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## Capital Flows in the Euro Area

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**Abstract**

We investigate the behaviour of gross capital flows and net capital flows for euro area member countries. We highlight the extraordinary boom-bust cycles in both gross flows and net flows since 2003. We also show that the reversal in net capital flows during the crisis has been very costly in terms of macroeconomic and financial outcomes for the high-deficit countries. Finally, we describe the reforms that can improve macro-financial stability across the euro area.

JEL Codes: E42, F32, F41

# 1    Introduction

The first decade of the euro coincided with extraordinary global growth in international financial trade. Indeed, the euro area was in the vanguard of the financial globalisation boom, with the elimination of intra-area currency risk additionally stimulating international financial integration, over and above the global factors that were at work across the set of advanced economies (Lane and Milesi-Ferretti 2008). This boom gathered pace from 2003 onwards and was especially pronounced in relation to international debt flows. In addition to the spectacular increase in the scale of gross flows, persistent and large-scale net financial imbalances within the euro area (and across the broader European region) also emerged during this period.

Since the final quarter of 2008, these trends have gone into sharp reverse. The scale of gross private-sector capital flows has plummeted, while net imbalances have contracted sharply. Moreover, the contribution of the boom-bust cycle in capital flows to the crisis underpins the design of bailout mechanisms, the banking union debate, innovations in the liquidity-provision role of the ECB and reforms to national macro-financial policy frameworks.

Accordingly, the goal of this paper is to provide an overview of the behaviour of international capital flows in the euro area. In Section 2, we first outline some conceptual issues relating to the analysis of capital flows. Section 3 provides an empirical review of capital flow dynamics before and during the crisis. Section 4 surveys the policy reform agenda in relation to improved management of capital flows, while Section 5 concludes.

# 2    Conceptual Framework

From a policy perspective, there are several reasons to monitor international capital flows. In this section, we first outline the rationale for monitoring net capital flows (current account imbalances). Next, we explain why it is also necessary to monitor gross capital flows, which are of increasing importance due to the scaling up of international balance sheets over the last twenty years. We also lay out the special factors relating to cross-border financial flows inside a monetary union, while emphasising that capital flows in the euro area can only be properly understood in the context of the global configuration of cross-border financial trade. Finally, we briefly review the existing empirical literature on the drivers of international capital flows.

## 2.1    Net Capital Flows

There is a sizeable literature on the macroeconomic and financial impact of the current ac- count imbalances that are the counterparts to net capital flows (Summers 1988, Blanchard 2007, Lane 2010a, Lane 2010b, Giavazzi and Spaventa  2011, Lane 2012a, Lane 2012b, Ob- stfeld 2012a, Obstfeld  2012b)[1]. Although current account imbalances may play a welfare- enhancing role by facilitating intertemporal smoothing and promoting the efficient international allocation of capital, large and persistent imbalances can be distorting   and also increase financial vulnerability.

First, as is outlined in Blanchard (2007), the dynamics of large imbalances imply significant inter-sectoral shifts in economic activity. During a high-deficit phase, the nontraded sector expands and the tradables sector contracts in relative terms; conversely, once this phase is over, rebalancing requires a relative contraction of the nontraded sector and expansion of the tradables sector. To the extent that learning-by-doing is an important source of productivity growth, the

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[1] 1 Studies of the policy implications of intra-euro-area imbalances include European Commission (2009,2010a, 2012a)

temporary squeezing of the exporting sector during the deficit phase may have adverse long-term consequences (Krugman 1987, Summers 1988, Rodrik 2008, Korinek and Serven 2011). Such reallocations also pose a challenge for the labour market, since it requires considerable mobility of workers across sectors. It is also a challenge for the financial system, since the growth and contraction of firms in each sector requires the efficient financing of new entrants and the effective management of exiting enterprises. It is important to appreciate that these challenges are largely symmetric across deficit and surplus economies. A country that runs a persistently large surplus must at some point switch from export-orientated activity to domestically-orientated activity and faces similar reallocation challenges. It also runs the risk of structural under-development of its nontraded sector, which may be difficult to remedy.

Second, large deficits pose financial risks. A country running a large deficit faces the risk of a "sudden stop" by which net capital flows go into reverse. In an environment in which macroeconomic adjustment is inevitably gradual in nature (due to various nominal rigidities and real rigidities), such a sudden stop will typically be associated with a sharp recession, plunges in domestic asset prices and financial distress (see, amongst many others, Obstfeld and Rogoff 2005, Mendoza 2010). There is an extensive empirical literature on current account reversals which documents such adverse macroeconomic effects, especially in relation to the rapid closing of large deficit positions and for those countries operating under fixed exchange rate regimes (see, for example, Edwards 2004, Lane and Milesi-Ferretti 2011, Lane and Milesi-Ferretti 2012). Even when the high-deficit period is over, a country that has a large stock of net external debt liabilities faces ongoing rollover risk, such that the vulnerability to a financial crisis remains.

Although such financial risks are not symmetric across deficit and surplus economies, a sudden stop episode also requires adjustment in the latter group, since the loss of export markets mean that domestic activity must take up the slack. Moreover, a large accumulated net external creditor position means that external wealth is vulnerable to declines in the value of external assets.

## 2.2    Gross Capital Flows

It is important to appreciate that the implications of any particular level of aggregate net flows and net positions crucially depend on the composition of the underlying gross flows and gross positions. In particular, the mix of debt and equity in foreign assets and foreign liabilities matters, as does the maturity structure and currency composition of debt and the sectoral identities of participants in cross-border financial trade (banks, governments, non-financial corporates, and households).

More generally, gross asset trade affects the macroeconomic and financial equilibrium of all participating countries, even those with zero net imbalances. Indeed, since the scale of gross flows far exceeds net flows, understanding the full matrix of capital inflows and capital outflows and the level and composition of the international balance sheet is essential for monitoring and surveillance purposes.

In principle, high gross levels of capital outflows and capital inflows can be stabilising by supporting international risk diversification. State-contingent foreign liabilities allow domestic economic risks to be shared with foreign investors, while holding foreign assets can provide some insulation for domestic investors. In addition, high gross flows may improve the efficiency of financial intermediation by supporting the growth of international financial centres (to the extent that agglomeration externalities and scale economies are important).

However, gross flows can also raise macroeconomic and financial risks. For instance, a domestic credit boom may be amplified by cross-border debt inflows into the domestic banking system, allowing an expansion in domestic lending (Borio et al 2011, Bruno and Shin 2012, Lane and McQuade 2012). Moreover, domestic financial risks can be amplified even if capital inflows are fully recycled into capital outflows. For instance, the funds that Icelandic banks

borrowed overseas were largely used to fund foreign acquisitions by Icelandic entrepreneurs, while the Irish banking crisis was deepened by the external financial activities of Irish speculators that were aggressive investors in foreign property markets as well as in the local property market.

Issuing foreign liabilities to fund foreign claims may also fuel the international expansion of banks. While this could provide risk diversification, it may also facilitate poorly-managed banks to take on excessive risks in particular sectors (global real estate) or enter new activities in which it does not have a comparative advantage (eg US subprime, poorlyunderstood local lending markets)[2]. In turn, foreign loan losses may threaten domestic financial stability and the scaling up of bank balance sheets through internationalisation may contribute to "too big to fail" problems (Broadbent 2012).

Finally, some types of gross flows may just be motivated by tax and regulatory arbitrage, especially in relation to "round-tripping" arrangements. A byproduct of such flows is that it adds to financial complexity, making it difficult to identify and track the distribution of risk exposures across countries.

## 2.3    Capital Flows and Monetary Union

The analysis of international capital flows takes on special resonance in relation to the euro area. Large external imbalances of individual member countries pose special adjustment challenges, since the elimination of national currencies means that real exchange rate adjustment is in part dependent on the external evolution of the euro and in part on differential price and wage dynamics inside the euro area. In relation to the former, surplus and deficit countries within the euro area will have conflicting views on the appropriate direction for the external value of the euro. Moreover, even if the euro area were running a collective imbalance, the volatility of currency markets means that the euro cannot be relied upon to move in a helpful direction over any near-term time scale.

Moreover, in the presence of nominal and real rigidities, engineering bilateral real depreciations inside a monetary union is especially problematic. Procyclical real exchange rate behaviour inside a monetary union is a destabilising force in relation to nominal debt and real interest rate dynamics.  A positive differential in wage and price inflation during current account deficit phases improves capacity to take on extra nominal debt by boosting nominal incomes while also providing an incentive to bring forward spending plans in the face of a common area-wide nominal interest rate. These forces work in the opposite direction during adjustment phases, with a negative inflation differential raising the real value of nominal debt liabilities and encouraging the deferral of spending plans.

The absence of national currencies also affects the payoff structure on nominal assets and liabilities. During the crisis, several advanced economies with independent currencies obtained net external wealth gains through currency depreciation, which raised the local currency value of foreign-currency assets relative to domestic-currency liabilities. This mechanism is not available to individual countries inside a monetary union. More generally, national policymakers cannot deploy inflation and currency depreciation to alter the returns on local-currency instruments relative to foreign-currency instruments.

In terms of accumulated net positions, bilateral creditor-debtor relations inside the euro area may give rise to stark conflicts of interest during periods of financial distress, in terms of striking the balance between fostering debt payment discipline and debt restructuring. At the same time, strong political and institutional ties between creditor and debtor economies also facilitate additional policy options, such as the provision of official financing at below market rates, even if the design of the associated policy conditionality programme provides further room for dispute

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[2]See also CGFS  (2010), Allen et al (2011) and CIEPR (2012).

between creditors and debtors.

In relation to liquidity provision in the event of market disruption or rollover risk, the euro denomination of cross-border debt liabilities means that the eurosystem can provide cross-border liquidity to banks. This is in sharp contrast to the environment facing emerging market economies that have foreign-currency liabilities, which must rely on international organisations or foreign central banks (through swap lines) to provide foreign-currency liquidity. In this way, membership of monetary union provides a "safe harbour," at least relative to similarly-indebted open economies that can only obtain foreign-currency funding. Liquidity provision is also an issue in the sovereign debt market. Until recently, the fear was that individual sovereigns within the euro area could not rely on central bank support to counter liquidity runs. However, the OMT programme announced by the ECB de facto acts to forestall such runs where the solvency of vulnerable governments is underpinned by adhering to policy conditionality under an official ESM programme.

## 2.4    Global Capital Flows

While bilateral capital flows and bilateral positions within the euro area are the major proportion of total cross-border financial linkages, it is also important to recognise that external financial linkages are also important. Within Europe, the United Kingdom plays a special role as an international financial centre, with high two-way flows vis-a-vis the euro area. Bilateral financial links are also strong with other European advanced economies, while the euro area is also a significant net investor in Central and Eastern Europe.

Globally, two-way financial trade with the United States is especially important. This was underlined during the 2008-2009 global financial crisis, with European banks incurring significant losses in the ABS market in the United States, while the high reliance of European banks on dollar funding markets left these banks vulnerable to the freezing of these markets. The group of emerging economies in Asia and Latin America are also an increasingly important source and destination for capital flows. Finally, offshore financial centres (such as the Caribbean islands) are another important global counter-party for euro area investors.

These external financial linkages matter for several reasons. Although the aggregate current account balance of the euro area has been relatively small in recent years, net ex- ternal financial flows can allow the euro area to run collective current account imbalances, providing scope for smoothing in the event of area-wide shocks. In addition, gross external financial positions provide room for risk sharing with the rest of the world, which is especially relevant for area-wide shocks. At the same time, as vividly illustrated by the US financial shock in 2008, it also means the euro area is exposed to external financial shocks.

## 2.5    The Drivers of Capital Flows

In relation to the underlying drivers of capital flows, the literature has traditionally been organised around "push" and "pull" factors, where the former refers to the determination of outward flows from investor economies and the latter refers to the characteristics of those economies receiving capital inflows. However, this distinction has more limited relevance in understanding the general levels of gross flows, since capital inflows and capital outflows for individual economies are very highly correlated.

In respect of net capital flows, there is a vast literature on the determination of current account balances. In addition to cyclical and fiscal factors, this literature has also highlighted the contributions of country characteristics such as demographic structures, the level of development and natural resource endowments in explaining persistent current account imbalances (see Lane and Milesi-Ferretti 2012 for a recent overview).

As highlighted by Forbes and Warnock (2012a, 2012b), there is a striking global factor in

gross capital flow patterns, with common waves of higher or lower gross capital flows affecting all countries. In turn, this global factor can be linked to the general financial environment, with a strong correlation with indicators of expected financial market volatility (such as the VIX index)[3]. In addition, there is also considerable cross-country variation in the gross scale of capital flows. As shown by Lane and Milesi-Ferretti (2008a), countries with larger domestic financial systems, higher output per capita, greater trade openness and smaller populations typically exhibit higher levels of international financial integration. Furthermore, the composition of capital flows differs across different country groups, with advanced economies typically showing a higher equity share in foreign assets and a higher debt share in foreign liabilities than emerging or developing economies (Lane and Milesi-Ferretti 2007).

Europe has been to the forefront of international financial integration. In addition to having the basic country characteristics favouring high capital flows, the abolition of capital controls in the 1980s and early 1990s, the harmonisation of financial regulations at EU level and the introduction of the single currency have all promoted levels of capital flows in excess of other advanced economies (Lane 2006, Lane 2009, Lane and Milesi-Ferretti 2008). These factors especially stimulated financial trade within the euro area by reducing transaction costs and increasing the elasticity of substitution between assets issued by the individual member countries (Coeurdacier and Martin 2009, Spiegel 2008a, Spiegel 2008b). However, asset trade between the euro area and the rest of the world was also stimulated by the creation of a deeper, more liquid financial market.

Importantly, the creation of the euro had a bigger impact on debt-type flows than on equity-type flows. The commodity-type nature of wholesale debt products and the high perceived substitutability of common-currency bonds in a low-risk environment fuelled a rapid expansion in cross-border debt flows. As surveyed by Lane (2006, 2009), the creation of the euro also promoted cross-border equity/FDI trade. However, exchange rate risk is a relatively minor factor in the valuation of equity-type assets, so that the euro effect was necessarily smaller than for the debt category.

In terms of the debt-equity composition of capital flows, Faria et al (2007) find that larger, more open economies with a better institutional quality score have a greater equity share in external liabilities. Moreover, these authors find that equity financing is stronger among those countries that have undertaken a greater degree of domestic financial reform.

## 2.6    Summary

In summary, the behaviour of gross capital flows and net capital flows both affect the macro-financial environment. At a conceptual level, it is plausible that adjustment mechanisms are very different for members of a monetary union relative to countries with national currencies (whether flexible or pegged at a given point in time). In the next section, we turn to analysis of the actual path of capital flows for euro area countries.

