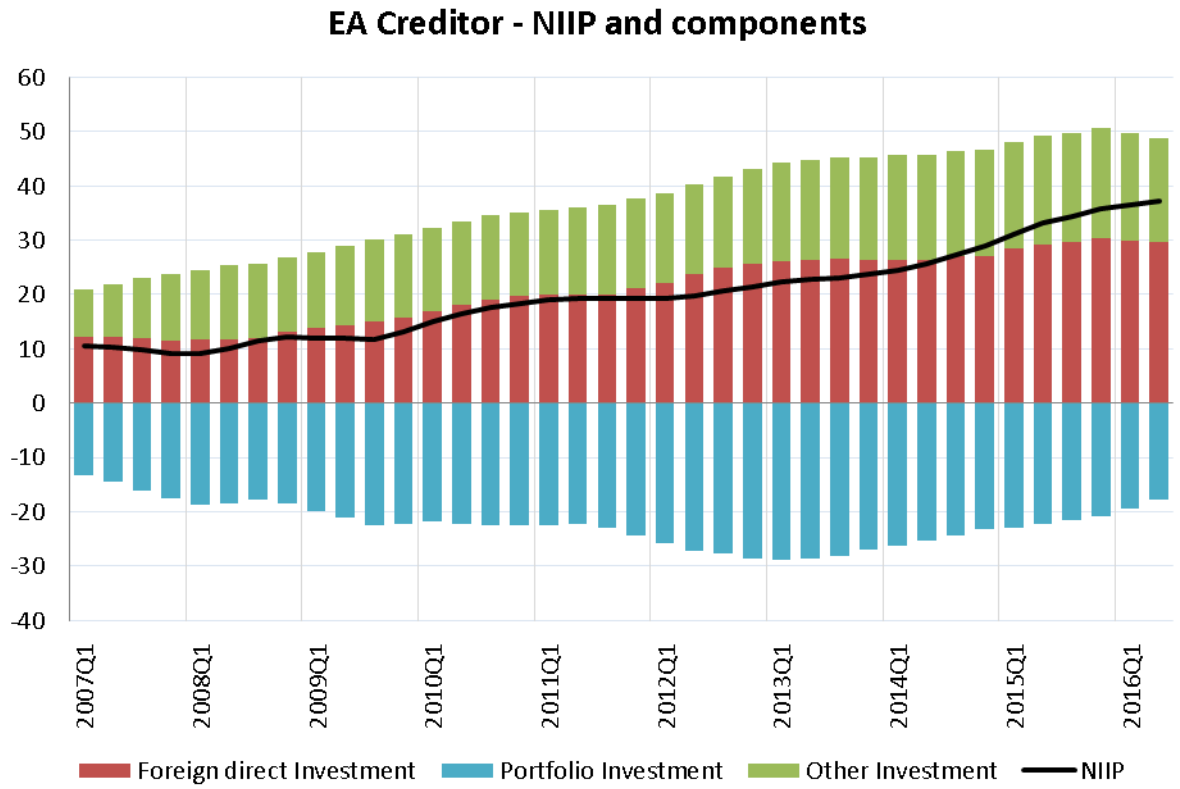
Turning to an analysis of the stock and valuation effects in the euro area and beyond, the following emerges:

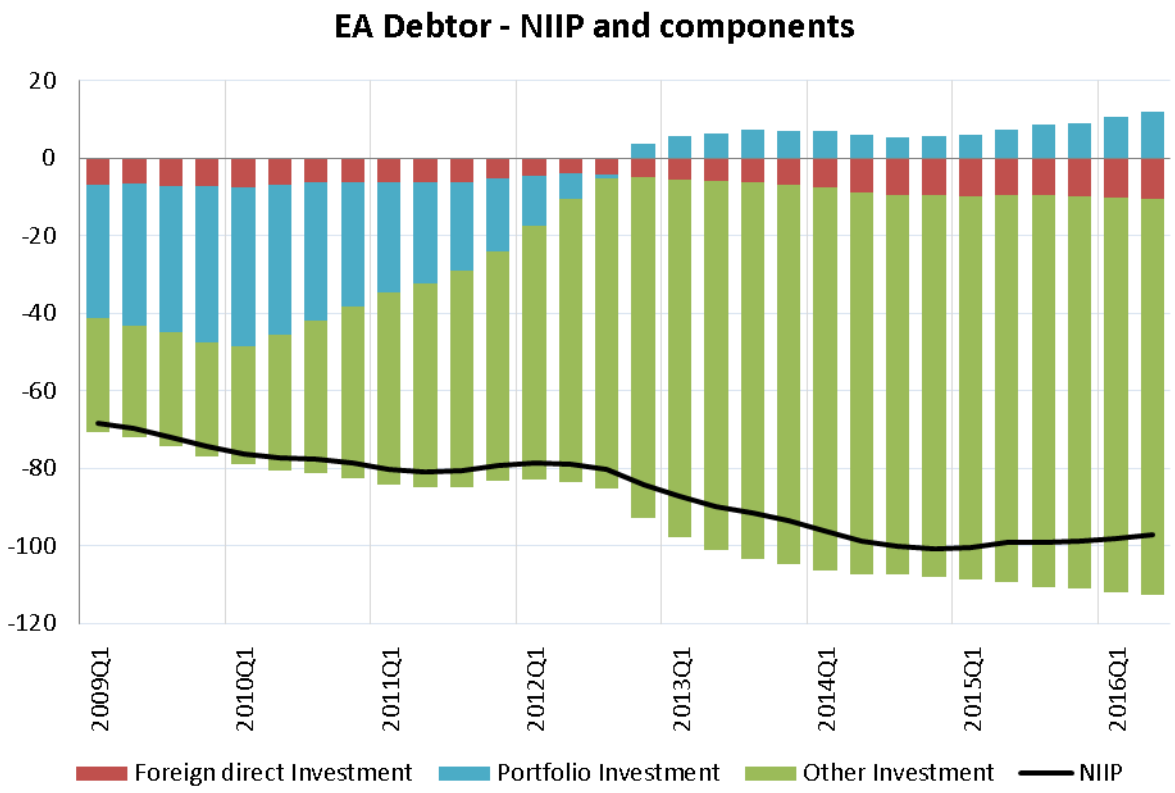
The prolonged period of current (and financial) account imbalances in the pre-crisis period resulted in the accumulation of large stock of external assets and liabilities for all the **euro area** groups as well as the **CEE** countries. **The UK** had a negative NIIP position of around 36 percent of GDP until 2010, but this has been considerably reduced over the last three years. **Northern Europe** moved closer to a balanced position by 2013. **Central Eastern European countries** stand out for the large negative NIIP, which has surpassed 80 percent of GDP in 2009 and has remained constant at that level since then.

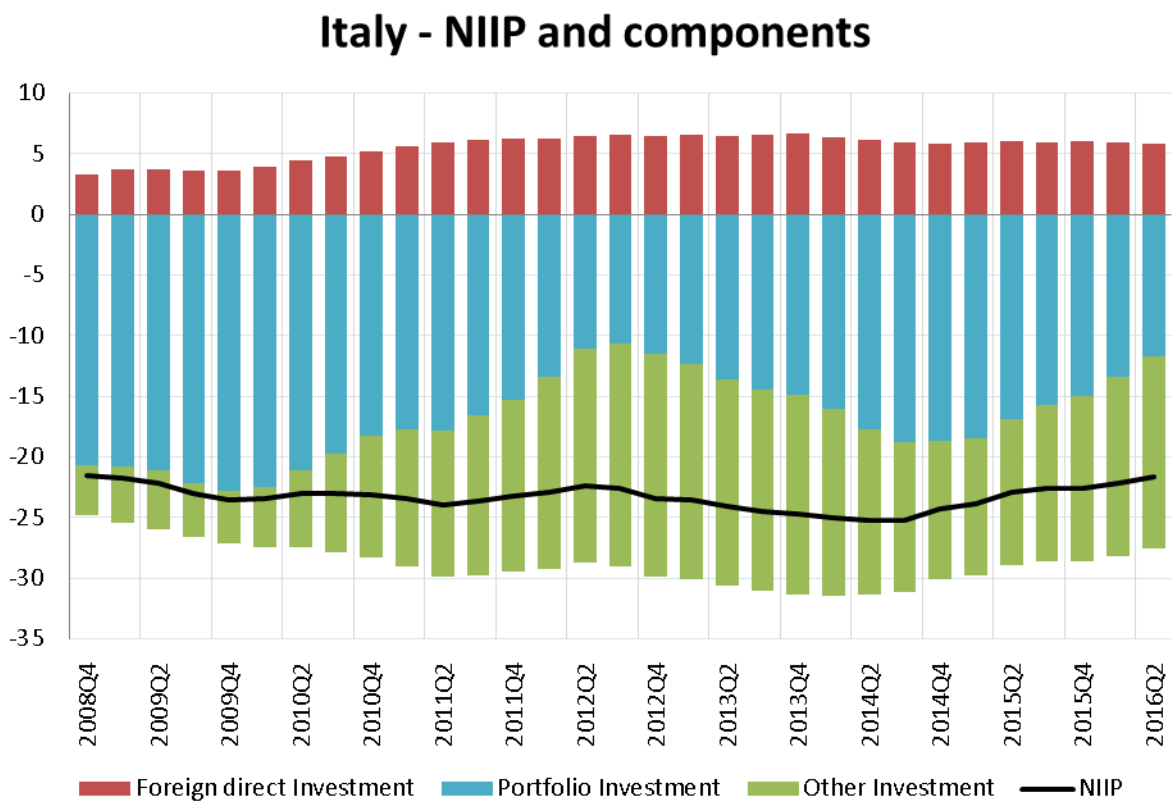
In terms of composition, the **euro area creditor countries** surplus is mostly accounted for by other investment (the most important part of it is cross-border bank loans) and direct investment. Portfolio equity and debt instead contributed negatively, reflecting the attractiveness of the euro area capital markets for foreign investors, which however have been declining since 2013. In the euro area debtor countries, accumulated portfolio investment liabilities have been declining since the start of the European debt crisis, and turned into assets by the end of 2012, while other investment liabilities grew in importance, and make up nearly all of the euro area debtor countries' negative NIIP

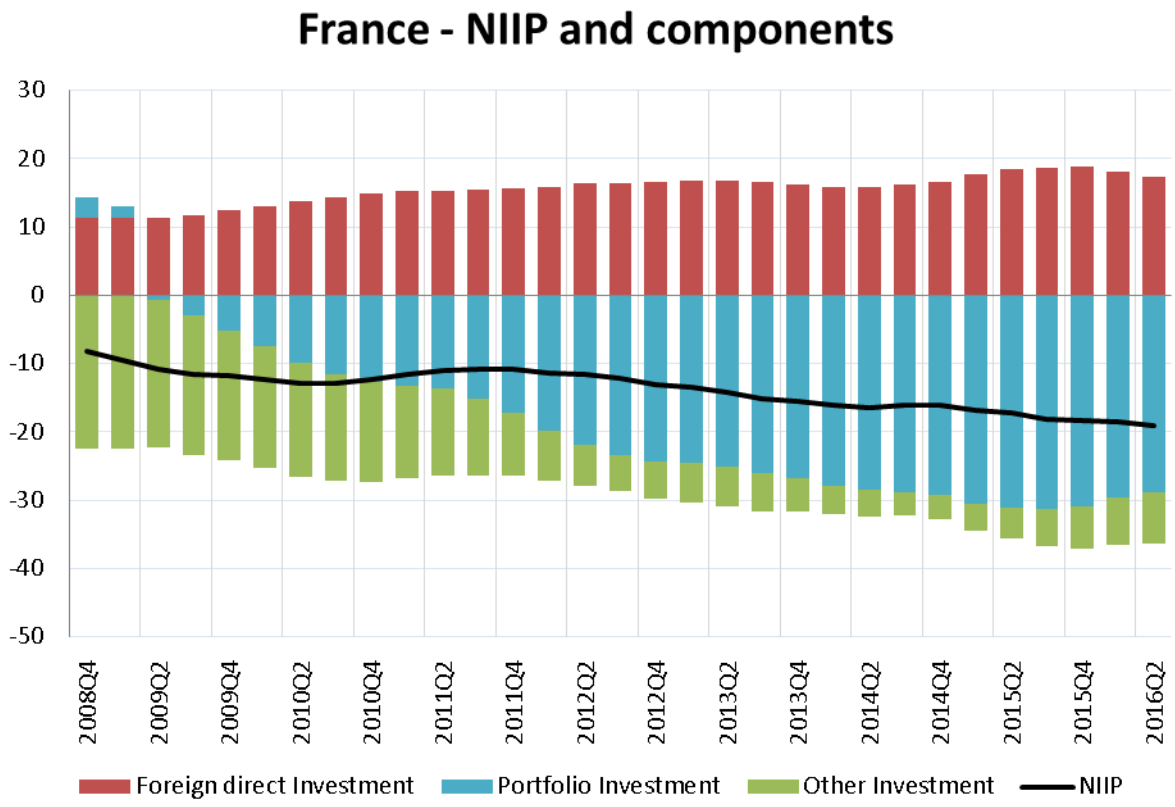
now. **France** and **Italy** also have a negative position but here the most important component is portfolio debt liabilities outstanding, followed by other investment liabilities, which have decreased their importance over the last 4 years, reflecting a deleveraging process.

Figure 21: Net international investment position the three euro-area groups (percent of GDP)




EA Debtor - NIIP and components
20
0
-20
-40
-60
-80
-100
-120
2009Q1
2010Q1
2011Q1
2012Q1
2013Q1
2014Q1
2015Q1
2016Q1
Foreign direct Investment
Portfolio Investment
Other Investment
NIIP

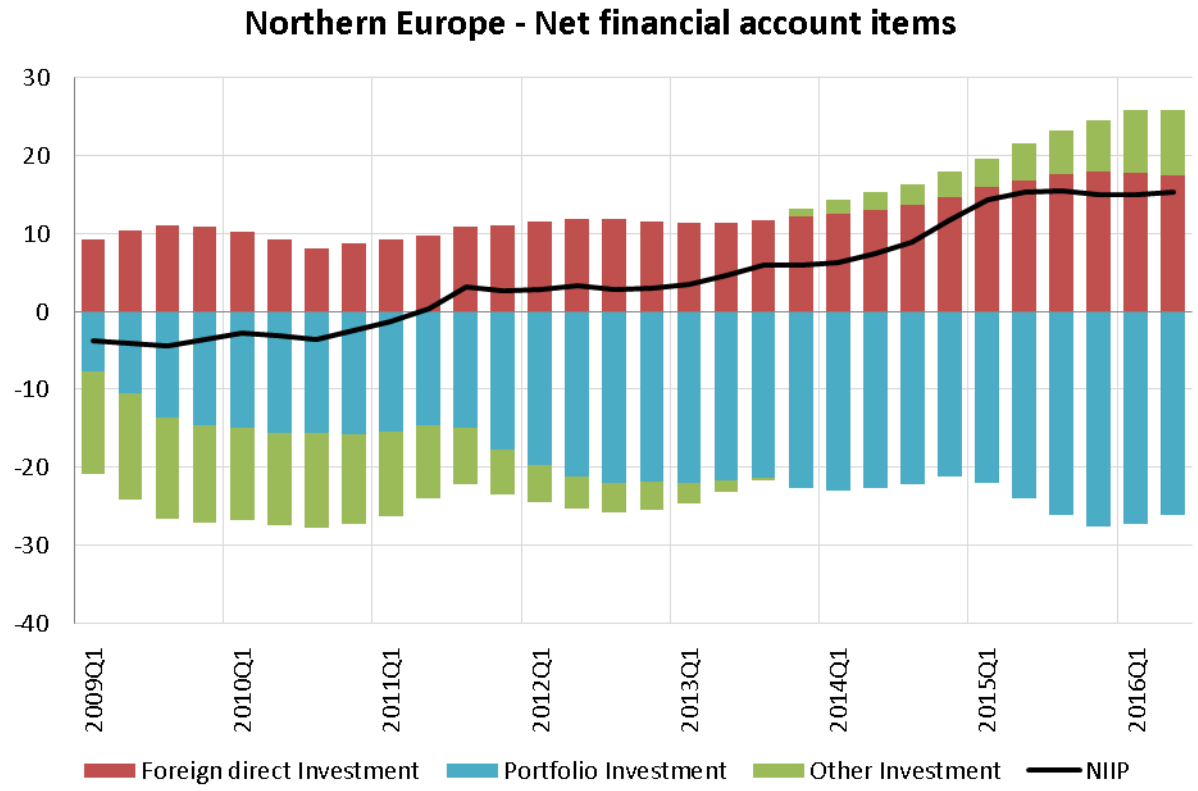


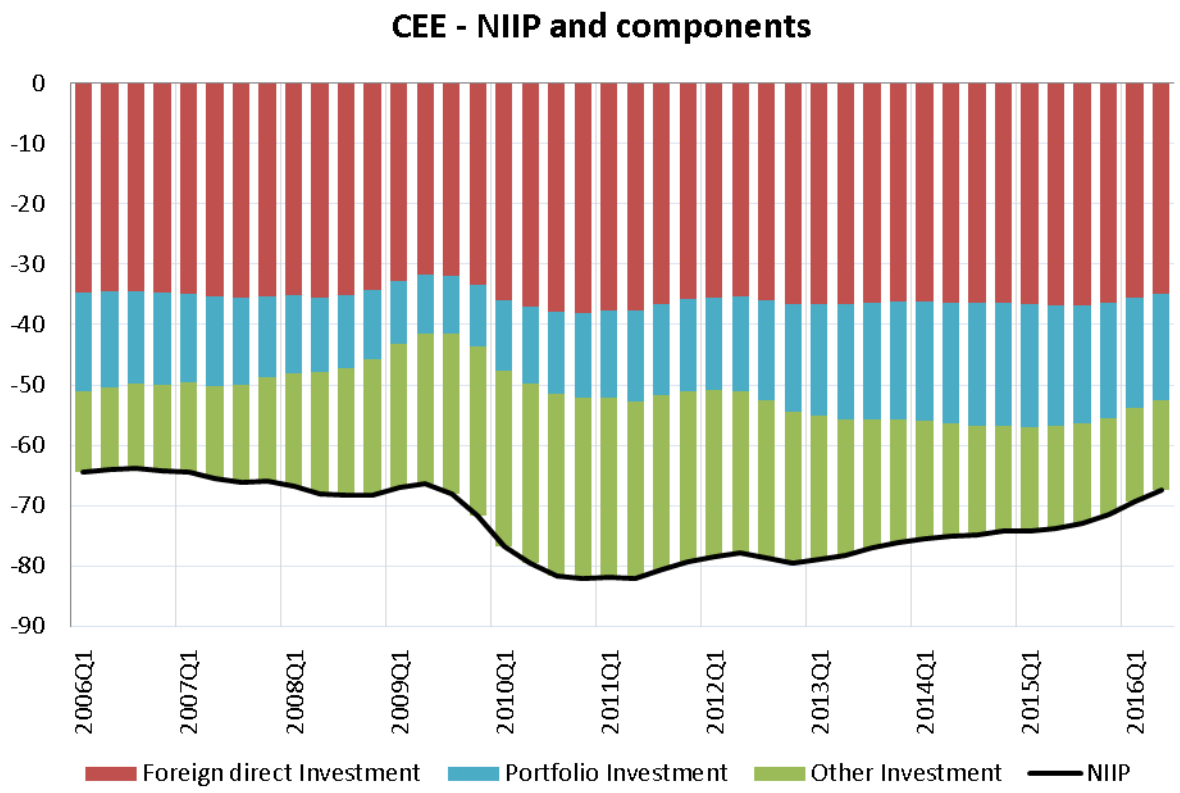


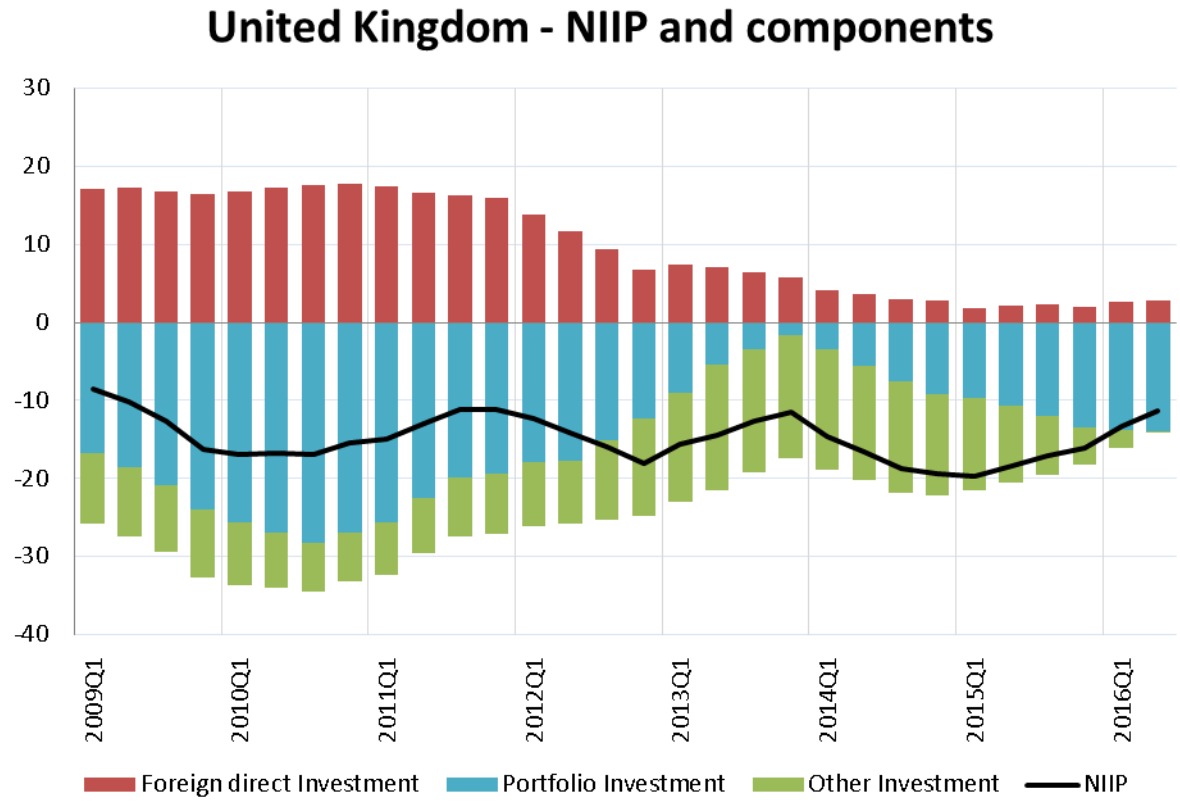
Source: Eurostat and Bruegel calculations.

Concerning the other groups of countries (Figure 22), the **North of Europe's** external negative NIIP is driven by portfolio debt, whereas the contribution of other investment stocks has been shrinking over time, and direct investments and portfolio equity investments are positive. The **UK** was in deficit in terms of all NIIP components apart from direct investment, which has recently almost rebalanced through a reduction of both assets and liabilities, suggesting a sizeable cross-border deleveraging. **CEE** exhibits net liabilities in all instruments and more than one-half of their NIIP liabilities are direct investment, while portfolio debt and other investment (including bank loans) share the remaining part. It is noteworthy that their net other investment liabilities decreased from about 23 percent of GDP in 2009Q4 to about 14 percent of GDP by 2015Q1, suggesting that foreign banks decreased significantly their exposure to the region.

Figure 22: Net international investment position of EU north, the UK and central and eastern Europe (percent of GDP)







Source: Eurostat and Bruegel calculations.

3.4 Cyprus, Greece and Iceland – capital flows and economic performances in times of capital controls

The imposition of capital controls, which is possible only in exceptional circumstances under EU law[10], makes Cyprus and Greece highly interesting cases for a bilateral analysis of their capital flows. Last year's report (Darvas et al, 2015) gave already a detailed description of the factors leading to the imposition of capital flows in those countries. This year, first we focus on bilateral capital flows to and from the respective countries, extending our analysis to Iceland. Second, we introduce a novel analysis of the impact of capital controls on the economic performance of Cyprus, Greece and Iceland.

3.4.1 Analysis of capital flows in times of capital controls

We focus on the three EEA countries that introduced capital controls: Cyprus (in 2013), Greece (in 2015) and Iceland (in 2008). In the cases of Cyprus and Iceland, quite some time has passed since the introduction of controls and both countries have left their assistance programmes, which allow a proper analysis. On the other hand, Greece has introduced capital controls only in summer 2015, a few months before its third financial assistance programme. This programme is still in place and a rather short time has passed since then. Moreover, Greek economic developments are influenced by the various impacts resulting from its two earlier and unsuccessful financial assistance programmes, which were agreed in 2010 and 2012, respectively, and therefore the experience with the Greek capital controls are rather limited. Still, for completeness we include Greece in the analysis.

A bilateral analysis of portfolio and other investment (banking) flows allows drawing an even more nuanced picture in term of exposure.

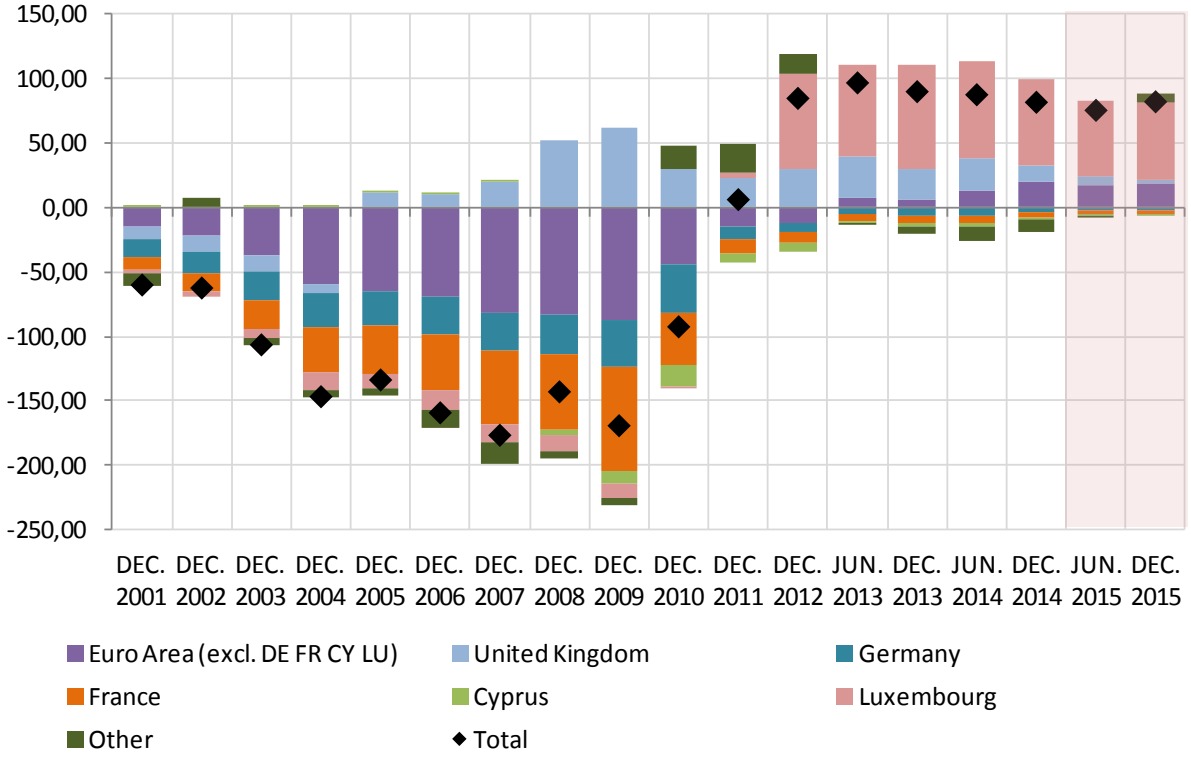
The net bilateral composition of portfolio investment of the three countries (Figure 23) reveals that Greece and Iceland experienced major inflows, while Cyprus experienced major outflows in the period before the outbreak of their respective crises. During that period, the euro area, and especially France and Germany increased their portfolio holdings vis-a-vis **Greece**. These flows contracted significantly with the outbreak of the Greek sovereign debt crisis in 2012, and stayed low thereafter. Indeed, net portfolio investment turned from liabilities to assets by end 2012, as non-residents moved out of Greek portfolio holdings. With the imposition of capital controls in 2015, total net portfolio investment contracted somewhat in June 2015, but returned to Dec 2014 levels by end 2015. **Iceland's** net bilateral portfolio investment position reveals a similar picture. While the Euro area, as well as the United Kingdom invested heavily in Icelandic securities in the run-up of the crisis, these flows subsided with the beginning of the financial turmoil in 2008. Capital controls were imposed in November of the same year. Inflows decreased thereafter, and stabilized at very low levels since Dec 2011. By Dec 2015, non-residents started increasing again their exposures vis-a-vis Iceland, on the back of a strong economic recovery. **Cyprus** recorded an accumulation of portfolio

[10] Article 63 of the Treaty on the Functioning of the European Union (TFEU), which is the main article on the freedom of capital movements, states that "*Within the framework of the provisions set out in this Chapter, all restrictions on the movement of capital [all restrictions on payments] between Member States and between Member States and third countries shall be prohibited.*" However, there are certain exceptions in the TFEU, which are summaries at this webpage: http://ec.europa.eu/finance/capital/framework/treaty/index_en.htm Moreover, there are also exceptions established by the case law of the Court of Justice of the European Union, based on exceptions stipulated in the Treaty, related to "*overriding requirements of the general interest*". In the case of Cyprus, the European Commission concluded that "*In current circumstances, the stability of financial markets and the banking system in Cyprus constitutes a matter of overriding public interest and public policy justifying the imposition of temporary restrictions on capital movements*.", see at http://europa.eu/rapid/press-release_IP-13-298_en.htm .

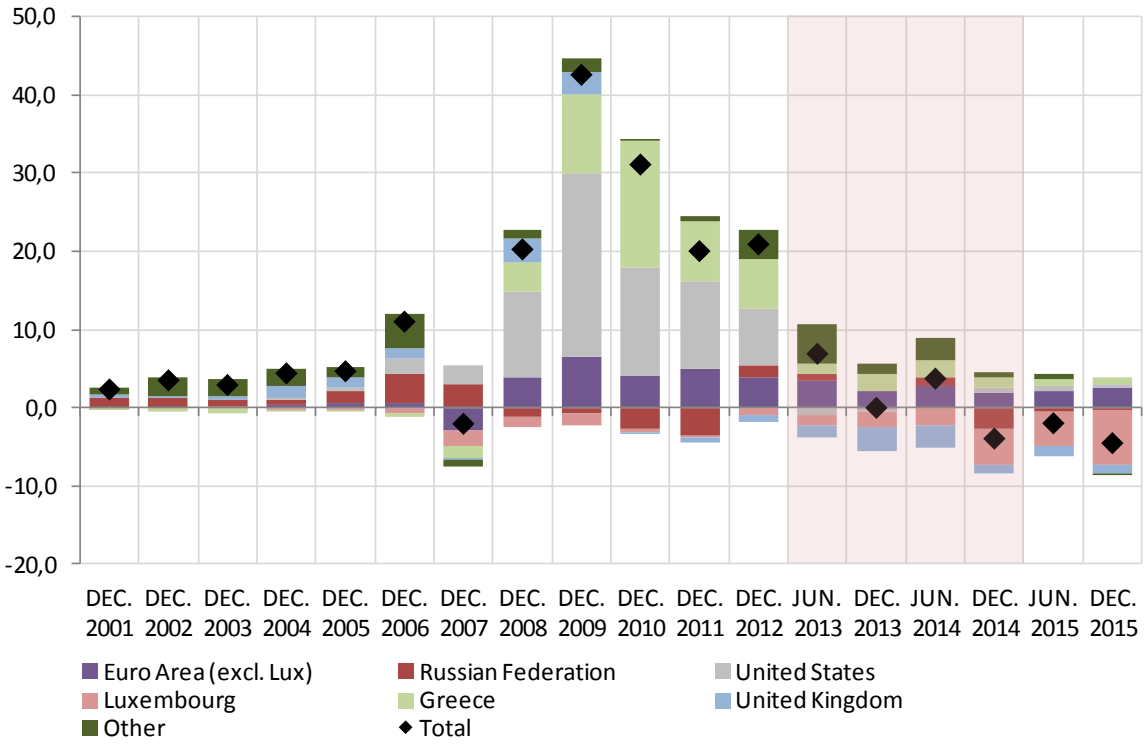
assets vis-à-vis Russia, United Kingdom and others in the run-up of the crisis. But especially during 2008-2011 resident investors purchased significant amounts of British and Greek securities. Flows to Greece started to diminish when the Greek crisis hit in 2010. In June 2012, a haircut of 53.5% was applied to the nominal value of Greek government bond holdings, which was even larger in net present value terms. This, together with the disposal of Cypriot banks' branches in Greece in 2013 reduced the financial links with Greece significantly. With the imposition of capital controls in March 2013, total net outflows somewhat diminished. Capital controls were abolished in April 2015, which coincided with a reverse of net portfolio flows, from liabilities to assets – over 2015, non-residents mainly from Luxembourg seem to be investing again in Cypriot securities.

