EURO AREA CROSS-BORDER FINANCIAL FLOWS

Since the introduction of the single currency in 1999 European Monetary Union has played a key role in the process of financial integration, not only within the euro area, but also at the global level. The global financial crisis, which started in mid-2007 and came to a head after the collapse of Lehman Brothers in September 2008, suddenly interrupted the process of steady global financial integration. Against this background, this article reviews the role of the euro area in global cross-border finance both prior to, and since, the global financial crisis.

1 THE ROLE OF THE EURO AREA IN GLOBAL CROSS-BORDER FINANCE

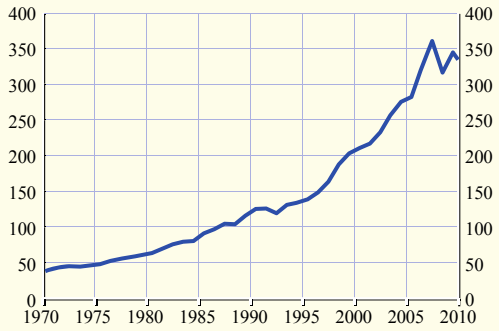
The process of global financial integration manifests itself in steadily rising cross-border financial flows and the accumulation of large and rising foreign assets and liabilities. These can take the form of, for instance, portfolio investment in bonds or equities, foreign direct investment in enterprises, or loans between residents of different countries[1]. Taken together, total cross-border financial flows are thus an aggregate measure of the size of transactions in financial assets, and, more generally, of the intensity of financial linkages between different economies.

Between 1980 and 2007, before the outbreak of the global financial crisis, global foreign assets and liabilities grew sixfold, from around 60% of world GDP to more than 360% of world GDP – corresponding to average annual growth in excess of 10% of world GDP (see Chart 1). Over the same period gross global financial flows grew at an equally fast pace, rising from 6% of world GDP in 1980 to 36% of world GDP in 2007. Although global trade in assets, measured thus, still falls short of trade in goods and services, the latter increased over the same period at a much lower rate, from around 40% of world GDP in 1980 to roughly 50% of world GDP in 2007 (see Chart 2).

1 A more detailed presentation of how international financial flows can be categorised and how they are accounted for in balance of payments statistics is provided in Section 2.

Chart 1 Total outstanding cross-border financial assets and liabilities

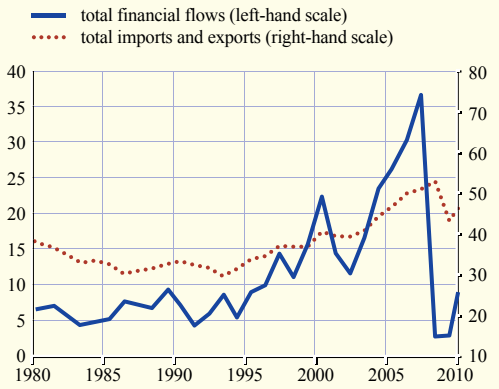
(percentages of world GDP)



Sources: IMF and ECB staff calculations.
Note: Last observation refers to 2010. The data are based on the IMF's International Financial Statistics (IFS), and data gaps in the IFS are filled on the basis of the methodology presented in Lane, P.R. and Milesi-Ferretti, G.M., "The external wealth of nations mark II: Revised and extended estimates of foreign assets and liabilities, 1970-2004", *Journal of International Economics*, Vol. 73, No 2, 2007, pp. 223-250.

Chart 2 Total cross-border financial flows, and total imports and exports of goods

(percentages of world GDP)



Source: IMF World Economic Outlook.
Note: Last observation refers to 2010.

During the global financial crisis world trade in both goods and financial assets collapsed. Global cross-border investment, as measured by global asset and liability financial flows, plunged from over USD 20 trillion (more than 35% of world GDP) in 2007 to around USD 1.5 trillion (less than 5% of world GDP) in the following year (see Chart 2). Since then global cross-border investment has steadily recovered and the annual value of international transactions in financial assets currently exceeds USD 10 trillion. This indicates that the crisis has only temporarily halted the process of increasing financial integration and that the global economy is likely in the future to continue reaping the sizeable benefits that international financial integration can offer for partaking economies (as discussed in more detail in Box 1 of this article).