# 3    Empirical Analysis

In this section, we review the behaviour of gross capital flows and net capital flows in the euro area, both in relation to the pre-crisis period and also during the crisis itself.

## 3.1    Data Limitations

The interpretation of capital flow data is limited by several factors. First, international financial

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[3] The VIX index is a measure of the implied volatility  of S&P 500 index options. It captures the dispersion in expected returns over the next 30-day period.

intermediation activities mean that a capital flow from country A to country B may just form one part of a chain of financial trades that links an ultimate investor in country Y to an ultimate asset in country Z. Indeed, some fraction of capital flows just constitutes pure round tripping whereby it is convenient for an investor in country Y to make a domestic investment through an intermediation chain involving cross-border components. Since most capital flow data is just recorded on a residence principle, it is not generally possible to trace through these links to identify the true underlying transaction.[4]

This bedevils the interpretation of gross capital flows, as well as the interpretation of whatever bilateral data are available.

## 3.2 Gross Capital Flows

Figure 1 shows the boom-bust cycle in gross capital flows for the euro area (including both intra-area flows and extra-area flows). The volume of capital flows shows steady growth from the mid-1990s to 2000 but then took a dip during the 2001-2002 recession before a near-tripling in flows between 2002 and 2007. As is shown by Lane and Milesi-Ferretti (2008), the growth in cross-border financial trade was far quicker than the growth in cross-border trade in goods and services during this period for advanced economies.

At the peak, gross capital flows exceeded 40 percent of GDP, far in excess of other advanced economies. The collapse in capital flows in 2008-2009 was truly remarkable, falling to about 5 percent of GDP. While this was qualitatively similar to the general collapse in capital flows during this period, the contrast with the pre-crisis environment was largest for the euro area (see also Milesi-Ferretti and Tille 2011). Furthermore, in contrast to emerging markets, there has been very little recovery in the scale of capital flows since then.

Figure 2 illustrates the pattern highlighted by Forbes and Warnock (2012a, 2012b) - the time series of gross capital flows is very correlated with the level of expected volatility in global financial markets, as proxied by the VIX index. This is an important feature: the boom-bust cycle in capital flows has to be interpreted in the context of varying conditions in the global financial system, rather than being necessarily closely tied to macroeconomic factors in home or destination economies.

The persistent high levels of capital flows during the pre-crisis period mapped into large accumulated foreign asset and foreign liability positions. Figure 3 shows the ratio of the sum of foreign assets and foreign liabilities to GDP (the IFI index) for the euro area, the United States and Japan. It shows that the scale of the international balance sheet for the euro area (again including bilateral cross-border positions within the euro area) was far above the values exhibited by other advanced economies.

Banks were at the centre of cross-border asset trade, with the domestic banking system the main intermediary for international capital flows. Figure 4 shows the growth in the cross-border assets of banks - the profile is very similar to the pattern for capital flows shown in Figure 1.

Although many countries fail to report the share of capital flows attributable to banks, the data are available for some countries. McCauley et al (2010) estimate that the cross-border positions of banks accounted for 40-60 per cent of total external liabilities for Belgium, Switzerland and the United Kingdom and at least 25 per cent for France, Italy and the Netherlands.

Underlining the distinction between residency and ownership, these authors also report that foreign-owned banks alone accounted for about ten per cent of the external liabilities of Belgium, Italy, Spain, Switzerland and the United States. While a growing role for foreign-owned banks in domestic banking systems offer many benefits, it can give rise to potential

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[4] However, there is current discussion of initiatives that can improve the situation. One element is the adoption of legal entity identifiers (LEIs) so that it is easier to track trade in securities. See also Haldane (2012).

coordination problems across different national regulators. Moreover, it makes it more difficult to interpret cross-border capital flows, at least in relation to working out the allocation of ultimate risks.

While the expansion in cross-border positions may have supported geographical diversification in bank portfolios, it also plausibly increased risk levels through several channels (Committee on Global Financial Stability 2010, Committee on International Economic Policy and Reform 2012). First, by facilitating an expansion in the size of bank balance sheets, the moral hazard associated with "too big to fail" syndrome was propagated. Second, in relation to national banking systems, the rapid growth increased the fiscal risks in the event of a systemic bank crisis. Third, on the liability side, much of the cross-border funding was short-term in nature, increasing the vulnerability of banking systems to capital flow reversals. Fourth, on the asset side, geographical diversification did not imply sectoral diversification nor could it guard against a global decline in asset prices or loan quality.[5]

Figure 5 shows the debt-equity mix in capital flows. During the late 1990s, the debt-equity ratio in capital inflows declined but this was reversed during 2000-2007, with debt flows growing more quickly than equity flows. The crisis saw an end to this credit boom, with debt flows declining much more than equity flows. This is consistent with the analysis in Milesi-Ferretti and Tille (2011). In particular, these authors find that the sudden stop in capital flows was strongest in relation to bank-related debt flows.

Figure 6 shows the corresponding debt-equity ratios in the international balance sheet. The general patterns are broadly similar to those for capital flows in Figure 5, even if valuation effects mean that fluctuations in debt-equity ratios are also heavily influenced by shifts in the relative value of equity investments.

On the liability side, a high debt-equity ratio is a risky profile in the event of a negative macroeconomic shock and/or a negative credit system shock. The fixed-commitment nature of standard debt contracts means that a decline in income levels fuels adverse feedback dynamics, through rising debt-income ratios. This is amplified during a financial crisis, since the capacity of banks and other debt providers to support distressed debtors becomes compromised.

In contrast, a high equity component in external liabilities partially absorbs such shocks. A decline in income should be associated with a reduction in state-contingent payouts to equity investors. Moreover, the existence of an equity cushion makes it easier to cope with credit market shocks.

If external debt liabilities are matched by external equity assets, this combination is vulnerable to a downturn in global equity markets, which reduces the value of foreign assets with no similar reduction in the value of foreign liabilities. Again, this is especially problematic if a credit shock occurs at the same time, since the decline in equity values makes it more difficult to manage the associated balance sheet problems.

Accordingly, the rise in debt flows during the 2003-2007 period increased the vulnerability of the euro-area financial system to credit-market shocks and output shocks. Of course, this is precisely what occurred during 2008-2009.

Table 1 examines the cross-country variation in issuing debt and equity instruments over three periods (1999-2002, 2003-2007, 2008-11) and also reports the corresponding accumulated liability stock positions for 1998, 2002 and 2007.[6]Table 1 highlights the unusual nature of the 2003-2007 period, with a very striking increase in the scale of debt issuance by a number of

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[5] For instance, Irish banks were heavily exposed to the domestic property sector but also made loans secured against foreign property investments. This increased their vulnerability to an international decline in property values.

[6] We focus on the composition of liabilities, in order to address whether there are clear differences in the debt-equity mix on the part of issuers. The composition of liabilities is especially important in managing shocks that originate in the domestic economy.

countries.[7]

However, it is important to appreciate that most of these countries also issued equity liabilities at similar levels to other countries, so that it was not generally the case that these countries raised atypically level of equity-type external funding. The primary exception is Greece in terms of issuing comparatively-low levels of FDI liabilities (although it had a relatively high level of issuance of portfolio equity liabilities during 2003-2007).

Rather, Table 1 shows that international equity flows (scaled by GDP) are relatively limited compared to debt flows across all periods, just as equity financing (apart from the internal funds of existing shareholders) plays a relatively minor role compared to debt financing for most corporations. Accordingly, the marked increase in debt flows during 2003-2007 represented a significant decline in the risk-absorbing capacity of financial structures, given the mismatch with the lower levels of equity funding.

## 3.3    Net Capital Flows

Figure 7 shows the cross-country standard deviation of current account imbalances for the euro area. It vividly captures the sharp increase in dispersion from 2003 to 2007, with a subsequent partial compression in the distribution. Figure 8 shows the associated pattern in the cross-country distribution of net international investment positions.[8]

In qualitative terms, the direction of net capital flows during this period was similar to the previous decade. As highlighted by Blanchard and Giavazzi (2002) and Fagan and Gaspar (2007), the formation of monetary union can help explain an increased dispersion in current account imbalances, since the elimination of currency risk fostered lower interest rates and easier credit conditions in the euro periphery. Moreover, since the peripheral countries had lower income levels at the time of euro entry, net capital flows were correlated with the initial level of output per capita, which is consistent with convergence mechanisms.

However, the magnitude of current account imbalances was far bigger during 2003-2007 than during the "euro entry" period. Accordingly, it is important to appreciate that the expansion in net imbalances during 2003-2007 cannot be easily linked to the convergence mechanisms that should have operated most powerfully in the period just  before and just after the launch of the euro. Rather the 2003-2007 expansion in net positions occurred simultaneously with the acceleration in gross capital flows (especially gross debt flows) and "risk on" conditions in global financial markets.

In related fashion, Lane and Milesi-Ferretti (2012) estimate a fundamentals-based model of current account imbalances for four-year averages over the  1960-2008 period, which relates current account imbalances to demographic variables, levels of development, fiscal positions, financial crises and other factors. Although the fit of the model is quite good over the sample period, the residuals for the final 2005-2008 period are especially large, which suggests that the increase in current account dispersion cannot be explained by a shift in fundamentals.

Furthermore, Lane and Pels (2012) show that the correlation between current account imbalances and growth expectations strengthened during this period, even controlling for the initial level of output per capita. To the extent that growth expectations were excessively optimistic in some countries, this was a risk-amplifying pattern. As noted by Eichengreen (2010) and Giavazzi and Spaventa (2011), this was especially problematic since capital inflows were deployed to finance consumption and investment in the nontraded sector (especially real estate), rather than to finance productivity-enhancing projects in the traded sector.

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[7] The high level of debt liabilities issued by France reflects the role of its banking system in intermediating international financial flows, with these debt liabilities funding the external activities of French banks.

[8] Figure 8 also shows the dispersion in cumulated sum of net financial flows since 1995 (normalised to equal the net international investment position at the beginning of the period), which shows a generally similar profile.

Indeed, as is clear from Figure 9, the cross-country correlation between the average current account balance and average output growth was close to zero over 1999-2007, with the demand boost from capital inflows masking underlying growth problems in some of the high-deficit countries. Over the extended 1999-2012 period, the correlation is strongly negative, with average current account deficits associated with significantly worse growth performance. Working out the relative contributions of crisis-related adverse dynamics versus a poor prognosis for potential output in explaining the low growth of the high-deficit countries is a major analytical and empirical challenge.

Moreover, Figure 10 shows that real interest rate differentials were much narrower during 2003-2007 relative to earlier phases, so that the widening of imbalances cannot be attributed to a simple, fixed relation between interest rate differentials and net capital flows. This is not too surprising in view of the importance of asset prices (collateral values) and variation in credit regulation in determining differences in credit growth across countries - the interest rate is not a sufficient statistic for the determination of credit flows (Geanakoplos 2009, Lane and McQuade 2012).

In summary, the discrete increase in current account dispersion during 2003-2007 represents a very unusual phase in the history of international capital flows. The simplest interpretation is that the expansion in net imbalances reflected a combination of a perceived reduction in financial risk and a perceived improvement in the ability of the financial system to absorb risk events (through securitisation and other financial innovations). These factors permitted not only an increased elasticity of net capital flows to underlying differences in fundamentals across countries (demographics, relative output per capita, migration patterns, fiscal positions) but also facilitated the emergence of leverage-fuelled property booms in some countries. (We return to the relation between capital flows and domestic macro-financial dynamics in the next section.)

It is plausible also that some structural changes were under way that was perhaps incompletely understood at the time (see also Chen et al 2013). These include the implications for Southern Europe of the rapid growth in manufacturing production in China and other parts of emerging Asia, the accession of Central and Eastern Europe to the European Union in 2004, the major increase in the oil price, the sustained appreciation of the euro against the dollar from 2001 onwards, the global shifts in portfolio allocation strategies (with increased interest in property assets and bond assets and declining interest in corporate equity assets) and the implications of financial-sector reforms in various countries (for instance, amongst others, the removal of government guarantees from Landesbanks in 2004 and the reorganisation of financial supervision and regulation in Ireland in 2004).

Finally, while much of this analysis pertains to the wider set of advanced economies, it is also important to appreciate that some of the mechanisms were specific to the euro area. In particular, the common currency and common central bank plausibly reduced perceived credit risks in relation to intra-area net flows and also provided reassurance in terms of the scope for central bank liquidity interventions in the event of negative shocks.

## 3.4    Capital Flows and Domestic Economic Activity

Following Lane and McQuade (2012), Figure 11 shows the strong correlation between net debt inflows and domestic credit growth during the pre-crisis period.[9] Furthermore, as shown by

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[9] The outsized importance of international mutual funds for Ireland and Luxembourg means that the usual debt-equity breakdown is not informative and these countries are not included in the graph. In-ternational mutual funds have foreign portfolio equity liabilities (the shares in the mutual funds held by investors) and hold foreign portfolio debt assets. Still, it is well known that the local Irish banking system was also a large-scale net recipient of debt inflows.

Borio et al (2011), credit booms were also reinforced by international credit flows that bypassed the domestic banking system through direct cross-border lending to customers and foreign purchases of bonds issued by domestic investors.

The ability of banks to raise external debt funding allowed domestic lending growth to outstrip domestic deposit growth, which also supported the strong momentum in domestic property prices in some high-deficit countries. However, this expansion in the size of bank balance sheets and bank leverage ratios also increased financial vulnerability. In particular, domestic credit booms are a robust correlate of subsequent financial crises (Gourinchas and Obstfeld 2012, Schularick and Taylor 2012).

Moreover, as highlighted by Reis (2013), credit frictions in the financial system can mean that capital inflows are misallocated, with incumbent non-productive firms (but possessing collateral assets) can survive through increasing debt levels and thereby inhibiting the expansion of more productive firms. Since the mass of non-productive firms are more likely to be in the nontraded sector, this financial mechanism also contributes to the expansion of the nontraded sector relative to the traded sector.

Table 2 shows the growth differentials between nontraded and traded sectors. Columns (1) and (2) are based on the detailed sectoral data from the OECD's STAN database but 2009 is the latest available year for some key countries; columns (3) and (4) are based on more aggregated sectoral data from the AMECO data base that runs until 2011.

Taking first the STAN data, the differences across countries are striking, with the relative size of the nontraded sector expanding strongly in some of the high-deficit countries (Greece, Ireland and Spain) and shrinking in some of the surplus countries (especially Germany) during the pre-crisis period. In turn, sectoral growth differentials changed sign during the crisis period. For instance, despite the shock to world trade in 2008-2009, the nontraded sector for Greece and Ireland contracted even more quickly than the traded sectors as a result of the collapse in domestic demand.[10] Such sectoral output volatility puts pressure on labour markets and financial systems, in terms of efficiently accommodating inter-sectoral reallocations.