Figure 23: Net portfolio investment positions of Greece, Cyprus and Iceland

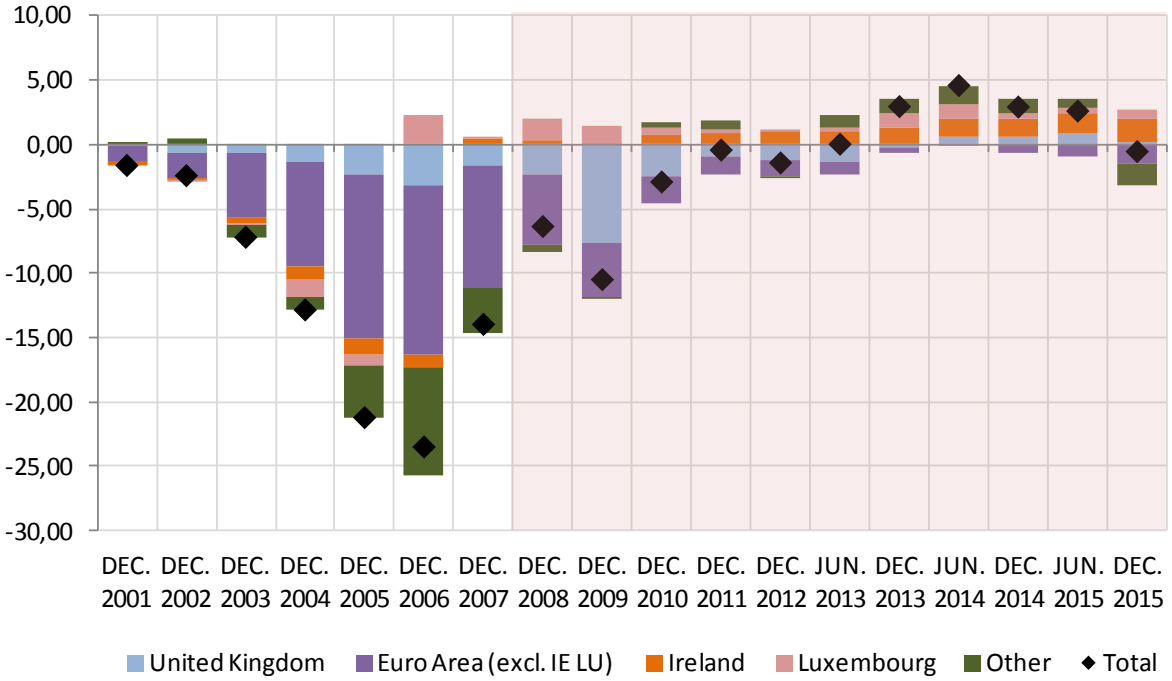
Panel A: Greece
(Billion USD)



Panel B: Cyprus
(Billion USD)



Panel C: Iceland
(Billion USD)

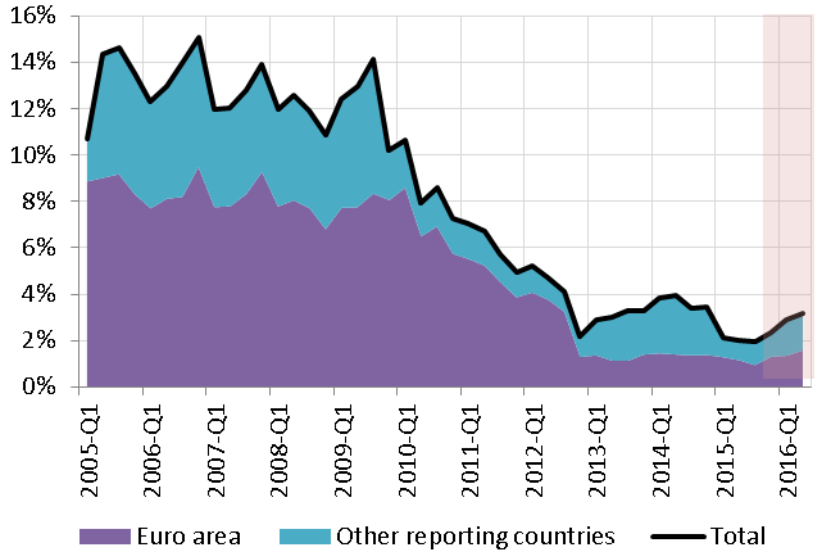


Source: IMF Coordinated Portfolio Investment Survey (CPIS); Note: Latest data available: December 2015. Red area indicates the duration of capital controls.

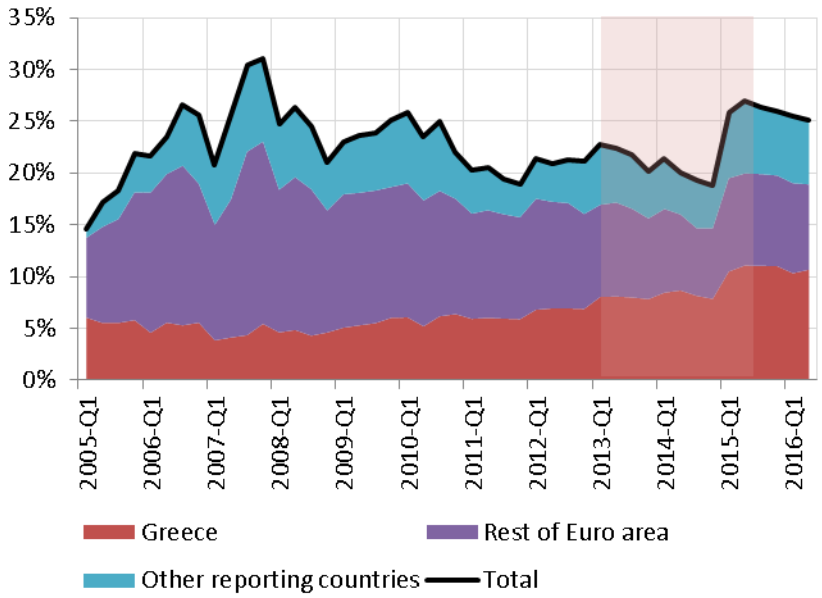
Other investment banking flows are captured by the **BIS consolidated banking statistics** exhibit a significant exposure of Euro area banks to **Greece** before the start of the crisis (Figure 24 Panel A). With the start of the financial crisis, and the subsequent Greek crisis in 2010, Greece was subject to substantial cross-border deleveraging from Euro area, as well as from other reporting countries. The decline stabilized turned to a moderate increases in 2013, before a new deleveraging started in early 2015, on the back of renewed tensions in the Greek negotiations process between the new Syriza-led government and Greece's official creditors. However, after the third financial assistance programme agreed in summer 2015, Syriza was re-elected to power in autumn 2015 and the third financial assistance programme started to being implemented, a recovery in banking claims on Greece started in late 2015, which continued in early 2016. This development suggests improvements in the confidence in the Greek economy. In terms of **banking exposure to Cyprus**, Panel B in Figure 24 reports that Greece, the rest of the euro are and other reporting countries increased their exposure until the start of the financial crisis in 2008, contrary to Greece no major drop in exposure can be observed with the start of the crisis. Greek banks continued to increase their exposure slowly over the whole period, while the rest of the euro area steadily decreased it. The events unfolding during winter/spring 2013 accelerated this trend, and led to a major drop of banking claims on Cyprus. Relative stabilization of cross-border deleveraging that can be observed throughout 2014. Interestingly, when the capital controls were lifted in April 2015, banking claims on Cyprus increased again and stabilize over the rest of 2015 on significantly higher levels. Panel C in Figure 24 shows banking exposure to Iceland, which was reduced quite significantly since the financial crisis in 2008 and the imposition of capital controls, and stayed low thereafter.

Figure 24: Net Foreign Banking exposures to Greece, Cyprus and Iceland

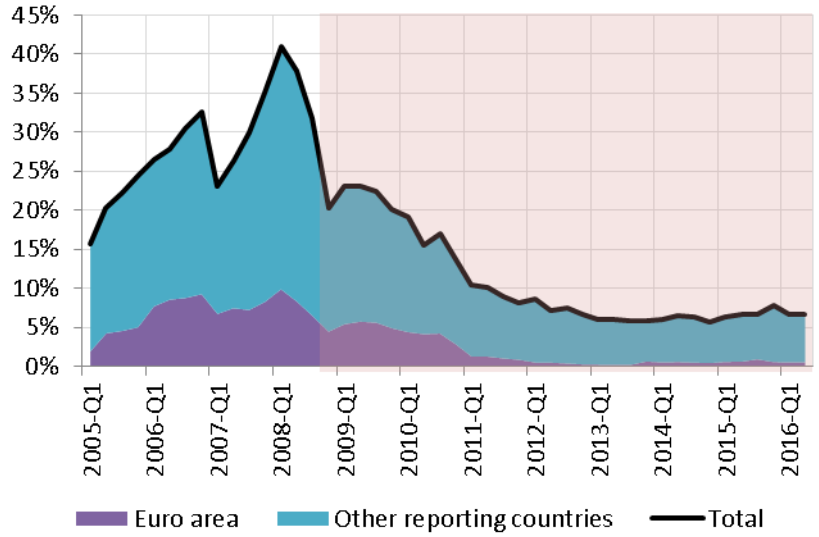
Panel A: claims on Greece
(in percent of GDP)



Panel B: claims on Cyprus
(in percent of GDP)



Panel B: claims on Iceland
(in percent of GDP)



Source: BIS, Consolidated Banking Statistics, ultimate risk basis. GDP: Eurostat.

Overall, the imposition of capital controls in both Cyprus and Iceland led to a moderation of both portfolio and banking flows. Interestingly, as capital controls were lifted in April 2015 in Cyprus, a major increase in foreign bank claims could be observed, as investment could flow again into the country without restrictions. As highlighted in DG ECFIN (2016), Cyprus has exited successfully the financial assistance programme, stabilizing its banking sector. However, investment is still depressed, as high corporate debt is weighting on it, and the share of NPLs needs still to be addressed.

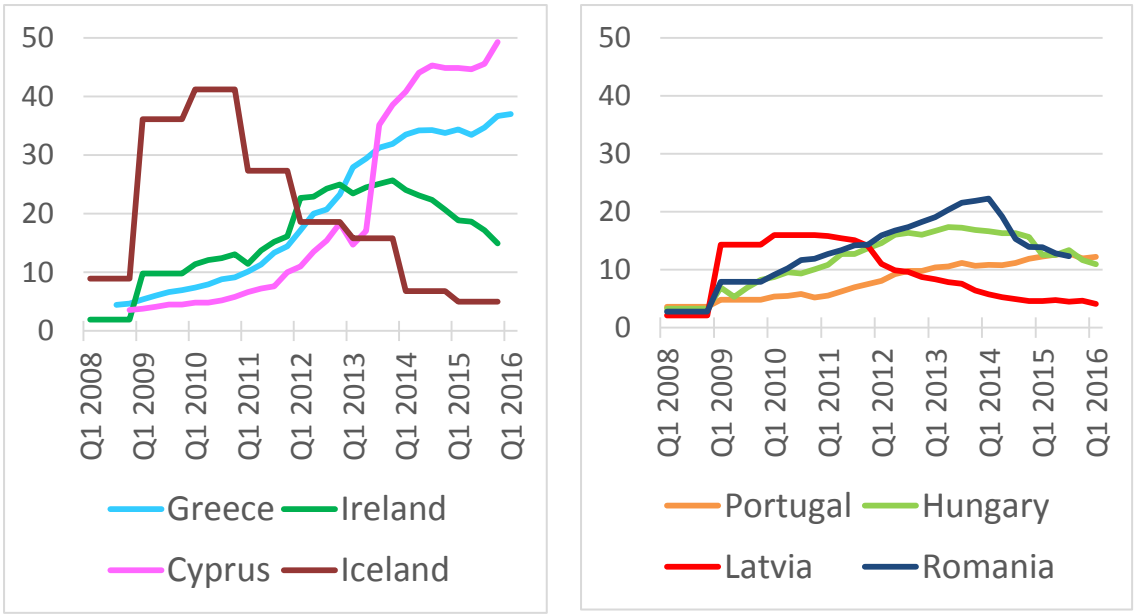
Figure 25 shows that the share of NPLs increased from 18% at the end of 2012 to 38% by the end of 2013 and even further to 49% by the end of 2015. Unfortunately, documents of the financial assistance programme issue at the inception of the programme did not include NPL projections and therefore we do not know whether such

a large increase was foreseen or not. In any case, the large increase in NPLs may be assessed two ways:

- if there are debtors who would be able to pay for their loans, but deliberately do not pay, then the increase in NPLs may have boosted consumption and thereby economic recovery;
- but if the increase in NPLs was not deliberate from the side of debtors, but reflect their difficult financial situation, then the increasing NPLs may in fact be associated with weaker economic developments.

Regarding Iceland, the share NPLs suddenly increased to 41% by 2010, after which the ratio has been steadily falling (Figure 25), suggesting that the balance sheets of both banks and private borrowers are improving. IMF (2015) points out that re-integrating the Icelandic financial sector with global financial markets remains a challenge, linked to the lifting of capital controls. In April 2016, Iceland took a large step toward that direction, by substantially loosening restrictions on in- and outflows. For Greece, no real conclusions can be drawn on the impacts of capital controls on financial flows and NPLs, as the period in consideration is too short. We only note that NPLs were already very high by the inception of the third financial assistance programme in 2015.

Figure 25: The share of non-performing loans in some financial assistance countries



Source: IMF Financial Soundness Indicators, available at: http://data.imf.org/?sk=9F855EAE-C765-405E-9C9A-A9DC2C1FEE47&sId=1390030341854 and Central Bank of Iceland Financial Stability report http://www.cb.is/publications/publications/publication/2016/04/20/Financial-Stability-2016-1-published/ .
Note: quarterly data is not available for Ireland, Portugal and Romania in 2008 and 2009; Latvia in 2008, 2009, 2010; Hungary in 2008; and Iceland for all years: for these years, the corresponding annual data is indicated in each quarter.

3.4.2 The impact of capital controls on economic performance in Cyprus, Greece and Iceland

It is difficult to assess the impact of capital controls on macroeconomic developments, because such a task would require a sufficiently comprehensive macro-financial model in which a counterfactual 'no capital control' scenario could be simulated. However, it is worthwhile to compare economic developments in countries that introduced capital controls with those which have not, even if such a comparison has limitations.

We compare the Iceland (where capital controls were introduced in 2008), Cyprus (2013) and Greece (2015) to the following group of countries which also received financial assistance in 2008-2011 (in brackets we indicated the year of the financial assistance programme)[11]:

- **EU6**. Six European Union countries, which have not introduced capital controls: Greece (2010), Hungary (2008), Ireland (2010), Latvia (2009), Portugal (2011) and Romania (2009).
- **NEU10**. Ten non-EU countries, in which there remained a high level of capital account openness as measured by the Chinn-Ito index[12]: Armenia (2009), Dominican Republic (2010), El Salvador (2009), Georgia (2008), Guatemala (2009), Jamaica (2010), Mongolia (2009), Serbia (2009), Seychelles (2008) and Sri Lanka (2009).
- **NEU6**. Six non-EU countries, in which there is a low level of capital account openness and/or tight new controls were introduced: Belarus (2009), Bosnia and Herzegovina (2009), Honduras (2008), Moldova (2010), Pakistan (2008) and Ukraine (2008).

Since there are problems with all possible ways to compare the actual outcomes of countries that had different starting positions, faced different shocks and agreed to their financial assistance programmes at different points in time, we report three indicators.

Indicator 1: Actual developments

We start with comparing actual GDP and unemployment developments.

- However, comparison of actual developments is distorted by various factors, such as different initial conditions within the country itself and different global economic environment. The different type and size of the economic/financial shocks that hit the countries at inception of the financial assistance programme should also have had differentiated impacts on the economy. For example, one may argue that shock in Cyprus in 2013 was huge, given that the size of the financial system relative to GDP was extremely large. But at the same time

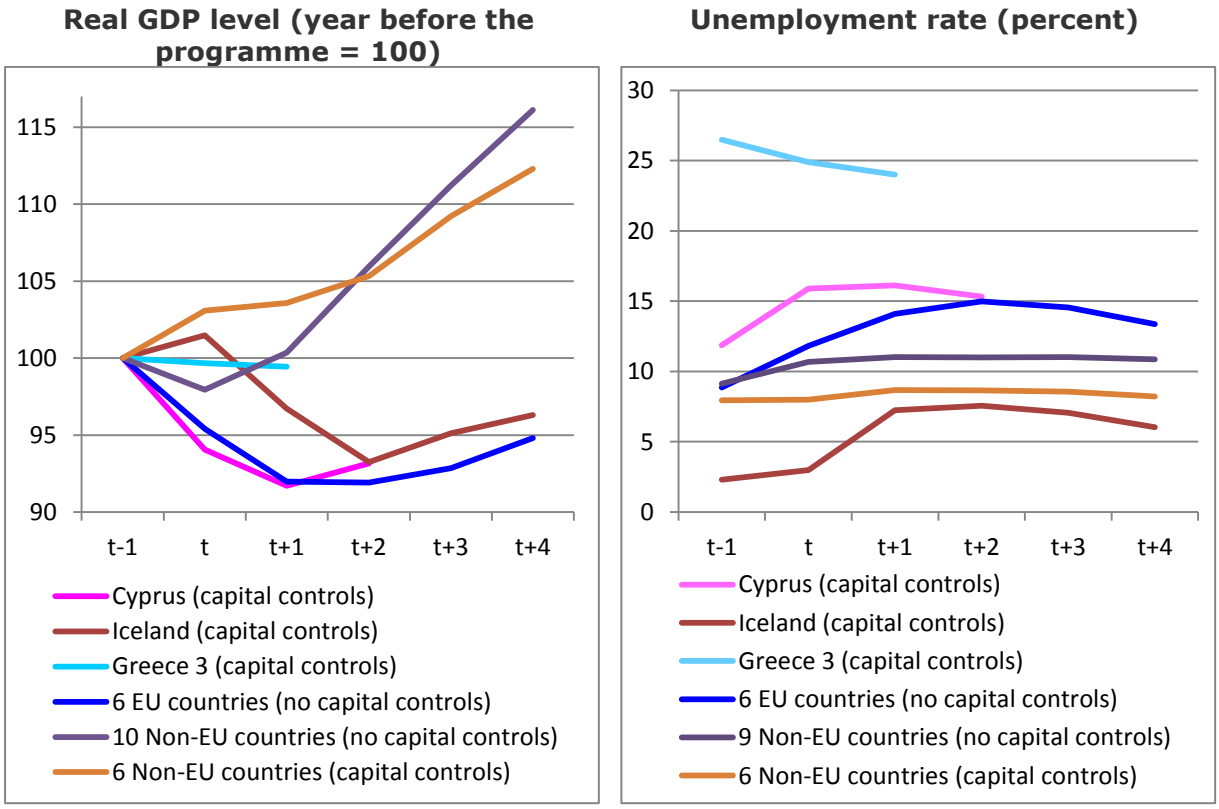
[11] Our data source for actual GDP and unemployment rate data is from the April 2016 dataset of the IMF's World Economic Outlook. For Greece, where capital controls were introduced in 2015, we use the June 2016 OECD forecasts in order to be able to report the expected developments in 2016. The sources of programme assumptions are the IMF country reports issued at the inception of the financial assistance programme. The IMF does not participate in the third financial assistance programme for Greece and thereby we use the European Commission's brief debt sustainability analysis, which includes information on planned GDP developments (but no information is available on planned unemployment developments), which is available here: http://ec.europa.eu/economy_finance/assistance_eu_ms/greek_loan_facility/pdf/debt_sustainability_analysis_en.pdf .

[12] We used the updated dataset of Chinn and Ito (2006) to separate 'no capital control' and 'capital control' countries. The dataset is available at: http://web.pdx.edu/~ito/Chinn-Ito_website.htm

European and global economic developments improved compared to earlier financial assistance episodes in 2008-09.

Keeping these problems in mind, Figure 5 shows that GDP developments in Cyprus were broadly similar to developments in EU6, while Iceland and Greece (under its third assistance programme) did much better. However, GDP developments of non-EU countries were extraordinary (at least on average) compared to EU financial assistance countries: there was no recession in capital control countries and only a minor recession in non-control countries, while both groups had a GDP level of about 10% above the pre-assistance level by three years after the inception of the assistance programme. Clearly, crises outcomes in the EU/EEA were much worse. Changes in the unemployment rate reveal a broadly similar picture.

Figure 26: Actual real GDP and unemployment rate developments in financial assistance countries



Source: Bruegel calculation based on the April 2016 World Economic Outlook of the IMF. Note: t in the horizontal axis indicates the starting year of the financial assistance programme. See information about the country groups in the main text.

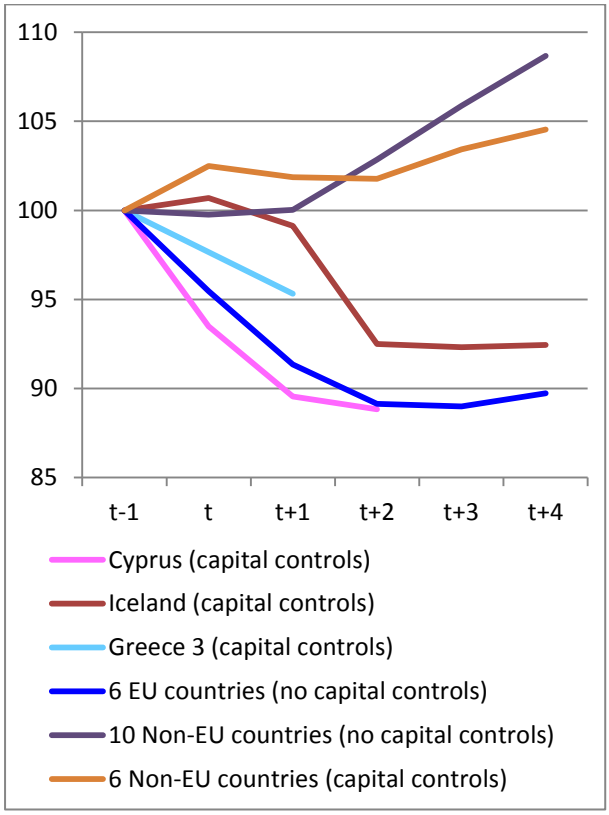
Indicator 2: Home GDP developments relative to GDP developments of the rest of the world

- For this indicator we calculate the weighted-average GDP of 67 main trading partners, deriving separate weights for each country depending on the geographical distribution of their foreign trade.
- This indicator considers the external environment, which is especially important for small open economies.
- A key weakness of this comparison is that the size of the banking system relative to GDP was much higher in Cyprus and Iceland than in other financial assistance

countries, and both countries suffered from a systemic banking crisis. Thereby, the negative impact of the banking crisis on the economy may have been larger than in other countries that have not suffered from a systemic crisis of an oversized financial system.

Figure 27 shows that GDP of Cyprus developed slightly worse than the GDP of EU6 countries relative to trading partners' GDP, yet as we argued above, the shock in Cyprus may have been larger than in other countries. On the other hand, Iceland, and so far the third financial assistance programme of Greece, outperforms EU6 countries. This indicator also shows that non-EU countries did particularly well in comparison to EEA countries.

Figure 27: Real GDP level: gap relative to GDP of trading partners in financial assistance countries (year before the programme = 100)



Source: Bruegel calculation based on the April 2016 version of the IMF's World Economic Outlook (GDP), while we derived the weighted based on Bayoumi, Lee and Jaewoo (2006). Note: t in the horizontal axis indicates the starting year of the financial assistance programme. See information about the country groups in the main text. For each country, we calculated the weighted-average GDP of 67 main trading partners, deriving weights from the geographical distribution of their foreign trade on the basis of the matrix derived by Bayoumi, Lee and Jaewoo (2006).

Indicator 3: GDP and unemployment developments relative to the assumptions made at the inception of the financial assistance programme[13]

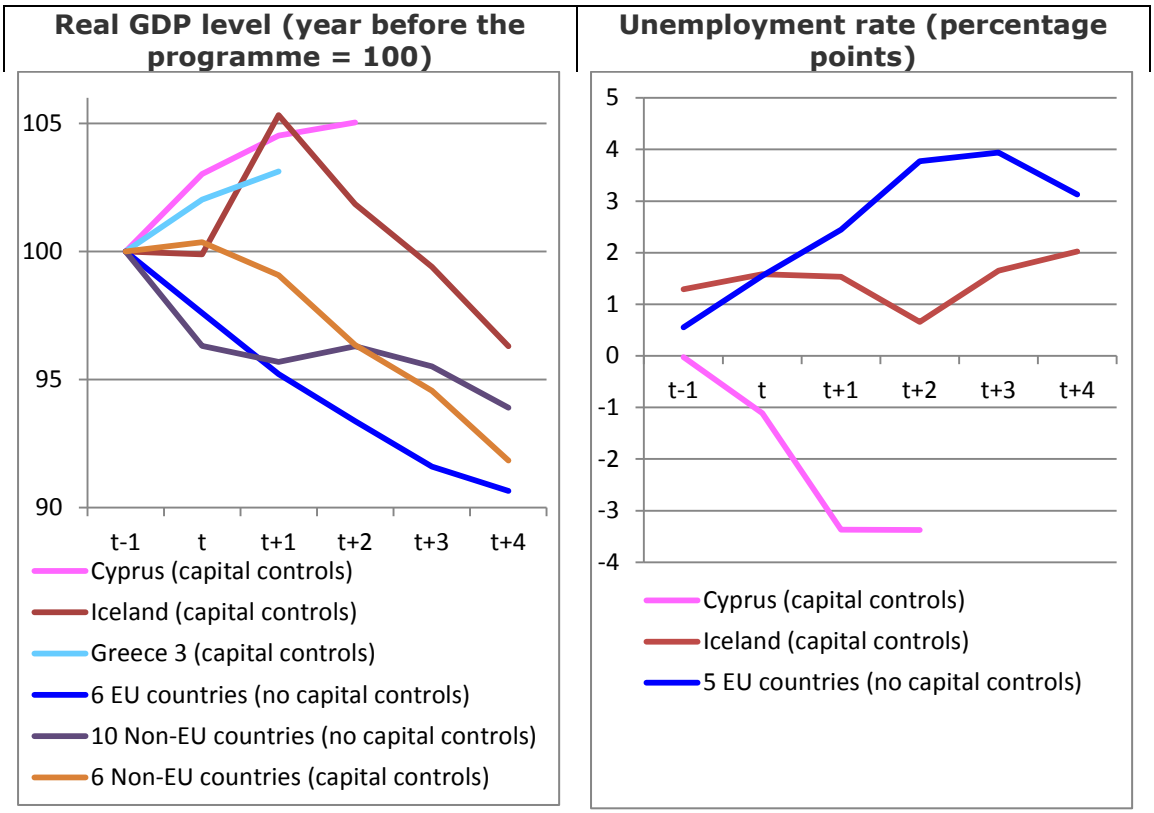
[13] Programme assumptions were collected from the IMF country reports which accompanied the decisions to grant financial assistance. The third Greek programme is not financed by the IMF and therefore there was no IMF country report: for this programme, the European documents were highly non-transparent as regards the assumptions. The published brief debt sustainability analysis (http://ec.europa.eu/economy_finance/assistance_eu_ms/greek_loan_facility/pdf/debt_sustainability_analysis_en.pdf) included GDP growth assumptions from 2015 to 2018.

- This indicator considers country-specific circumstances and therefore should be superior to the two simpler indicators discussed above.
- However, a key problem with this indicator is that it must have been difficult to assess the impact of capital controls at the inception of financial assistance programmes, which may have led to more pessimistic projections for countries in which capital controls were introduced than for countries in which capital controls were not introduced. Moreover, by realising that most assumptions made in the 2008-10 financial assistance programmes were too-optimistic, the 2013 Cypriot programme may have been calibrated on the basis of more pessimistic assumptions. Yet this latter problem does not arise for Iceland, which was among the first countries in 2008 to apply for financial assistance.

It is notable on Figure 28 that as regards GDP, all three EEA capital control countries outperformed their programme assumptions (in the case of Iceland, only up to 3 years after the programme), while other countries, including non-EU countries, underperformed on average. As regards unemployment, in Cyprus the actual unemployment rate became smaller than what was assumed in the programme (thereby the values are negative). For Iceland, there seems to be an upward revision in the unemployment rate, because even in year t-1 (i.e. 2007), the unemployment rate was more than 1 percentage point higher than in the programme assumption. Yet even with this upward revision, Iceland performed better than the EU6 (excluding Hungary) relative to programme assumptions[14].

[14] Unfortunately, unemployment projections are not available for the third Greek financial assistance programme, nor for most non-EU countries.

Figure 28: Real GDP and unemployment rate in financial assistance countries: gap between actual developments and programme assumptions



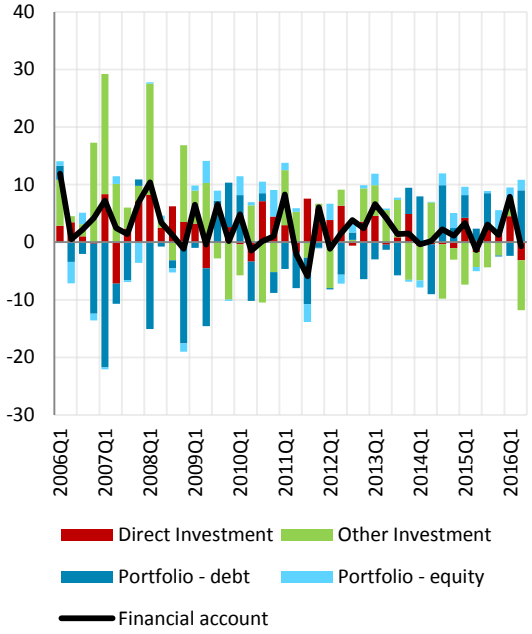
Source: Bruegel calculation based on the April 2016 version of the IMF's World Economic Outlook and IMF programme documents published at the inception of the financial assistance programmes. Note: t in the horizontal axis indicates the starting year of the financial assistance programme. See information about the country groups in the main text. The group of 5 EU countries on the right panel does include Hungary, because unemployment rate projection was available only up to 2009. The third Greek programme is not included in the right panel, because no public document included information on the expected unemployment rate developments.

Overall, while we do not have a sufficiently comprehensive macro-financial model to assess the impacts of capital controls and all three comparisons we conducted have certain drawbacks, our results suggest that the introduction of capital controls in Iceland (2008), Cyprus (2013) and Greece (2015) was not associated with unfavourable economic performance relative to the other EU countries. And in the case of our most preferred indicator, developments relative to programme assumptions, all three capital control EEA countries outperformed, while other financial assistance countries (both inside and outside the EU) significantly underperformed.