Box 1

THE BENEFITS AND CHALLENGES ASSOCIATED WITH CROSS-BORDER FINANCIAL INTEGRATION

There is a broad consensus in the literature on international financial integration that global cross-border investment is beneficial to both the investing and the recipient economies, and that, over a longer horizon in particular, the benefits can be sizeable.[1]

First, cross-border holdings of assets and liabilities allow economies to share the risk associated with their individual domestic business cycles.[2] By enabling a country to borrow during economic downturns and to lend in economic upturns, financial openness enhances consumption and income risk-sharing, while reducing the volatility of consumption growth. This counter-cyclical effect of global capital markets on real variables is particularly important, given that shocks tend to be temporary or idiosyncratic. Besides, improved risk-sharing, in turn, enhances the ability of countries to specialise in their most productive sectors, leading to increased economic efficiency.[3]

Second, international financial flows are essential in order to direct global capital to the areas where it can be used most productively. This observation is based on the neoclassical growth model, which predicts that, under the assumption of diminishing marginal returns on capital, capital should flow from economies where its use yields a relatively smaller marginal return to economies where the marginal productivity of capital is higher. The ability to draw upon an international pool of resources, in turn, affects domestic investment and growth, as it allows economies to expand investment and production beyond the constraints imposed by domestic savings. In many emerging economies, the capacity to save is constrained by a low level of income. Net capital inflows can thus supplement domestic savings and increase the level of capital employed, helping the recipient country to raise its rate of economic growth and improve its living standards.[4]

Third, it is often argued that the presence of foreign investors increases the level of productivity in the recipient country, for instance via a concomitant transfer of knowledge that is not accounted for

1 See Kaminsky, G.L. and Schmukler, S.L., "Short-run pain, long-run gain: the effects of financial liberalisation", *NBER Working Paper*, No 9787, 2003.
2 See Fratzscher, M. and Imbs, J., "Risk sharing, finance, and institutions in international portfolios", *Journal of Financial Economics*, Vol. 94, No 3, 2009, pp. 428-447.
3 See Kalemli-Özcan, S., Sorensen, B. and Yosha, O., "Risk Sharing and Industrial Specialization: Regional and International Evidence", *American Economic Review*, Vol. 93, No 3, 2003, pp. 903-918.
4 See Levine, R., "International financial liberalization and economic growth", *Review of International Economics*, Vol. 9, No 4, 2001, pp. 688-702.

in the capital flows themselves.[5] A related point in favour of financial openness is that it can have a beneficial impact on the efficiency of the domestic banking system by increasing the depth and breadth of domestic financial markets and lowering costs associated with oligopolistic markets.[6]

Fourth, there is another indirect effect – or "collateral benefit" – of cross-border financial integration, which emerges as a result of the disciplining forces that financial integration may exert on domestic economic policies and on public and corporate governance.[7] The literature on cross-border investment typically finds that foreign investors are particularly sensitive to information asymmetries and prefer to invest in countries with sound institutions and a stable macroeconomic track record.[8] To the extent that domestic authorities want to reap some of the above-mentioned benefits of financial integration and thus want to attract foreign investment to the domestic economy, financial integration may have a disciplining impact on domestic policy-makers by encouraging them to refocus on stability-oriented and sustainable economic and monetary policies.[9] Given that greater policy discipline translates into greater macroeconomic stability, this in itself leads to faster economic growth – as do the direct effects of financial integration – as emphasised in the recent literature on endogenous growth.

Against the background of the global financial crisis, the role of macroeconomic discipline and stability has recently moved to the centre of public debate and economic research on global financial integration. The reason for this is that, despite the undeniably beneficial effects of financial integration on growth and on general societal welfare in the long run, imbalanced capital flows can also pose considerable challenges and imply significant risks for domestic economies with unsustainable domestic policies that fail to align the objectives of external and domestic stability.