The higher level of aggregation in the AMECO data means that the sectoral growth differences are less pronounced in some cases but the general pattern is still observable: growth in the high-deficit countries was concentrated in the nontraded sector during 2003-2007, a sectoral pattern that has moderated or reversed during 2007-2011.

It is also informative to examine the pattern of sectoral financial flows, as is shown in Table 3.[11] A positive value for total net financial outflows reported in the first column corresponds to the net accumulation of foreign assets, where a negative value denotes net financial inflows. In turn, the other columns show the underlying sectoral net flows.

In principle, an aggregate net inflow may be distributed as a uniform net inflow across all sectors or it may be associated with heterogeneous sectoral patterns. Indeed, Table 3 shows that there was wide variation at the sectoral level during 2003-2007. For instance, while the household sector in Ireland showed a marked increase in net financial inflows, this was not particularly the case in the other high-deficit countries. Similarly, while the aggregate net inflow into Greece and Portugal was associated with an increase in government borrowing, this was not true in Ireland or Portugal. During 2003-2007, the only strong correlation is between aggregate net flows and the net flows of non-financial corporations.[12]

Similarly, the patterns in aggregate net flows during 2008-2011 are associated with significant variation in sectoral net flow patterns. The main exception is that there is a strong

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[10] More recent sectoral data are not yet available for the high-deficit countries.

[11] Ideally, BOP/IIP data should be perfectly integrated with data on sectoral financial flows and sectoral balance sheets. However, differences in collection methods mean that there can be important discrepancies.

[12] Ireland is an exception, which relates to the predominant role played by foreign-owned multinationals in the non-financial corporate sector.

correlation between aggregate net flows and net flows for the government sector during this period. This is consistent with especially-severe recessions experienced by the high-deficit countries and the high costs of managing troubled financial systems in these countries.

## 3.5    Capital Flows and the Crisis

In terms of crisis dynamics, Figure 12 shows the strong correlation between current account balances in 2007 and the subsequent adjustment process. High-deficit countries experienced a contraction in the size of current account imbalances and much larger recessions than other euro area countries. Although the cross-sectional patterns in real exchange rates over 2007-2012 are correlated with the size of initial imbalances, the correlations are quite low and the magnitudes of the shifts in real exchange rates are quite small (see also Table 4).[13] These patterns for the euro area are in line with the evidence for a much larger sample of countries reported in Lane and Milesi-Ferretti (2012).

Table 5 provides further insight by reporting the shifts in savings and investment rates that have accompanied current account adjustment. The most striking pattern is that high-deficit countries experienced extraordinary declines in investment rates. For Greece, Ireland and Spain, this investment slump was predominantly in the labour-intensive construction sector, which was associated with a sharp reduction in employment.

Figure 12 and Tables 2-5 illustrate the negative macroeconomic impact of the boom- bust cycle in net capital flows.  The very high pre-crisis current account deficits in the euro periphery meant that these countries were especially exposed to a sudden adverse shift in financial markets, in view of the close correlation between general financial sentiment and the scale of capital flows.[14]

In turn, the rapid reversal in capital flows was associated with large-scale expenditure reduction. Since there was only minor movement in real exchange rates, there was little by way of expenditure switching such that the net outcome was severe output declines in the high-deficit countries.[15]

The scale of current account adjustment would surely have been larger in the absence of cross-border ESCB liquidity flows (as reflected in Target 2 balances) and official EU/IMF funding to Greece, Ireland  and  Portugal (Cecchetti  et al 2012, Lane and  Milesi-Ferretti 2012, Merler and Pisani-Ferry 2012, Auer 2013, Whelan  2013). The changes in Target 2 balances between 2008.Q3 and 2012.Q2 are shown in Table 4 and show large increases in net Target 2 liabilities in the high-deficit countries and in net Target 2 claims in the high-surplus countries.

Large official gross flows also allowed private-sector foreign investors in creditor countries to exit from positions in the high-deficit countries by declining to rollover expiring claims. In the absence of large-scale official flows, foreign investors would plausibly have incurred larger valuation losses through sharper declines in asset values and more extensive debt writedowns.

In relation to gross capital flows, Milesi-Ferretti and Tille (2011) show that the spec- tacular

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[13] Table 2 reports real exchange rates based on HICP and GDP deflators. Alternative indices that focus on unit labour costs show larger movements. However, the interpretation of ULC-based indices is quite problematic, given the impact of compositional changes. In particular, a recession that drives out lower-productivity firms but has zero impact on wage levels would show an improvement in unit labour costs, even if no surviving firms experienced any reduction in production costs. (Depending on the relation between markups and productivity, it is possible that indices based on GDP deflators also face a similar interpretation problem.)

[14] In related fashion, Forbes (2012) shows that the contagion of extreme negative returns is especially strong for euro area member countries. In particular, contagion forces are correlated with large, highly-leveraged banking systems and with high levels of portfolio liabilities.

[15] The recessions observed in the high-deficit countries also were influenced by the policy responses in these countries.  We do not take a stand here on the relative contributions of fiscal austerity and banking- sector deleveraging to the overall macroeconomic outcomes.

contraction during the crisis was a global phenomenon. However, it hit the euro area especially hard since the gross scale of capital flows was so much bigger than in other advanced economies or in emerging markets. Since the freezing of credit markets was at the centre of the original phase of the crisis during 2008-2009, it is not surprising that bank-related debt flows fell the most.

Still, although the reversal in net capital flows was surely destabilising for the high- deficit countries, some types of capital flows have acted as a buffer during the crisis. For instance, the evidence provided by Forbes (2012) suggests that high stocks of foreign port-folio assets may have mitigated contagion effects for some countries.

More generally, the ability to repatriate foreign assets has provided much needed liquidity to distressed entities, especially where foreign assets maintained more value than domestic assets. This has been important for some multi-country banks that were able to extract capital from foreign affiliates in order to shore up domestic operations.[16] At a national level, the liquidation of the foreign assets in Ireland's sovereign wealth fund has been an important source of funding in addressing its domestic banking crisis.

Still, it must be acknowledged that another potentially stabilising role for capital flows has had only limited impact for euro area countries. That is, for a country with an independent currency, exchange rate depreciation during a crisis might stimulate capital inflows since the decline in the foreign-currency value of domestic assets should encourage bargain seekers. This mechanism is switched off for individual members of the euro area.

## 3.6    Stocks-Flow Adjustments and the Valuation Channel

In relation to balance sheet adjustment dynamics, it would be informative to work out the full profile of cross-border valuation effects during the crisis. However, accurate valuation estimates are not available, since the data on the dynamics of international investment positions are insufficiently detailed for most member countries of the euro area.[17]

Still, a few basic points can be made. One key feature is that valuation effects have played a smaller role relative to some other countries with floating currencies and a higher equity component in positions, since euro-denominated debt assets and liabilities form the bulk of the cross-border positions of member countries.

That said shifts in the external value of the euro will have a valuation impact in relation to the non-euro assets held by member countries. For instance, the depreciation of the euro against the dollar in 2008 partly offset the negative valuation impact of the decline in ABS values in the United States on euro area investors (see also Gourinchas et al 2012).

However, intra-area positions are mostly denominated in euro, so that the exchange rate channel has not been operative in terms of intra-area adjustment. In contrast, the United States, United Kingdom, Australia and New Zealand all enjoyed valuation gains during the crisis on account of substantial currency depreciations that raised the domestic-currency value of the substantial foreign-currency foreign assets held by these countries.

In relation to equity values, it might be expected that the equity/FDI liabilities of troubled economies should have lost value during the crisis, which is a stabilising pattern. However, to the extent that investors in these countries held foreign equities, the downturn in global equity values during the crisis would have acted in the opposite direction. For instance, Ireland had a high equity component in its foreign asset position (mainly through the portfolio choices of its pension funds), so that the global crisis had an adverse valuation impact on its external position

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[16] Examples include the sale of its Polish affiliate by Allied Irish Bank and the sale of an equity stake in its Brazilian affiliate by Banco Santander.

[17] On the dangers of extracting valuation estimates from aggregated data, see Curcuru et al (2008), Lane and Milesi-Ferretti (2009), Curcuru et al (2013) and Lane (2013).

(Lane 2013).

The valuation channel also operates on debt positions in the form of writedowns and shifts in bond prices. For instance, much of the March 2012 reduction in Greek sovereign debt values fell on foreign investors, while foreign investors have also absorbed the bulk of the write down of the subordinated bonds issued by Irish banks.

Similarly, the foreign bond liabilities of the euro periphery fell in value due to the impact of rising risk premia on bond prices.[18] However, as noted by European Commission (2012a), if risk premia decline, bond prices will recover and the value of external liabilities will increase in associated fashion. To the extent that financial institutions have been slow to recognize declines in the value of debt assets in their reporting, the full impact of the debt crisis on external positions may not yet have emerged.

As noted by European Commission (2012b), the counterpart to the valuation gains recorded for some of the debtor countries has been valuation losses for the creditor countries in the euro area, in view of the importance of intra-area bilateral investment positions. While this represents the playing out of risk-sharing mechanisms, it also can lead to a negative contagion channel. The most striking example is provided by Cyprus, with valuation losses from its exposure to Greek sovereign debt a major factor in its loss of access to market funding.

In gaining a complete understanding of the macro-financial impact of cross-border valuation effects, it would be desirable to know the full matrix of inter-sectoral valuation effects in addition to the aggregate cross-border valuation effects. This is relevant, since valuation losses incurred by leveraged institutions (such as banks) are more likely to generate amplification effects than losses incurred by less inter-connected ultimate investors. While the availability of sectoral financial account data has vastly improved in recent years, similar sectoral detail for cross-border financial positions is very incomplete.

Bearing in mind these caveats, it may still be informative to examine the stock-flow adjustments in the international investment position data. For the reasons indicated, non-valuation adjustment factors can be important and there is insufficient detail to make a clean separation between the contributions of valuation effects and other adjustments. In general, we can write

$$NIIP_t - NIIP_{t-1} = NETFLOW_t + SFA_t \tag{1}$$

$$SFA_t = NETVAL_t + NETOTH_t \tag{2}$$

where the stock-flow adjustment term is the combination of net valuation effects and net other adjustments (data revisions, new measurement techniques, reclassifications and so on).

In terms of the overall dynamics, it is interesting to establish whether stock-flow adjustments are stabilising or destabilising. In terms of the cross-country distribution, we address this by estimating two specifications

$$SFA_{it} = \alpha + \beta NETFLOW_{it} + \varepsilon_{it} \tag{3}$$

$$SFA_{it} = \alpha + \delta SFA_{it-1} + \varepsilon_{it} \tag{4}$$

The former regression asks whether net flows and the stock-flow adjustment are correlated in a given period, whereas the latter regression asks whether stock-flow adjustments are correlated over time. In the former case, a positive value for $\beta$ means that those countries making net

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[18] An exception is Ireland, which records bond liabilities at book value rather than at market value, such that the value of its foreign bond liabilities have not moved with shifts in market prices. See also Arslanalp and Tsuda (2012).

acquisitions of foreign assets also enjoy positive stock-flow adjustment terms, which increases the dispersion in net international investment positions.[19] In contrast, a negative value for β means that the distribution of net international investment positions is more compressed than would be suggested by the patterns in net financial flows.

In the latter case, a positive value for δ means that those countries enjoying positive stock-flow adjustments in period t−1 are also likely to enjoy positive stock-flow adjustments in period t. In contrast, a negative value for δ means that there is a mean reversion tendency with positive stock-flow adjustments followed by negative stock-flow adjustments in subsequent periods.

Table 7 shows the data for the euro area member countries for 2002-2007 and 2007-2011, while Table 8 reports regression analysis. In the regression analysis, we consider a narrow sample of euro area member countries. In addition, we also report results for a wider sample of 31 advanced countries.[20]

Table 8 shows a striking pattern for the euro area countries. Column (1) shows that there was a positive correlation between net financial flows and the stock-flow adjustment term during 2002-2007, whereas column (2) shows a negative correlation during 2007-2011. That is, the pattern of stock-flow adjustments tended to increase dispersion in net international investment positions during the pre-crisis period but has contributed to the compression of net international investment positions since the crisis began.

Column (3) of Table 8 confirms this pattern, with a negative correlation between the stock-flow adjustment terms in 2002-2007 and 2007-2011. Furthermore, columns (4)-(6) of Table 8 show that these patterns are not generally evident in the wider sample of advanced economies. Rather, the relation between net financial flows and stock-flow adjustments is orthogonal in the wider sample, while there is also no dynamic pattern between stock-flow adjustments across periods.

To provide further insight, Table 9 reports the stock-flow adjustments for the net debt and net equity components (where equity is decomposed into portfolio and FDI components). It is important to emphasise that the net debt component has contributed an important part of the overall stock-flow adjustment term, so that the conceptual distinction between debt and equity is insufficient to understand the playing out of stock-flow adjustments. In line with the discussion above, these stock-flow adjustments can be linked to losses on debt assets for some key countries such as Germany whereas the positive stock-flow adjustment term for countries such as Greece and Portugal can be linked to the declining value of the sovereign bonds held by foreign investors during this period.

As indicated above, although the patterns in the stock-flow adjustment terms in Tables 8 and 9 are intriguing, a full understanding requires much more comprehensive and reliable data on the individual components underlying stock-flow adjustments. In particular, reliable inferences on the contributions played by the valuation term can only be based on the detailed publication of the underlying rates of returns estimated on foreign assets and foreign liabilities.

## 3.7    Bilateral Patterns

As noted above, the high levels of intra-area positions mean that there are especially strong linkages among the euro area countries in terms of bilateral patterns in international capital flows and international exposures. As indicated above, it is not possible to work out the full matrix of ultimate bilateral exposures in view of the limitations of residence-based capital flow data. Still, Tables 10 and 11 show some broad patterns in the data: Table 10 shows the importance of

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[19] We do not address lines of causality between net financial flows and stock-flow adjustments but rather focus on the correlation pattern.

[20] The expanded sample includes the EU27, Switzerland, Norway, Iceland, United States, Canada, Japan, Australia and New Zealand.

measured intra-area positions (relative to GDP and as a share of total holdings), while Table 11 shows the geographical distribution of measured extra-area positions.[21]

The importance of intra-area holdings provides a basic rationale for the establishment of European-level bailout funds; in view of the scope for spillover effects within the currency union (see also Tirole 2012). Although it is difficult to assess the drivers of bilateral capital flows, it is worth noting that, all else equal, euro area investors were less likely to run from destinations inside the euro area than were investors from outside the euro area during the 2008-2010 periods (Galstyan and Lane 2013).