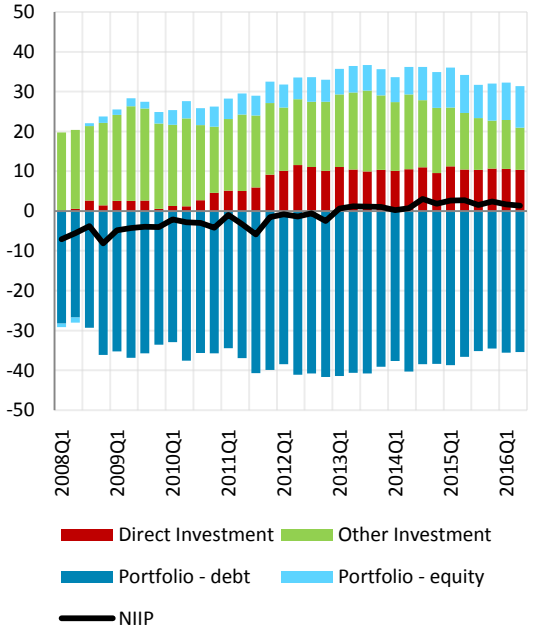
3.5 Annex to Chapter 3: country-specific data

Figure 29: Financial account and net international investment position of EU countries

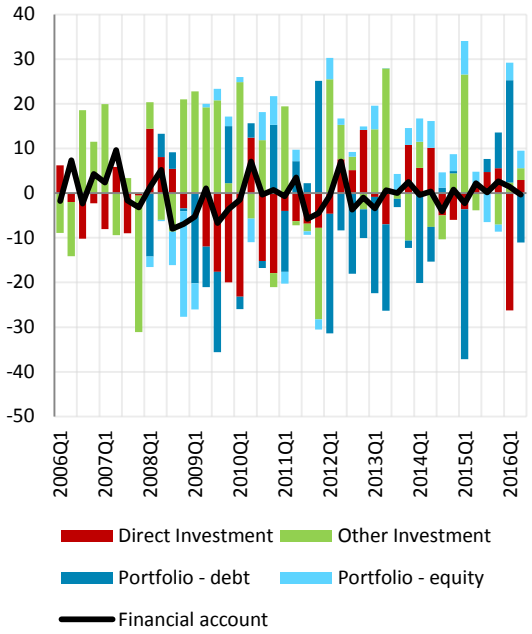
Austria - Financial Account - net components (% of GDP)



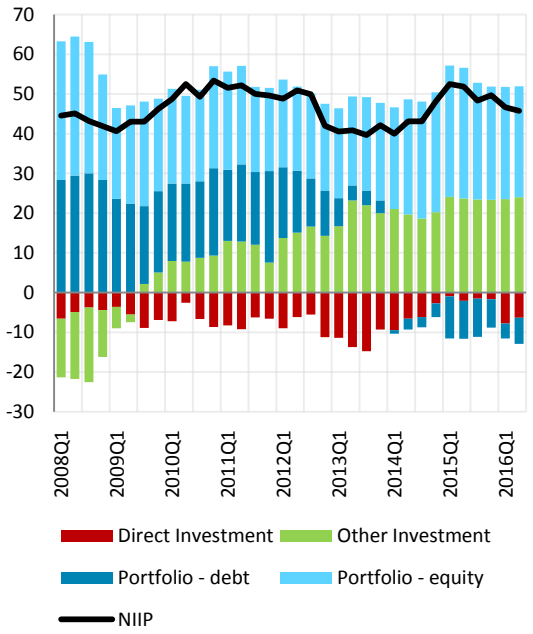
Austria - Net International Investment Position net components (% of GDP)



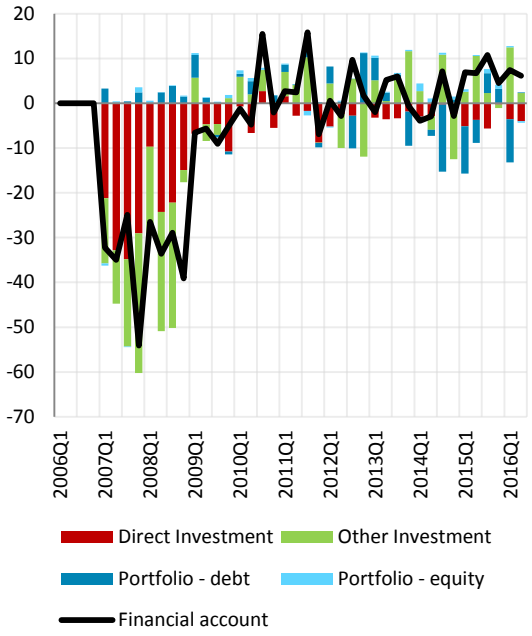
Belgium - Financial Account - net components (% of GDP)



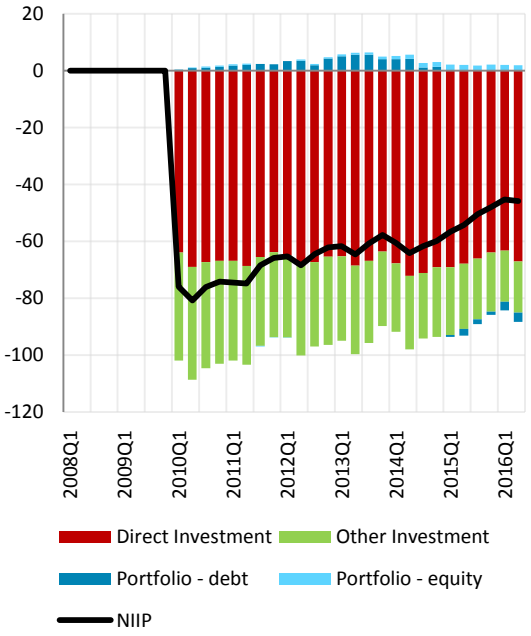
Belgium - Net International Investment Position net components (% of GDP)



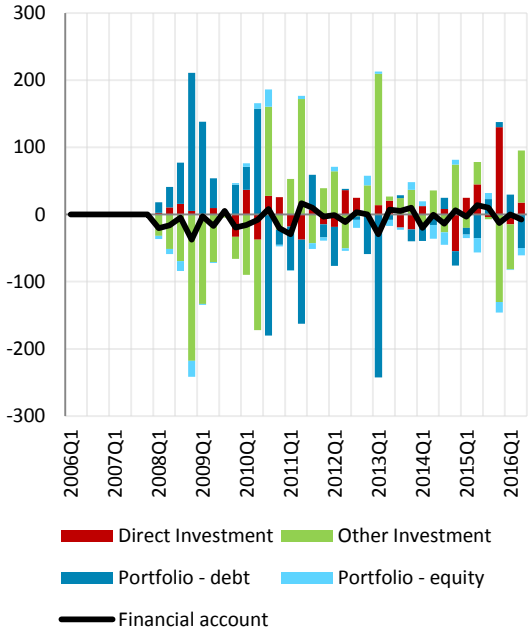
Bulgaria - Financial Account - net components (% of GDP)



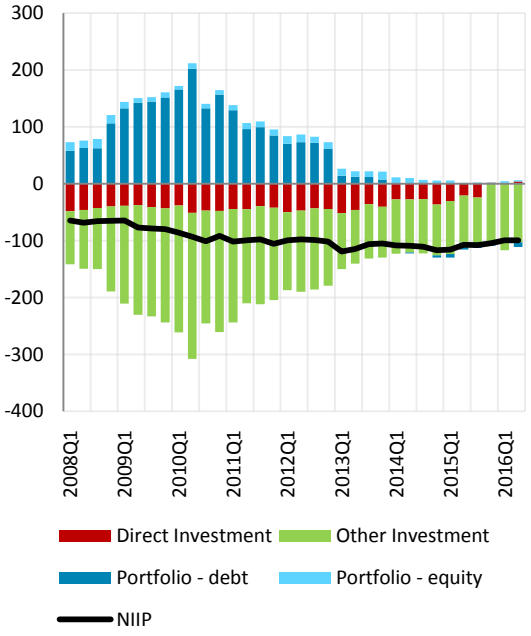
Bulgaria - Net International Investment Position net components (% of GDP)



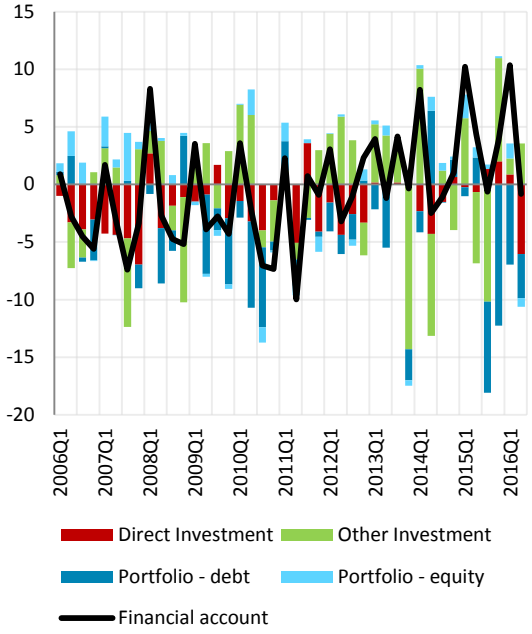
Cyprus - Financial Account - net components (% of GDP)



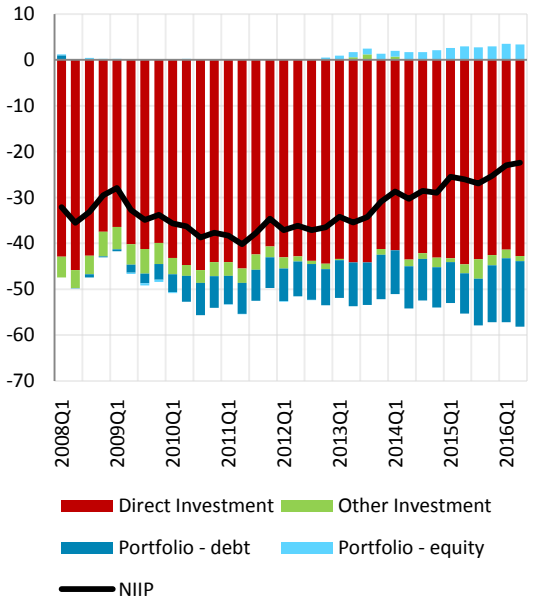
Cyprus - Net International Investment Position net components (% of GDP)



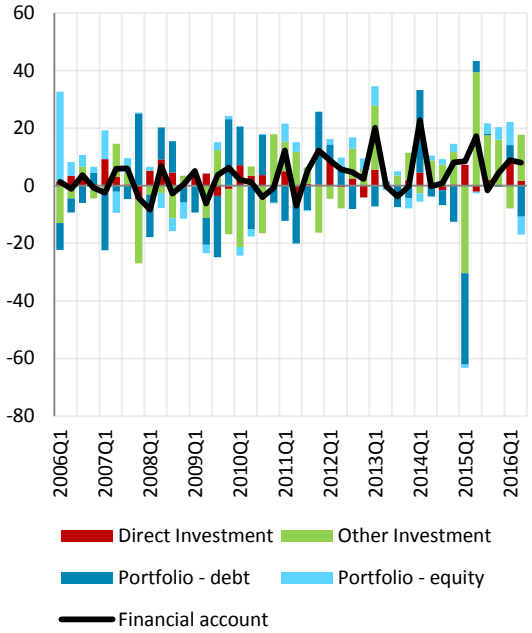
Czech Republic - Financial Account - net components (% of GDP)



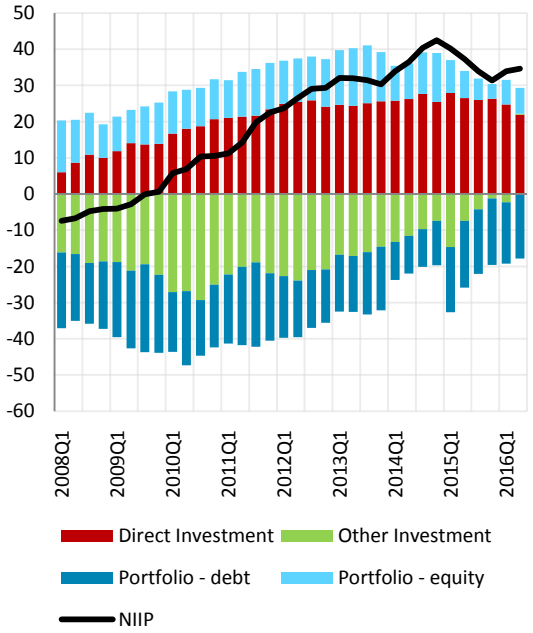
Czech Republic - Net International Investment Position net components (% of GDP)



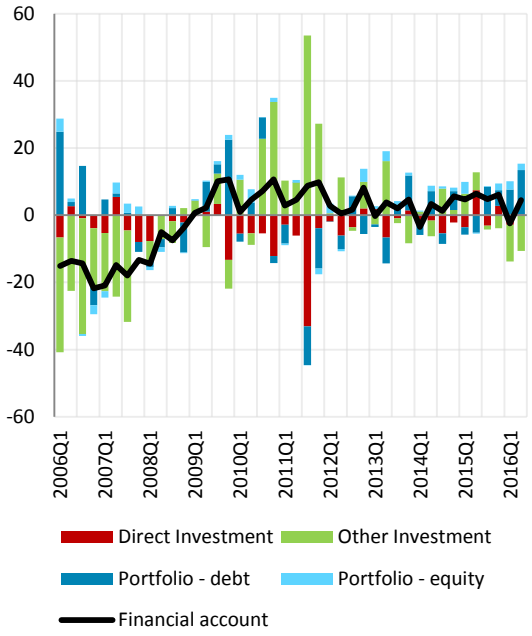
Denmark - Financial Account - net components (% of GDP)



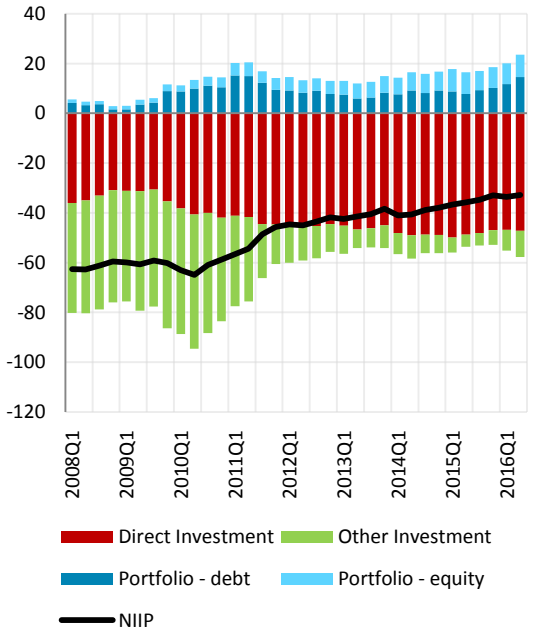
Denmark - Net International Investment Position net components (% of GDP)



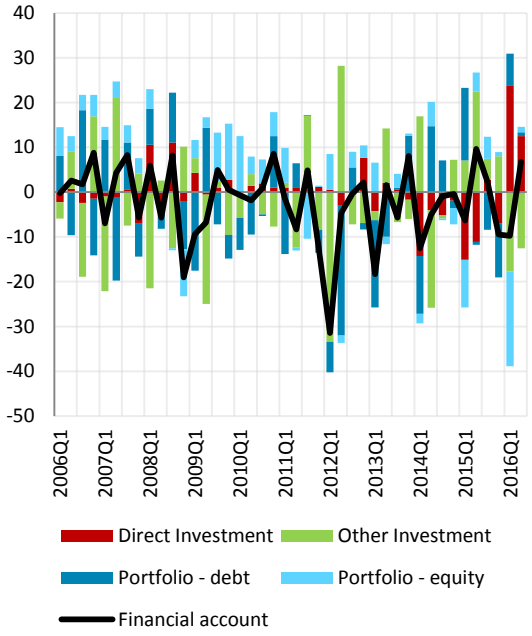
Estonia - Financial Account - net components (% of GDP)



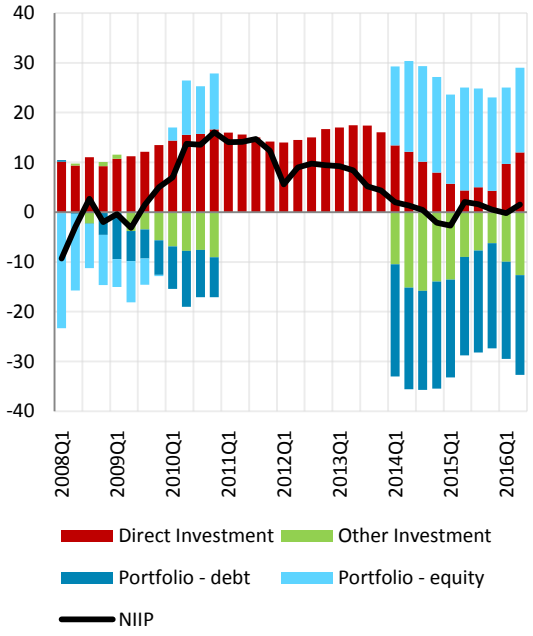
Estonia - Net International Investment Position net components (% of GDP)



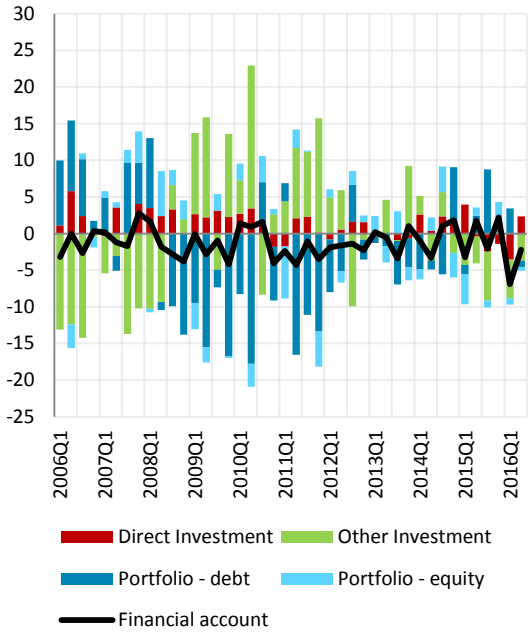
Finland - Financial Account - net components (% of GDP)



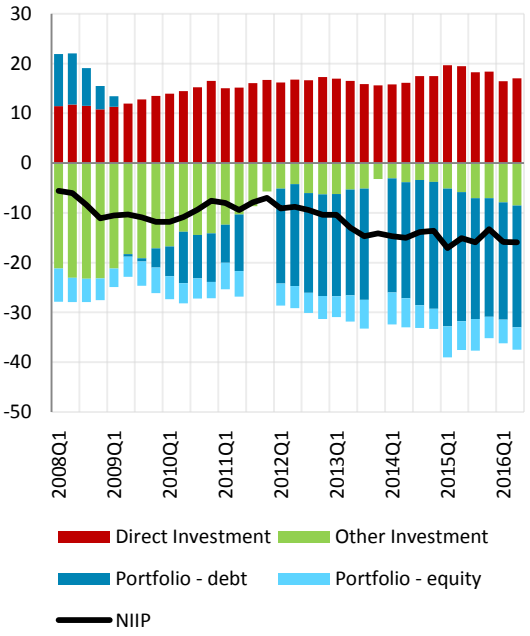
Finland - Net International Investment Position net components (% of GDP)



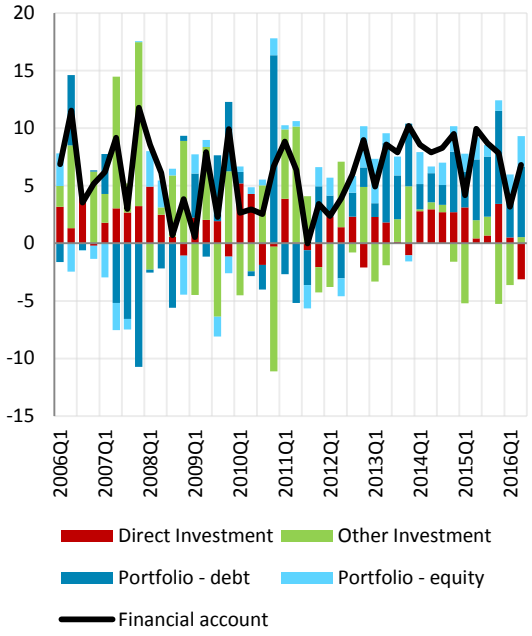
France - Financial Account - net components (% of GDP)



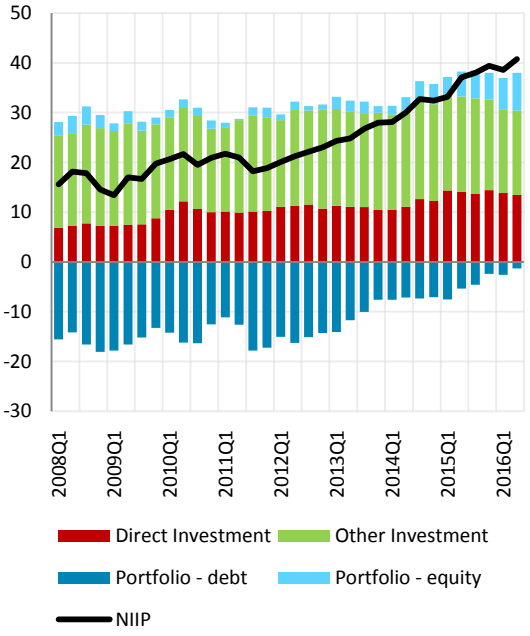
France - Net International Investment Position net components (% of GDP)



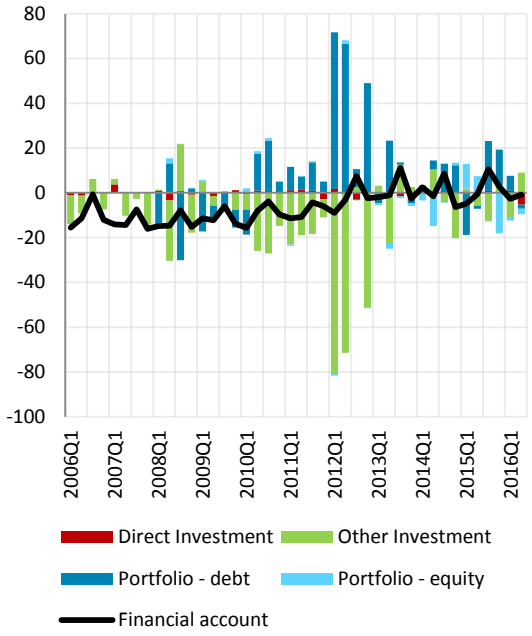
Germany - Financial Account - net components (% of GDP)



Germany - Net International Investment Position net components (% of GDP)



Greece - Financial Account - net components (% of GDP)



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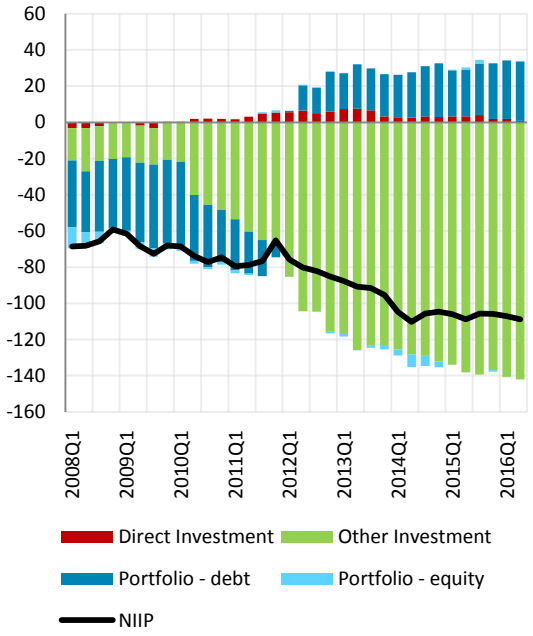
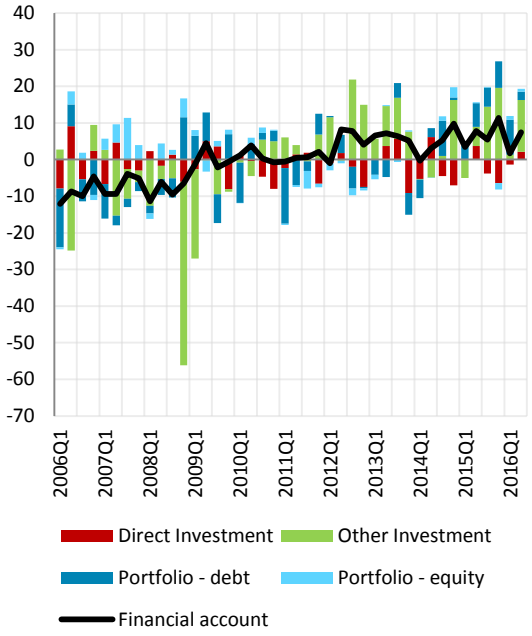
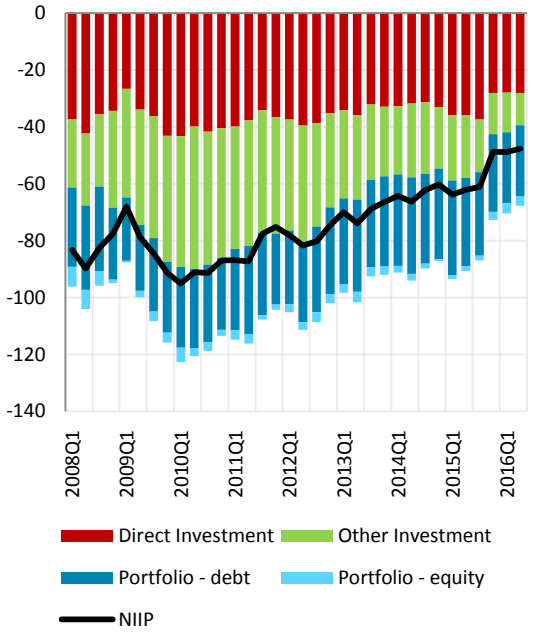


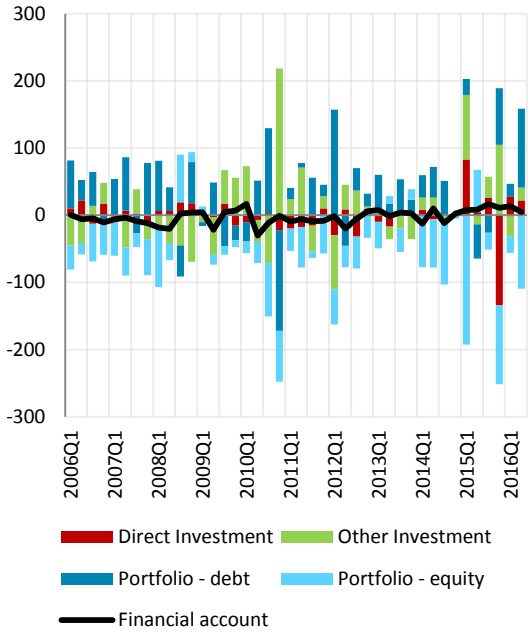
Hungary - Financial Account - net components (% of GDP)



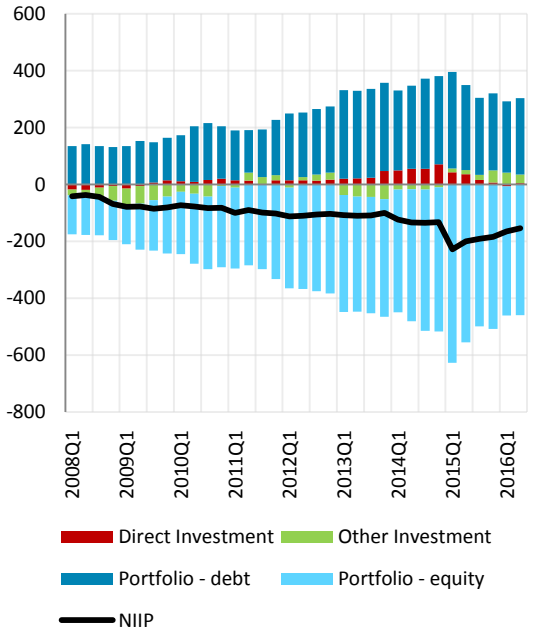
Hungary - Net International Investment Position net components (% of GDP)



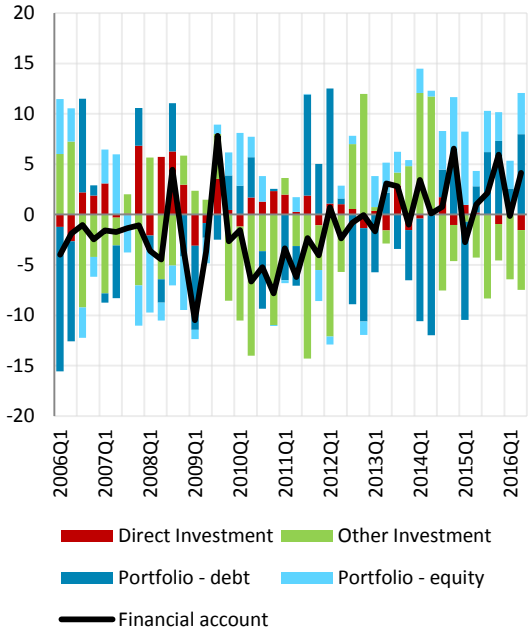
Ireland - Financial Account - net components (% of GDP)



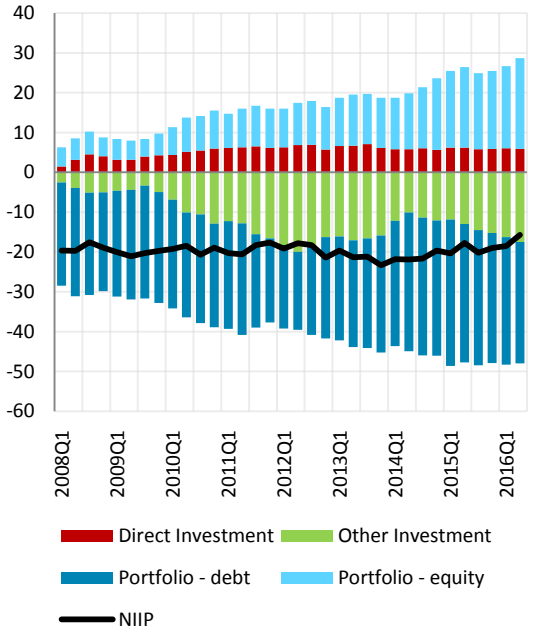
Ireland - Net International Investment Position net components (% of GDP)



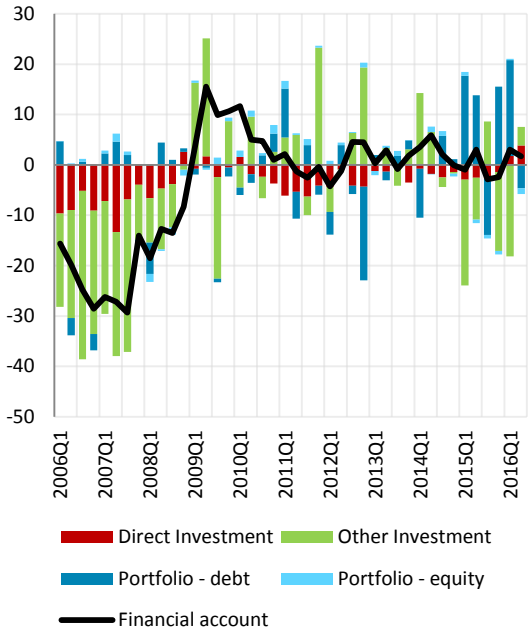
Italy - Financial Account - net components (% of GDP)



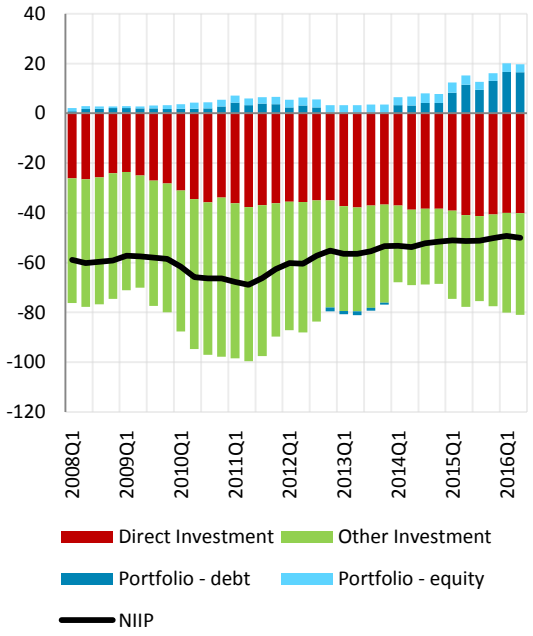
Italy - Net International Investment Position net components (% of GDP)