In fact, excessively prolonged and large net capital inflows can have undesirable macroeconomic effects, including rapid monetary expansion and inflationary pressures, and can thus inflate asset prices and fuel credit growth, raising the risk of boom and bust cycles. Financial flows driven by volatile factors such as herding behaviour among investors or the so-called "hunt for yield" can, in an environment of increased risk appetite, lead to a mispricing of financial assets, with the associated risk of sudden adjustments, giving rise to painful consequences for the real economy. At the same time, the impact of such speculative inflows on long-run growth may be minor if such inflows are used to finance speculative or low-quality domestic investments.

Thus the lesson that can be gleaned from the economic literature on financial integration and cross-border capital flows is that balanced and sustainable macroeconomic policies are needed in order to reap the benefits of global financial integration, as they enable countries to attract stable and balanced capital inflows, which are conducive to the long-run growth of the economy.

5 See Kose, M.A., Prasad, E.S. and Terrones, E.M., "Does Openness to International Financial Flows Raise Productivity Growth?", *Journal of International Money and Finance*, Vol. 28, No 4, 2009, pp. 554-580.
6 See Levine, R., "Finance and development: Issues and experience", *Journal of International Economics*, Vol. 37, No 3, 1994, pp. 273-277.
7 See Kose, M.A., Prasad, E., Rogoff, K. and Wei, S-J., "Financial Globalization: A Reappraisal", *IMF Staff Papers*, Vol. 56, No 1, 2009, pp. 8-62.
8 For the role of institutions, see Alfaro, L., Kalemli-Özcan, S. and Volosovych, V., "Capital Flows in a Globalized World: The Role of Policies and Institutions", *NBER Working Paper*, No 11696, 2005; Fidora, M., Fratzscher, M. and Thimann, C., "Home bias in global bond and equity markets: the role of real exchange rate volatility", *Journal of International Money and Finance*, Vol. 26, No 4, 2007, pp. 631-655; and Gelos, R.G. and Wei, S-J., "Transparency and International Portfolio Holdings", *Journal of Finance*, Vol. 60, No 6, 2005, pp. 2987-3020.
9 See "Financial Globalization and Monetary Policy Discipline: A Survey With New Evidence from Financial Remoteness", *IMF Staff Papers*, Vol. 56, No 1, 2009, pp. 198-221.

Moreover, economic policies also need to be carefully aligned with the objective of external sustainability, as the volatility that is inherent in cross-border capital flows can have a significant impact on the volatility of domestic macroeconomic variables in the absence of stability-oriented domestic economic, monetary and exchange rate policies.

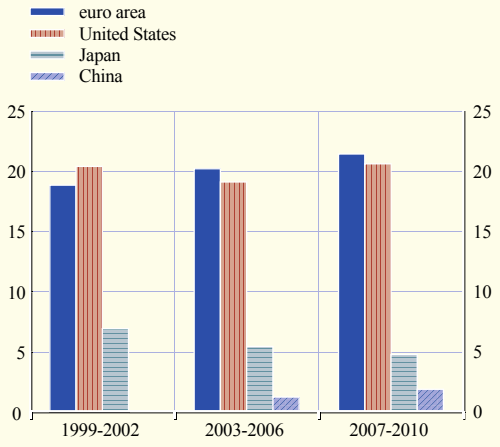
The euro area has played an important role in the rapid expansion of global cross-border finance, facilitating the intensification of financial linkages not only between euro area Member States, but also between the euro area and the world economy. With regard to the former, the catalytic effect of European Monetary Union, which fostered a continuing process of integration in European financial markets and brought about a surge in intra-euro area cross-border investment, is well documented in the literature on financial integration.[2] With the introduction of the single currency, European Monetary Union has also given rise to increased extra-euro area financial flows and a steadily growing euro area share in the global trade of financial assets (see Chart 3).