## 3.8    Summary

In summary, the euro area has experienced boom-bust cycles in both gross capital flows and net capital flows. The amplitude of these cycles was unprecedented relative to historical experience. While the qualitative nature of the boom-bust cycle was similar for the broader European region and the global set of advanced economies, the quantitative scale was larger inside the euro area. Since debt-type instruments dominated cross-border capital flows, the pre-crisis boom in capital flows fuelled the expansion in bank balance sheets and increased vulnerability to macroeconomic and financial shocks.

Moreover, the evidence is that adjustment to the reversal in net capital flows has been very costly in terms of macroeconomic outcomes for the high-deficit countries, with attendant spillover effects on the creditor countries. The reversal in gross capital flows (especially debt flows) has also exacerbated the crisis in banking systems, in view of the problematic nature of adjustment to sudden shifts in funding conditions.

The severe costs of this boom-bust cycle has motivated much discussion of various policy reforms. In the next section, we outline the implications of capital flow volatility for the design of national and international policy frameworks.

# 4    The Policy Agenda

The effective management of capital flows requires reforms at several different levels.[22] Most directly, the design of the international financial system influences the nature and risk profile of cross-border asset trade. At an indirect level, the design and implementation of national and European-level macro-financial policy frameworks shape the level and composition of capital flows and determine the sensitivity of macroeconomic and financial outcomes to capital flow shocks.

## 4.1    International Financial System

At a global level, a stronger international safety net (under the auspices of the IMF) can reduce the vulnerability of countries to sudden stop episodes. While the traditional focus in this debate has been on emerging market economies, the euro area (and other advanced economies) also would benefit. First, an external safety net is important in relation to area-wide shocks. Second, the high level of capital flows means that a globally-based fiscal backstop to liquidity provision can limit adverse feedback loops by which liquidity provision threatens the fiscal position of creditor governments (see also Obstfeld 2011a). Third, a safer international financial system for emerging market economies would also indirectly benefit the advanced economies, since it would allow the emerging economies to adopt less restrictive monetary and exchange rate arrangements.

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[21] See also the detailed analysis provided by Milesi-Ferretti et al (2010) and Waysand et al (2010).
[22] See also Ostry et al (2011) and Farhi et al (2011).

At the European level, the establishment of the ESM (and its temporary predecessor the EFSF) provides additional support. An intra-European safety net is an appropriate complement to an IMF-level safety net; in view of the especially high cross-border financial linkages within Europe and its capacity to deal with shocks hitting only a minority of euro area economies (see also Obstfeld 2011a, Obstfeld 2011b, Tirole 2012, Obstfeld 2013).

A third level of support for the stability of the sovereign bond market is provided by the ECB's OMT programme, which is designed to work hand in hand with the ESM. The role of the OMT programme is to help minimise the risk of self-fulfilling liquidity panics in the sovereign bond market by reassuring investors that there is a "purchaser of last resort" for solvent governments, underpinned by an agreed ESM programme that sets out conditions to ensure that the fiscal fundamentals are clearly on a sustainable path.[23]

Of course, liquidity provision cannot address solvency problems. Accordingly, another major area for reform is to improve the capacity of the international system to operate efficient debt restructuring schemes (see also Sachs 1995 and Rogoff and Zettelmeyer 2002). One key area is to ensure that banks are not too big to fail, together with bank capital structures that provide a sufficient buffer against unexpectedly large losses. A second key area is to develop a better sovereign debt restructuring mechanism. While the current debate on European banking reform has provided many options in relation to the former, there has been less public debate about the latter problem.

Such reforms would go some way to deter the high levels of debt financing that have been at the centre of the current crisis. An over-reliance on debt financing would be further corrected by reforms in taxation and corporate governance systems to limit the current incentives to prefer debt funding over equity funding (see also Rogoff 1999). To varying degrees, the debt-equity choice is distorted for households, non-financial corporates and financial corporates (including banks). For instance, the scaling back of tax deductions for debt interest payments would be helpful, as would reforms to executive compensation schemes to deter excessive leverage for firms and banks.

While such reforms can be done at the national level, the obvious cross-border spillover effects in relation to the taxation and regulation of corporations and mobile factors mean that international cooperation can be especially effective. To a degree, coordinated regulatory reform of banking systems can be accomplished at global and European levels through the Basel mechanisms and through the European Banking Authority, the European Systemic Risk Board and the new Single Supervisory Mechanism. At a European level, the joint introduction of the financial transaction tax in eleven member countries also represents an important innovation in the coordination of tax reform.

Equity funding would be further encouraged by structural reforms that better enable enterprises to tap equity markets and bond markets. The emergence of the larger-scale enterprises that are most easily traded on public equity markets can be facilitated by the deeper unification of the European single market, especially in relation to the lagging services sector. In relation to the financing of new firms, the expansion of the venture capital market can enable greater equity financing of start-ups. Again, the importance of portfolio diversification for venture capital firms means that this sector can be most effectively developed at the pan-European level. In related fashion, the deeper integration of the European corporate bond market can also improve financial stability by reducing the dependence of corporates on local bank finance (Coeure 2013).

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[23] The OMT programme replaces the Securities Market Purchase (SMP) programme that had a similar intent but was more limited in scale. Of course, the ECB has also provided de facto support for sovereign bonds through its various liquidity policies for banks that are important purchasers of sovereign bonds (MTRO, LTRO). However, that method is quite indirect and has the unattractive property of increasing the co-dependence between banks and sovereigns.

To the extent that there are political barriers to higher levels of foreign equity ownership of domestic enterprises, such concerns mainly relate to regulated industries such as utilities and media firms, so that there is a close connection between cross-border equity transactions and perceptions of the uniformity of treatment of foreign and domestic owners in these sectors.

Financial innovations can also play a role, by fostering the adoption of more state- contingent debt contracts. For instance, the wider use of GDP-indexed bonds would provide a more stable funding environment for governments and other entities that are vulnerable to national-level risk factors (see also Borensztein and Mauro 2004). Although there are verification and moral hazard issues with state-contingent bond contracts, the increased levels of surveillance and monitoring under the reformed European fiscal governance system reduces such concerns. Moreover, it is possible that some of the gains could be reaped by repayment terms that are contingent on the state of the wider European economy rather than national-level output, which would further mitigate the moral hazard problem. In similar vein, trade in regional-level housing price index contracts could spread the risks associated with house price boom-bust cycles (Shiller 1998).

While it is notoriously difficult to successfully launch new markets and new financial products (given the importance of liquidity and depth), there could be an important role for international policy initiatives to support such innovations. For instance, individual countries that might be interested in issuing GDP-indexed bonds face the classic "lemons" problem, whereas their use could be normalised if there were a coordinated push to develop such instruments on a multi-country basis. The recent European agreement about the inclusion of collective action clauses in sovereign bond contracts shows that international coordination can be helpful in promoting such innovations. As a first step, official loans to distressed countries could specify GDP-indexed repayment terms. In turn, the operation of official loans on this basis may stimulate the private market for such instruments.

## 4.2     Macro-Financial Stabilisation Policy Framework

The volatility of capital flows should also inform design of macro-financial stabilisation policies at both national and European levels. Taking first a national-level perspective, the high costs of boom-bust cycles in international debt flows reinforce the case for a macro- prudential framework, which encompasses both financial stability policy and fiscal policy. Indeed, this perspective underpins the recently-introduced "macroeconomic imbalance procedure" that is now a key component of the European policy framework.

### 4.2.1     Macro-Prudential Policies

A macro-prudential regulatory system can mitigate the risks of excessive cross-border debt flows by influencing the composition of both the asset side and the liability side of the balance sheets of banking systems. On the asset side, regulations that that guard against excessive geographic concentration in loan portfolios would limit the expansion of regionally-specialised banks and, indirectly, stimulate the relative market share of larger, geographically-diversified banks. In related fashion, regulations that limit sectoral concentration in loan portfolios would reduce the risk of excessive exposure to individual sectors (such as construction or asset-backed securities). In turn, this would help to limit the amplification dynamics that fuel regional property boom-bust cycles. Similarly, regulators could mandate that the bond holdings of banks be sufficiently diversified, including limits on the exposure to individual sovereign governments. Such regulations should be more effective under the new single supervisory mechanism, since it is important to take a consolidated view of the activities of each banking group, fully incorporating the correlations across the asset holdings of individual subsidiaries of the parent bank.

On the liability side, a regulatory approach that dissuades excessive wholesale funding would

in effect reduce the scale of cross-border debt inflows during boom periods; given that cross-border debt flows are primarily inter-bank flows (see also Committee on International Economic Policy and Reform 2012). Although, this in part may be offset by an expansion in direct cross-border lending, this could also be mitigated through cooperation with home-country supervisors of foreign banks, as is facilitated by Basel III (Borio et al 2011). Indeed, the recently-agreed single supervisory mechanism should eliminate the risk of such regulatory arbitrage within the European system (see also Coeure 2013).

### 4.2.2    Fiscal Policy

Turning to fiscal policy, a macro-prudential framework entails an "leaning against the wind" strategy in relation to the financial cycle as well as the output cycle (see also Lane 2010a, 2010b, 2012). That is, during periods in which private-sector financial balances are deteriorating, the government should adopt a countervailing approach by running larger financial surpluses. In this way, the volatility of aggregate financial balances and the risks of financial instability can be reduced.

It should be appreciated that this approach is fully consistent with the Fiscal Compact Treaty, since it targets the underlying structural fiscal balance and takes a broad view of cyclical influences on fiscal outcomes (see also Benetrix and Lane 2011, 2012). In particular, the fiscal impact of the financial cycle means that a stable structural fiscal balance is consistent with a volatile overall fiscal balance, since persistent and possibly-large financial shocks affect the cyclical component of the fiscal balance.

The complex and time-varying relation between the financial cycle and the fiscal cycle reinforces the importance of high-quality, independent economic-financial analysis under-pinning fiscal decisions, in view of the difficulties associated with calibrating macroeconomic and financial risks. To this end, national fiscal councils can play a useful role in providing independent, authoritative country-specific analyses of the macro-financial risks that need to be addressed by national fiscal policies.

In addition to the overall balance, fiscal policy can also play a stabilizing role through time-varying tax rates and the composition of government spending. In terms of the former, rapid growth in domestic spending (giving rise to an excessive current account deficit) can be forestalled through increases in consumption and investment taxes, which in turn can be reduced during downturns.[24] Furthermore, "fiscal exchange rate" policy can be deployed by which elements of currency adjustment can be replicated through time-varying movements in labour taxes and VAT (see, for example, Calmfors 2003 and Farhi et al 2012). Since there are well-understood risks in "fine-tuning" tax rates, such cyclical interventions should only be deployed in the event of large and persistent shocks.

In addition to influencing the aggregate level of private spending, tax policy can also influence the sectoral composition of output. In particular, time-varying tax rates on transactions can play a role in mitigating boom-bust cycles in the property market. A cyclical policy that alters transactions taxes in proportion to the gap between current property prices and a fundamentals-based estimate of "equilibrium" property prices can play a stabilising role. Again, given the difficulty in estimating such price gaps, such tax interventions should be reserved for only sufficiently large and persistent gaps.

In relation to the composition of government spending, Blanchard (2007) outlines how variation in the mix of government consumption of tradables and nontradables can mitigate some

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[24] Ireland introduced a saving subsidy scheme in 2001/2002 in order to encourage a reduction in consumption growth. However, the ending of the scheme in 2006/2007 was not conditioned on the state of the cycle, so that its effectiveness as a cyclical stabilisation tool was quite incomplete.

of the distortions associated with large swings in private-sector spending patterns. In particular, during a boom period in which private spending on nontradables is tem- porarily high, a reduction in government consumption of nontradables can mitigate the over-expansion of the nontraded sector.

Finally, although this discussion has focused on the potential role of activist countercyclical fiscal measures, the underlying structural design of the fiscal system also matters for macro-financial stability. For instance, as was highlighted in Section 4.1, the favourable tax treatment of debt interest payments encourages excessive leverage and is a barrier to a greater role for equity finance. Similarly, subsidies for home ownership (such as mortgage interest relief) plausibly increase the relative importance of debt finance, given the importance of home ownership as collateral for lending to the household sector.

### 4.2.3 Structural Reforms

The shifts in sectoral economic activity associated with fluctuations in net capital flows also reinforce the importance of labour market institutions (and ancillary policies) that can facilitate the mobility of workers across sectors. This fundamental principle should inform policy choices across a wide spectrum of policy issues, including retraining, housing, pensions and wage flexibility.

Resilience in the face of sectoral volatility is also enhanced by strong financial and legal systems that can facilitate the entry and growth of firms in expanding sectors and efficiently manage the decline and exit of firms in contracting sectors. The value of a robust banking system in managing reversal episodes underlines the importance of ensuring the resilience of the banking system in the face of capital flow volatility. In relation to the legal system, efficient mechanisms for debt restructuring (households, corporates, and banks) are an important element in exiting from crisis episodes (Laeven and Laryea 2009, Laryea 2010, Brown and Lane 2011).

## 4.3 European-Level Reforms

European-level reforms can also play an important role in enhancing stability in the face of cross-border capital flows. Most important, an area-wide banking union would limit the amplification channels by which cross-border capital flows interact with national macroeconomic and fiscal cycles. During boom periods, an area-wide single supervisory mechanism would be better placed to identify excessive geographical concentration in loan portfolios; during busts, an area-wide resolution regime would forestall the diabolic loop between national banking systems and national sovereigns that has been so costly during the current crisis.[25] To the extent that banking union also fostered the emergence of truly pan-European banks, the risks of banking crises would also be reduced, since such banks would have more diversified portfolios and could better withstand country-level or regional-level shocks (see also Allen et al 2011).

The introduction of eurobonds can also be stabilising by breaking the link between "flight to safety" and "capital flight." Currently, investors that fear default in peripheral economies can only purchase a safe asset by buying a "core" bond (mainly, German bunds). As pointed out by Brunnermeier et al (2011), it is possible to design European Safe Bonds (ESBies) that would comprise the senior tranche of a portfolio consisting of the sovereign bonds of the member countries (up to some limit). Through tranching, the benefits of issuing a safe asset would be shared across the member states and this would limit the scale of cross-border capital flight during crisis periods.