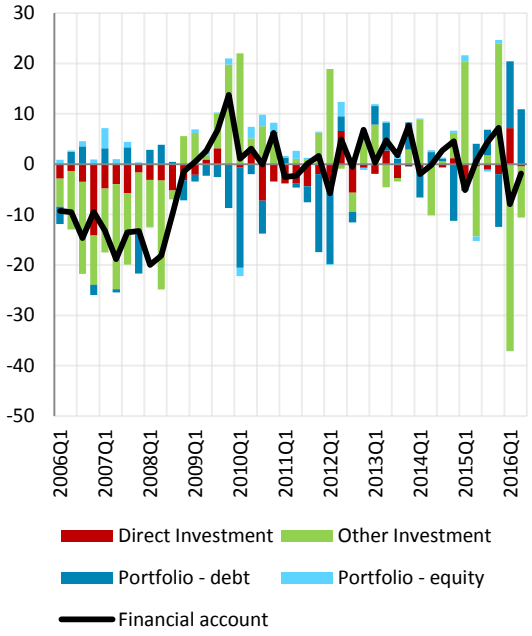
Latvia - Financial Account - net components (% of GDP)



Latvia - Net International Investment Position net components (% of GDP)



Lithuania - Financial Account - net components (% of GDP)



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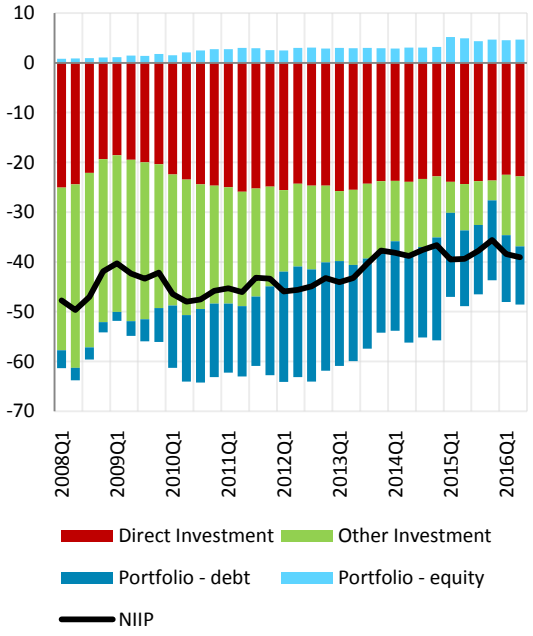
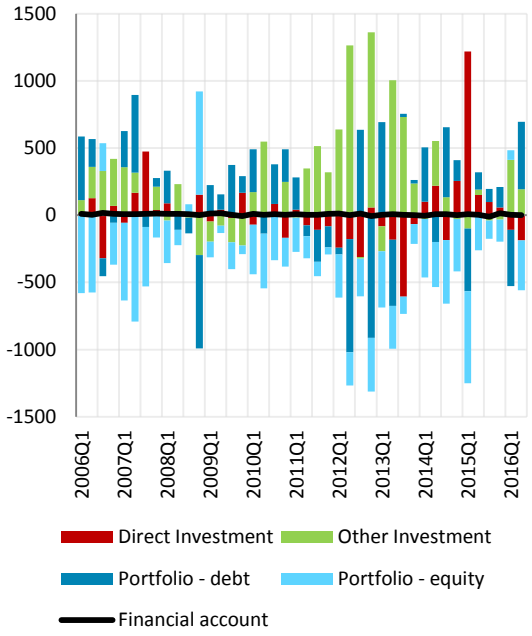
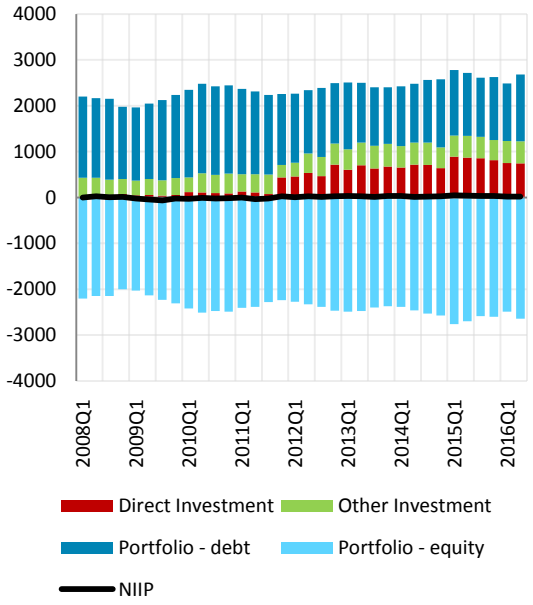


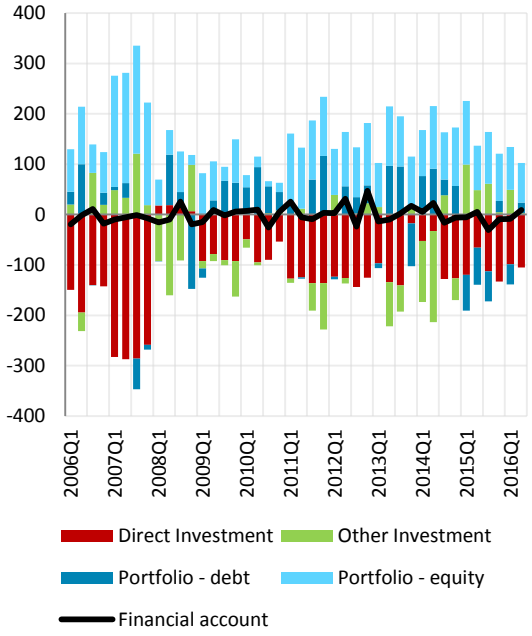
Luxembourg - Financial Account - net components (% of GDP)



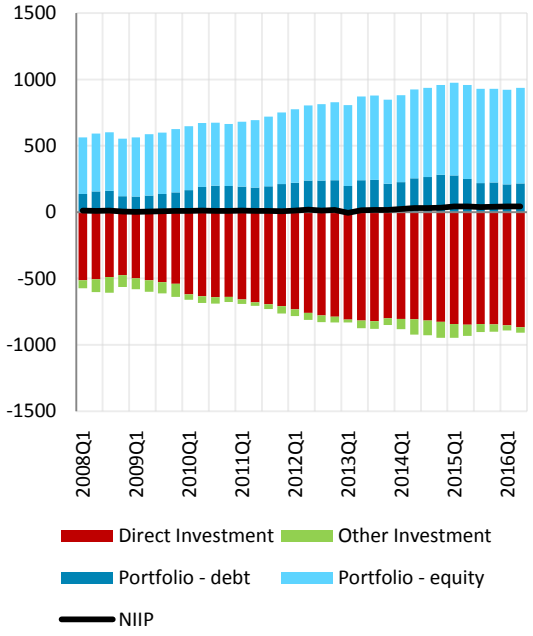
Luxembourg - Net International Investment Position net components (% of GDP)



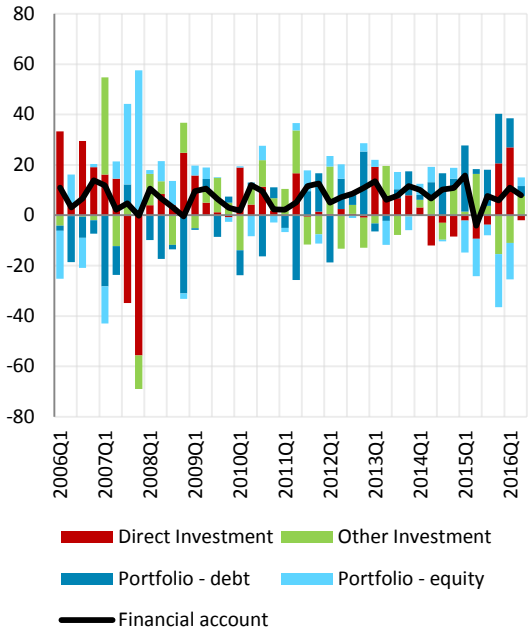
Malta - Financial Account - net components (% of GDP)



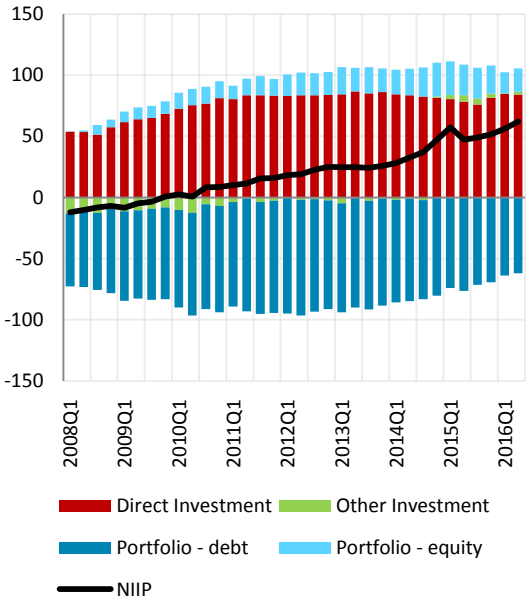
Malta - Net International Investment Position net components (% of GDP)



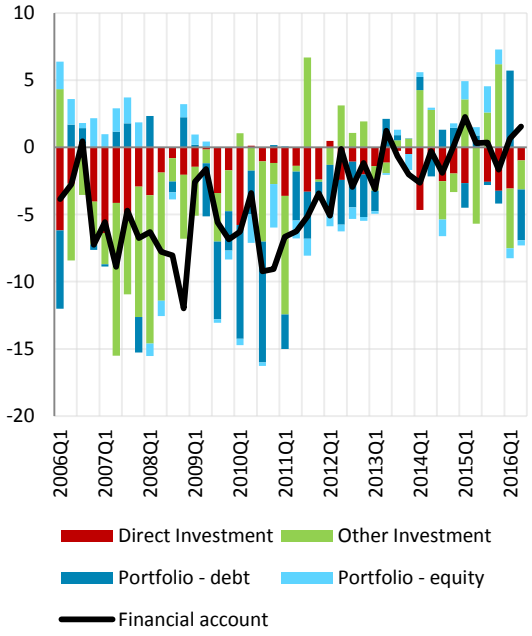
Netherlands - Financial Account - net components (% of GDP)



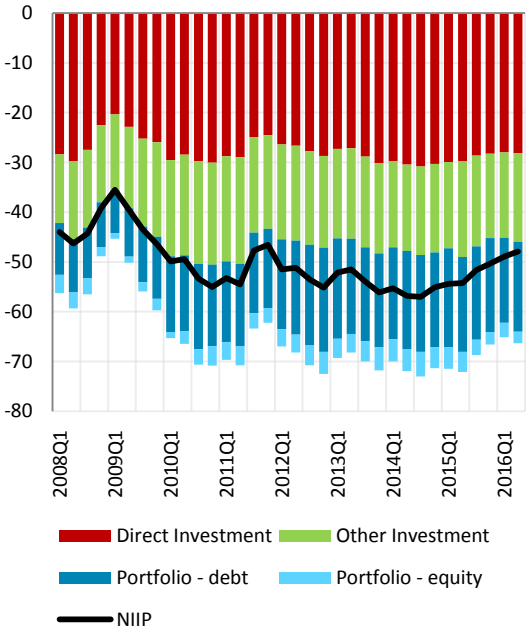
Netherlands - Net International Investment Position net components (% of GDP)



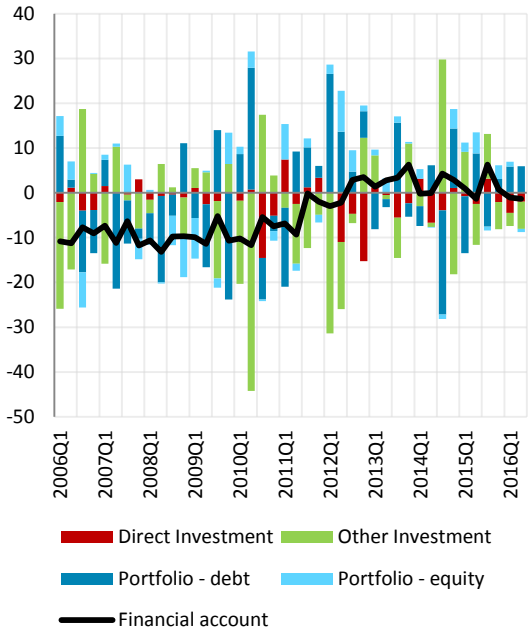
Poland - Financial Account - net components (% of GDP)



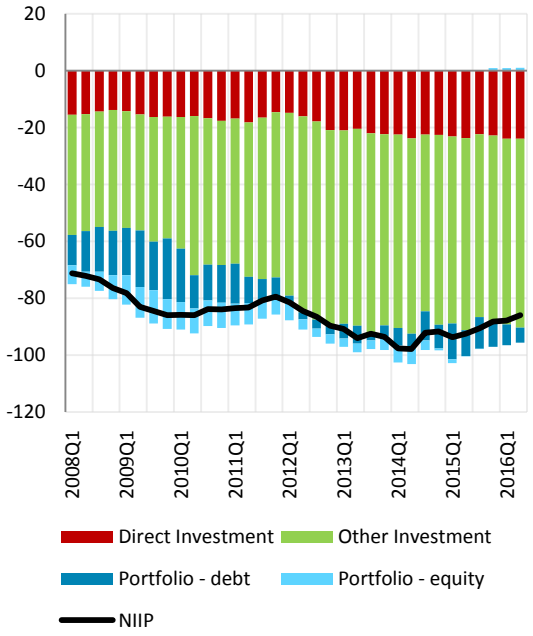
Poland - Net International Investment Position net components (% of GDP)



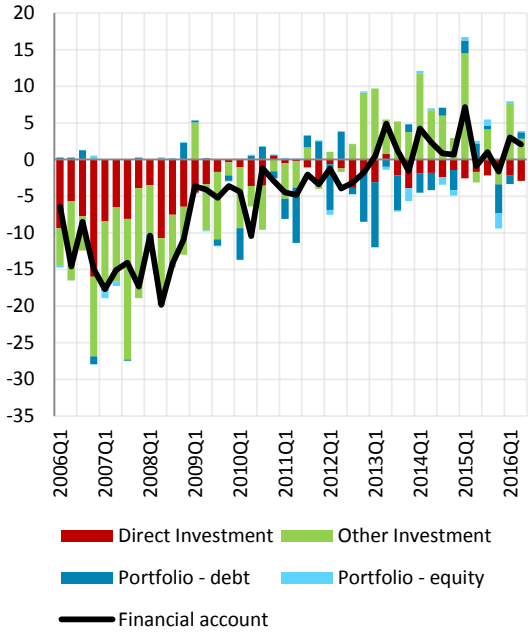
Portugal - Financial Account - net components (% of GDP)



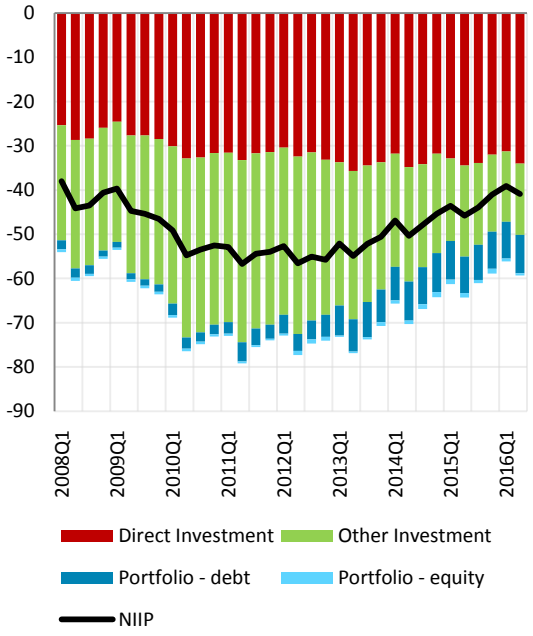
Portugal - Net International Investment Position net components (% of GDP)



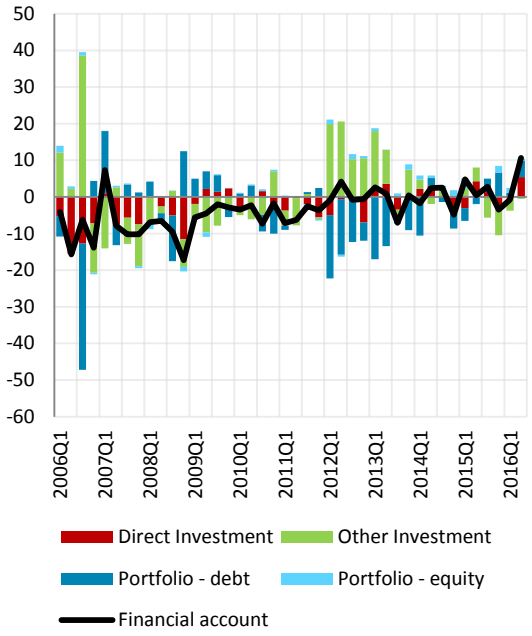
Romania - Financial Account - net components (% of GDP)



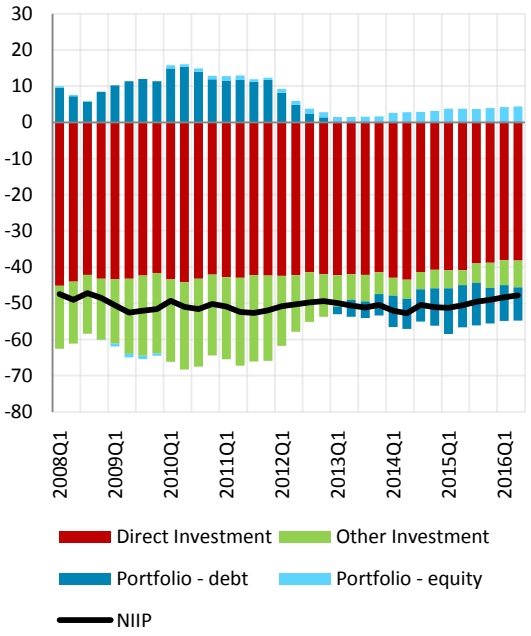
Romania - Net International Investment Position net components (% of GDP)



Slovakia - Financial Account - net components (% of GDP)



Slovakia - Net International Investment Position net components (% of GDP)



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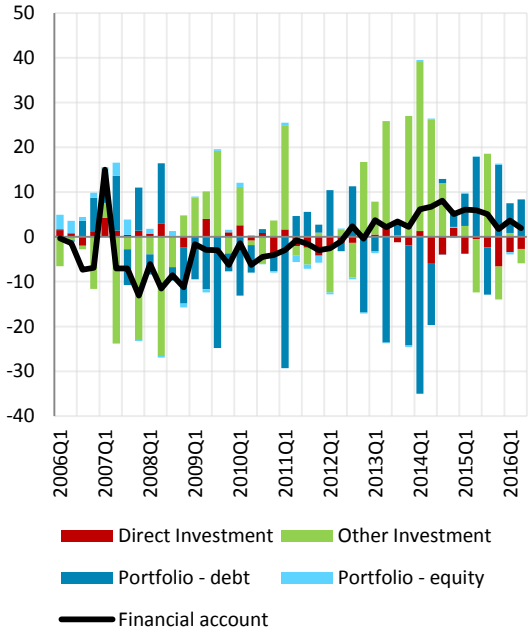
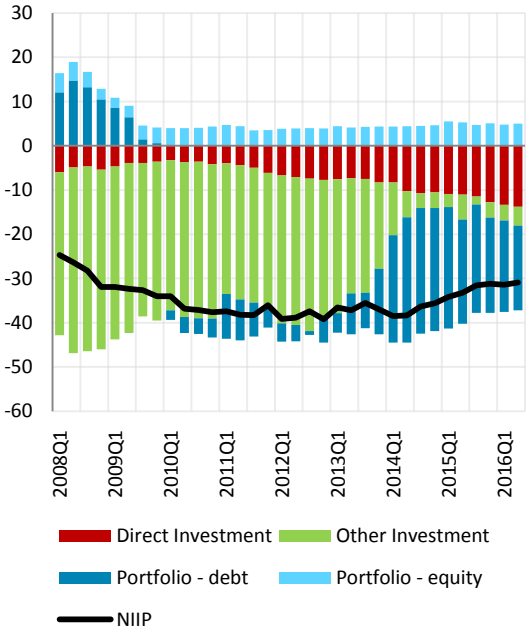
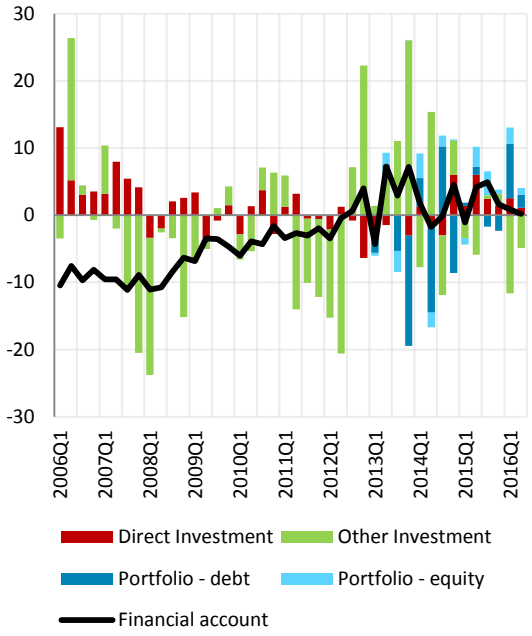


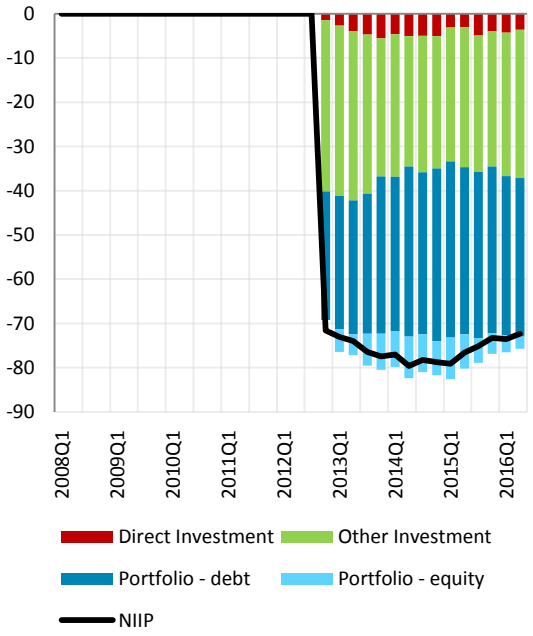
Slovenia - Net International Investment Position net components (% of GDP)



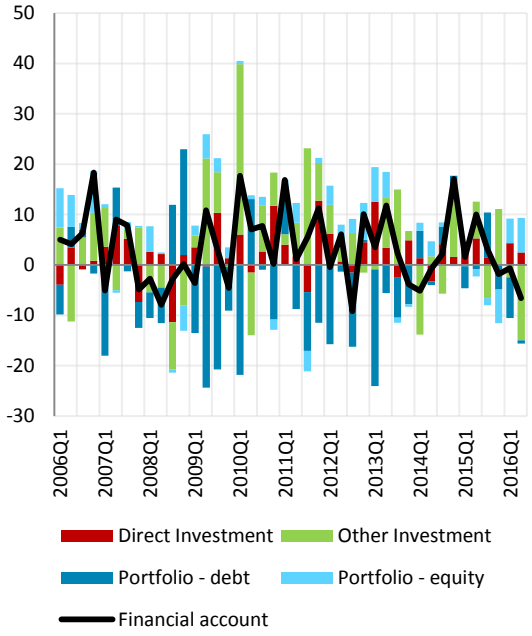
Spain - Financial Account - net components (% of GDP)



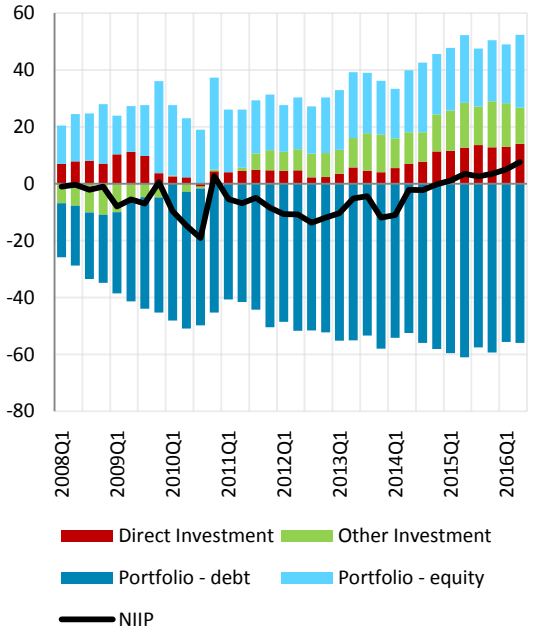
Spain - Net International Investment Position net components (% of GDP)



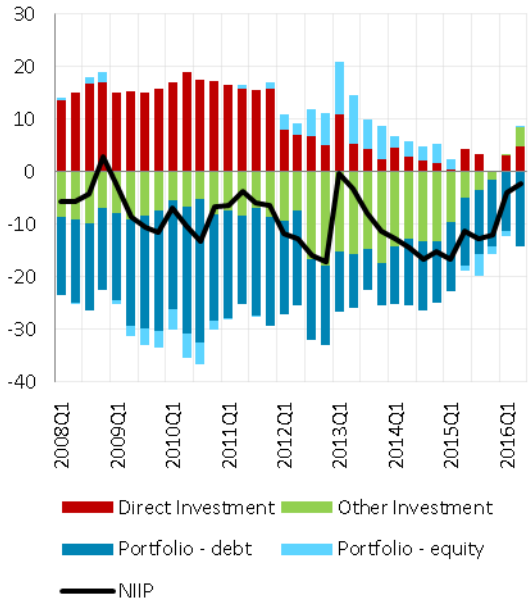
Sweden - Financial Account - net components (% of GDP)



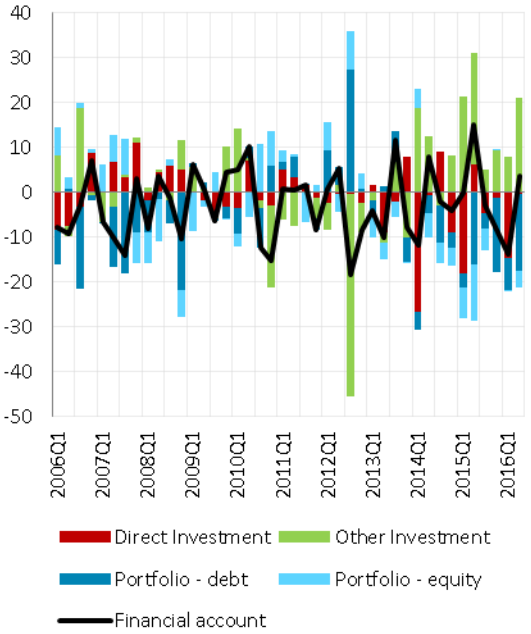
Sweden - Net International Investment Position net components (% of GDP)



United Kingdom - Net International Investment Position net components (% of GDP)



United Kingdom - Financial Account - net components (% of GDP)



4. Institutional investors and risk sharing in Europe's Capital Markets Union

4.1 Rationale

Integrated capital markets facilitate risk sharing across sectors and countries, which in turn helps smoothing the impact of economic shocks on consumption and investment (Véron and Wolff, 2015). However, empirical evidence points to varying degrees in which risk sharing via capital markets actually helps smooth shocks in different jurisdictions. Valiante (2016) summarizes the evidence that points to the limited contribution of risk sharing to consumption smoothing in the euro area and the EU.

Compared to the findings of Asdrubali et al. (1996), who estimate that 48 percent of shocks to gross state product in the US between 1981-1990 were smoothed by risk sharing (39 percent for 1964-1990), the seminal paper of Sørensen and Yosha (1998) found that the contribution of capital markets in smoothing shocks for 6 large Member States of the (then) European Community was a mere 8 percent of shocks (and statistically not significant) during the period 1981-90. They suggest that the reduction of informational barriers to cross country ownership would likely increase the volume of international capital flows and therefore foster integration[15].

More recent work by Afonso and Furceri (2007) estimated a close to 10 percent risk sharing in the EMU between 1998 and 2005, while the estimate of Furceri and Zdienicka (2013) is near to zero.

Demyanyk, Ostergaard and Sørensen (2008) found that the monetary union has facilitated risk sharing, although the level of risk sharing is still much below the level found among U.S. states. They argue that removal of formal barriers to diversification of assets and obstacles to cross border banking could help to improve integration.

Schoenmaker and Bosch (2008) also found that the home bias has declined in Europe after the introduction of the euro, which decline was stronger in euro area countries than in the non-euro-area countries. They also conclude that euro-area-based investors have switched from home to euro-area securities.

Therefore, while cross-border integration of European capital markets has increased in the 2000s, risk sharing continues to remain below values observed within the United States and other large federations. This suggests that there is major scope for further cross-border capital markets integration which could bring many benefits, including increased cross-border risk sharing. The EU's Capital Markets Union initiative rightly recognises the benefits of further integration (European Commission, 2015).

[15] Sørensen and Yosha (1998) test empirically whether consumption smoothing is achieved by means of risk sharing. Their method requires decomposing GDP growth rates into five component growth rates using national account identities and, thus, use data from OECD National Accounts. They estimate a system of five linear regressions by a two-step Generalized Least Squares procedure, using a panel estimation with time fixed effects for OECD and (then) European Community countries; in each regression, the growth rates of the components are regressed on the GDP growth rates. Specifically, they identify the share of variation in output smoothed through income risk sharing with the slope coefficient of growth rates of net factor income from abroad on GDP rates. They obtained coefficients are statistically no different than zero for both the OECD and the EC, leading them to the conclusion that the bulk of consumption smoothing is not achieved by virtue of income risk-sharing but, instead, saving in credit markets. They compare and contrast their results to Asdrubali et al. (1996), who carry out a similar exercise for US states and find that the majority of soothing occurs through "capital markets", which encompasses net factor income from abroad together with capital depreciation and corporate savings.

In this study we aim to focus on a particular aspect of financial integration and risk sharing in capital markets: institutional investment. The contribution of institutional investment to risk sharing depends on:

- the size of institutional investment;
- the degree of geographical diversification of portfolios, and
- the composition of assets held.

The aim of the research study is to investigate these three aspects of financial integration in the EU's Capital Markets Union and to assess the prospects for increased risk sharing in the EU.

Our main hypothesis is that the larger the assets managed by institutional investors, the smaller the home bias and thereby the larger the scope for risk sharing, ceteris paribus. Our focus will be on portfolio equity home bias, and less so on portfolio bond home bias, because the former is more important from the perspective of risk sharing.

4.2 Literature

The concept of 'home bias' refers to a preference for greater investment in home country assets. There is no uniform definition of home bias, but different authors define it differently (we will detail our definition in Section 4.4). A huge literature explores the complex determinants of equity home bias and the asset-allocation strategies of mutual funds, as we review below. However, surprisingly limited research papers have been published on home bias of two major types of institutional investors, namely pension funds and insurance companies.

Strong and Xu (2003) try to explain the existence of a home bias in equity investment in developed economies by developing a measure of investors' optimism (relative and absolute) that is used to explain the behavioural component of investment decisions. They find that fund managers from the United States, the United Kingdom, continental Europe and Japan show a significant relative optimism towards their home equity market. Institutional factors have largely failed to explain the home bias. Their data comes from the Merrill Lynch Fund Manager Survey: a survey of 250 large fund managers from USA, UK, continental EU and Japan, constituted by questions concerning mainly prospects for international equity markets. The survey has a monthly frequency and covers the period October 1995-October 2001.

Edison and Warnock (2004) report empirical evidence that US portfolio holdings of emerging markets securities tend to be biased towards firms that are larger, with less restrictions on foreign ownership or cross-listed on a US exchange. In particular, they show that the effect of the cross listing is very strong. The authors therefore conclude that information asymmetries play an important role in equity home bias. They use confidential security-level data on U.S. holdings of emerging market stocks from comprehensive benchmark surveys conducted by the U.S. Treasury Department and the Federal Reserve Board as of March 1994 and December 1997, for 9 emerging economies (Argentina, Brazil, Chile, Mexico, Indonesia, Korea, Malaysia, Philippines, Thailand).

Suh (2005) assesses the role of information asymmetries in investment decisions. He looks at the portfolio holdings of different countries as well as portfolio adjustments: in the latter case he assumes that the more frequently a country adjusts its portfolio, the better it is informed. His results suggest that home bias can arise from unobservable factors such as information asymmetry and investor optimism. Data for portfolio holdings are from the Economist magazine's "Our Quarterly Portfolio Poll" for the period

Q1/89 to Q2/99, while data for portfolio performance are from Datastream. Countries classified as: US, rest of America, UK, Germany, France, rest of Europe, Japan, and rest of Asia.

Aggarwal, Klapper and Wysocki (2005) examine the investment allocation choices of actively-managed US mutual funds in emerging market equities after the market crises of the 1990s. They find that at the country level, US funds invest more in open emerging markets with stronger accounting standards, shareholder rights, and legal frameworks. At the firm level, US funds are found to invest more in firms that adopt discretionary policies such as greater accounting transparency and the issuance of an American Depositary Receipt (ADR). Their data comes from the February 2002 release of the Morningstar database for US mutual funds.

Chan, Covrig and Ng (2005) analyse six possible determinants of home bias in the equity market allocation of mutual funds in 26 countries. The authors check for: (i) economic development, (ii) capital controls, (iii) stock market development, (iv) familiarity[16], (v) investor protection and (vi) other factors. There is evidence for a significant impact of stock market development and familiarity variables on both domestic and foreign bias, whereas economic development and capital controls influence only the foreign bias. Their data on mutual fund holdings from 26 countries in 1999 and 2000 are from the TFS Database, created by The Investex Group, Securities Data Company and CDA/Spectrum. Data are at the fund level.

Hau and Rey (2008) analyse firm level data of mutual funds to draw some stylized facts on the distribution of home bias at the fund level in different countries. Empirical evidence shows that there is a high level of heterogeneity across mutual funds. They also find that (i) large countries tend to be more closed than small ones, implying a higher level of home bias; (ii) bigger funds tend to be more home-biased than smaller ones, perhaps because smaller funds are usually able to offer more customised investments and are able to circumvent some barriers to foreign investments; (iii) the more a fund has a diversified portfolio in geographical terms, the broader the portfolio will be in terms of sectors. The main data source is TFS (Thomson Reuters Financial Securities). It provides disaggregated firm level data for mutual funds in 16 countries for the years from 1997 to 2002.

Anderson, Fedenia, Hirschey, Skilba (2011) focus on the role of cultural variables on international diversification of institutionally managed portfolios. They find that countries with a high level of uncertainty avoidance[17] show a higher home bias, countries characterized by a high level of masculinity[18] and long term orientation tend to have more internationally diversified portfolios, and countries with higher cultural distance[19] tend to diversify less. Therefore, according to this study, culture impacts investor behaviour directly and not merely though indirect channels such as the legal and

[16] Familiarity is specified as common language, geographic distance and bilateral trade (the sum of bilateral exports and imports as a share of the total sum of exports/imports).

[17] One of the dimensions of national culture based on research on values by Geert Hofstede, Gert Hofstede and Michael Minkov; defined as "*the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity*" (https://geert-hofstede.com/national-culture.html).

[18] "*Masculinity…represents a preference in society for achievement, heroism, assertiveness and material rewards for success. Society at large is more competitive. Its opposite, femininity, stands for a preference for cooperation, modesty, caring for the weak and quality of life. Society at large is more consensus-oriented.*"

[19] Cultural distance indices are computed by taking a simple average of the difference of scores in "values" between the investor and the target country, normalized by the total variance of the scores. These values are: future orientation, assertiveness, collectivism and uncertainty avoidance as per GLOBE; individualism, masculinity, uncertainty avoidance and long-term orientation as per Hofstede.

regulatory framework. The data include information at the fund level for over 60 countries and securities held in more than 80 countries. Sources are different public filings plus CRSP, Datastream and WorldScope. Data are for year 2006 and the methodology follows a cross section approach.

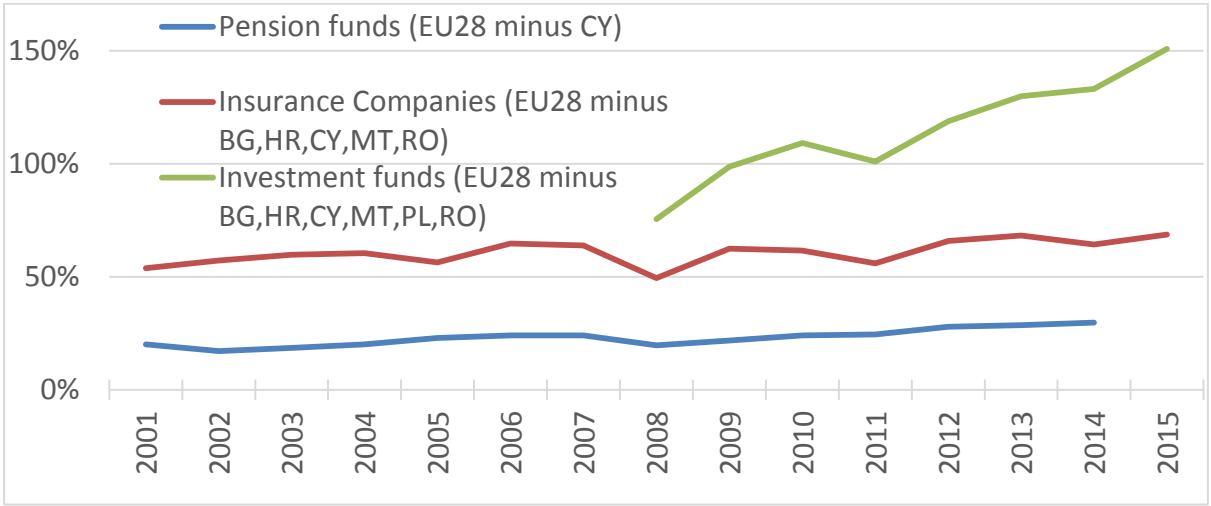
Rubbaniy, Van Lelyveld and Verschoor (2014) study the home bias of Dutch pension fund investment behaviour. A decline in the level of home bias has been observed among Dutch pension funds from 1997 to 2006, which might be due to a relaxation of the strict regulation and a continued increase in the size of pension funds' assets relative to Dutch GDP, as we report later on Figure 31 on page 95. A large increase in managed assets may imply lower home bias – the key hypothesis we test in our paper –, partly because managers of large funds tend to be more professional and thereby recognise more the benefits of risk diversification, and partly because the supply of the desired securities at home becomes relative small compared to the assets managed by institutional investors.

The empirical evidence of Rubbaniy, Van Lelyveld and Verschoor (2014) also shows that the preference for domestic portfolio holdings (home bias) seems to be determined also by some fund characteristics, like liability-structure and size. They use a panel dataset of more than 600 Dutch Pension Funds between 1992 and 2006. The data source is the supervisory dataset of the Dutch National Bank (DNB): this is an entity-level dataset with detailed information on portfolios and balance sheets with an exceptionally high coverage (95%).

4.3 Evolution of institutional investment and the supply of securities

Assets managed by institutional investors (defined as pension funds, insurance companies and investment funds) have increased in the past fifteen years in the EU, but in absolute value and as a share of EU GDP (Figure 30)[20]. Pension fund assets increased from 18 percent of GDP to 29 percent from 2001-14, while insurance funds assets expanded from 57 percent of GDP to 68 percent from 2001-15. The fastest growth is observed for investment funds, where unfortunately a much shorter period is available: their assets increased from 99 percent of GDP to 151 percent from 2008-15.

Figure 30: Assets managed by institutional investors in the EU (% of EU GDP), 2001-2015



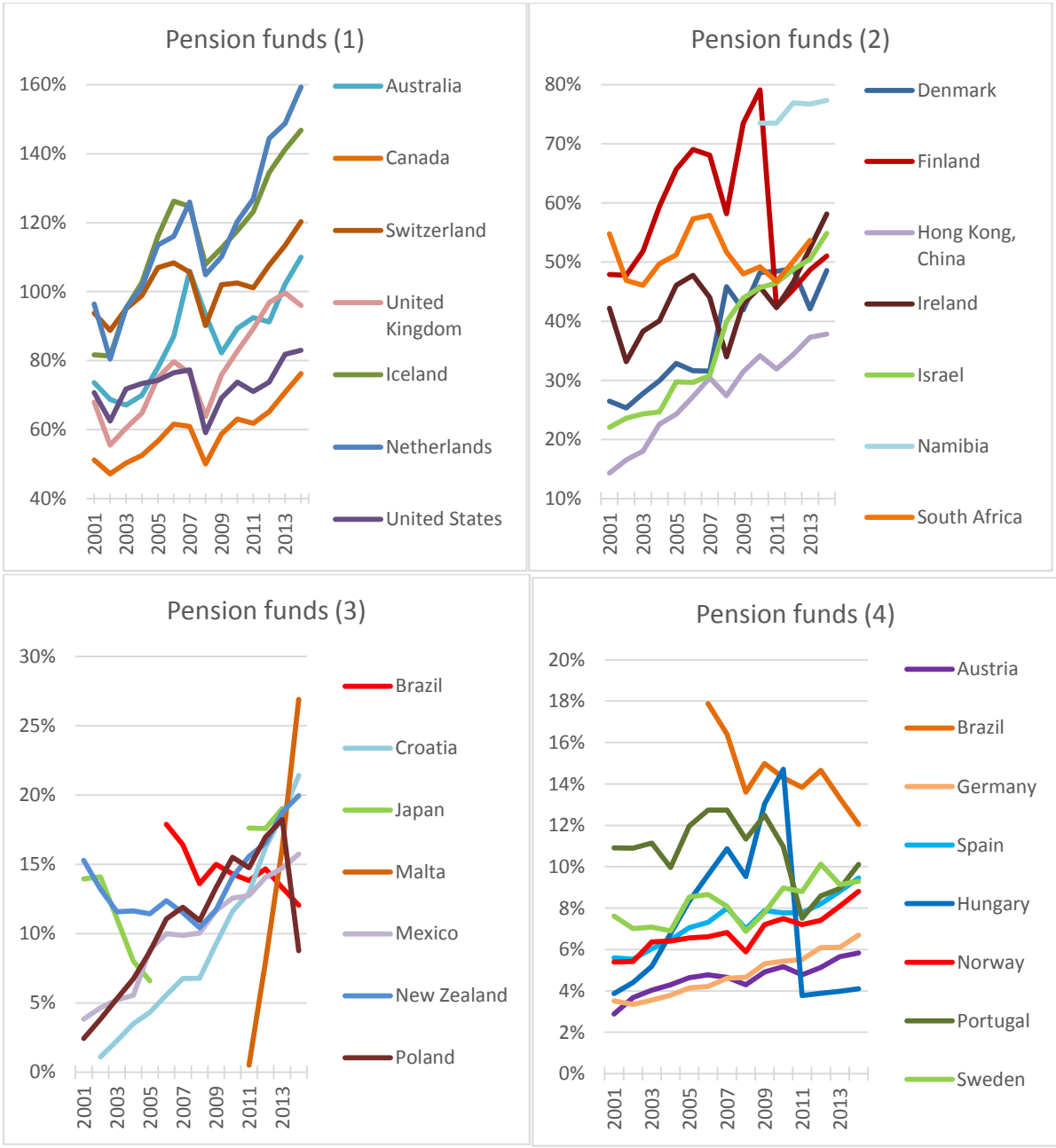
[20] We note that assets of the three types of investors are not additive, because of cross-sectoral holdings, for example pension funds holding of investment fund shares.

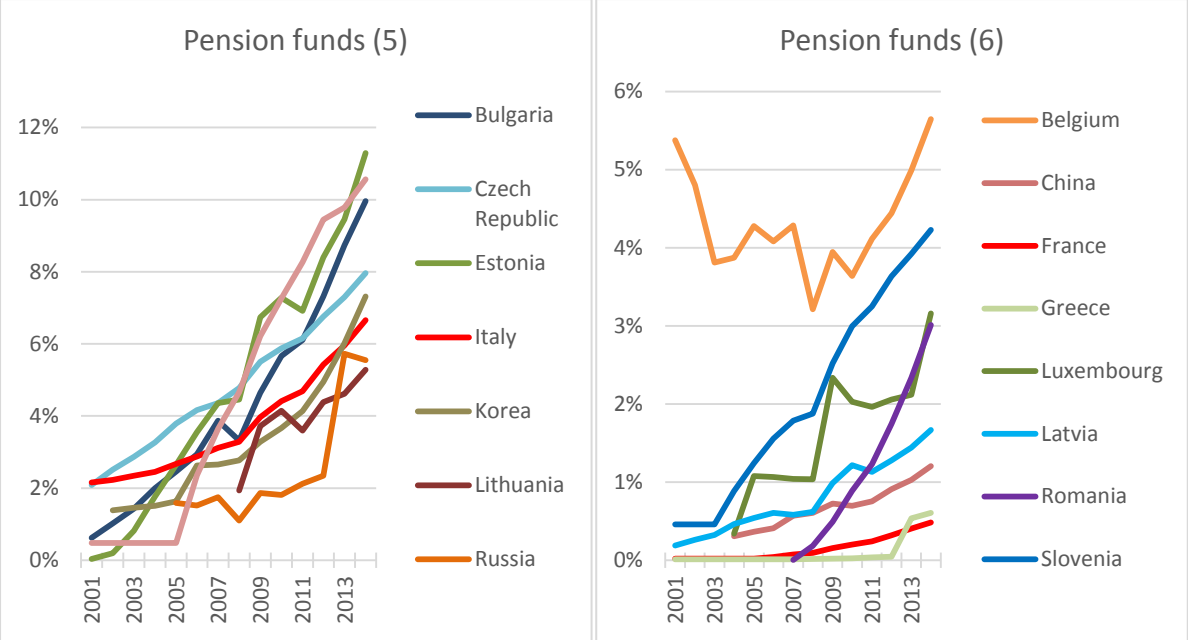
Source: Bruegel calculations based on data listed in the data annex. Note: we use constant country-composition EU aggregates and thereby approximate the missing data points. For example, for pension funds, there are 22 countries for which data is available in the full period of 2001-2014. We first calculate the sum of these 22 countries. Data for Luxembourg is available for 2004-2014: we calculated the share of Luxembourg in the sum of assets of the 22 countries and approximate the missing data for 2001-2003 by assuming that Luxembourg's share in the sum of 22 countries 2001-2003 is the same as in 2004. We then calculate the sum of assets of 23 countries: the initial 22 plus Luxembourg. Data for Lithuania is available for 2008-14 and we approximate the missing data for 2001-2007 by assuming that Lithuania's share in the combined assets of the 23 countries was the same in this period as in 2008. Finally, we add Malta similarly, for the 2010-2014 period. We follow the same approach for aggregating insurance corporations and investment fund assets. Note that we calculate these EU aggregates to be able to show constant-country composition values on the chart, but we will not use such approximated data in our regression analysis.

Beyond the general increasing trend in the EU, the size of the three types of institutional investors and their increase through time vary a lot across EU Member States.

Pension funds' assets to GDP ratios range from 160%, the highest, in the Netherlands to virtually 0% for France and Greece in 2015 (Figure 31). The Netherlands together with the UK are the two EU Member States that joined by Anglo-Saxon countries (Australia, Canada, the US), Iceland and Switzerland are home to the largest pension fund industries, as compared to the size of the economy (Panel 1). Most EU Member States have moderately-sized or even small pension fund industries in the context of a global comparison. Note the large number of countries where pension funds' assets to GDP are below 10% and that the vast majority of them are EU countries. In France and Greece, pension funds are essentially non-existent (Panel 6). That was also the case for most of the Member States that joined the EU in the in the accession waves from 2004 onwards at the start of the 2000s. Nevertheless, in many of these Member States, Croatia, Estonia, Malta and Slovakia to mention a few, there has been a rapid expansion of the industry in the last 14 years. On the other hand, pension funds in large continental Member States such as Germany, Italy and Spain have remained relatively small over this period. Regardless of the value of the ratio in 2001, the size of the pension fund industry relative to the size of the economy has tended to increase. However, growth has not be uniform over the years, as the 2008-2009 financial crisis caused a contraction in the value of assets relative to GDP, especially in those countries that are home to large pension fund sectors. Finally, it is worth noting the sharp drop in the assets to GDP ratio of pension funds in Hungary from 15 percent of GDP to 4 percent in 2011, which was the result of a reversal of the mandatory private pension funds system which was introduced in the late 1990s. There was also a very significant drop in Finland from 79 percent of GDP in 2010 to 42 percent a year later.

Figure 31: Pension fund assets (% of GDP), selected countries, 2001-2014

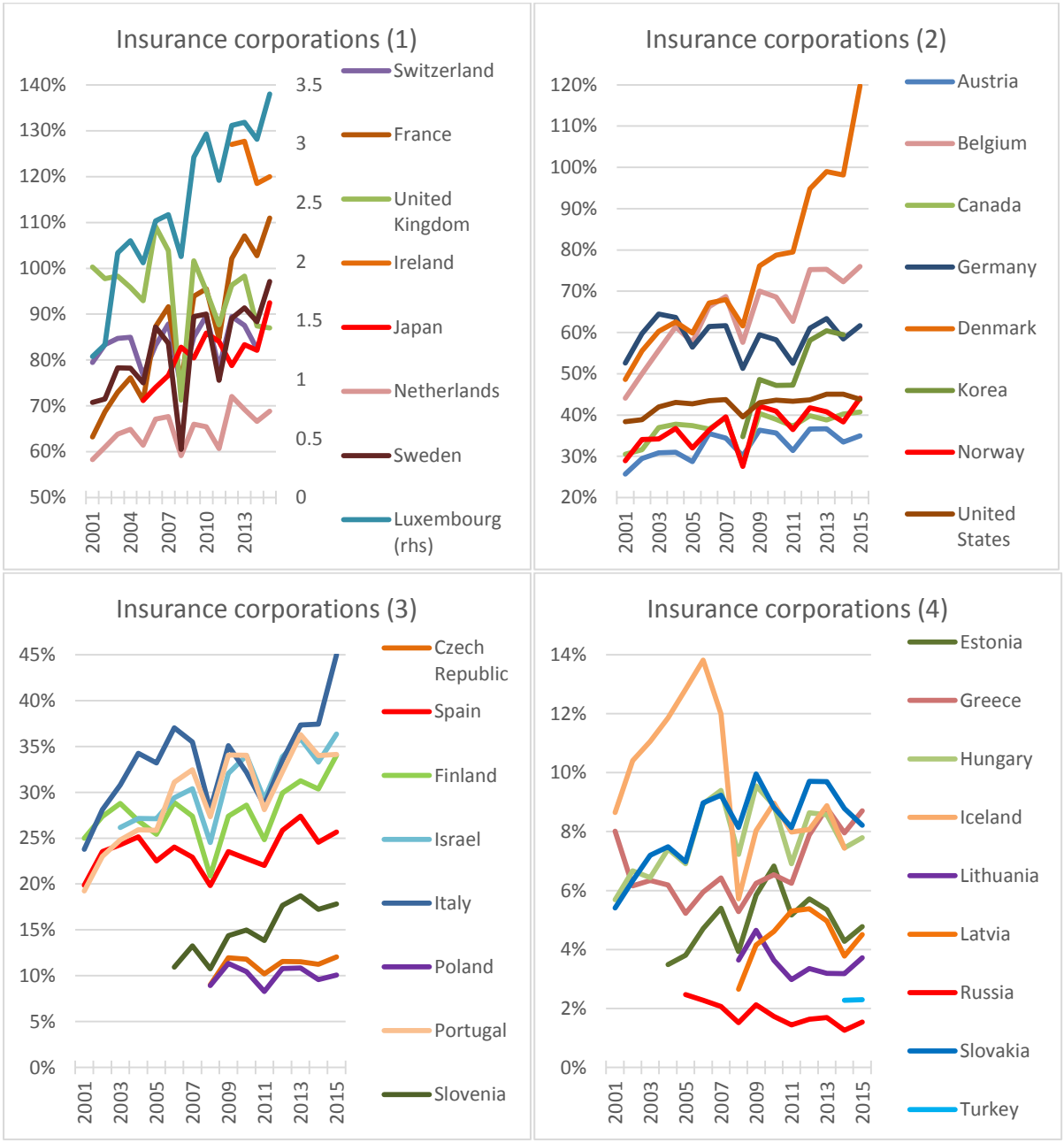




Source: see data annex.

Data in the asset to GDP ratios of insurance corporations is available for a more restrictive set of countries. Figure 32 reports values for selected economies. A comparison with the equivalent charts for pension funds reveals that insurance companies are more mature in the beginning of the 2000s and the size of their balance sheet relative to the size of the economy is more stable over the period 2001-2015. The second observation is less true for large insurance industries, such as the Luxembourgish and the French in (Panel 1), but also the Danish in (Panel 2), where the asset ratio has more than doubled in the last 15 years. Another general pattern is the drop in the value of total assets relative to GDP in 2008, and less so in 2011, once again more so where insurance corporations tend to be larger (Luxembourg, France, Sweden). The fourth panel also captures the financial collapse of Iceland, as it impacted the insurance sector. In terms of cross-country comparison, Luxembourg has by far the largest industry relative to its size, and so do many large Member States, i.e. France and the UK, joined by Ireland and the Nordic Member States. On the contrary, insurance corporations in Greece, the Baltics and the countries of Central Europe are rather small. The rest of the Member States are home to an insurance sector whose size is closer to the average of the distribution and comparable to that of other advanced economies, such as the US, Canada and South Korea. It should be noted that Figure 32 and Figure 33 are to some extent complementary. The large share of insurance assets and low share of pension fund assets in France, for example, can be explained by the fact that life insurance policies are the main vehicle for pension savings in France.

Figure 32: Insurance corporation assets (% of GDP), 2001-2015

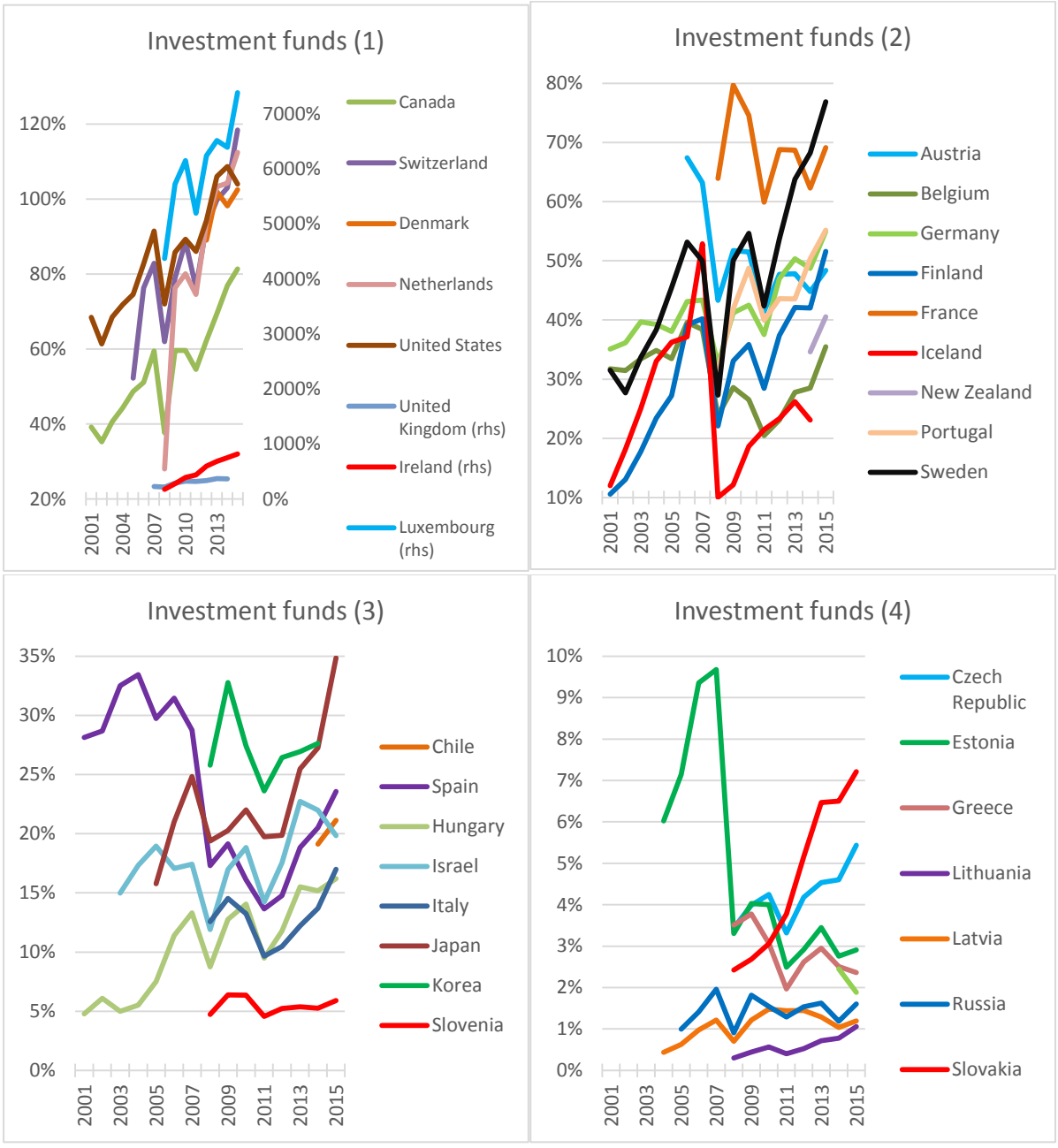


Source: see data annex.

Unfortunately, data for investment funds are much shorter and, crucially, begin in the year 2008 for most countries (Figure 33). However, for some countries the data goes back before 2008 and help to show the extent to which the value of investment funds' assets suffered during the financial crisis. The range and the dispersion of countries' ratios are larger than for the other two types of institutional investors. Specifically, Luxembourg, whose investment funds industry size is a staggering 70 times its GDP size, Ireland and the UK are the clear outliers in the distribution. The UK, US, Netherlands, Denmark and Sweden also have relatively large investment funds, with a ratio closer to 100%. Again, investment funds are developed the least in the Baltics, Central Europe and Greece. Most of the continental EU states (including France and Germany) fall in between and closer to the median. Finally, one can notice that, at least since 2008,

assets of investment funds have grown faster than GDP especially in those countries where they were already relatively developed (those in panel 1, Sweden in panel 2).

Figure 33: Investment fund assets (% of GDP), 2000 and 2014



Source: see data annex.

Institutional investment is expected to increase further, in particular pension funds. While some countries have well developed pension fund schemes, others have very small or no private pension funds. The main drivers of pension fund development are ageing and safeguarding pension entitlements (by separating pension liabilities from corporate balance sheets into independent pension funds).

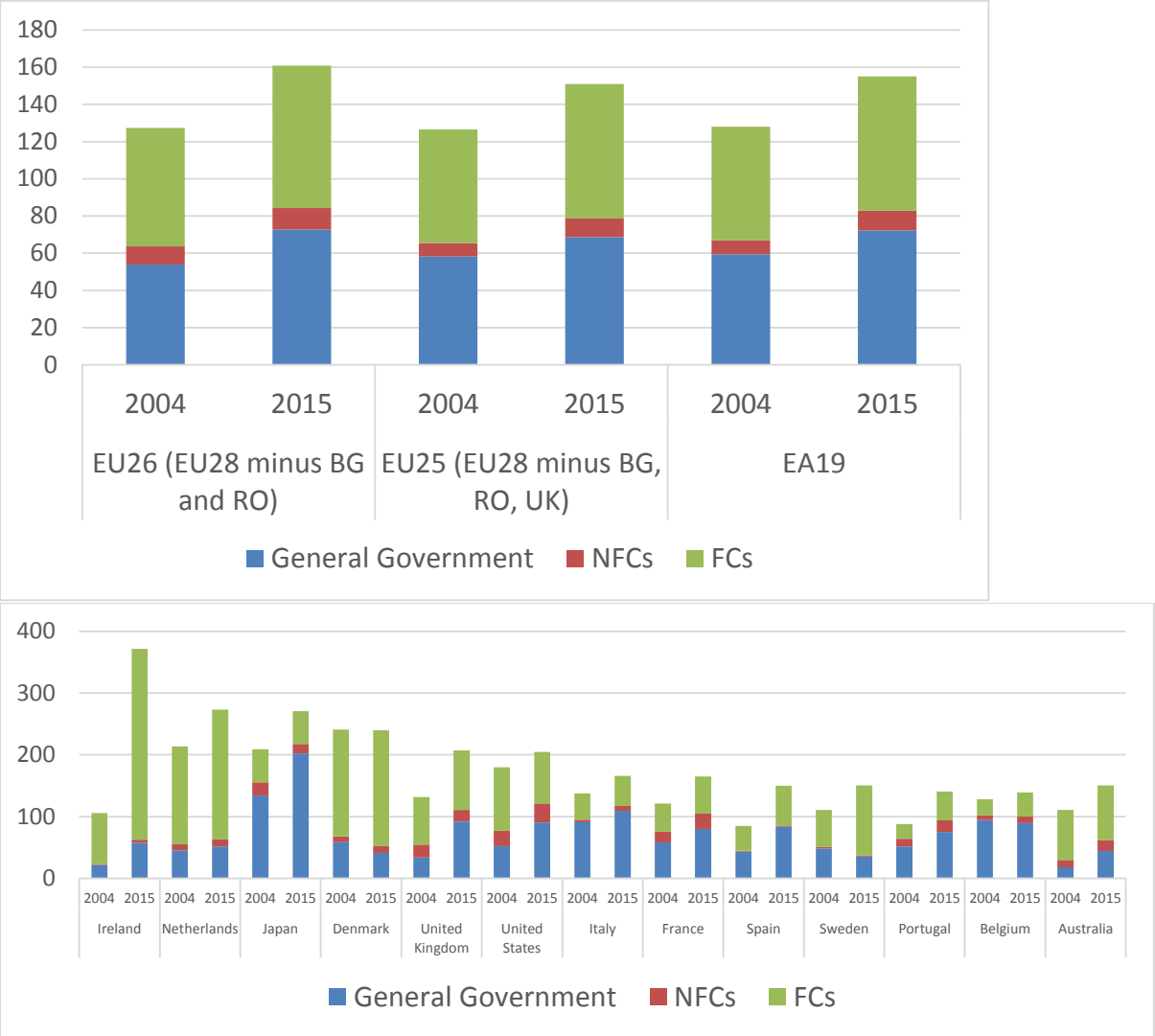
The increasing demand for marketable securities (equities and bonds) by institutional investors should be satisfied by the increasing issuing of equity and bonds by corporates, as well as government bonds. Figure 34 shows that the outstanding stock of debt

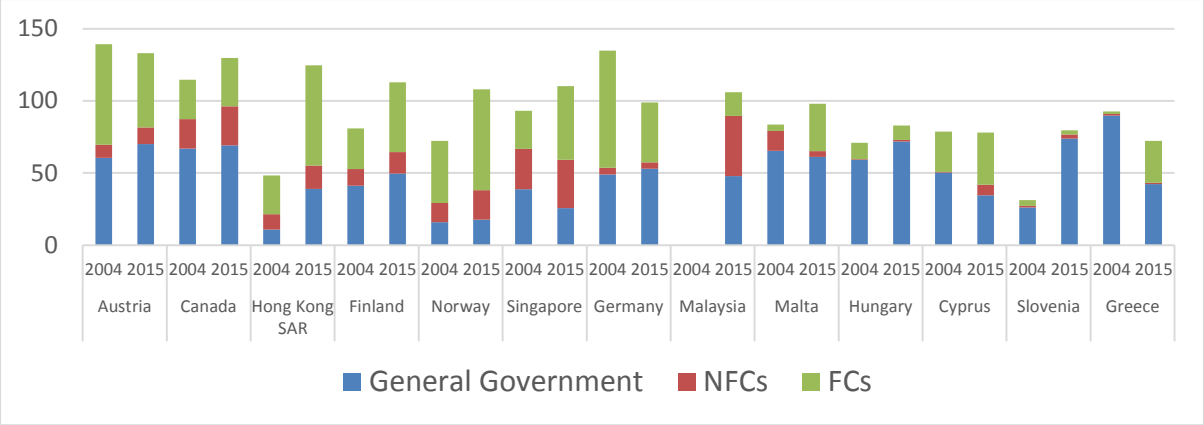
securities increased from 2004 to 2015 by all three major issuers, the general government, non-financial corporations (NFCs) and financial corporations (FCs). In the EU as a whole (excluding Bulgaria and Romania due to data availability issues) debt securities issued by general governments and financial corporations are broadly similar in size, while non-financial corporations have relatively small, but increasing share. The EU aggregate excluding the UK (see the centre of Figure 34) is somewhat smaller.