Finally, the new "macroeconomic imbalances procedure" (MIP) can also play a role in the

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[25] An area-wide fiscal transfer system would also help to moderate regional boom-bust cycles.

prevention and correction of such imbalances. In particular, the coherent analysis of national-level imbalances within the context of a wider area-wide perspective can enrich the policy debate, especially by revealing the limitations of country-specific explanations of inherently cross-country imbalances.

Importantly, as is explained in European Commission (2012c), the MIP recognises the importance of distinguishing between debt-type and equity-type capital flows, which is appropriate given the special risks attached to the former category. In addition, while the MIP specifies threshold values for current account balances and the net international investment position in terms of identifying macroeconomic imbalances, it also recognises that the analysis of macroeconomic risks should not be mechanical in nature but rather should interpret these values in the context of the prevailing country-specific and system- specific circumstances.

The analysis in this paper suggests that there are no simple rules in interpreting the role of gross and net capital flows in determining macro-financial risks. Rather, it requires a full-scale analysis, such that the surveillance of capital flows on an ongoing basis is a demanding challenge.

## 4.4    Summary

This section has covered a wide range of reform proposals at both international and national levels.

Certainly, it is true that some types of reform are substitutes for other types of reform. For instance, more effective bail-in mechanisms for bank creditors mean that the expected fiscal costs of banking crises should be lower.   Similarly, stronger national-level macrofinancial policy frameworks mean that the scale of any European-level joint fiscal initiatives can be more limited.

However, many reforms are complementary in nature, with reform along one dimension reinforcing the effectiveness of reform along another dimension. Most obviously, the current crisis has demonstrated the complementarity between strong public finances and a strong banking system.

Moreover, in terms of the political dynamics of reform, it is important to emphasise the basic complementarity between national-level and European-level reforms. The attractiveness of implementing domestic reforms is enhanced if it is perceived as increasing the likelihood of achieving breakthroughs in implementing European-level reforms. Equally, in the other direction, the viability of new European-level initiatives (banking union, eurobonds, joint fiscal funds) critically depends on the successful implementation of domestic reforms (national  fiscal frameworks,  structural reform  of labour and product markets). Otherwise, such European-level institutions could be undermined by weak domestic policies in individual member countries, especially to the extent that the costs of self-generated national crises are transferred to the wider euro area.

Finally, the gradual sequencing of reforms means that there is a risk that the full reform process will not be completed.  If the full set of reforms is not implemented before the euro area recovers from the current crisis, the political momentum required to complete the process may fade and an incomplete level of reform means that the euro area may remain excessively vulnerable to future crisis episodes.

# 5    Conclusions

The extraordinary boom in debt-creating capital flows during the 2003-2007 pre-crisis period was a major contributory factor to the current crisis in the euro area. In turn, the subsequent behaviour of capital flows has been central in understanding the amplitude and transmission of the crisis itself.

Our empirical analysis highlights some important points. In terms of the pre-crisis period, the surge in cross-border debt flows outstripped equity flows, such that risk- absorbing capacity was compromised. Identifying the sources of the general complacency about financial risk during this period (across the advanced economies and across both creditor and debt countries) warrants further investigation and reinforces the case for a more robust macro-financial surveillance framework at both national and international levels.

Furthermore, the boom-bust cycle has especially highlighted the costliness of sudden stops for countries running large and persistent current account deficits. This is especially relevant for the euro area, since the option of nominal devaluation is not available to member countries in responding to swings in net capital flows. Although the sudden stop in private flows has been partly cushioned by official flows, the crisis has also reinforced the body of evidence that wage/price rigidities are sufficiently strong that current account deficits cannot be quickly closed in the absence of flexible exchange rates without deep declines in domestic demand and sharp increases in unemployment. It is difficult to overstate the importance of this finding for the prudent conduct of macro-financial policies at the national level.

Accordingly, there is a challenging reform agenda for policymakers, both in terms of preventive measures to avoid excessive capital flow episodes and in terms of improving the resilience of macro-financial systems to financial shocks. While some of the main reform elements are recognised in the design of the "macroeconomic imbalance procedure", the Fiscal Treaty, the OMT programme of the ECB and various banking union proposals, much remains to be done in terms of establishing good operational procedures to effectively manage capital flows (and their implications).

In overall terms, as emphasised by Lane (2012) and Coeure (2013), the scale of cross- border capital flows per se should not be considered a direct policy target. Rather, the general aim of policy reforms should be a new financial environment in which destabilising- type flows are reduced (such as excessive debt flows intermediated by non-diversified local banks) but stabilising-type flows are expanded (such as equity flows and debt flows inter- mediated through diversified banks that are embedded in an area-wide banking union).

Finally, there also remains a basic data challenge. The level of information in the capital flow data and the international investment position data remains very unsatisfactory, in term of incomplete information about the sectoral and geographical identities of creditors and debtors, maturity structures, currency exposures, ultimate risk allocation and the composition of valuation effects. While there are some current initiatives to fill in some of the data gaps, there is a long way to go.

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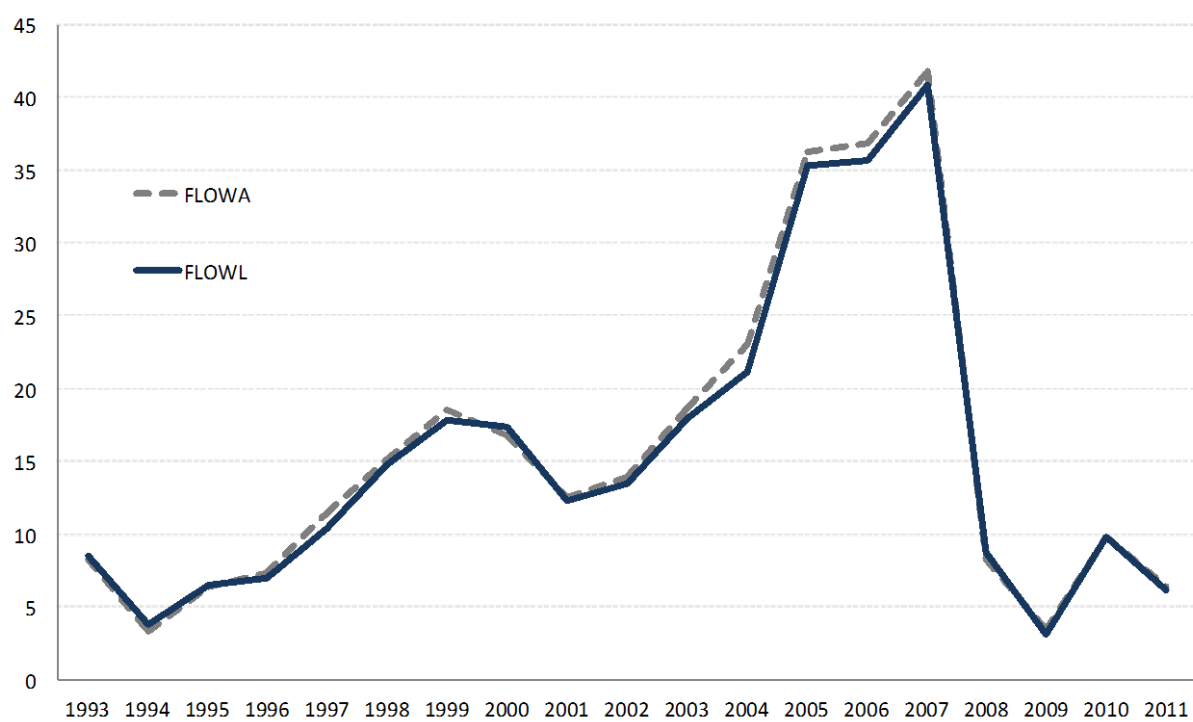
Figure 1: Euro Area: Capital Flows. Note: Capital Outflows and Capital Inflows in per cent of GDP. Source: IMF BOP database.
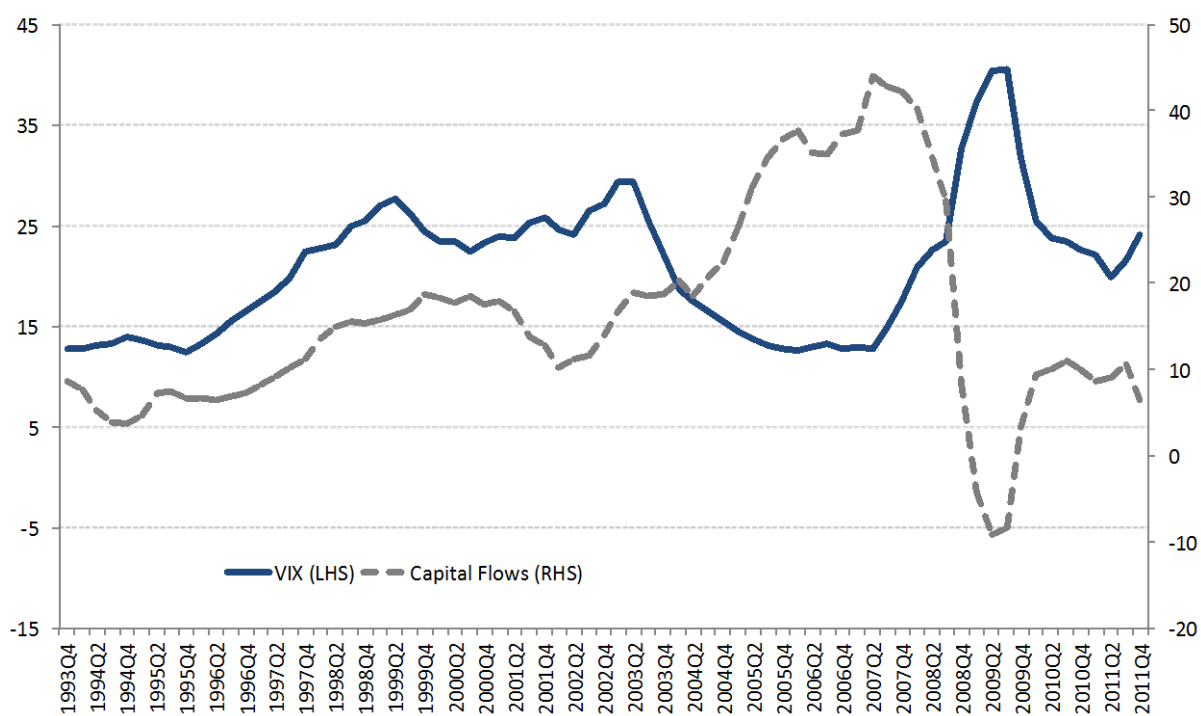
Figure 2: Market Volatility and Capital Flows. Note: Capital flows variable is average of inflows and outflows, in per cent of GDP; VIX index of expected market volatility. Source: Chicago Board Options Exchange and IMF BOP database.