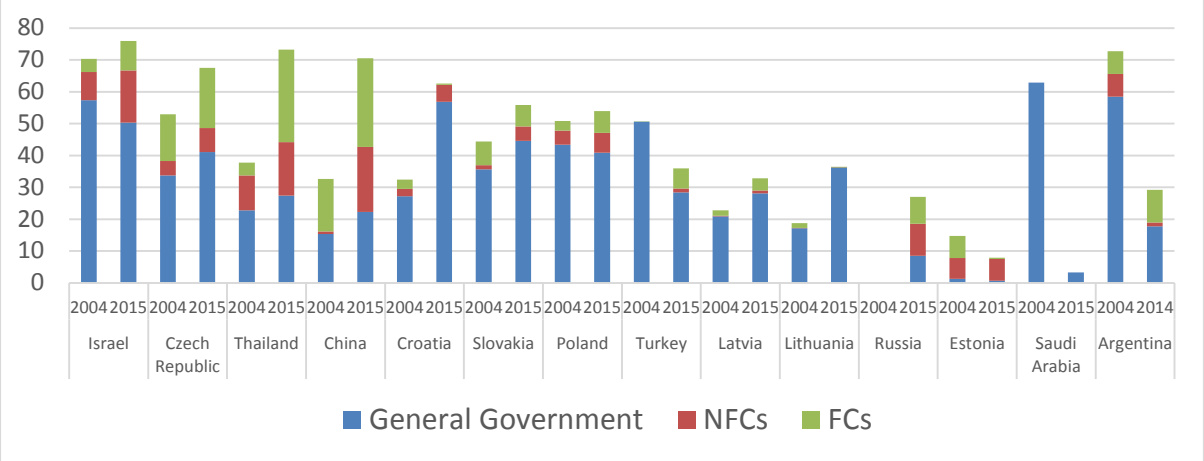
In most countries debt securities relative to GDP has increased from 2004 to 2015, the exceptions are Austria, Argentina, Cyprus, Germany, Greece, Turkey and Saudi Arabia. In the cases of Cyprus and Greece the deep economic crisis of the past years reduced private sector issuances, while official loans replaced debt securities in general government financing.

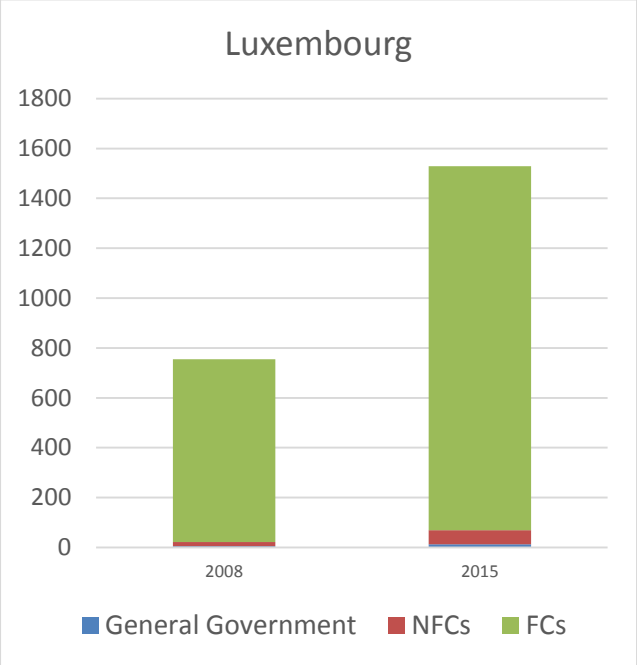
We plot Luxembourgish data on a separate panel, given the extraordinary large stock of debt securities issued by financial institutions (about 15-times annual GDP in 2015).

Figure 34: Debt securities by issuer, selected countries (% of GDP), 2004 and 2015





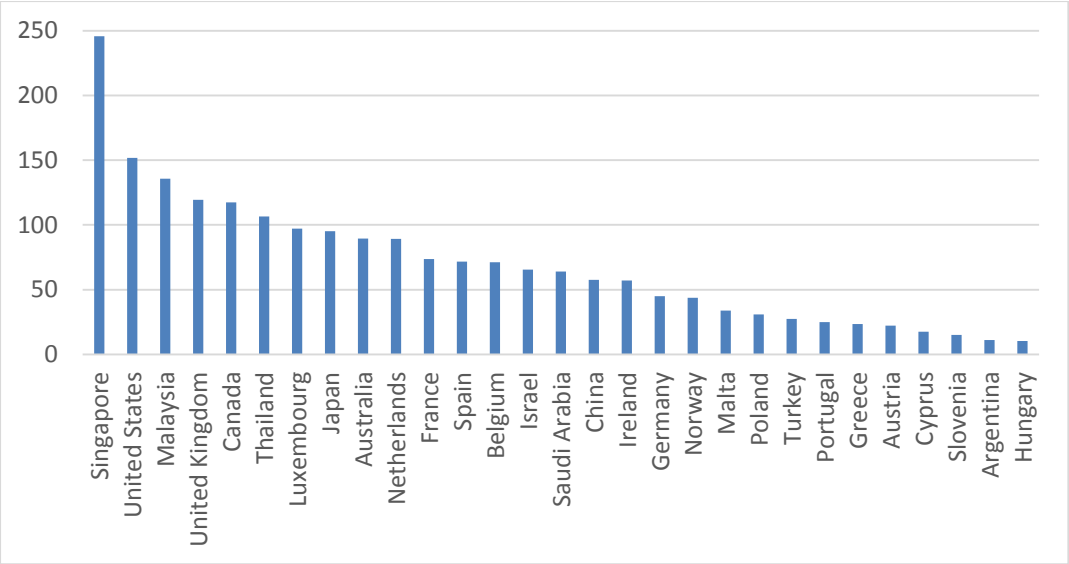




Source: see data annex.

Stock market capitalisation as a share of GDP (Figure 35) varies significantly across countries. In smaller and in emerging countries its share in GDP is rather low at a few dozen percent. In Germany stock market capitalisation is about 50 percent and in the Netherlands, France and Belgium it is about 90-100 percent, still below the US value of about 140 percent of GDP.

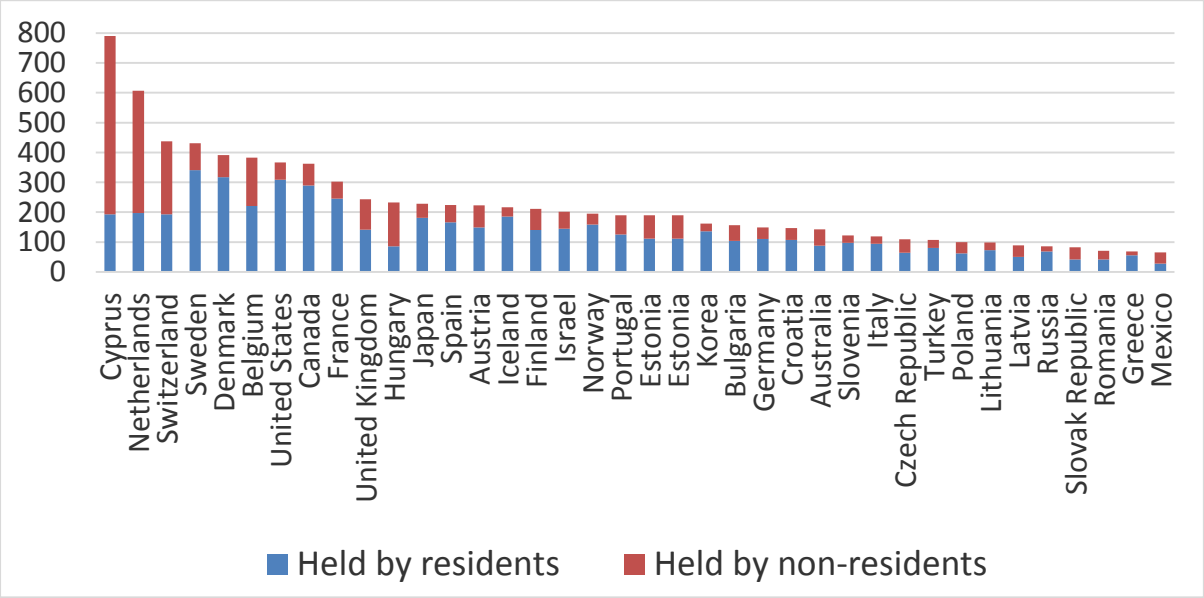
Figure 35: Stock market capitalisation of listed companies in 2015, selected countries, % of GDP

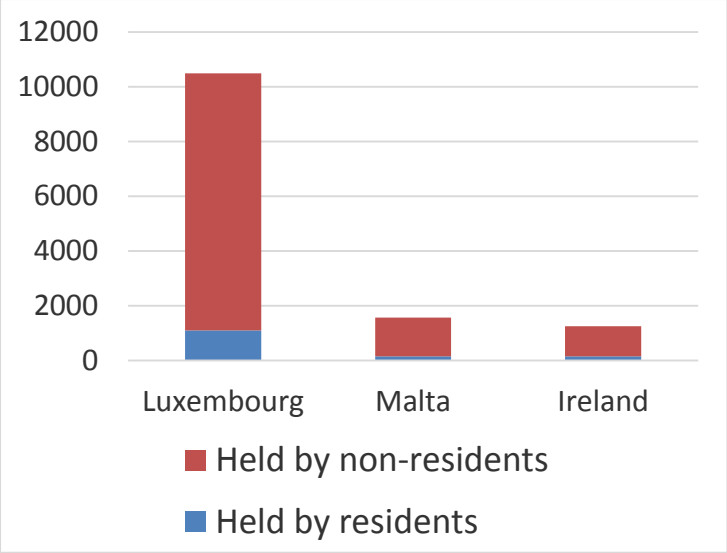


Source: World Bank, Market capitalisation of listed companies

However, stock market capitalisation does not include all domestic equity investment opportunities. The financial balance sheet data of the national accounts dataset also includes, beyond listed shares, unlisted shares, other equity and investment fund shares/units. Figure 36 shows huge variation across countries from value less than 50 percent of GDP to 105-times GDP in Luxembourg (therefore, we plotted Luxembourg, along with Malta and Ireland, on a second panel). There is also a great diversity in the share of non-resident holdings of total domestic equity: non-residents have dominant roles in Luxembourg, Malta, Ireland, Cyprus and the Netherlands, while their share is only around 20 percent for example in Italy, Greece, Sweden, Canada, Japan and the United States.

Figure 36: Total domestic equity market capitalisation held by residents and non-resident (from the national accounts dataset), selected countries, 2014, % of GDP





Source: see data annex. Note: Financial balance sheet data of the national accounts dataset includes four categories: (1) listed shares, (2) unlisted shares, (3) other equity and (4) investment fund shares/units. Data for Switzerland is for 2013.

4.4 A new pension fund foreign investment restrictions index

An important factor is whether prudential regulations allow institutional investors to diversify geographically across borders. Some countries still have investment limits, while others apply the prudent person principle (appropriate diversification). Unfortunately, no numerical indicators have been published to summarise regulatory restrictions. Since we would like to include such restrictions as an explanatory variable in our regressions, we create a new index that we call 'Pension fund foreign investment restrictions index'.

4.4.1 Description of the new index

We construct the index using data from the Annual Survey of Investment Regulation of Pension Funds of the OECD:

http://www.oecd.org/finance/private-pensions/annualsurveyofinvestmentregulationofpensionfunds.htm

The survey covers years 2001 and 2005 to 2014 for most countries in our regression sample; however, for some countries coverage is not complete. The exact series we used is the "Restriction on foreign investment (code R2), All asset classes (code A8)". We calculate the index for 42 countries: 24 EU countries and 18 non-EU countries. The index cannot be calculated for 4 EU countries: Latvia, Cyprus and Croatia are not included at all in the OECD dataset, while for France there is no data on restrictions on foreign investment[21]. The availability of the index is reported in Table 4.

We define an index of regulatory restrictions on foreign investment of pension funds in country i for year t as q_{it} where:

$$q_{it} = 1 - s_{it}$$

[21] We note that some further non-EU countries could be added.

and s_{it} is the maximum allowed share of foreign assets in the pension fund portfolio of country i for year t. The index can be understood as measuring the extent to which limits on foreign investment constrain diversification. It ranges from 0 to 1 and higher values correspond to more stringent regulatory restrictions.

The series provides a qualitative description of restrictions on the assets pension funds are permitted to hold, which includes quantitative limits. These limits correspond to the maximum share of foreign assets pension funds in each country are permitted to hold in their portfolio, but more often than not they do not apply uniformly across all world assets. This makes the task less straightforward and calls for some simplifying assumptions, which are presented below.

The most common way limits are defined is on the basis of location. In certain cases, different restrictions apply to OECD and non-OECD countries. Since the bulk of global securities were issued in OECD countries, we only consider restrictions (or the lack thereof) on securities issued in OECD countries and ignore restrictions applying to non-OECD countries. Therefore, 'no restrictions on assets holdings within the OECD' is equivalent to allowing 100% of assets to be "foreign", thus implying potential for "full diversification". When there is no discrimination among OECD countries, we define maximum allowed share of foreign assets simply as:

$$s_{it} = s_{it}^{OECD}$$

However, in some countries separate limits are placed on holdings of assets within the EU/EEA and in those OECD members that are not in the EU/EEA. In those cases, we opt for a weighted average of the two limits, applying equal weights. In these cases we define the maximum allowed share of foreign assets as:

$$s_{it} = 0.5s_{it}^{EEA/EU} + 0.5s_{it}^{OECD\ NON\ EEA/EU}$$

Thus, if a country's regulations allow investment without limit within the EU but forbid the holding of assets of other OECD countries, it is assumed that the pension fund can achieve only half the diversification it could potentially achieve without any limit imposed on the OECD as a whole.
Likewise, when the quantitative limit is expressed in terms of the currency in which assets are denominated, it is weighted by a proxy of the currency's importance. Specifically, if the limits refer to the US dollar or the euro, then the weight is 0.5, if it is foreign currency in general then the weight is 1:

$$s_{it} = 0.5s_{it}^{EUR} + 0.5s_{it}^{USD}$$

For one country (Israel) in our sample restrictions take the form of minimum credit ratings. A relatively high credit rating restriction limits the share of eligible foreign assets. We make the following assumptions:

- Credit rating of BB-, i.e. below investment grade: we assume there is no restriction, i.e. $s_{it} = 1$.
- Credit rating of BBB-, i.e. investment grade: we assume there is no restriction, i.e. $s_{it} = 1$.
- Credit rating of A-: we assume that $s_{it} = 0.7$.
- Credit rating of A: we assume that $s_{it} = 0.6$.

If there is a quantitative limit expressed as a percentage of the pension fund assets on top of a minimum credit rating requirement, we simply multiply that limit by the assumed share of eligible assets implied by the rating. For example, in 2007 the restriction in Israel required that at most 70% of assets can be invested in any country

which is BB- rated at least: in this case $s_{it} = 0.7$, because (as we list above) we treat the BB- credit rating as not constraining foreign investments.

Finally, when the description lists different restrictions for different pension funds/options in a country (see Table 2 for these cases), the index is calculated for each one and a simple average over the funds/options is calculated:

$$s_{it} = \frac{1}{N}\sum_{j=1}^{N} s_{jit}$$

where s_{jit} is the limit for the jth pension fund/option in country i out of a total of N pension funds/options. Note that if there are more than one pension funds/options, calculating the average is the last step in obtaining s_{it}. We first construct each of the s_{jit} according to the same guidelines as above. In some cases, where for each option or plan the limits are the same, the single limit is used. Table 5 below summarizes for which countries there were more than one limits, the funds'/options' names and the way the limit is calculated.

Table 4: Our new pension fund foreign investment restrictions index

Country	code	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australia	AU	0				0	0	0	0	0	0	0	0	0	0
Austria	AT	0.25				0.5	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Belgium	BE	0.35				0	0	0	0	0	0	0	0	0	0
Bulgaria	BG											0	0	0	0
Canada	CA	0.7				0	0	0	0	0	0	0	0	0	0
Chile	CL						0.7	0.6	0.4	0.4	0.35	0.2	0.2	0.2	0.2
Colombia	CO						0.8	0.8	0.6	0.6	0.6	0.475	0.475	0.475	0.475
Czech Republic	CZ	0				0	0	0	0	0	0	0	0		
Denmark	DK	0.8				0	0	0	0	0	0	0	0	0	0
Estonia	EE						0	0	0	0	0	0	0	0	0
Finland	FI	0.475				0.45	0.45	0.225	0.225	0.225	0.225	0	0	0	0
Germany	DE	0.835				0.35	0.35	0.35	0	0	0	0	0	0	0
Greece	GR	0				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Hong Kong (China)	HK											0.3	0.3	0.3	0.3
Hungary	HU	0.75				0	0	0	0	0	0	0	0	0	0
Iceland	IS	0.5				0	0	0	0	0	0	0.5	0.5	0.5	0
India	IN												1	1	1
Ireland	IE	0				0	0	0	0	0	0	0	0	0	0
Israel	IL						0.5	0.3	0.3	0.3	0.4	0.3	0	0	0
Italy	IT	0				0	0	0	0	0	0	0	0	0	0
Japan	JP	0				0	0	0	0	0	0	0	0	0	0
Korea	KR	0.9				0.575	0.575	0.575	0.575	0.575	0.575	0.575	0.65	0.25	0.25
Lithuania	LT													0	0
Luxembourg	LU	0.9				0	0	0	0	0	0	0	0	0	0
Malta	MT											0	0	0	0
Mexico	MX	1				0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Netherlands	NL	0				0	0	0	0	0	0	0	0	0	0
New Zealand	NZ	0				0	0	0	0	0	0	0	0	0	0
Norway	NO	0				0	0	0	0	0	0	0	0	0	0
Poland	PL	0.95				0.95	0.95	0.825	0.825	0.825	0.825	0.825	0.825	0.475	0.8
Portugal	PT	0.8				0	0	0	0	0	0	0	0	0	0
Romania	RO											0	0	0	0
Russia	RU							0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8
Slovak Republic	SK	0				0.3	0.3	0.3	0.3	0	0	0	0	0	0
Slovenia	SI											0	0	0	0
South Africa	ZA						0.85	0.8	0.8	0.8	0.8	0.8	0.75	0.75	0.75
Spain	ES	0				0	0	0	0	0	0	0	0	0	0
Sweden	SE	0.9				0	0	0	0	0	0	0	0	0	0
Switzerland	CH	0.7				0.7	0.7	0.7	0.7		0.7			0	0
Turkey	TR	0				0	0	0	0	0	0	0	0	0	0
United Kingdom	GB	0				0	0	0	0	0	0	0	0	0	0
United States	US	0				0	0	0	0	0	0	0	0	0	0

Note: not available data are highlighted with yellow.

Table 5: Countries where different restrictions apply for different pension funds/options

	Country	Funds/options	Years	Method	N (for average)
AT	Austria	Pensionskassen; Support funds	2013-2014	Same limits	-
BG	Bulgaria	Mandatory universal pension funds (UPF); Mandatory professional pension funds (PPF); Voluntary pension funds with occupational schemes (VPFOS); Voluntary pension funds (VPF)	2013-2014	Same limits	-
CL	Chile	Five anonymized funds; joint limit reported and used	2006-2014	Joint limit	-
CO	Colombia	Four anonymized funds	2011-2014	Average	4
DE	Germany	Pensionskassen; Pensionsfonds	2005*-2014	Average	2
FI	Finland	Voluntary pension plans; Statutory pension plans	2007-2014**	Average	2
HU	Hungary	Voluntary pension funds (VPF); Mandatory pension funds (MPF)	2001	Average	2
JP	Japan	EPF; TQP	2001	Same limits	-
KR	Korea	Personal pension; corporate pension (average of limits for DB and DC)	2005-2014	Average	2
LT	Lithuania	Conservative funds; Other funds; Supplementary accumulation for pension	2013-2014	Same limits	-
LU	Luxembourg	SEPCAV and ASSEP; CAA supervised pension funds	2007-2014	Same limits	-
MT	Malta	Occupational Retirement Schemes; Personal Retirement Schemes	2013-2014	Same limits	-
MX	Mexico	All Afores, (Siefore) Basic Fund 1; All Afores, (Siefore) Basic Fund 2; All Afores, (Siefore) Basic Fund 3; All Afores, (Siefore) Basic Fund 4	2013-2014	Same limits	-
PL	Poland	Open Pension Funds; Employee Pension Funds	2001-2014	Average	2
PT	Portugal	Closed pension funds; Open pension funds; Personal retirement saving schemes (PPR)	2013-2014	Same limits	-
RO	Romania	Private pension fund - second pillar; Private pension fund - third pillar	2013-2014	Same limits	-
RU	Russia	Mandatory funded pillar, default option; Mandatory funded pillar, conservative option; Mandatory funded pillar, Non-state pension funds and Investment	2010-2014	Average	4
SK	Slovak Republic	Privately managed mandatory pension system - Bonds Guaranteed Fund; Privately managed mandatory pension system - Equity Non-Guaranteed Fund; Privately managed mandatory pension system - Other types of funds; Voluntary personal	2013-2014	Same limits	-

* Pensionskassen are not mentioned at all in 2005, but is included anyway with the same limit as 2006

** The names are somewhat different for years 2013 and 2014, but essentially refer to the same funds

4.4.2 Developments in pension fund restrictions

Our index suggests that many countries apply very limited if any, restrictions on foreign investment (Table 4). Many of them, including but not limited to the Italy, Japan, Netherlands, Spain, the United Kingdom and the United States, did not apply any specific limits as early as 2001, the first year the survey is conducted.

However, some other countries imposed substantial limits in 2001 and gradually relaxed these barriers in recent years. This set of countries includes Denmark, Finland, Germany, Hungary, Romania and Sweden in the EU, but also Canada, Chile and Switzerland outside the EU.

Yet there is also a group of countries where considerable constraints have persisted over time. This is the case for Austria and Poland, which keep currency restrictions for pension fund assets, Greece, which limits pension fund foreign investment within the EEA. Outside the EU Mexico, Russia and South Africa apply rather restrictive limits that have proved persistent, while India outright forbids foreign investment.

4.5 Home bias and euro-area bias

Institutional investors, as professional parties, typically hold geographically diversified portfolios of marketable securities. In that way, institutional investors contribute to financial integration and risk sharing across Europe's Capital Markets Union and beyond. As institutional investors increase in size, they become more professional and may reduce the home bias in their investments. This is the key hypothesis we test using our dataset.

4.5.1 Data issues

We describe our data in detail in the data annex, but we highlight a few key issues related to the comparability of data.

Unfortunately, it is rather difficult to obtain time series on assets held by institutional investors separated as domestically and non-domestically issued.

- While the OECD's Institutional Investors' Assets and Liabilities dataset may seem to be a straightforward data source, unfortunately it is not suitable for our purposes. This dataset includes country-wide data for three types of institutional investors (pension funds, insurance corporations, investment funds) and various asset types[22], separated whether issued by residents or not. However, we realised that a major double-counting problem raises serious questions about the usefulness of this dataset. Specifically, some pension funds and insurance companies moved away from the direct purchase of securities and instead purchased investment fund shares. After such a change, all holdings of investment fund shares are regarded as 'domestic' if the investment fund is registered in the home country. However, since these investment funds hold a diversified portfolio including foreign assets, such a change from direct investment to

[22] The dataset also includes data on liabilities of institutional investors.

investment fund share holdings seemingly increases the home bias, even if there was no effective change in home bias.

Unfortunately, it is not possible to approximate the investment fund's home/foreign holding division (which can be calculated from the OECD dataset) to allocate the pension fund holdings of investment fund shares, because pension fund investment fund shares are not broken down by the residency of the issuer. Only the aggregate of 'equity and investment fund shares' holdings of pension funds is available according to the residency of the issuer, but since pension funds likely hold domestic equities too, it is not possible to obtain information from the OECD dataset on the pension funds' holding of resident investment fund shares.

- We therefore use the IMF's Coordinated Portfolio Investment Survey (CPIS) for cross-border positions and we consider the total economy asset and liability positions. Unfortunately, the sectoral data of this dataset (which include data for "insurance corporations and pension funds") includes too many missing data and we are also unsure whether this sectoral data suffers or not from the same double-counting problem as the OECD's dataset.

Therefore, we use the IMF's CPIS dataset on foreign assets and liabilities of the total economy. Clearly, we use indicators of home bias that represent the total economy, while we wish to assess the impact of institutional investors on home bias. Consequently, there is a discrepancy between the sectoral composition of our dependent variable (total economy home bias) and explanatory variable (assets managed by institutional investors). This discrepancy will likely disturb our regression results. We note, however, that in countries in which institutional investors manage relatively large assets, the home bias of institutional investors have a significant influence on the home bias of the total economy. A reasonable strategy for our estimations would therefore be to consider only those countries in which institutional investors manage assets which are relatively large compared to the country's GDP.

In order to calculate home and euro-area biases, we also need data on the total volume of outstanding debt and stock or equity market capitalisation.

For equities, a possible indicator is stock market capitalisation. Many related studies rely on this indicator. A key advantage of this indicator is the consistent definition across countries and availability for most countries of the world. However, stock market capitalisation may include foreign direct investment holdings of non-residents, if the total value of the listed companies are considered, not just the shares traded publicly.

Another problem with the use of stock market capitalisation data is its possible incompatibility with the CPIS portfolio holdings data. Mutual funds are classified as equity in the CPIS, but some of them are bond funds. For this reason, world stock market capitalization is an insufficient match for CPIS equity data.

An alternative to the use of stock market capitalisation data is the use of the equity data from the financial balance sheet statistics of the national accounts dataset. Financial balance sheet data includes four categories: (1) listed shares, (2) unlisted shares, (3) other equity, and (4) investment fund shares/units. A problem with this data is the possibility of double counting: investment funds may hold listed and unlisted shares and other equity and thereby the sum of the four categories may overstate the actual equity supply.

A further issue with the use of equity data from the national accounts dataset (that we believe we are able to address properly) is that we are interested in portfolio equity holdings of institutional investors, while national accounts data include all kinds of equity, including foreign direct investment claims on the home country. To address this issue, we subtracted all foreign equity claims (i.e. both portfolio and foreign direct investment claims) on the country in question to arrive at an indicator of domestic equity holdings of residents. Then, using the CPIS dataset, one can identify the domestic equity portfolio holdings of non-residents and add it up to domestic equity holdings of residents to obtain the total stock of domestic (portfolio) equity.

Since neither stock market capitalisation, not equity data from the national accounts dataset is perfect, we derive our home bias indicator using both of these versions and study both of them in our regressions analysis.

Finally, debt securities data is from BIS, ECB and for two countries (Switzerland and Iceland) from national accounts data. Comparing the three data sources, it appears that the data is practically identical for those countries that are included in all three datasets. We use debt securities (i.e. bonds, bills and other commercial papers) issued by all sectors of the economy (i.e. the general government, financial corporations and non-financial corporations).

4.5.2 Our home bias and euro-area bias indicators

Following Ahearne et al (2004), we use a simple indicator of home bias in portfolio investments (i.e. we do not consider foreign direct investments). The International Capital Asset Pricing Model (ICAPM) suggests that when asset markets are integrated, implying that investors can buy and sell foreign securities without any restriction and without extra transaction costs, all investors should hold the world market portfolio in which each country portfolio is weighted by its market capitalisation. A simple indicator of home bias measures the deviation from the ICAPM benchmark, that is, one minus the ratio of the share of foreign equities in the home and world portfolios:

$$EHB_i = 1 - \frac{S(FE)_i}{S(FE)_{W-i}}$$

EHB_i: Equity home bias of country *i* (i.e. the indicator calculated by us) [23],
$S(FE)_i$: Share of foreign equity securities in country *i*'s total equity portfolio (which is in turn 1 minus the share of domestic portfolio equity),
$S(FE)_{W-i}$: Share of foreign equity in world portfolio available to country *i* (which is 1 minus the share of country *i* in total world stock/equity market capitalisation).

Since we are using two sources for domestic portfolio equity, the alternative definitions of country *i*'s total portfolio equity portfolio are the following:

1. When using stock market capitalisation: sum of portfolio equity assets held abroad (CPIS data) and domestic stock market capitalisation (see sources in the annex) minus the domestic portfolio equity held by foreigners (CPIS data);
2. When using national accounts data: sum of portfolio equity assets held abroad (CPIS data) and domestic portfolio equity holdings of residents

[23] We note again that we consider only portfolio equity holdings and do not consider foreign direct investment holdings.

(national account's equity data minus all foreign equity claims on the country).

EHB_i is not larger than 1. Its values can be interpreted as follows:

- $EHB_i = 1$: Domestic investors invest 100% in domestic equity, which is the case of complete home bias;
- $0 < EHB_i < 1$: Domestic investors have some home bias for domestic equities, but they invest part of their portfolio in foreign equities (the closer to 1, the higher the home bias);
- $EHB_i = 0$: A neutral portfolio, in which there is no home bias: domestic investors invest in foreign equity securities proportionally to the share of foreign equity in world portfolio, in line with the ICAPM prediction;
- $EHB_i < 0$: In theory, domestic investors may have a bias for holding foreign debt securities. E.g., hypothetically, if a country which issues 10% of global equities (implying that $S(FE)_{W-i} = 0.9$) keeps 95% of its assets in foreign equities, then $EHB_i = 1 - \frac{0.95}{0.9} = -0.056$.

We also define an indicator measuring the euro-area bias in portfolio equity investments (again, we do not consider foreign direct investment). This indicator aims to measure whether the share of investments in the euro area (for non-euro area countries) or the share of investments in the rest of the euro area (for euro area countries) in the foreign portfolio is larger than the share of euro-area assets (except home-issued securities in the case of euro countries) in total foreign equity portfolio which is available for the country in question. The total foreign equity portfolio which is available for the country in question is the sum of equity securities of all countries of the world excluding the country in question.

Formally,

$$EEAB_i = 1 - \frac{S(Non - EAFE)_i}{S(Non - EAE)_{W-i}}$$

$EEAB_i$: indicator of equity euro-area bias of country *i* (i.e. the indicator calculated by us)*;*
$S(Non - EAFE)_i$: share of non-euro area equity holdings in the total foreign portfolio equity holdings of country *i*;
$S(Non - EAE)_{W-i}$: share of non-euro area equity (and non-home equity in the cases of non-euro area countries) in the total foreign equity holdings of all countries of the world excluding country *i*.

That is, while the home bias indicator above considers the total portfolio of the country, the euro area bias indicator considers only the foreign equity holdings.

$EEAB_i$ can take the following values:

- $EEAB_i$=1: This is the case of complete euro-area bias, that is, the country does not hold any non-euro area equity in its foreign portfolio, but only euro-area portfolio equity;
- $0 < EEAB_i < 1$: There is some bias for euro-area equities, i.e. when such securities are held in a larger proportion than their relative supply;
- $EEAB_i$=0: A neutral portfolio, in which there is no euro-area bias: the two shares are equal, that is, the holdings of non-euro area portfolio equity in

the foreign equity portfolio of country *i* is proportional to the supply of non-euro area portfolio equities;

- $EEAB_i < 0$: A bias for non-euro area securities, which is the case when a country holds more non-euro area securities than their relative supply.

Portfolio debt securities home and euro-area biases can be defined similarly, for which we consider debt securities (i.e. bonds, bills and other commercial papers) issued by all sectors of the economy (i.e. the general government, financial corporations and non-financial corporations; see detailed data sources in the Annex).

The country-composition of the euro area is not constant in our sample period due to new members joining between 2006-15. However, a constant-composition euro area aggregate is preferable. We therefore consider the only the first 12 members of the euro area (EA12)[24], which countries anyway strongly dominate equity and debt securities issued in the euro area. Furthermore, there are many missing values in the assets held in the newer euro members and therefore their inclusion would limit our sample period.

Finally, we note that the countries considered for the definition of world supply differ for the two portfolio equity home bias indicators and for the portfolio debt securities home bias indicator:

- Equity based on stock market capitalisation: we use 'world total' as published by the World Federation of Exchanges;
- Equity based on national accounts data: sum of 38 countries;
- Debt securities: sum of 42 countries.

4.5.3 Home bias and euro-area bias developments

Table 6 summarises the average level of home and euro area bias indicators in four main country groups in 2014. The equity home bias in the euro area and in the other three older EU member states is lower than in the newer EU member states and in non-EU advanced countries, while the euro-area bias is comparably high in the euro-area and newer EU member states, but low in the other three older EU member states and in advanced countries. The euro area is most special concerning debt securities: home bias is the lowest and euro-area bias is the highest among the country groups.