## IFI Ratios
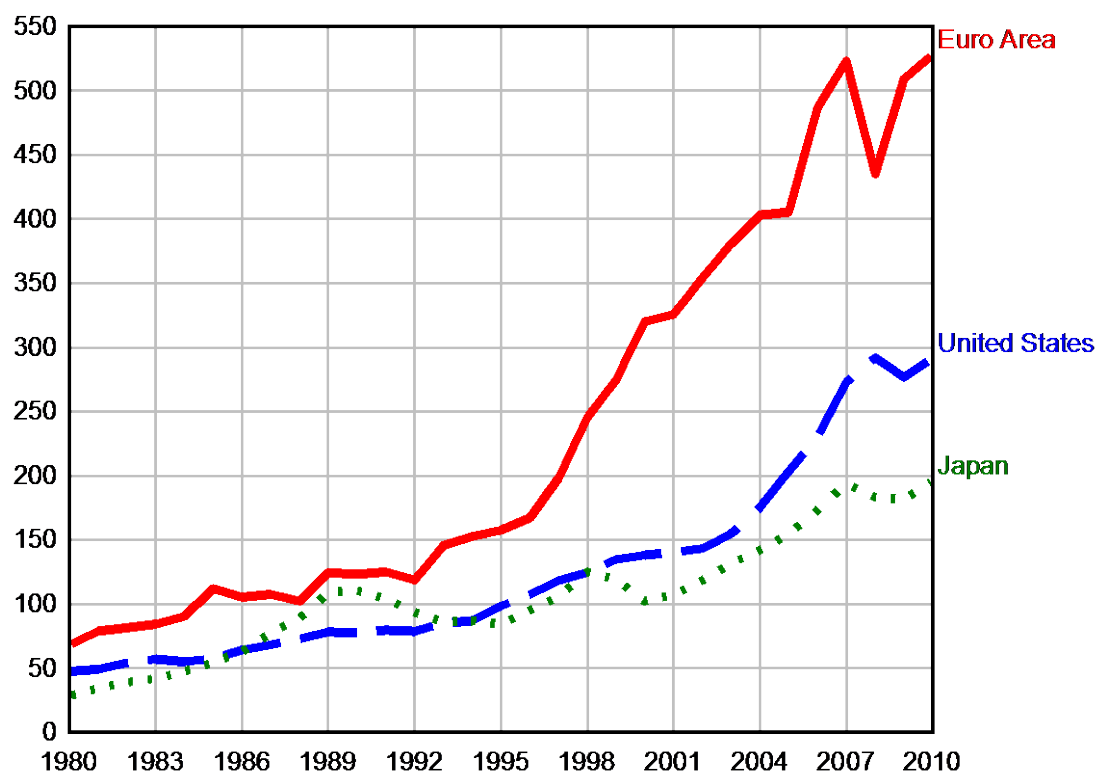


Figure 3: International Financial Integration Ratio.  Note:  Ratio of foreign assets plus foreign liabilities to GDP.
Source: Updated version of dataset described in Lane and Milesi-Ferretti (2007).
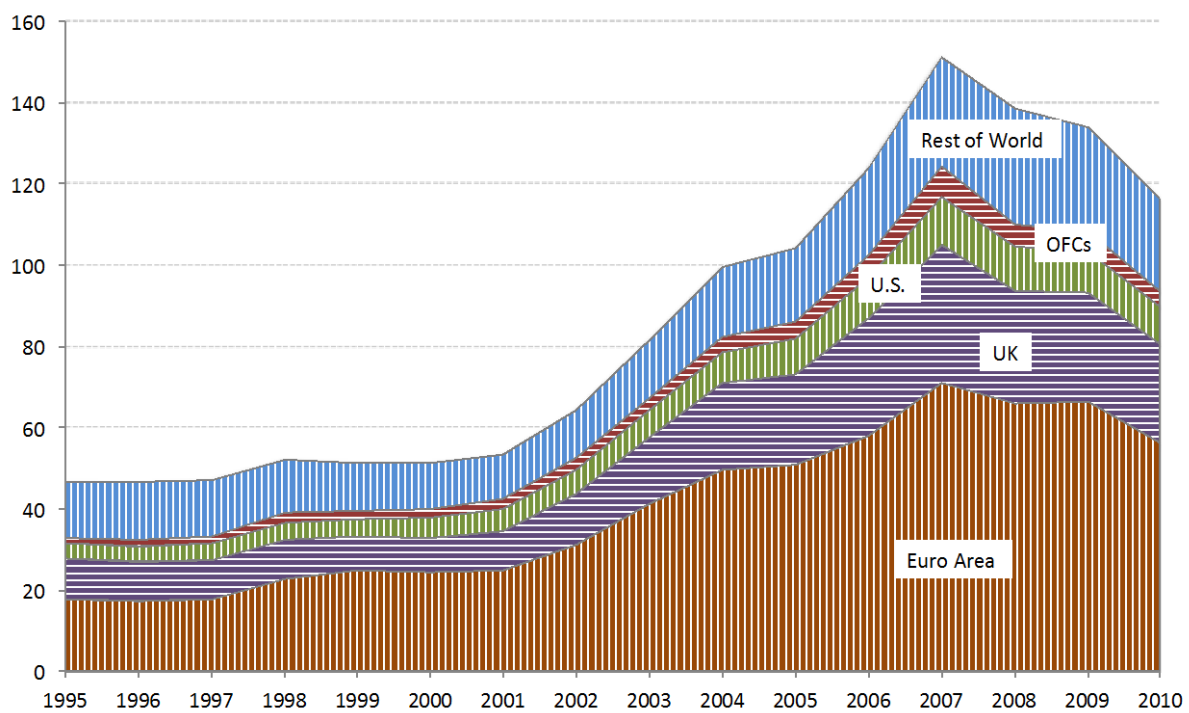
Figure 4: Euro Area: Cross-Border Bank Assets. Note: Percent of GDP. Source: BIS Locational Banking Statistics.
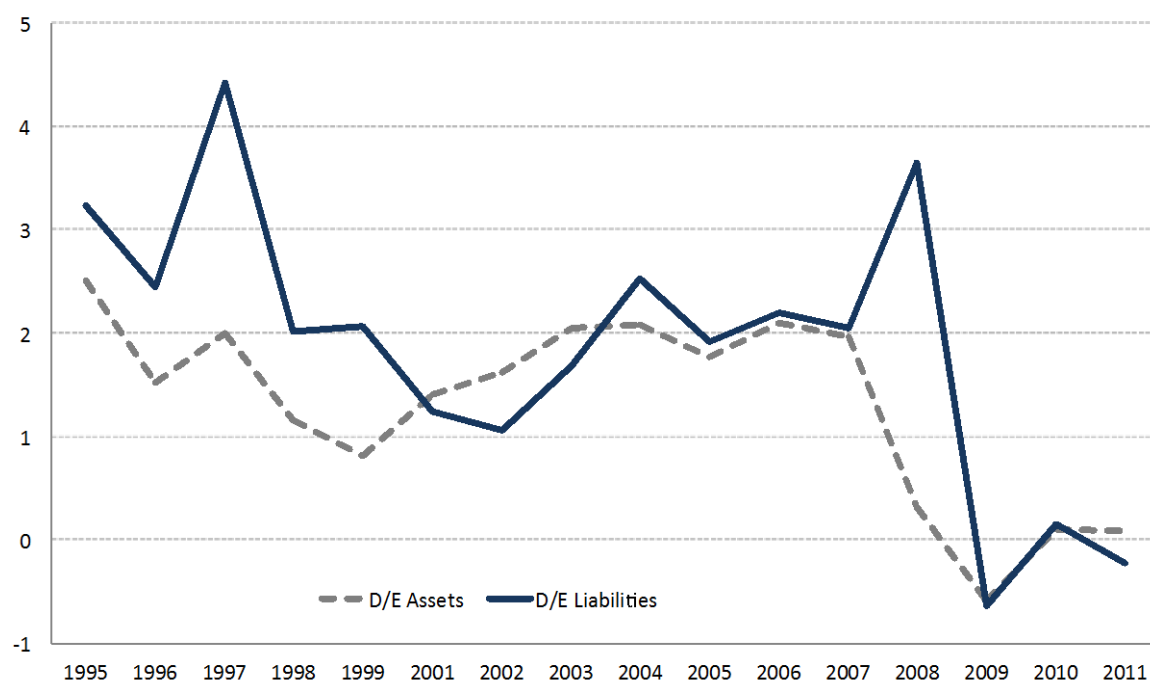
Figure 5: Euro Area: Debt-Equity Mix in Capital Flows. Note: Debt-Equity ratios, where debt flows are sum of portfolio debt flows plus other debt flows plus reserves flows and equity flows are sum of FDI flows plus portfolio equity flows. Source: IMF BOPS dataset.
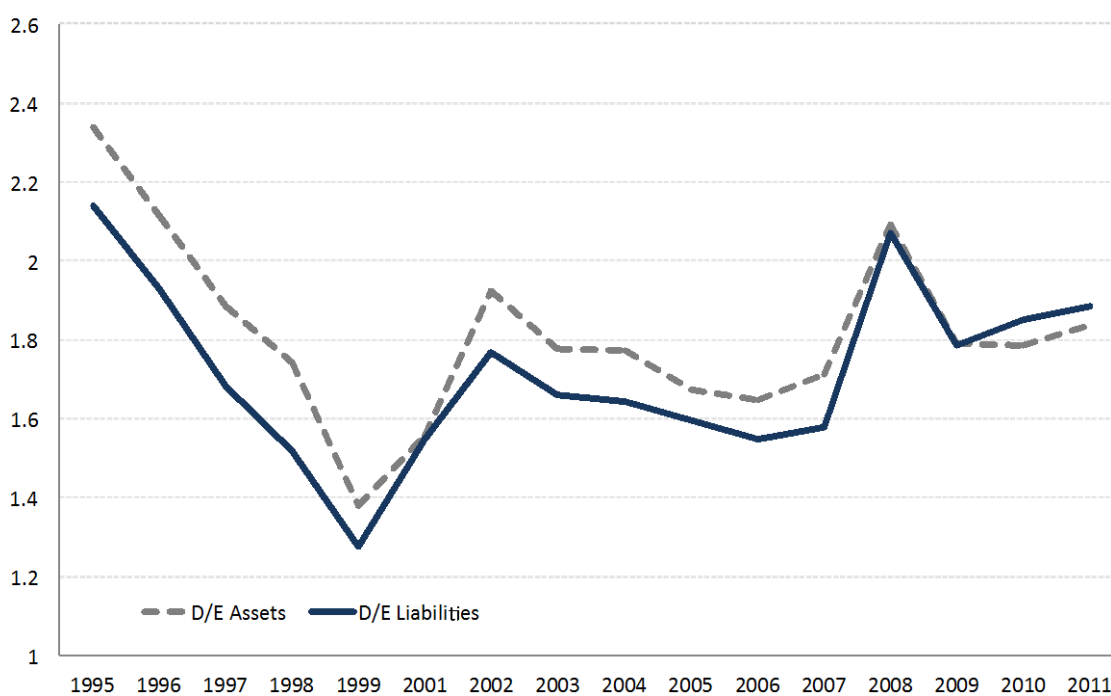
Figure 6: Euro Area: Debt-Equity Mix in the International Balance Sheet. Note: Debt-Equity ratios, where debt is sum of portfolio debt stock plus other debt stocks plus reserves stock and equity is sum of FDI stock plus portfolio equity stock. Source: Updated version of dataset described in Lane and Milesi-Ferretti (2007).
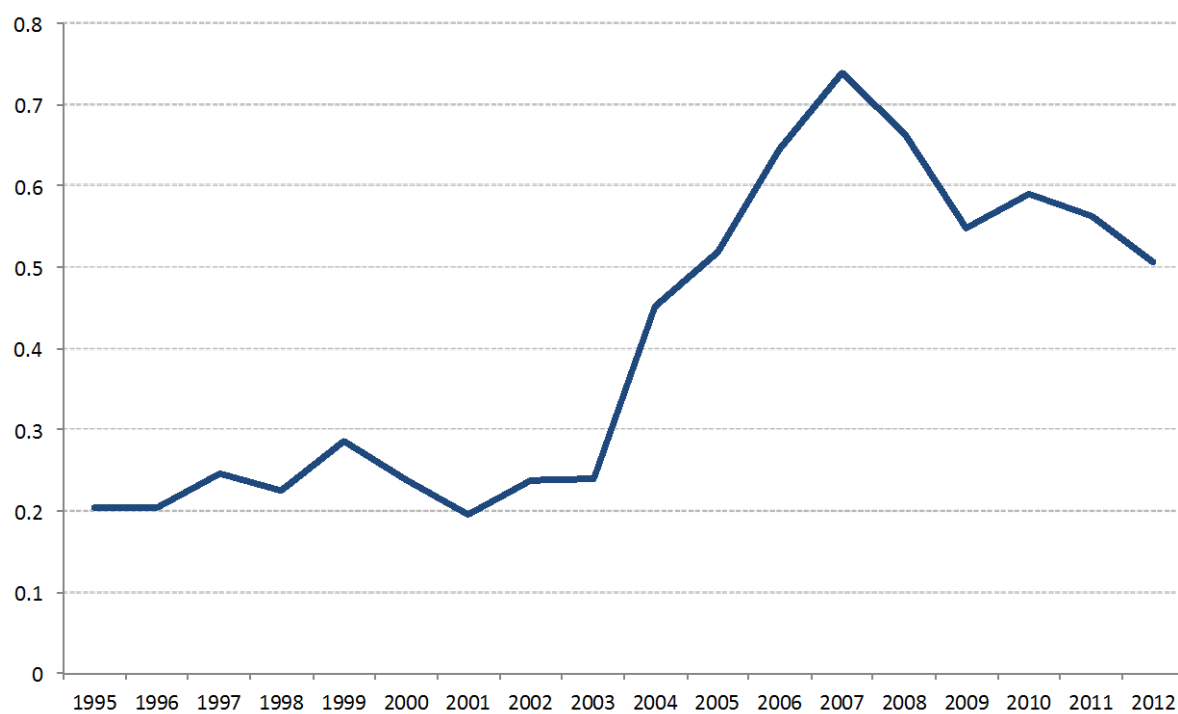
Figure 7: Euro Area: Current Account Dispersion. Note: Standard Deviation of current account balances (ratios to GDP). Source: IMF WEO dataset.
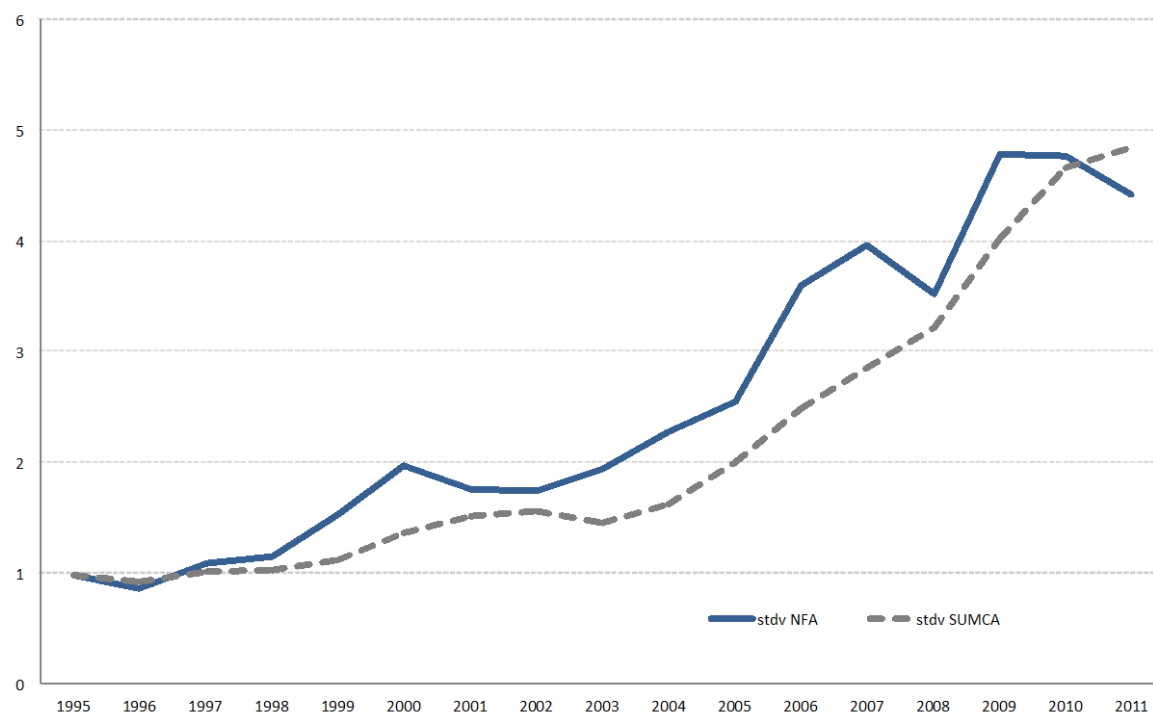
Figure 8: Euro Area: NIIP Dispersion. Note: Standard Deviation of net international investment positions and cumulative current account positions (ratios to GDP). Source: Updated version of dataset described in Lane and Milesi-Ferretti (2007).
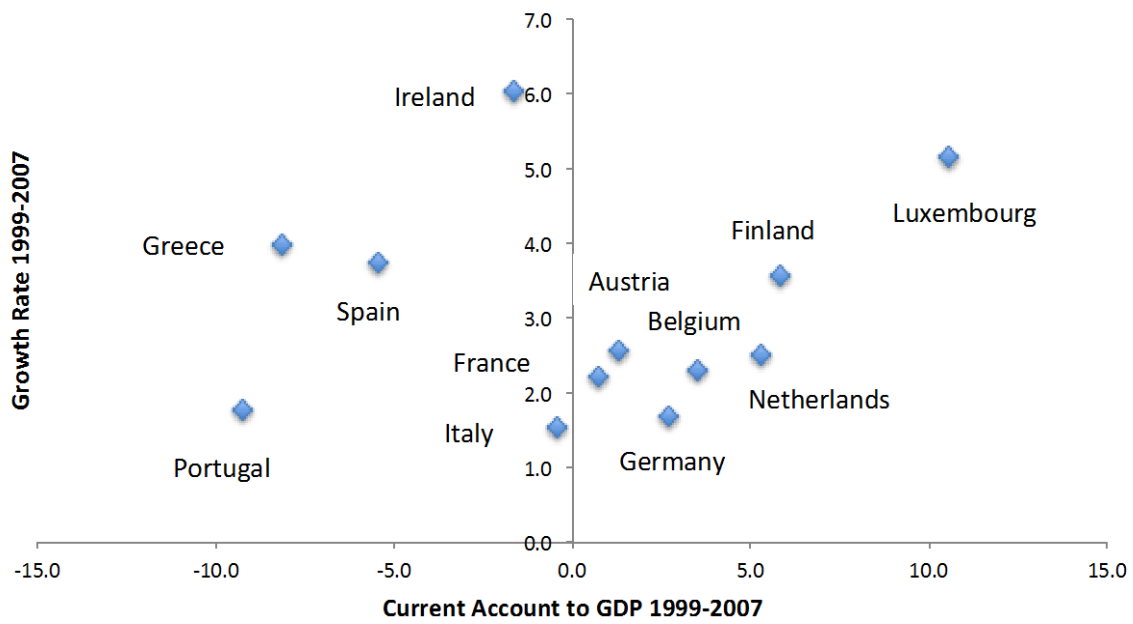
Figure 9: Current Account Imbalances and Output Growth. Note: Average values over 1999-2007.
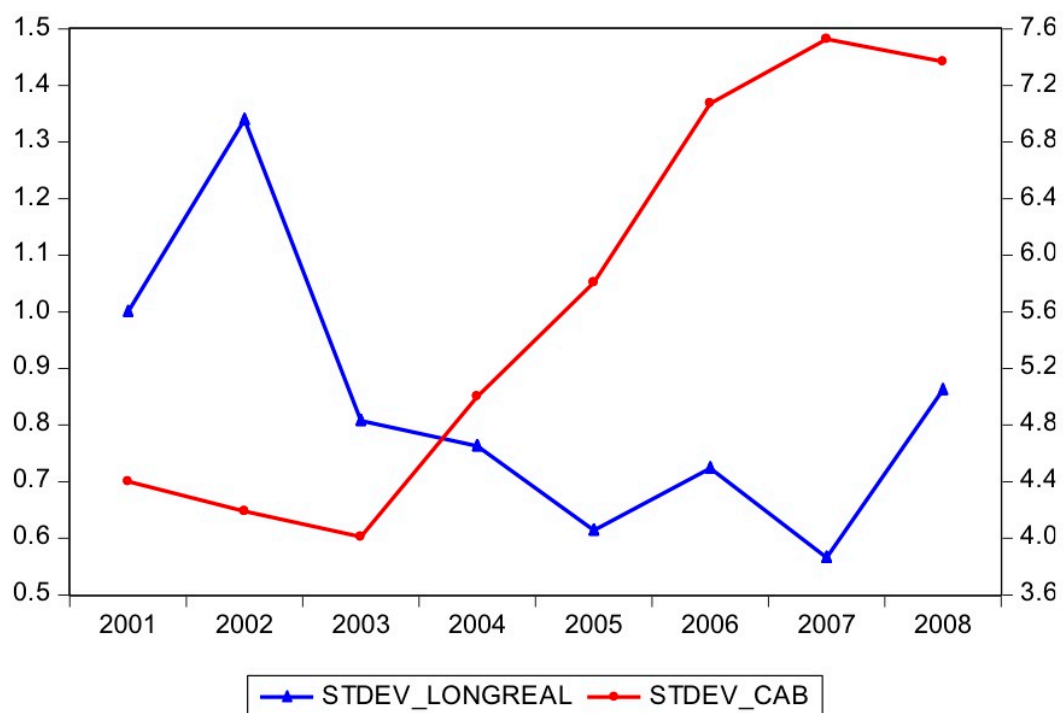
Figure 10: Real Interest   Rate Dispersion and Current Account Dispersion. Note: Cross-country standard deviations of real interest rates and current account balances for euro12 group.
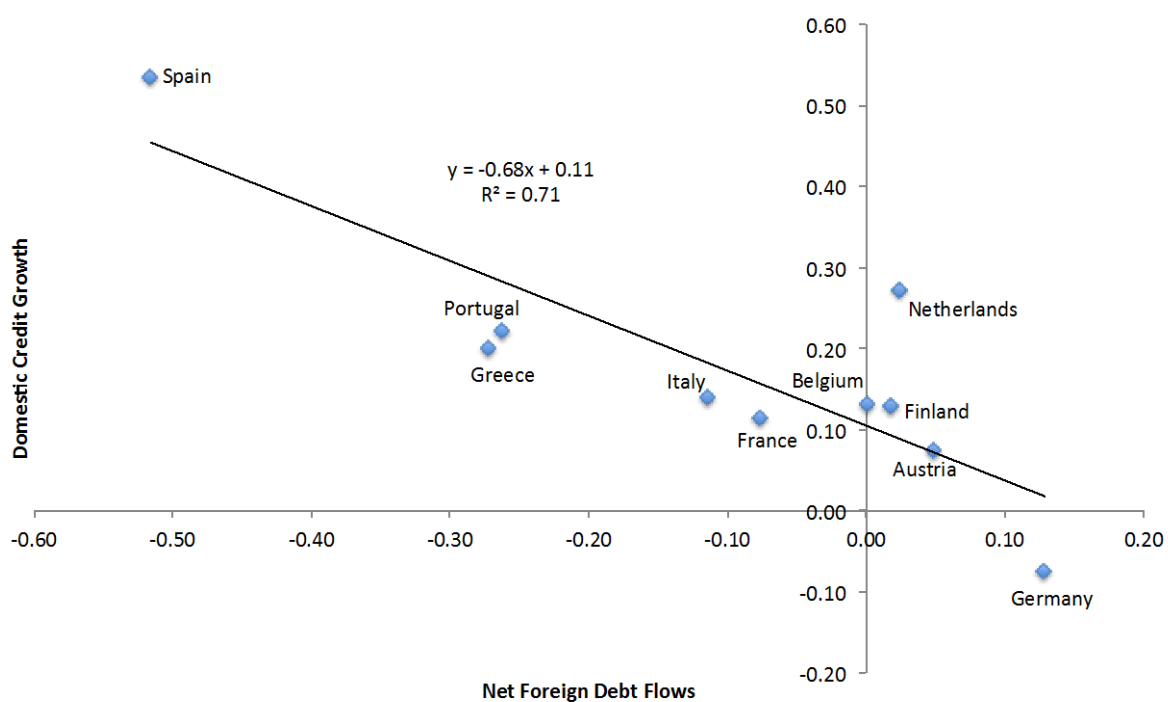
Figure 11: Euro Area: Domestic Credit Growth and Net Foreign Debt Flows, 2003-2008. Note: Based on Lane and McQuade (2012).
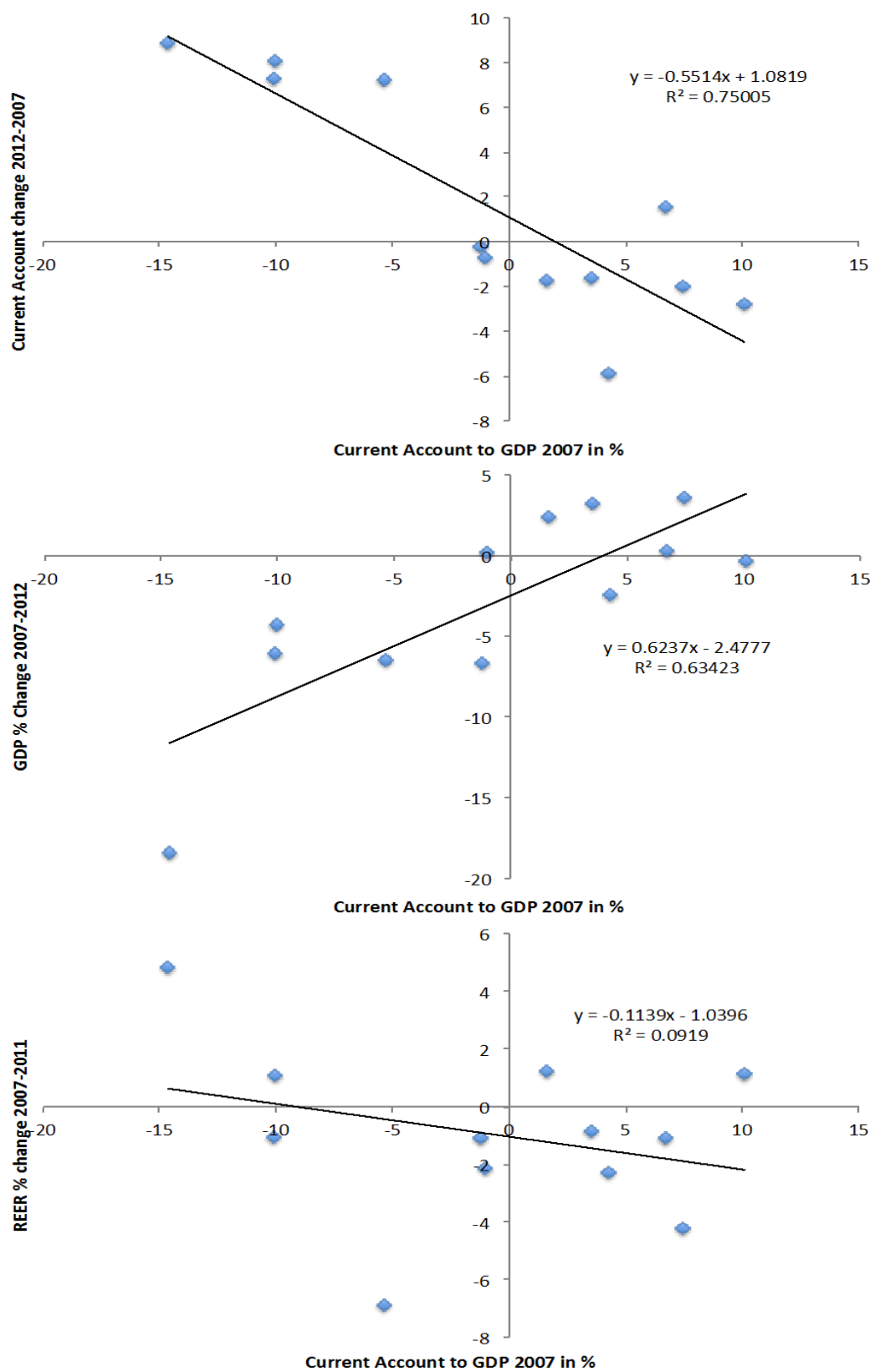
Figure 12: Dimensions of Current Account Adjustment, 2007 to 2012. Note: Top scatter is change in current account between 2007 and 2012 against 2007 current account balance; middle scatter is output growth rate between 2007 and 2012 against 2007 current account balance; bottom scatter is change in real exchange rate between 2007 and 2012 against 2007 current account balance.