Therefore, it seems that euro-area membership may have promoted a lower home bias and higher a euro-are bias in debt securities, while EU membership may have been a driving force for equities. This latter observation is in line with the findings of Beakert *et al* (2013), who concluded, using industry valuation differentials across European countries, that membership in the EU significantly lowers discount rate and expected earnings growth differentials across countries (which are indicators of financial integration), but the adoption of the euro is not associated with increased integration.

[24] The first twelve members of the euro area are: Austria, Belgium, Finland, France, Germany, Greece, Italy, Ireland, Luxembourg, the Netherlands, Portugal and Spain.

Table 6: Average level of home bias and euro-area bias in four country groups, 2014

	EHB1	EHB2	DHB	EEAB1	EEAB2	DEAB
Euro-area 12*	0.49	0.73	0.46	0.65	0.50	0.54
Old EU 3	0.47	0.79	0.70	0.21	0.09	0.30
New EU 5	0.75	0.96	0.86	0.68	0.63	0.26
Advanced 4	0.65	0.84	0.82	0.04	-0.17	-0.16

Note: The average of country-specific values is reported. ***EHB1****: portfolio equity home bias based on stock market capitalisation;* ***EHB2****: portfolio equity home bias based on national accounts data;* ***DHB****: debt securities home bias;* ***EEAB1****: portfolio equity euro-area bias based on stock market capitalisation;* ***EEAB2****: portfolio equity euro-area bias based on national accounts data;* ***DAB****: debt securities euro-area bias.* ***Euro-area 12****: first 12 euro members; yet EHB1 and EEAB1 excludes Ireland and Luxembourg given the larger than 1 EHB1 estimate, which likely reflect data errors, as we discussed earlier;* ***Old EU 3****: Denmark, Sweden and the United Kingdom;* ***New EU 5****: Bulgaria, Czech Republic, Hungary, Poland and Romania;* ***Advanced 4****: Canada, Israel, Japan and the United States.*

Country-specific developments in portfolio equity home and euro-area biases are reported in Figure 37, while Figure 38 presents home and euro-area debt securities bias indicators.

Figure 37: Portfolio equity: home and euro-area biases

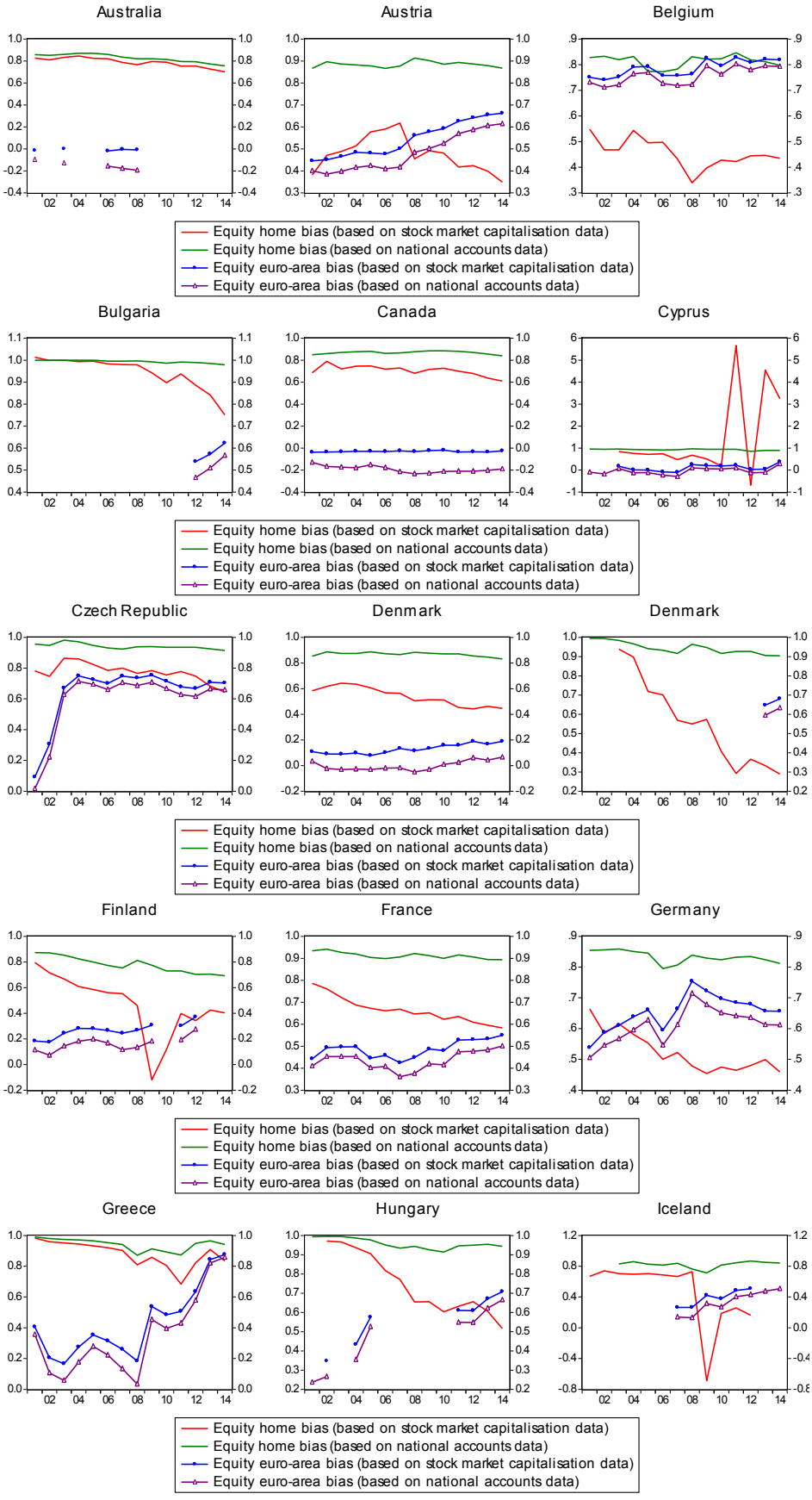


Figure 37 continued, Portfolio equity and debt: home and euro-area biases

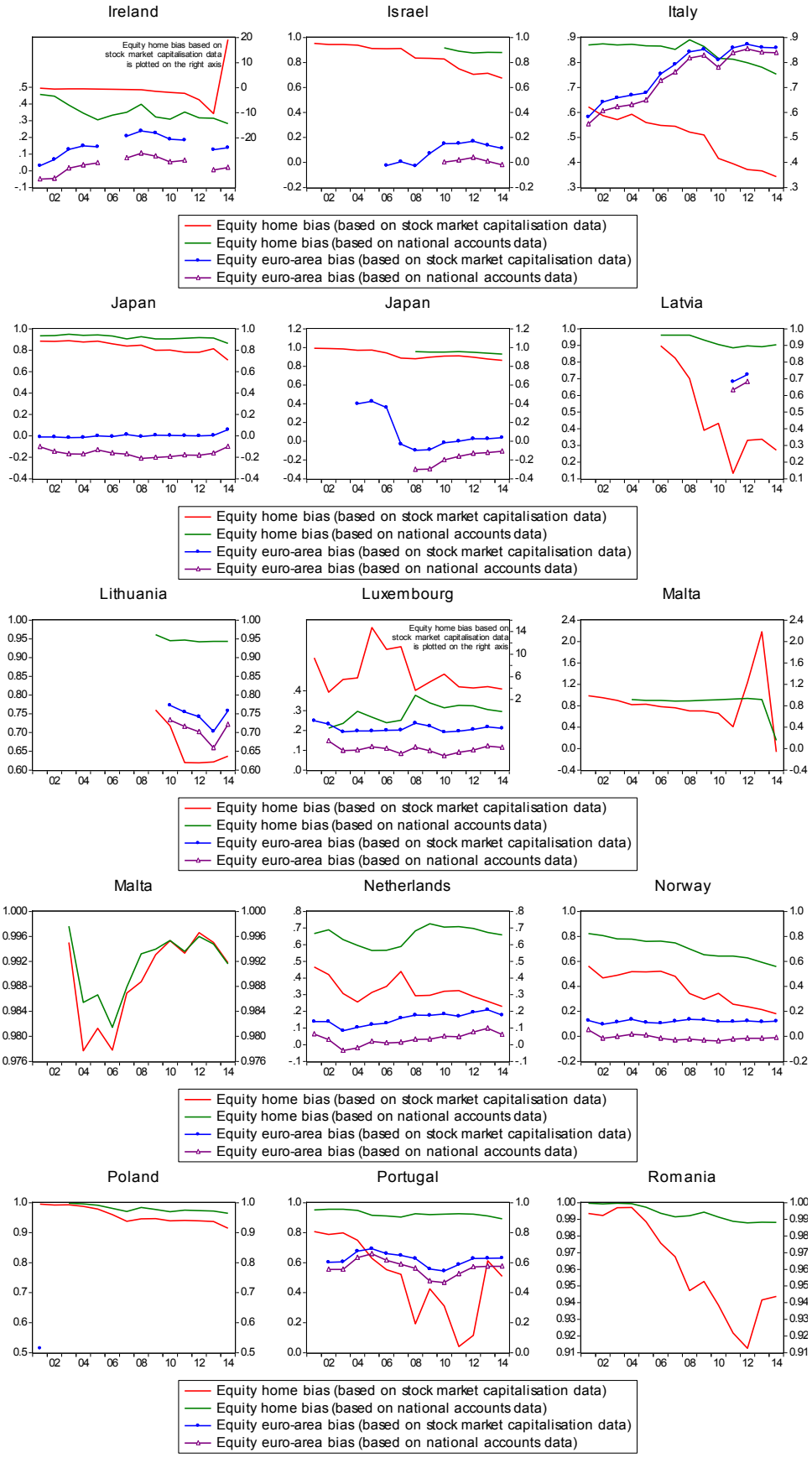
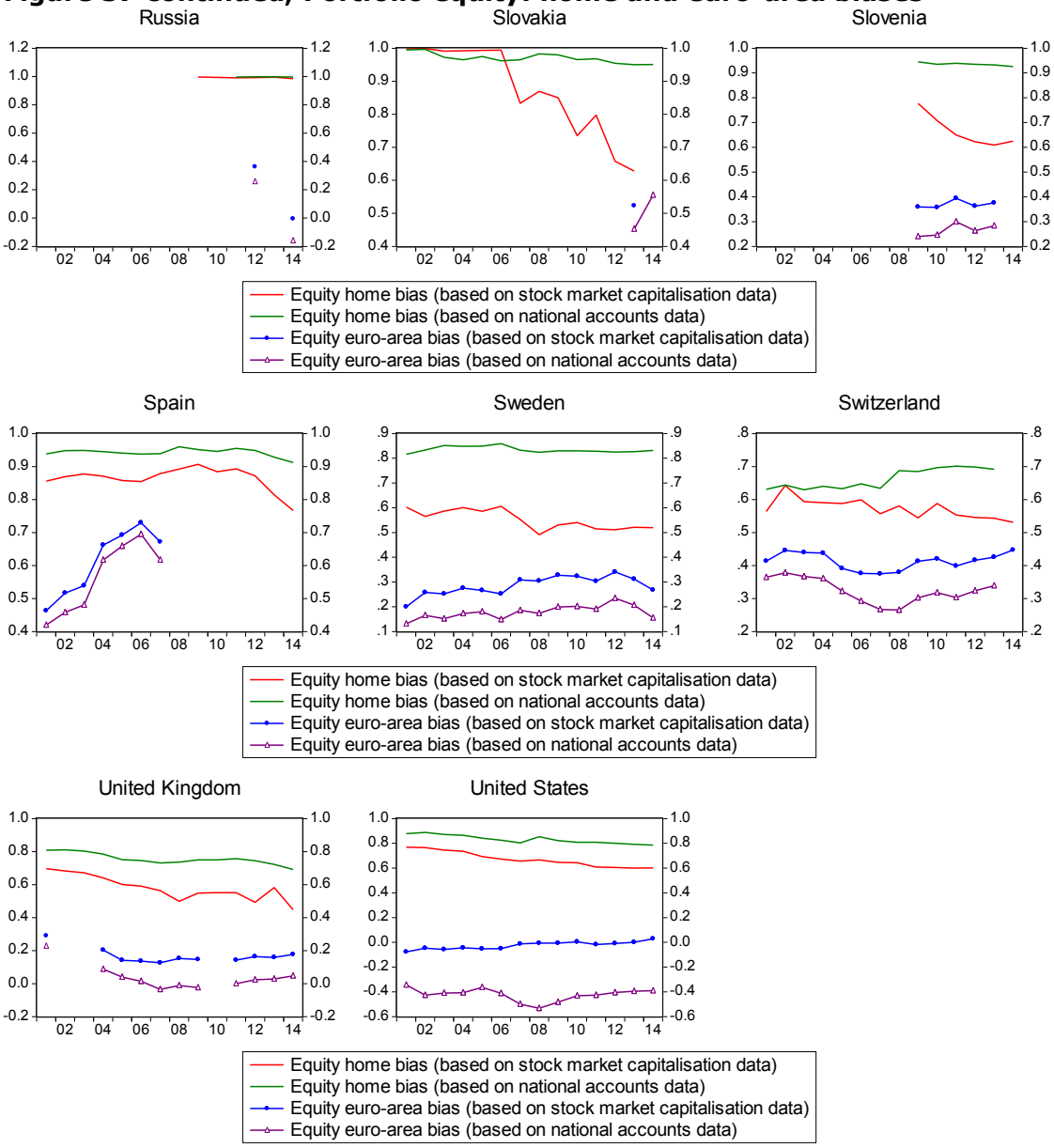


Figure 37 continued, Portfolio equity: home and euro-area biases



Source: Authors' calculations as discussed in the main text.

Figure 38: Portfolio debt securities: home and euro-area biases

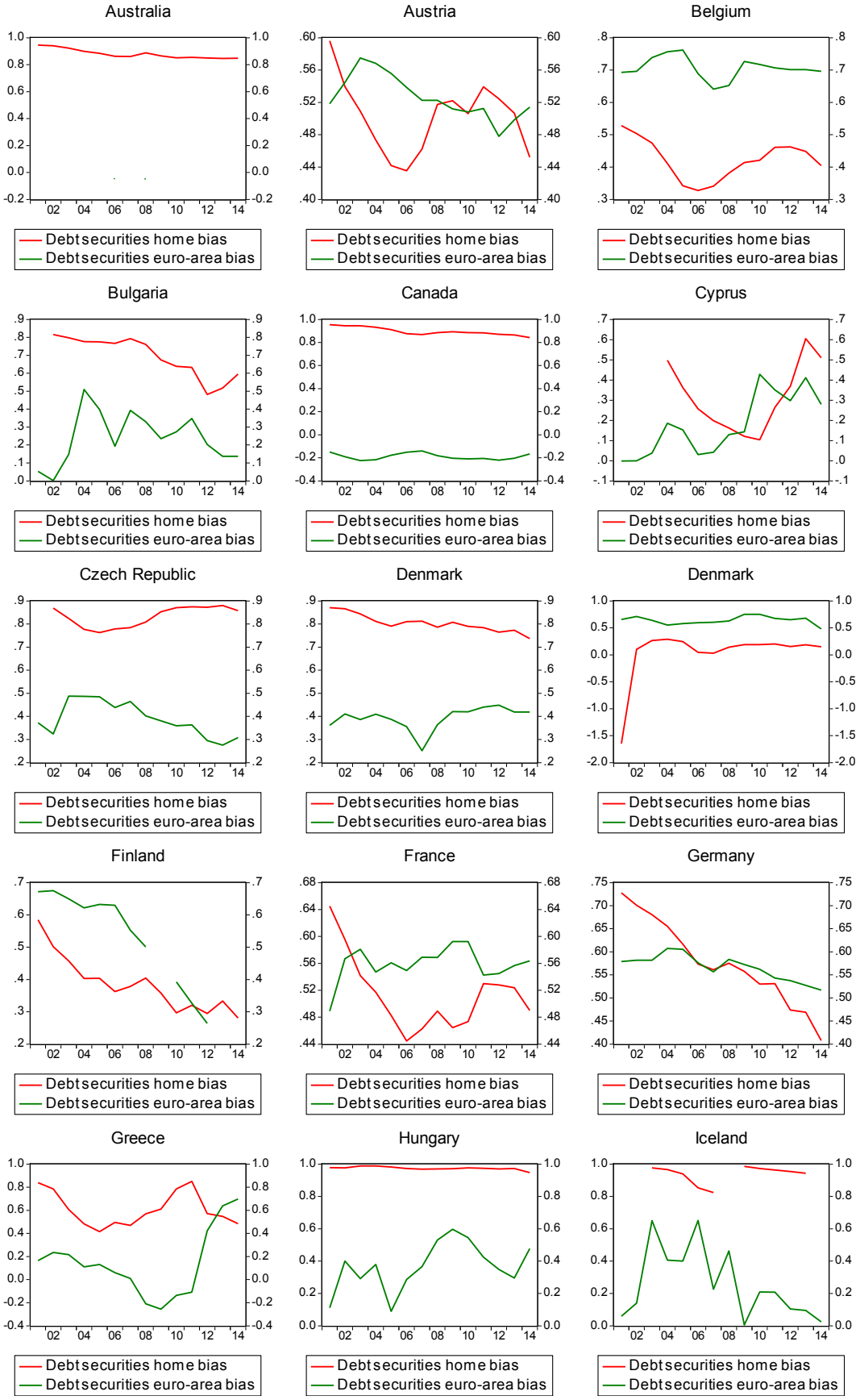


Figure 38 continued, Portfolio debt securities: home and euro-area biases

Figure 38 continued, Portfolio debt securities: home and euro-area biases

Source: Authors' calculations as discussed in the main text.

Figure 37 and Figure 38 show rather diverse levels and developments of both home and euro-area biases.

In some euro members the equity euro-area bias has increased throughout the sample period of 2001-14 (Austria, Greece, Italy), while in others this bias is already high at the beginning of our sample period (Belgium, Germany, Portugal) and changes little. Yet in Finland and the Netherlands equity euro-area bias remains relatively low and therefore there is no uniform development within the euro area in terms of portfolio equity euro-area bias.

While the home bias is much higher in the central and eastern European non-euro members of the European Union, there is a high level of euro-bias in these countries (Bulgaria, Czech Republic and Hungary; unfortunately many data is missing for Poland and Romania). This probably reflects that political, economic and financial links also boost the share of euro area in foreign asset holdings.

In the three other EU countries, Denmark, Sweden and the United Kingdom, there is a low level of euro-area bias, while home bias in terms of portfolio equity

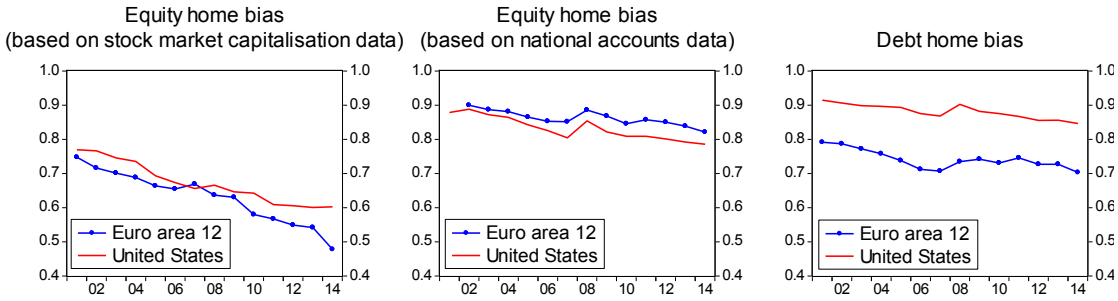
is broadly similar to most euro-members, while debt home bias is much higher than in the euro-area.

Non-EU countries are generally characterised by a higher level of home bias than EU countries. This suggests that EU membership fosters financial integration and perhaps reduces information barriers which sometimes limit cross-country diversification, which is in line with the findings of Beakert *et al* (2013) as we highlighted before. It is also notable that the euro-area bias of non-EU countries is relatively close to zero. Key exceptions are Russia's meaningful debt euro-area bias, Turkey's fluctuating but generally positive equity and debt euro-are bias, and Argentina's and the US negative debt euro area bias. These differences likely indicate the regional proximity is a factor in allocating the foreign securities portfolio.

We highlight that so far we reported indicators on the home bias of each country as a whole, but not risk sharing within a country. For example, in the introduction to this chapter we summarised a number of articles concluding that there is considerable risk-sharing within the United States, while our indices are informative on the domestic/foreign division of assets holdings of the United States (and all other countries). In order to compare better the home bias vis-à-vis the rest of the world of the United States and the euro area, we calculate the home bias of the euro area as if the euro area was a single country. That is, we consolidate intra-euro area claims and regard those claims as 'domestic claims' from the perspective of the euro-area 12 aggregate and consider only non-euro foreign claims as 'foreign' claims from the perspective of the euro area 12 aggregate. We do the same consolidation for intra-euro area liabilities. The total market capitalisation of the euro area 12 aggregate is simply the sum of market capitalisations of the 12 countries. By calculating these "consolidated" euro area 12 aggregates, we can calculate the home bias of the euro area 12 group using our expressions, as if the euro area 12 was a single country.

Figure 39 reports remarkable similarity of the euro area 12 as a whole and the United States in terms of equity home bias, while there is a higher level of debt home bias in the United States than in the euro area 12 group. As expected, the home bias of the euro area 12 as a whole is higher than the average of country-specific home biases of the 12 countries (see the latter in Table 6).

Figure 39: Home bias in the euro area as a whole and in the United States



4.6 Panel regression analysis: the determinants of home bias

Our regression estimates explore if the size of the assets managed by institutional investors contributes to the home bias. Our main hypothesis is that the larger the assets managed by institutional investors, the smaller the home bias and thereby the larger the scope for risk sharing, ceteris paribus.

We estimate variants of the following regression:

$$f(EHB_{i,t}) = \alpha + \gamma_i + \delta_t + \beta ASSETS_{i,t} + \boldsymbol{\theta X_{i,t}} + \varepsilon_{i,t},$$

where: $EHB_{i,t}$ is one of the two indicators of the equity home bias of country *i* in time *t*, $ASSETS_{i,t}$ is the share of institutional investors' assets in the GDP of country *i* in time *t*, $\boldsymbol{X_{i,t}}$ denotes control variables, and $\varepsilon_{i,t}$ is the residual. α is the general constant, γ_i is the country-specific fixed effect, δ_t is the time-specific fixed effect, β and the vector $\boldsymbol{\theta}$ are parameters to be estimated.

$f(.)$ indicates a function to transform the home bias indicator. We note that $EHB_{i,t}$ typically takes values between zero and one, while the bulk of the explanatory variables are in principle unbounded from above, which may render a standard specification invalid. However, in our assessment the consequences of the limited range of the dependent variable is not so important and we note that many published articles did not address this problem. We therefore estimate two versions, one which does not consider this problem and one which addresses it, and we will compare the results between these two options:

- In one version the (untransformed) home bias indicator is the dependent variable, i.e. $f(x) = x$;
- In a second version we use a logistic transformation, $f(x) = log\left(\frac{x}{1-x}\right)$. By definition, the logistic transformation disregards cases when $EHB_{i,t} \leq 0$ (which cases are rare in our dataset) and $EHB_{i,t} \geq 1$. We note that $EHB_{i,t} = 1$ is a theoretical possibility, but it does not appear in our dataset, while in a few cases $EHB_{i,t} > 1$ (Cyprus, Ireland and Luxembourg equity home bias based on stock market capitalisation), which probably reflects data problems.

We estimate the same model for debt securities home bias.

We use the total assets managed by all three types of institutional investors, that is, the sum of assets managed by pension funds, insurance corporations and investment funds. The relative importance of these funds varies across countries. For example, as demonstrated Figure 31, the share of pension fund assets in GDP is very close to zero in France, while France has the third highest insurance corporations' assets relative to GDP after Luxembourg and Ireland (Figure 32). The sum of the assets of the three types of investors represents the total volume of assets which may influence the country-wide home bias, which is our dependent variable in the regressions.

We consider the following control variables:

- GDP per capita relative to the US: it measures the level of development, which may proxy several factors influencing the ability of a country to diversify its asset holding, such as economic development, institutional quality, investor protection or average education level in the country. The expected sign of the estimated parameter is negative.

- Financial Development Index, which is a sub-component of the World Economic Forum's Global Competitiveness Index: it may proxy the many factors that influence the size of capital markets. A higher financial development may encourage investors to invest nationally rather than abroad, thereby the expected sign of the parameter estimate is positive.
- The share of exports of goods and services to GDP: it measures the openness of the country to trade. More trade openness may influence cross-border asset diversification and hence the expected sign of the estimated parameter is negative.
- Domestic market capitalisation relative to home GDP: the availability of domestically issued securities may also influence home bias: a country with larger home stock of securities may diversify less, and therefore the expected sign of the estimated parameter is positive. For the three home bias indicators we use the corresponding domestic market capitalisation data:
    - Equity based on stock market: stock market capitalisation;
    - Equity based on national accounts: equity data from national accounts;
    - Debt securities: total outstanding stock of domestic debt securities by all sectors (government, financial corporations, and non-financial corporations).
- Foreign market capitalisation relative to home GDP: the availability of foreign issued securities may also influence home bias, e.g. foreign supply of securities is smaller from the perspective of United States than from the perspective of Estonia. The expected sign of the estimated parameter is negative. For the three home bias indicators we use the corresponding foreign market capitalisation data:
    - Equity based on stock market: stock market capitalisation;
    - Equity based on national accounts: equity data from national accounts;
    - Debt securities: total outstanding stock of domestic debt securities by all sectors (government, financial corporations, and non-financial corporations).
- Pension fund foreign investment restrictions index: more restrictive financial regulation should lead to home bias, and thereby the expected sign of the estimated parameter is positive. While this index refers to pension funds only, it may be indicative on possible restrictions for insurance corporations and investment funds too.
- Euro-area bias: since Figure 37 suggested that euro-area bias is important for euro-area countries and its increase went hand-in-hand with the decline of home bias, we include the euro-area bias only for euro-area countries. A negative estimated parameter would indicate that euro-area bias reduces home bias.

In order to test the marginal contribution of the euro-area bias to the regression result, we estimate a version of the regression without this variable and another version with this variable.

An important consideration relates to the use of fixed effects. Without fixed effects, the explanatory variables are bound to explain all cross-country and cross-time variation. However, there could be important country-specific factors not included in the model, and there could be general trends through time across all countries, which can be controlled by the addition of country and period fixed effects. We therefore estimate model variants both with and without fixed effects.

We include in the regression 25 countries:

- 18 European Union countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Hungary, Italy, Lithuania, Netherlands, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom;
- 7 non-EU countries: Canada, Iceland, Israel, Japan, Russia, Switzerland, United States.

Among the EU countries, we do not include in the regression:

- Four countries for which the pension fund restriction index cannot be calculated: Croatia, Cyprus, France and Latvia;
- Four additional countries for which assets of insurance corporations and/or investment funds are not available: Bulgaria, Malta, Poland and Romania (we note that data on assets is not available for Cyprus either);
- Ireland and Luxembourg, given that these countries are financial centres and have asset ratios to GDP which are several factors higher than in other countries and therefore these countries are special cases.

For three types of home bias indicators and two types of functional form, the following six tables include the result, starting with the portfolio equity home bias, our main focus. For each of these six options we report eight versions of the regression (depending on whether euro area-bias, financial development index and fixed effects are included or not). Thereby, we report the results of 48 regression estimates.

Table 7: Panel regression results: untransformed portfolio equity home bias based on stock market capitalisation data

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Assets	**-0.07**	**-0.08**	**-0.06**	**-0.015**	**-0.08**	**-0.09**	**-0.08**	**-0.04**
[t-ratio]	*[-9.7]*	*[-9.4]*	*[-1.6]*	*[-0.4]*	*[-11]*	*[-10.3]*	*[-2.4]*	*[-1.3]*
(p-value)	*(0.000)*	*(0.000)*	*(0.117)*	*(0.673)*	*(0.000)*	*(0.000)*	*(0.016)*	*(0.180)*
GDP per capita	**-0.76**	**-0.51**	**-0.28**	**-0.09**	**-0.72**	**-0.52**	**-0.58**	**-0.44**
[t-ratio]	*[-11.6]*	*[-6.3]*	*[-1.2]*	*[-0.3]*	*[-11]*	*[-6.7]*	*[-3.2]*	*[-1.9]*
(p-value)	*(0.000)*	*(0.000)*	*(0.220)*	*(0.759)*	*(0.000)*	*(0.000)*	*(0.001)*	*(0.065)*
Financial market dev.	**0.02**	**0.01**	**-0.02**	**-0.001**				
[t-ratio]	*[1.2]*	*[0.7]*	*[-0.6]*	*[0]*				
(p-value)	*(0.233)*	*(0.493)*	*(0.526)*	*(0.983)*				
Exports	**-0.19**	**-0.22**	**-0.38**	**-0.37**	**-0.27**	**-0.28**	**-0.48**	**-0.50**
[t-ratio]	*[-4.1]*	*[-5.7]*	*[-2.5]*	*[-2.5]*	*[-6]*	*[-7.6]*	*[-4.9]*	*[-5.1]*
(p-value)	*(0.000)*	*(0.000)*	*(0.013)*	*(0.013)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Home market cap.	**0.24**	**0.15**	**0.21**	**0.15**	**0.25**	**0.17**	**0.22**	**0.16**
[t-ratio]	*[8.5]*	*[5.3]*	*[4.2]*	*[3.9]*	*[10.9]*	*[8]*	*[5.1]*	*[5]*
(p-value)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
World market cap.	**-0.56**	**-0.81**	**-0.43**	**-0.62**	**-0.36**	**-0.60**	**-0.33**	**-0.60**
[t-ratio]	*[-5.2]*	*[-6]*	*[-0.7]*	*[-1]*	*[-3.3]*	*[-5.1]*	*[-0.7]*	*[-1.3]*
(p-value)	*(0.000)*	*(0.000)*	*(0.476)*	*(0.315)*	*(0.001)*	*(0.000)*	*(0.493)*	*(0.210)*
Pension fund restriction	**0.13**	**0.14**	**-0.03**	**-0.02**	**0.09**	**0.10**	**-0.02**	**-0.04**
[t-ratio]	*[3.6]*	*[5]*	*[-0.6]*	*[-0.4]*	*[3.3]*	*[3.7]*	*[-0.6]*	*[-1.4]*
(p-value)	*(0.000)*	*(0.000)*	*(0.558)*	*(0.716)*	*(0.001)*	*(0.000)*	*(0.524)*	*(0.154)*
Euro-area bias (for euro area countries only)		**-0.24**		**0.19**		**-0.21**		**0.10**
		[-6]		*[1.6]*		*[-6]*		*[1.1]*
(p-value)		*(0.000)*		*(0.105)*		*(0.000)*		*(0.252)*
fixed effects	no	no	yes	yes	no	no	yes	yes
R2	0.66	0.66	0.90	0.90	0.64	0.64	0.91	0.91
N.o. time periods	9	9	9	9	14	14	14	14
N.o. countries	25	25	25	25	25	25	25	25
N.o. total observations	178	168	178	168	225	215	225	215

Note: OLS with robust standard errors. The dependent variable is portfolio equity home bias based on stock market capitalisation data. Four explanatory variables are included relative to (home) GDP: (1) assets of institutional investors; (2) exports of goods and services; (3) home stock market capitalisation; (4) world stock market capitalisation excluding the home stock market. World stock market capitalisation excluding the home stock market relative to home GDP is divided by 10000. GDP per capita at purchasing power parity is relative to the United States. Where indicated, both cross-section and period fixed effects are included. The values in squared brackets below the parameter estimates are the t-ratios (rounded to one digit after the decimal), and in round brackets are the p-values (rounded to three digits after the decimal).