Table 1: Composition of Capital Inflows and Foreign Liabilities

| | Capital Inflows | | | | | | | | |
| | 1999-2002 | | | 2003-2007 | | | 2008-2011 | | |
| | DEBT | PEQ | FDI | DEBT | PEQ | FDI | DEBT | PEQ | FDI |
|---|---|---|---|---|---|---|---|---|---|
| Austria | 14.8 | 0.4 | 2.3 | 18.7 | 1.9 | 9.8 | 1.5 | -0.4 | 0.3 |
| Belgium | 15.0 | -0.2 | 7.1 | 30.4 | 1.1 | 13.6 | -13.2 | 0.1 | 21.4 |
| Finland | 7.9 | 5.3 | 5.0 | 8.9 | 1.4 | 3.0 | 30.5 | -0.3 | 0.6 |
| France | 9.6 | 2.0 | 3.4 | 19.3 | 1.9 | 3.0 | 4.7 | 0.5 | 1.6 |
| Germany | 8.8 | 1.2 | 4.4 | 8.3 | 1.0 | 1.4 | 1.3 | -0.3 | 0.9 |
| Greece | 6.5 | 0.4 | 0.6 | 14.7 | 2.4 | 0.9 | 13.1 | -0.5 | 0.8 |
| Italy | 6.7 | -0.3 | 1.1 | 9.1 | 0.2 | 1.4 | 3.2 | 0.0 | 0.6 |
| Netherlands | 3.6 | 3.7 | 11.3 | 3.4 | 0.6 | 5.8 | -46.3 | 0.7 | 1.5 |
| Portugal | 15.3 | 1.3 | 3.3 | 12.2 | 3.0 | 2.8 | -4.6 | -0.1 | 2.1 |
| Spain | 11.3 | 1.7 | 5.0 | 18.7 | -0.2 | 2.9 | 4.6 | 0.1 | 2.6 |

| | Foreign Liabilities | | | | | | | | |
| | 1998 | | | 2002 | | | 2007 | | |
| | DEBT | PEQ | FDI | DEBT | PEQ | FDI | DEBT | PEQ | FDI |
|---|---|---|---|---|---|---|---|---|---|
| Austria | 92.3 | 7.3 | 11.2 | 153.1 | 8.3 | 21.4 | 203.0 | 28.0 | 75.6 |
| Belgium | 157.8 | 7.0 | 70.5 | 213.4 | 7.1 | 100.8 | 310.7 | 15.8 | 170.6 |
| Finland | 69.0 | 61.4 | 16.0 | 95.7 | 65.7 | 33.7 | 107.5 | 93.3 | 51.6 |
| France | 67.3 | 20.4 | 37.3 | 108.7 | 23.7 | 30.3 | 172.2 | 41.0 | 48.2 |
| Germany | 76.0 | 13.3 | 11.6 | 116.6 | 10.6 | 26.3 | 135.7 | 27.3 | 30.4 |
| Greece | 49.6 | 9.0 | 9.8 | 99.3 | 5.7 | 10.5 | 144.2 | 30.1 | 17.1 |
| Italy | 68.8 | 18.7 | 8.9 | 89.7 | 12.1 | 10.6 | 111.4 | 19.7 | 17.7 |
| Netherlands | 124.0 | 76.6 | 40.8 | 207.0 | 59.7 | 79.7 | 290.4 | 85.2 | 97.8 |
| Portugal | 90.8 | 15.3 | 24.5 | 159.6 | 13.2 | 33.6 | 203.1 | 32.7 | 49.7 |
| Spain | 55.6 | 12.6 | 19.6 | 93.4 | 17.8 | 37.3 | 144.8 | 28.8 | 40.6 |

Note: Upper panel are average annual inflows, measured as ratios to GDP. Lower panel are stocks of foreign liabilities, measured as ratios to GDP. DEBT is sum of portfolio and other debt; PEQ is portfolio equity; FDI is foreign direct investment. Ireland and Luxembourg not reported, due to impact of international financial centre activity on the composition of international balance sheet. Source: IMF BOP and updated version of Lane and Milesi-Ferretti (2007).

Table 2: Growth Differential: Nontraded versus Traded Sectors

| | OECD STAN | | AMECO | |
|---|---|---|---|---|
| | 2003-2007 | 2007-2009 | 2003-2007 | 2007-2011 |
| Austria | -0.04 | 0.09 | -0.07 | -0.01 |
| Belgium | 0.10 | 0.16 | 0.03 | 0.06 |
| Finland | 0.01 | 0.31 | -0.15 | 0.20 |
| France | 0.15 | 0.04 | 0.02 | 0.08 |
| Germany | -0.10 | 0.23 | -0.11 | 0.05 |
| Greece | 0.16 | -0.06 | 0.12 | -0.06 |
| Ireland | 0.35 | -0.10 | 0.06 | -0.28 |
| Italy | 0.03 | 0.17 | -0.03 | 0.08 |
| Luxembourg | 0.11 | 0.34 | 0.14 | 0.41 |
| Netherlands | -0.03 | 0.10 | 0.02 | 0.002 |
| Portugal | 0.09 | n/a | 0.04 | 0.004 |
| Spain | 0.16 | 0.14 | 0.13 | 0.05 |

Note: Traded/nontraded sectoral allocations in STAN database follows Galstyan and Lane (2009); Agriculture/fishing and manufacturing counted as traded in AMECO database, while services and construction counted as nontraded. Relative growth rates in value added.

Table 3: Sectoral Net Financial Flows

| | 2003-2007 | | | | |
|---|---|---|---|---|---|
| | TOTAL | NFC | FC | GOVT | HH |
| Belgium | 18.0 | -0.7 | 4.7 | -2.9 | 17.1 |
| Germany | 45.9 | 24.8 | 4.7 | -11.5 | 27.8 |
| Ireland | -9.9 | 0.7 | 15.9 | 5.2 | -31.8 |
| Greece | -37.5 | -25.7 | -0.1 | -26.7 | 15.0 |
| Spain | -29.1 | -33.7 | 4.6 | 4.9 | -5.0 |
| France | -2.4 | -7.1 | 2.8 | -14.3 | 16.3 |
| Italy | -6.5 | -12.8 | 5.1 | -14.3 | 15.4 |
| Luxembourg | 10.7 | -5.5 | 9.2 | 4.9 | 2.1 |
| Netherlands | 35.5 | 32.7 | 7.1 | -3.8 | -0.5 |
| Austria | 8.8 | -9.3 | 6.1 | -9.6 | 21.6 |
| Portugal | -36.6 | -27.4 | 1.4 | -20.3 | 9.6 |
| Finland | 16.7 | 6.8 | 0.4 | 14.8 | -5.2 |

| | 2008-2011 | | | | |
|---|---|---|---|---|---|
| | TOTAL | NFC | FC | GOVT | HH |
| Belgium | 4.6 | 2.6 | -4.4 | -14.1 | 20.4 |
| Germany | 18.6 | -0.5 | 5.0 | -8.1 | 22.2 |
| Ireland | -17.9 | 6.6 | 24.0 | -65.5 | 17.0 |
| Greece | -34.7 | -17.5 | 22.0 | -47.7 | 8.5 |
| Spain | -20.6 | -4.6 | 6.1 | -34.6 | 12.5 |
| France | -7.6 | -6.7 | 6.6 | -22.5 | 15.0 |
| Italy | -12.9 | -10.6 | 6.6 | -15.5 | 6.7 |
| Luxembourg | 1.5 | -9.9 | 7.4 | 1.0 | 2.9 |
| Netherlands | 19.6 | 31.4 | 3.1 | -14.2 | -0.8 |
| Austria | 9.1 | 2.4 | 3.1 | -12.3 | 16.0 |
| Portugal | -36.5 | -29.7 | 5.8 | -28.1 | 15.5 |
| Finland | -1.4 | -0.6 | 2.1 | -2.2 | -0.6 |

Note: Cumulative net financial flows for each sector (ratios to GDP). TOTAL, NFC, FC, GOVT, HH refer to total economy, non-financial corporations, financial corporations, government and households respectively. Source: Eurostat.

Table 4: Real Exchange Rate Adjustment, 2007.Q4 to 2012.Q2

|  | CA | EA17 | | N=36 | |
| --- | --- | --- | --- | --- | --- |
|  | CA | HICP | PGDP | HICP | PGDP |
| Austria | 3.5 | 1.0 | 0.1 | -2.2 | -1.1 |
| Belgium | 1.6 | 2.7 | 0.2 | -0.4 | -0.2 |
| Finland | 4.3 | 3.7 | 0.2 | -1.1 | -1.0 |
| France | -1.0 | -0.7 | 0.03 | -4.6 | -3.7 |
| Germany | 7.5 | -2.5 | -0.1 | -6.4 | -6.1 |
| Greece | -14.6 | 3.8 | 0.2 | 1.6 | 0.1 |
| Ireland | -5.4 | -7.2 | -0.6 | -11.0 | -16.8 |
| Italy | -1.2 | 2.4 | 0.1 | -1.9 | -2.6 |
| Luxembourg | 10.1 | 2.9 | 0.4 | 1.2 | 6.0 |
| Netherlands | 6.7 | 0.1 | -0.04 | -2.1 | -3.3 |
| Portugal | -10.1 | -0.5 | -0.1 | -2.6 | -3.5 |
| Spain | -10.0 | 0.4 | -0.1 | -1.8 | -4.0 |
| Correlation |  | 0.08 | 0.35 | 0.005 | 0.29 |

Note: 2007 current account balance. Real effective exchange rates based on HICP and GDP deflators. Correlations refer to correlation between change in real exchange rate and the initial current account balance. Source: European Commission's Price and Cost Competitiveness Database.

Table 5: Current Account Adjustment 2007-2012: Saving and Investment

|  | $CA_{2007}$ | $\Delta CA$ | $\Delta S$ | $\Delta I$ |
|---|---|---|---|---|
| Austria | 3.5 | -1.6 | -2.8 | 0.1 |
| Belgium | 1.6 | -1.7 | -4.5 | -1.3 |
| Finland | 4.3 | -5.9 | -8.2 | -4.0 |
| France | -1.0 | -0.7 | -2.7 | -1.9 |
| Germany | 7.5 | -2.0 | -3.7 | -1.8 |
| Greece | -14.6 | 8.8 | -3.6 | -13.2 |
| Ireland | -5.4 | 7.2 | -8.2 | -16.3 |
| Italy | -1.2 | -0.2 | -4.4 | -4.5 |
| Luxembourg | 10.1 | -2.8 | -5.0 | 0.8 |
| Netherlands | 6.7 | 1.5 | -2.5 | -3.4 |
| Portugal | -10.1 | 7.2 | 0.1 | -7.1 |
| Spain | -10.0 | 8.0 | -3.7 | -11.3 |
| Correlation |  | -0.87 | -0.21 | 0.80 |

Note: Changes in current account balance, saving rate and investment rate from 2007 to 2012. Correlations refer to correlation between change in current account balance, saving rate and investment rate and the initial current account balance. Source: Based on AMECO database.

Table 6: Target2 Balances

|  | Q3.2008 | Peak | Q3.2012 |
|---|---|---|---|
| Austria | -8.7 | -13.1 | -13.1 |
| Belgium | -29.7 | -30.4 | -7.7 |
| Finland | -0.9 | -1.4 | 36.2 |
| France | -2.8 | -6.1 | -0.1 |
| Germany | 4.0 | 27.6 | 26.1 |
| Greece | -6.1 | -52.3 | -52.3 |
| Ireland | -17.1 | -96.2 | -54.6 |
| Italy | 2.5 | 5.4 | -18.0 |
| Luxembourg | 45.6 | 283.7 | 254.1 |
| Netherlands | 1.7 | 25.8 | 20.0 |
| Portugal | -8.2 | -44.0 | -43.5 |
| Spain | -2.2 | -38.8 | -38.0 |

Note: Target2 Flows are from Euro Crisis Monitor dataset. * Based on the IMF's 2012 GDP forecast for Greece. Peak quarters: Austria Q3.2012, Belgium Q4.2008, Finland Q2.2008, France Q4.2008, Germany Q2.2012, Greece Q3.2012, Ireland Q4.2010, Italy Q3.2009, Luxembourg Q2.2012, Netherlands Q1.2012, Portugal Q1.2012, Spain Q2.2012.

Table 7: Stock-Flow Adjustments in NIIP: Euro Area

| | 2002-2007 | | |
|---|---|---|---|
| | ΔNIIP | SUMFLOW | SFA |
| Austria | -8.2 | -10.0 | -18.2 |
| Belgium | 7.6 | -8.6 | -1.0 |
| Euro Area | -9.9 | -1.7 | -11.6 |
| Finland | -7.9 | -19.4 | -27.3 |
| France | -4.8 | 1.1 | -3.6 |
| Germany | 23.4 | -22.3 | 1.1 |
| Greece | -74.1 | 33.3 | -40.8 |
| Ireland | -11.5 | 11.1 | -0.4 |
| Italy | -19.7 | 7.2 | -12.5 |
| Luxembourg | 53.4 | -39.4 | 14.0 |
| Netherlands | 7.7 | -28.9 | -21.2 |
| Portugal | -62.6 | 33.8 | -28.8 |
| Spain | -62.0 | 26.3 | -35.7 |

| | 2007-2011 | | |
|---|---|---|---|
| | ΔNIIP | SUMFLOW | SFA |
| Austria | 13.1 | -11.9 | 1.3 |
| Belgium | 31.0 | 3.5 | 34.5 |
| Euro Area | 0.5 | 2.2 | 2.7 |
| Finland | 38.6 | -5.4 | 33.3 |
| France | -18.6 | 6.9 | -11.6 |
| Germany | 1.3 | -23.0 | -21.7 |
| Greece | 26.3 | 45.5 | 71.8 |
| Ireland | -66.4 | 10.7 | -55.6 |
| Italy | 3.2 | 11.5 | 14.7 |
| Luxembourg | 10.8 | -22.6 | -11.8 |
| Netherlands | 36.4 | -22.4 | 13.9 |
| Portugal | -8.7 | 35.5 | 26.7 |
| Spain | -4.8 | 20.9 | 16.1 |

Note: SUMFLOW and SFA refer to cumulative net financial flow and stock-flow adjustment term respectively (ratios to GDP). Source: Based on IMF BOP data and updated version of Lane and Milesi-Ferretti (2007).

Table 8: Are Stock-Flow Adjustments Stabilising?

|  | (1) EA SFA0207 | (2) EA SFA0711 | (3) EA SFA0711 | (4) ADV SFA0207 | (5) ADV SFA0711 | (6) ADV SFA0711 |
|---|---|---|---|---|---|---|
| α | -15.10*** (3.90) | 6.40 (8.20) | -10.30 (9.50) | -0.15*** (.03) | 0.003 (.07) | -0.06 (.07) |
| SUMFLOW0207 | 0.43** (.16) |  |  | 0.19* (0.10) |  |  |
| SUMFLOW0711 |  | -0.71* (.32) |  |  | 0.89 (-1.20) |  |
| SFA0207 |  |  | -1.35** (.44) |  |  | -0.20 (.37) |
| $R^2$ | 0.40 | 0.24 | 0.49 | 0.10 | 0.09 | 0.003 |
| N | 12 | 12 | 12 | 31 | 31 | 31 |

Note: OLS regressions. EA is euro area 12 sample; ADV is 31 country sample of advanced countries. SFA is stock-flow adjustment; SUMFLOW is cumulative net financial flow. Robust standard errors in parentheses. ***, **, * refer to significance at 1, 5 and 10 per cent levels respectively.

Table 9: Composition of Stock-Flow Adjustments

|  | 2002-2007 | | | 2007-2011 | | |
| --- | --- | --- | --- | --- | --- | --- |
|  | NDEBT | NPEQ | NFDI | NDEBT | NPEQ | NFDI |
| Austria | -7.8 | -2.5 | -7.9 | -5.4 | 4.1 | 1.3 |
| Belgium | 0.3 | 21.9 | -22.5 | -0.1 | -15.3 | 48.4 |
| Finland | 0.0 | -32.3 | 5.4 | -14.5 | 44.7 | -0.2 |
| France | -0.9 | -6.3 | 6.9 | 0.2 | 3.8 | -14.8 |
| Germany | 5.1 | -4.9 | 1.1 | -19.9 | -0.2 | -1.8 |
| Greece | -19.7 | -13.7 | -5.1 | 34.2 | 24.0 | 12.7 |
| Italy | -9.1 | 1.2 | -4.4 | 8.7 | 6.4 | 0.3 |
| Netherlands | -15.3 | -9.0 | 1.5 | -20.1 | 16.6 | 11.2 |
| Portugal | -13.3 | 0.2 | -11.3 | 15.0 | 5.2 | 7.6 |
| Spain | -8.8 | -15.6 | -7.8 | 2.4 | 9.6 | 0.4 |

Note: Stock-flow adjustment terms for net debt, net portfolio equity and net FDI positions. Ireland and Luxembourg not reported, due to impact of international financial centre activity on the composition of international balance sheet. Source: IMF BOP dataset and updated version of Lane and Milesi-Ferretti (2007).

Table 10: Geography of Cross-Border Assets: Intra-Area Shares

|                  | % of GDP | % of Total |
|------------------|----------|------------|
| FDI              | 36.6     | 42.5       |
| Bank             | 50.9     | 46.9       |
| Bonds            | 45.3     | 61.6       |
| Portfolio Equity | 24.6     | 51.0       |

Note: FDI is for 2009 from CDIS database; Bank assets from BIS; Bonds and Portfolio Equity from CPIS.

Table 11: Extra-Area Holdings of Euro Area Residents: Per cent of Total Holdings

|  | FDI Assets | FDI Liabilities | Port. Equity Assets | Port. Debt Assets | Other Assets | Other Liabilities |
|---|---|---|---|---|---|---|
| Other Europe | 37.1 | 38.3 | 26.1 | 39.8 | 49.6 | 54.2 |
| North America | 22.8 | 26.0 | 34.8 | 34.8 | 16.2 | 14.4 |
| China | 1.5 | 0.3 | 2.9 | 0.1 | 0.9 | 1.2 |
| Japan | 1.3 | 2.2 | 5.3 | 3.8 | 2.0 | 1.7 |
| Offshore Financial Centres | 8.8 | 14.4 | 12.7 | 5.5 | 10.4 | 11.5 |
| Rest of World | 28.5 | 18.8 | 18.3 | 15.9 | 20.9 | 17.1 |

Note: Drawn from ECB's IIP dataset.