Table 8: Panel regression results: logistic transformation of portfolio equity home bias based on stock market capitalisation data

	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Assets	**-0.35**	**-0.37**	**-0.33**	**-0.09**	**-0.38**	**-0.39**	**-0.41**	**-0.18**
[t-ratio]	*[-8.9]*	*[-8.4]*	*[-1.7]*	*[-0.5]*	*[-10.3]*	*[-10.2]*	*[-2.4]*	*[-1.2]*
(p-value)	*(0.000)*	*(0.000)*	*(0.093)*	*(0.597)*	*(0.000)*	*(0.000)*	*(0.019)*	*(0.213)*
GDP per capita	-4.49	-4.24	-2.36	-1.21	-4.61	-4.40	-3.68	-2.66
[t-ratio]	*[-9.8]*	*[-10]*	*[-2]*	*[-0.9]*	*[-9.3]*	*[-8.9]*	*[-3.5]*	*[-2.1]*
(p-value)	*(0.000)*	*(0.000)*	*(0.053)*	*(0.386)*	*(0.000)*	*(0.000)*	*(0.001)*	*(0.035)*
Financial market dev.	**0.00**	**0.00**	**-0.01**	**0.09**				
[t-ratio]	*[0]*	*[0]*	*[0]*	*[0.5]*				
(p-value)	*(0.974)*	*(0.977)*	*(0.970)*	*(0.623)*				
Exports	**-1.17**	**-1.24**	**-1.15**	**-1.10**	**-1.52**	**-1.55**	**-2.89**	**-2.95**
[t-ratio]	*[-4.2]*	*[-4.2]*	*[-1.5]*	*[-1.5]*	*[-5.9]*	*[-6]*	*[-4]*	*[-4.1]*
(p-value)	*(0.000)*	*(0.000)*	*(0.125)*	*(0.131)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Home market cap.	**1.26**	**1.15**	**1.12**	**0.81**	**1.26**	**1.16**	**1.18**	**0.87**
[t-ratio]	*[6.3]*	*[6]*	*[4.2]*	*[3.9]*	*[8.9]*	*[8.9]*	*[5]*	*[4.9]*
(p-value)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
World market cap.	**-3.27**	**-3.41**	**-1.04**	**-2.25**	**-2.45**	**-2.60**	**-0.24**	**-1.65**
[t-ratio]	*[-5.5]*	*[-5.4]*	*[-0.4]*	*[-0.8]*	*[-4.7]*	*[-4.8]*	*[-0.1]*	*[-0.8]*
(p-value)	*(0.000)*	*(0.000)*	*(0.707)*	*(0.416)*	*(0.000)*	*(0.000)*	*(0.909)*	*(0.416)*
Pension fund restriction	**1.51**	**1.52**	**-0.06**	**0.03**	**1.15**	**1.12**	**0.03**	**-0.06**
[t-ratio]	*[4.5]*	*[4.8]*	*[-0.2]*	*[0.1]*	*[4.2]*	*[4.2]*	*[0.2]*	*[-0.3]*
(p-value)	*(0.000)*	*(0.000)*	*(0.824)*	*(0.899)*	*(0.000)*	*(0.000)*	*(0.877)*	*(0.746)*
Euro-area bias (for euro area countries only)		**-0.25**		**0.26**		**-0.19**		**0.20**
		[-3.2]		*[2.1]*		*[-2.8]*		*[2]*
(p-value)		*(0.002)*		*(0.040)*		*(0.006)*		*(0.045)*
fixed effects	no	no	yes	yes	no	no	yes	yes
R2	0.59	0.59	0.93	0.93	0.57	0.57	0.92	0.92
N.o. time periods	9	9	9	9	14	14	14	14
N.o. countries	25	25	25	25	25	25	25	25
N.o. total observations	178	168	178	168	225	215	225	215

Note: The dependent variable is the logistic transformation of portfolio equity home bias based on stock market capitalisation data. A logistic transformation is applied to the euro-area bias indicator too. See other notes to Table 7.

Table 9: Panel regression results: untransformed portfolio equity home bias based on national accounts equity data

	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Assets	**-0.04**	**-0.04**	**-0.02**	**-0.004**	**-0.04**	**-0.05**	**-0.03**	**-0.02**
[t-ratio]	*[-12.9]*	*[-13.2]*	*[-1.6]*	*[-0.4]*	*[-14.6]*	*[-14.1]*	*[-2.4]*	*[-1.5]*
(p-value)	*(0.000)*	*(0.000)*	*(0.105)*	*(0.681)*	*(0.000)*	*(0.000)*	*(0.017)*	*(0.137)*
GDP per capita	**-0.33**	**-0.30**	**0.02**	**0.19**	**-0.31**	**-0.28**	**-0.10**	**0.03**
[t-ratio]	*[-12]*	*[-10.6]*	*[0.1]*	*[1.4]*	*[-12.4]*	*[-11]*	*[-1]*	*[0.4]*
(p-value)	*(0.000)*	*(0.000)*	*(0.895)*	*(0.154)*	*(0.000)*	*(0.000)*	*(0.318)*	*(0.724)*
Financial market dev.	**0.001**	**0.0004**	**-0.01**	**-0.0004**				
[t-ratio]	*[0.2]*	*[0.1]*	*[-0.6]*	*[0]*				
(p-value)	*(0.864)*	*(0.955)*	*(0.570)*	*(0.981)*				
Exports	**-0.05**	**-0.05**	**0.07**	**0.07**	**-0.08**	**-0.08**	**0.06**	**0.03**
[t-ratio]	*[-3.1]*	*[-3.5]*	*[1.6]*	*[1.5]*	*[-5.5]*	*[-6]*	*[1.5]*	*[0.8]*
(p-value)	*(0.003)*	*(0.001)*	*(0.102)*	*(0.136)*	*(0.000)*	*(0.000)*	*(0.143)*	*(0.400)*
Home market cap.	**0.02**	**0.02**	**0.04**	**0.03**	**0.02**	**0.02**	**0.05**	**0.05**
[t-ratio]	*[4.8]*	*[4.1]*	*[6.3]*	*[5.9]*	*[4.6]*	*[3.8]*	*[6.4]*	*[5.7]*
(p-value)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
World market cap.	**-0.01**	**-0.03**	**0.15**	**0.19**	**-0.01**	**-0.03**	**0.20**	**0.23**
[t-ratio]	*[-0.7]*	*[-1.6]*	*[2.3]*	*[2.6]*	*[-0.7]*	*[-1.7]*	*[2.9]*	*[3.2]*
(p-value)	*(0.500)*	*(0.117)*	*(0.025)*	*(0.012)*	*(0.469)*	*(0.083)*	*(0.004)*	*(0.002)*
Pension fund restriction	**0.03**	**0.03**	**0.03**	**0.04**	**0.01**	**0.01**	**0.01**	**0.00**
[t-ratio]	*[2]*	*[1.8]*	*[1.2]*	*[1.2]*	*[0.9]*	*[0.6]*	*[0.6]*	*[0]*
(p-value)	*(0.047)*	*(0.073)*	*(0.252)*	*(0.234)*	*(0.354)*	*(0.577)*	*(0.541)*	*(0.982)*
Euro-area bias (for euro area countries only)		**-0.04**		**0.16**		**-0.04**		**0.12**
		[-3.8]		*[5.3]*		*[-4.3]*		*[3.8]*
(p-value)		*(0.000)*		*(0.000)*		*(0.000)*		*(0.000)*
fixed effects	no	no	yes	yes	no	no	yes	yes
R2	0.79	0.79	0.96	0.96	0.77	0.77	0.95	0.95
N.o. time periods	9	9	9	9	14	14	14	14
N.o. countries	25	25	25	25	25	25	25	25
N.o. total observations	176	166	176	166	221	211	221	211

Note: The dependent variable is portfolio equity home bias based on national accounts equity data. World market capitalisation is also based on national accounts data. See other notes to Table 7.

Table 10: Panel regression results: logistic transformation of portfolio equity home bias based on national accounts equity data

	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
Assets	**-0.26**	**-0.25**	**-0.13**	**-0.08**	**-0.26**	**-0.26**	**-0.18**	**-0.12**
[t-ratio]	*[-13.7]*	*[-10.6]*	*[-1.2]*	*[-0.8]*	*[-13.7]*	*[-11.4]*	*[-1.6]*	*[-1]*
(p-value)	*(0.000)*	*(0.000)*	*(0.218)*	*(0.419)*	*(0.000)*	*(0.000)*	*(0.115)*	*(0.306)*
GDP per capita	-4.08	-4.11	-1.72	-0.17	-4.32	-4.29	-2.66	-1.22
[t-ratio]	*[-8.8]*	*[-8.7]*	*[-1.3]*	*[-0.1]*	*[-9.1]*	*[-8.9]*	*[-2.2]*	*[-1.2]*
(p-value)	*(0.000)*	*(0.000)*	*(0.196)*	*(0.882)*	*(0.000)*	*(0.000)*	*(0.030)*	*(0.238)*
Financial market dev.	**-0.02**	**0.02**	**-0.11**	**-0.09**				
[t-ratio]	*[-0.2]*	*[0.3]*	*[-1.1]*	*[-0.8]*				
(p-value)	*(0.833)*	*(0.764)*	*(0.275)*	*(0.427)*				
Exports	**-0.39**	**-0.35**	**-0.27**	**-0.33**	**-0.63**	**-0.62**	**-2.00**	**-2.17**
[t-ratio]	*[-2]*	*[-1.6]*	*[-0.6]*	*[-0.7]*	*[-3.4]*	*[-3.1]*	*[-2.9]*	*[-3.1]*
(p-value)	*(0.043)*	*(0.108)*	*(0.558)*	*(0.511)*	*(0.001)*	*(0.002)*	*(0.004)*	*(0.003)*
Home market cap.	**0.21**	**0.20**	**0.31**	**0.29**	**0.19**	**0.19**	**0.38**	**0.36**
[t-ratio]	*[3.8]*	*[3.4]*	*[5.1]*	*[4.8]*	*[3.7]*	*[3.6]*	*[5]*	*[4.5]*
(p-value)	*(0.000)*	*(0.001)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
World market cap.	**-0.52**	**-0.47**	**0.75**	**0.91**	**-0.49**	**-0.49**	**2.45**	**2.68**
[t-ratio]	*[-3]*	*[-2.6]*	*[1]*	*[1.1]*	*[-3.4]*	*[-3.4]*	*[3]*	*[3.1]*
(p-value)	*(0.003)*	*(0.010)*	*(0.333)*	*(0.261)*	*(0.001)*	*(0.001)*	*(0.004)*	*(0.002)*
Pension fund restriction	**1.18**	**1.22**	**0.37**	**0.42**	**0.86**	**0.86**	**0.33**	**0.28**
[t-ratio]	*[3.5]*	*[3.7]*	*[1.5]*	*[1.6]*	*[3.3]*	*[3.3]*	*[1.6]*	*[1.3]*
(p-value)	*(0.001)*	*(0.000)*	*(0.131)*	*(0.115)*	*(0.001)*	*(0.001)*	*(0.105)*	*(0.185)*
Euro-area bias (for euro area countries only)		**-0.01**		**0.24**		**-0.01**		**0.25**
		[-0.2]		*[4.6]*		*[-0.3]*		*[4.5]*
(p-value)		*(0.848)*		*(0.000)*		*(0.771)*		*(0.000)*
fixed effects	no	no	yes	yes	no	no	yes	yes
R2	0.69	0.69	0.97	0.97	0.67	0.67	0.94	0.94
N.o. time periods	9	9	9	9	14	14	14	14
N.o. countries	25	25	25	25	25	25	25	25
N.o. total observations	176	166	176	166	221	211	221	211

Note: The dependent variable is the logistic transformation of portfolio equity home bias based on national accounts equity data. World market capitalisation is also based on national accounts data. A logistic transformation is applied to the euro-area bias indicator too. See other notes to Table 7.

Table 11: Panel regression results: untransformed portfolio debt securities home bias

	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Assets	**-0.06**	**-0.10**	**-0.06**	**-0.063**	**-0.05**	**-0.10**	**-0.07**	**-0.06**
[t-ratio]	*[-5.8]*	*[-9]*	*[-2.5]*	*[-2.4]*	*[-5.2]*	*[-9.3]*	*[-2.7]*	*[-2.3]*
(p-value)	*(0.000)*	*(0.000)*	*(0.014)*	*(0.017)*	*(0.000)*	*(0.000)*	*(0.008)*	*(0.023)*
GDP per capita	**-0.67**	**-0.43**	**-0.38**	**-0.55**	**-0.54**	**-0.38**	**-0.76**	**-0.76**
[t-ratio]	*[-5.8]*	*[-5.9]*	*[-1.6]*	*[-1.8]*	*[-5.7]*	*[-6.5]*	*[-3.1]*	*[-2.6]*
(p-value)	*(0.000)*	*(0.000)*	*(0.118)*	*(0.067)*	*(0.000)*	*(0.000)*	*(0.002)*	*(0.010)*
Financial market dev.	**0.03**	**-0.01**	**-0.03**	**-0.030**				
[t-ratio]	*[1.5]*	*[-0.4]*	*[-1.3]*	*[-1.3]*				
(p-value)	*(0.141)*	*(0.691)*	*(0.203)*	*(0.204)*				
Exports	**-0.21**	**-0.10**	**0.06**	**0.04**	**-0.29**	**-0.16**	**0.06**	**0.04**
[t-ratio]	*[-2.7]*	*[-1.8]*	*[0.5]*	*[0.3]*	*[-4.1]*	*[-3.1]*	*[0.8]*	*[0.6]*
(p-value)	*(0.008)*	*(0.069)*	*(0.651)*	*(0.752)*	*(0.000)*	*(0.002)*	*(0.435)*	*(0.559)*
Home market cap.	**0.16**	**0.20**	**0.18**	**0.17**	**0.14**	**0.19**	**0.11**	**0.10**
[t-ratio]	*[8]*	*[11.3]*	*[4.9]*	*[5]*	*[7.6]*	*[10.8]*	*[3.6]*	*[3.2]*
(p-value)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.001)*	*(0.001)*
World market cap.	**-0.86**	**-1.42**	**-0.96**	**-0.90**	**-0.66**	**-1.25**	**-0.98**	**-0.82**
[t-ratio]	*[-5.1]*	*[-9.6]*	*[-3.1]*	*[-3]*	*[-3.8]*	*[-7.4]*	*[-2.9]*	*[-2.4]*
(p-value)	*(0.000)*	*(0.000)*	*(0.002)*	*(0.004)*	*(0.000)*	*(0.000)*	*(0.005)*	*(0.015)*
Pension fund restriction	**0.03**	**-0.02**	**0.15**	**0.13**	**0.04**	**0.03**	**0.09**	**0.07**
[t-ratio]	*[0.6]*	*[-0.8]*	*[2.1]*	*[1.9]*	*[0.9]*	*[0.9]*	*[2.3]*	*[1.7]*
(p-value)	*(0.567)*	*(0.445)*	*(0.039)*	*(0.060)*	*(0.351)*	*(0.367)*	*(0.022)*	*(0.086)*
Euro-area bias (for euro area countries only)		**-0.51**		**-0.08**		**-0.49**		**-0.06**
		[-10.5]		*[-1.1]*		*[-12.1]*		*[-0.6]*
(p-value)		*(0.000)*		*(0.287)*		*(0.000)*		*(0.549)*
fixed effects	no	no	yes	yes	no	no	yes	yes
R2	0.69	0.69	0.96	0.96	0.66	0.66	0.95	0.95
N.o. time periods	9	9	9	9	14	14	14	14
N.o. countries	25	25	25	25	25	25	25	25
N.o. total observations	182	175	182	175	228	221	228	221

Note: The dependent variable is portfolio debt securities home bias based. World market capitalisation is based on debt securities data. See other notes to Table 7.

Table 12: Panel regression results: logistic transformation of portfolio debt securities home bias

	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)
Assets	**-0.31**	**-0.37**	**-0.30**	**-0.28**	**-0.25**	**-0.36**	**-0.42**	**-0.37**
[t-ratio]	*[-5.5]*	*[-5.9]*	*[-2.3]*	*[-2]*	*[-4.4]*	*[-5.5]*	*[-2.7]*	*[-2.2]*
(p-value)	*(0.000)*	*(0.000)*	*(0.022)*	*(0.045)*	*(0.000)*	*(0.000)*	*(0.007)*	*(0.026)*
GDP per capita	-3.89	-3.97	-2.38	-3.70	-3.35	-3.48	-4.24	-4.69
[t-ratio]	*[-5.1]*	*[-5.6]*	*[-1.7]*	*[-2.2]*	*[-5]*	*[-5.8]*	*[-3]*	*[-2.9]*
(p-value)	*(0.000)*	*(0.000)*	*(0.093)*	*(0.032)*	*(0.000)*	*(0.000)*	*(0.003)*	*(0.004)*
Financial market dev.	**0.18**	**0.10**	**-0.14**	**-0.06**				
[t-ratio]	*[1.5]*	*[0.8]*	*[-1]*	*[-0.5]*				
(p-value)	*(0.125)*	*(0.420)*	*(0.331)*	*(0.633)*				
Exports	**-0.49**	**-0.36**	**1.36**	**1.14**	**-0.99**	**-0.71**	**0.56**	**0.40**
[t-ratio]	*[-1]*	*[-0.7]*	*[1.4]*	*[1.2]*	*[-2.2]*	*[-1.6]*	*[0.9]*	*[0.6]*
(p-value)	*(0.338)*	*(0.472)*	*(0.165)*	*(0.215)*	*(0.029)*	*(0.113)*	*(0.361)*	*(0.535)*
Home market cap.	**0.99**	**1.08**	**0.97**	**0.65**	**0.86**	**1.01**	**0.46**	**0.22**
[t-ratio]	*[7.3]*	*[7.9]*	*[4.9]*	*[3]*	*[6.7]*	*[7.6]*	*[2.1]*	*[1.2]*
(p-value)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.003)*	*(0.000)*	*(0.000)*	*(0.033)*	*(0.229)*
World market cap.	**-4.47**	**-5.57**	**-1.12**	**0.95**	**-3.16**	**-4.60**	**-1.19**	**0.96**
[t-ratio]	*[-3.9]*	*[-4.7]*	*[-0.7]*	*[0.7]*	*[-2.6]*	*[-3.6]*	*[-0.5]*	*[0.5]*
(p-value)	*(0.000)*	*(0.000)*	*(0.491)*	*(0.515)*	*(0.010)*	*(0.000)*	*(0.605)*	*(0.632)*
Pension fund restriction	**0.34**	**0.26**	**0.35**	**0.10**	**0.43**	**0.46**	**0.32**	**0.18**
[t-ratio]	*[1.3]*	*[0.9]*	*[1.1]*	*[0.3]*	*[1.6]*	*[1.8]*	*[1.4]*	*[0.8]*
(p-value)	*(0.206)*	*(0.350)*	*(0.269)*	*(0.743)*	*(0.102)*	*(0.075)*	*(0.162)*	*(0.435)*
Euro-area bias (for euro area countries only)		**-1.15**		**0.33**		**-1.27**		**0.33**
		[-3.2]		*[2.8]*		*[-4.2]*		*[3.1]*
(p-value)		*(0.001)*		*(0.005)*		*(0.000)*		*(0.002)*
fixed effects	no	no	yes	yes	no	no	yes	yes
R2	0.42	0.42	0.97	0.97	0.38	0.38	0.96	0.96
N.o. time periods	9	9	9	9	14	14	14	14
N.o. countries	25	25	25	25	25	25	25	25
N.o. total observations	182	171	182	171	228	217	228	217

Note: The dependent variable is the logistic transformation of debt securities home bias. World market capitalisation is based on debt securities data. A logistic transformation is applied to the euro-area bias indicator too. See other notes to Table 7.

The results provide strong support for our main hypothesis: the larger assets managed by institutional investors the lower the home bias and thereby the greater the scope for risk sharing. All 48 estimated parameters have a negative sign and most of them are statistically significantly different from zero.

The parameter estimates of the control variables are in line with our expectations.

- Higher GDP per capita seems to reduce home bias: only three of the 48 estimates have a positive sign and none of these positive estimates are significant, while most of the negative parameter estimates are statistically significant.
- On the other hand, results for the Financial Development Index (which may capture effects similar to GDP per capita) are less encouraging: the parameter estimate is never significant and the sign of the estimated parameter varies. The most likely reason for this result is the strong correlation between the Financial Development Index and GDP per capita relative to the United States. In a simple panel regression, in which the Financial Development Index is regressed on GDP per capita relative to the US, the estimated parameter is very significantly positive with a t-ratio of 12.7. This suggests that there is high level of multicollinearity between

these two variables and therefore it is not wise to include both of them in the same regression. Since GDP per capita proved to be a more robust explanatory variable than the Financial Development Index, we included the latter variable in the first four versions of the regression in each table and dropped it from final four versions.

- Higher trade openness is negatively associated with home bias: only twelve of the 48 parameter estimates are positive and none of these positive estimates are significant, while most of the negative parameter estimates are statistically significant. This finding is consistent with the argument that it is cross-border trade integration to drive financial integration.
- Home market capitalisation is positively related to home bias: all 48 estimates have a positive sign and 47 estimates are statistically significant from zero. Therefore, the availability of domestically issued securities influences the home bias: countries with larger home stock of securities diversify less.
- The results of the availability of rest of the world securities are more mixed: while the estimated parameter is negative (as expected) when portfolio equity home bias based on stock market capitalisation is used (Table 7 and Table 8) and more than half of these estimates are statistically significant, for the national accounts data based portfolio equity home bias parameter are sometimes negative and while sometime positive, and both of these signs are statistically significant (Table 9 and Table 10). The parameter tends to be negative (as expected) for debt home bias (Table 11 and Table 12).
- Our estimates tend to suggest that our new pension fund foreign restriction index is positively related to home bias, that is, in countries with more restrictions home bias is higher, as expected: only six of the 48 estimated resulted in a negative parameter.
- The results for euro-area bias are mixed: when fixed effects are not included, the parameter estimate of euro-area bias is always negative and statistically significant in most cases. However, when fixed effects are included, all but one of the euro-area bias parameter estimates turn to positive, which is not surprising given that country-fixed effects can capture euro-area specific effects too. Intuition suggests that the elimination of currency risk should boost cross-country investments, especially in debt securities.

4.8 Data annex for Section 4

Assets of institutional investors are collected from a variety of sources in order to achieve the widest coverage possible.

-Pension funds

Main source:

Global Pension Statistics, from the OECD; the data appears in the publication "Pension Markets in Focus, 2015 edition" (http://www.oecd.org/finance/private-pensions/globalpensionstatistics.htm).
Dataset: Funded Pensions Indicators; Pension Plan Type: Total, by pension plan type; Definition Type: Total, by definition type; Contract Type: Pension funds (autonomous); Variable: INVESTMENT; Indicator: Assets as a Share of GDP; Unit: Percentage.

Additional sources:

Institutional Investors' Assets and Liabilities, from the OECD (https://stats.oecd.org/Index.aspx?DataSetCode=QASA_7II).
Sector: Pension funds; Transaction: Financial assets; Measure: $, current prices, current exchange rates, end of period.
Structural Financial Indicators, from the ECB (https://sdw.ecb.europa.eu/browse.do?node=9691551).

SSI.A.XX.1252.T10.1.U6.Z01.E

Dataset name: Banking structural statistical indicators; Frequency: Annual; Structural statist indicator: Total assets; Data type: Outstanding amounts at the end of the period (stocks); Counterpart area: Domestic (home or reference area); Currency of transaction: All currencies combined; Series denominat/spec calcul: Euro

Insurance corporations and pension funds statistics, ECB (http://sdw.ecb.europa.eu/browse.do?node=9691121).

ICPF.A.XX.N.V.LE.N_F.S1252.A1.S.1.N.E.Z

Dataset name: Insurance Corporations & Pension Funds Statistics; Frequency: Annual; Adjustment indicator: Neither seasonally nor working day adjusted; Valuation: Current prices; Transactions and other flows: Closing balance sheet; Asset/instr classification: Total Assets (financial and non-financial); Counterpart area: World (all entities); Counterpart institution sector: Total economy including Rest of the World (all sectors); Uses and resources: Debit (uses/assets); Consolidation: Non-consolidated; Denomination: Euro; Reference table number: Not applicable (Z)

-Insurance corporations

Main source:

Institutional Investors' Assets and Liabilities, from the OECD (https://stats.oecd.org/Index.aspx?DataSetCode=QASA_7II).
Sector: Insurance corporations; Transaction: Financial assets; Measure: $, current prices, current exchange rates, end of period.

Additional sources:

Structural Financial Indicators, from the ECB (https://sdw.ecb.europa.eu/browse.do?node=9691551).
SSI.A.XX.1251.T10.1.U6.Z01.E

Dataset name: Banking structural statistical indicators; Frequency: Annual; Structural statist indicator: Total assets; Data type: Outstanding amounts at the end of the period (stocks); Counterpart area: Domestic (home or reference area); Currency of transaction: All currencies combined; Series denominat/spec calcul: Euro

Insurance corporations and pension funds statistics, ECB (http://sdw.ecb.europa.eu/browse.do?node=9691121).
ICPF.A.XX.N.V.LE.N_F.S1251.A1.S.1.N.E.Z

Dataset name: Insurance Corporations & Pension Funds Statistics; Frequency: Annual; Adjustment indicator: Neither seasonally nor working day adjusted; Valuation: Current prices; Transactions and other flows: Closing balance sheet; Asset/instr classification: Total Assets (financial and non-financial); Counterpart area: World (all entities); Counterpart institution sector: Total economy including Rest of the World (all sectors); Uses and resources: Debit (uses/assets); Consolidation: Non-consolidated; Denomination: Euro; Reference table number: Not applicable (Z)

-Investment Funds

Institutional Investors' Assets and Liabilities, from the OECD (https://stats.oecd.org/Index.aspx?DataSetCode=QASA_7II).
Sector: Investment Funds; Transaction: Financial assets; Measure: $, current prices, current exchange rates, end of period.

Additional sources:

Investment funds balance sheet statistics, ECB (http://sdw.ecb.europa.eu/browse.do?node=9691120).
IVF.Q.XX.N.T0.T00.A.1.Z5.0000.Z01.E

Dataset name: Investment Funds Balance Sheet Statistics; Frequency: Quarterly; Adjustment indicator: Neither seasonally nor working day adjusted; Investment funds reporting sector: Total investment funds; Investment funds item: Total assets/liabilities; Original maturity: Total; Data type: amounts at the end of the period (stocks); Counterpart area: World not allocated (geographically); BS counterpart sector: Unspecified counterpart sector; Currency of transaction: All currencies combined; Balance sheet suffix: Euro.

Swiss National Bank, Swiss open collective capital investments (https://data.snb.ch/en/topics/finma#!/cube/capcollvf).

Claims and liabilities: Total assets; Key figures: Total.
Asset Management Survey, the Investment Association (http://www.theinvestmentassociation.org/investment-industry-information/research-and-publications/asset-management-survey/previous-surveys.html). The series used is "Assets under management in the UK".

*Values in EUR and CHF are converted into USD using end of year exchange rates obtained from the ECB and SNB databases.

Debt Securities

Main Source:

Debt securities statistics, from the Bank of International Settlements (http://stats.bis.org/bis-stats-tool/org.bis.stats.ui.StatsApplication/StatsApplication.html).

Q:XX:3P:Y:1:1:A:A:TO1:A:A:A:A:A:I, where XX is the country code and Y stands for the sector: 2 for General Government, B for Financial corporations and J for Non-financial corporations.
Issue type: All issue types; Default risk: All credit ratings; Collateral type: All issues; Issuer nationality: All countries excluding residents; Issuer sector – ultimate borrower: All issuers; Issue markets: All markets; Issue currency: All currencies; Original maturity: All maturities; Remaining maturity: All maturities; Rate type: All rate types; Measure: Amounts outstanding.

For Iceland and Switzerland:

Financial Balance Sheets, ESA 2010 (Unconsolidated) from Eurostat [nasa_10_f_bs] (http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nasa_10_f_bs&lang=en).
UNIT: Million euro; CO_NCO: Non-consolidated; SECTOR: Total economy; FINPOS: Liabilities; NA_ITEM: Debt securities

Stock Market Capitalization

World Development Indicators, from the World Bank (original source in World Federation of Exchanges).

National Accounts (equity)

Main source:

Financial Balance Sheets, SNA 2008 (non-nconsolidated) from the OECD (http://stats.oecd.org/#).
Dataset: 720. Financial balance sheets - non consolidated - SNA 2008; Sector: Total economy; Measure: US $, current prices, current exchange rates, end of period; Transaction: Financial liabilities, Equity and investment fund shares/units (AF5).

Dataset: 720. Financial balance sheets - non consolidated - SNA 2008; Sector: Rest of the world; Measure: US $, current prices, current exchange rates, end of period; Transaction: Financial assets, Equity and investment fund shares/units (AF5).

Additional sources:

Financial Balance Sheets, ESA 2010 (Unconsolidated) from Eurostat [nasa_10_f_bs] (http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nasa_10_f_bs&lang=en).

UNIT: Million euro; CO_NCO: Non-consolidated; SECTOR: Total economy; FINPOS: Liabilities; NA_ITEM: Equity and investment fund shares

UNIT: Million euro; CO_NCO: Non-consolidated; SECTOR: Rest of the world; FINPOS: Assets; NA_ITEM: Equity and investment fund shares

Japan

Financial Balance Sheets, SNA 1993 (Unconsolidated) from the OECD (http://stats.oecd.org/#).

Dataset: 720. Financial balance sheets - non consolidated; Sector: Total economy; Measure: US $, current prices, current exchange rates, end of period; Transaction: Financial liabilities, Shares and other equity.

Dataset: 720. Financial balance sheets - non consolidated; Sector: Rest of the world; Measure: US $, current prices, current exchange rates, end of period; Transaction: Financial assets, Shares and other equity.

Australia

Financial Balance Sheets, SNA 2008 (Consolidated) from the OECD (http://stats.oecd.org/#).

Dataset: 710. Financial balance sheets - consolidated - SNA 2008; Sector(s): Non-financial corporations, Financial corporations, General Government, Households and NPISH (summed); Measure: US $, current prices, current exchange rates, end of period; Transaction: Financial liabilities, Equity and investment fund shares/units (AF5).

Dataset: 710. Financial balance sheets - consolidated - SNA 2008; Sector: Rest of the world; Measure: US $, current prices, current exchange rates, end of period; Transaction: Financial assets, Equity and investment fund shares/units (AF5).

Russia

Financial Balance Sheets, SNA 2008 (Unconsolidated) form the Bank of Russia (https://www.cbr.ru/eng/statistics/?PrtId=fafbs).

Sector: Total economy (S1); Liabilities, Equity and investment fund shares/units (AF5).

Sector: Rest of the World (S2); Financial assets, Equity and investment fund shares/units (AF5).

*For the stock market capitalization, we consider the item Listed (Equity) liabilities of the Total Economy sector.

*For domestic equity holdings of residents, we consider equity and investment fund shares/units liabilities of the total economy sector minus equity and investment fund shares/units assets of the rest of the world sector.

*Values in EUR are converted into USD using end of year exchange rates obtained from the ECB SDW database. Values in RUB are converted into USD using end of year exchange rates obtained from the IMF's International Financial Statistics.

Exchange Rates

RUB/USD: International Financial Statistics from the IMF (CD-ROM, August 2016).

[SERIES_CODE: 922..AG.ZF...]

USD/CHF: Foreign exchange rates from the Swiss National Bank (https://data.snb.ch/en/topics/ziredev#!/cube/devkum).
End of month (December).

EUR/USD: Exchange Rates from the ECB (https://sdw.ecb.europa.eu/browseSelection.do?type=series&ec=&rc=&oc=&df=&SERIES_KEY=120.EXR.A.USD.EUR.SP00.E&dc=&cv=&node=SEARCHRESULTS&q=EXR.A.USD.EUR.SP00.E&pb=&trans=N).

Dataset name: Exchange Rates; Frequency: Annual; Currency: US dollar; Currency denominator: Euro; Exchange rate type: Spot; Series variation - EXR context: End-of-period

GDP and GDP per capita

World Economic Outlook, International Monetary Fund (April 2016 edition) (https://www.imf.org/external/pubs/ft/weo/2016/01/weodata/weoselgr.aspx).

Gross domestic product, current prices; USD

Gross domestic product based on purchasing-power-parity (PPP) per capita GDP; Current international dollar

Exports

World Development Indicators, World Bank (http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators#).

Exports of goods and services (current US$)

Financial Development Index

The Global Competitiveness Index, World Economic Forum (http://reports.weforum.org/global-competitiveness-index/downloads/).
*The overall score in the "8th pillar: Financial market development" is considered.

Pension Fund regulation index

The index is based on the: Annual Survey of Investment Regulation of Pension Funds database from the OECD (http://www.oecd.org/finance/private-pensions/annualsurveyofinvestmentregulationofpensionfunds.htm).

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