Conventional measures of financial integration suggest that, of the world's largest economies, the euro area is the one to display the highest degree of financial integration with the rest of the world. Between 2007 and 2010 the euro area accounted for, on average, 21% of the global stock of foreign assets and liabilities, placing it slightly ahead of the United States. While these figures reflect the relatively large share of the euro area and the United States in global economic activity, the stock of euro area foreign assets and liabilities also exceeds that of the United States and other major economies when measured in terms of the economies' GDP (see Chart 4). This pattern is even more pronounced when comparing cross-border financial activity in individual

2 See Lane, P. R., "Global Bond Portfolios and EMU", *International Journal of Central Banking*, Vol. 2, No 2, 2006, pp. 1-23. See also the article entitled "The contribution of the ECB and the Eurosystem to European financial integration", *Monthly Bulletin*, ECB, May 2006, and that entitled "The integration of Europe's financial markets", *Monthly Bulletin*, ECB, October 2003.

Chart 3 Share in world total of foreign assets and liabilities

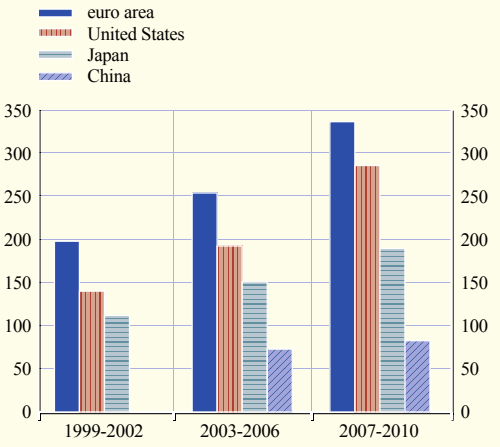
(average percentages of world total)



Sources: IMF, ECB and ECB staff calculations.[1)]
Note: For the euro area, data are net of intra-euro area cross-border investment. For China, data are only available for 2005-2009.
1) See the note in Chart 1.

Chart 4 Foreign assets and liabilities as a share of own GDP

(average percentages of GDP)



Sources: IMF, ECB and ECB staff calculations.[1)]
Note: For the euro area, data are net of intra-euro area cross-border investment. For China, data are only available for 2005-2009.
1) See the note in Chart 1.

economies – both in terms of stocks and flows and with regard to assets and liabilities – with measures of domestic financial activity such as domestic stock market capitalisation, the share of outstanding debt securities, and total turnover in domestic financial markets.

The euro area therefore not only has a prominent role in global financial markets (as implied by its large share in global financial stocks and flows), but also a high degree of integration with global finance (as indicated by the large share of stocks and flows of foreign assets and liabilities in euro area GDP). Taken together, this is indicative of the importance of euro area cross-border financial flows for the assessment of developments in global financial markets, as well as for the analysis of their impact on the euro area financial and real economy.

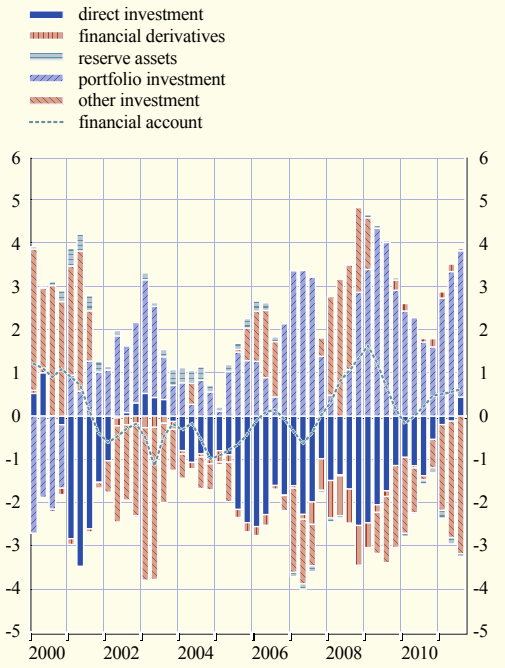
This article reviews the main trends in euro area cross-border finance since the inception of European Monetary Union. Particular emphasis is given to developments since the onset of the global financial crisis in 2007. The article also characterises some of the main drivers of euro area capital flows over the recent past. It then concludes with a discussion of policy implications.

2 TRENDS IN EURO AREA CROSS-BORDER FINANCE

Euro area cross-border financial transactions are summarised in the financial account of the euro area balance of payments (as briefly discussed in Box 2). Since the inception of European Monetary Union the euro area financial account has been stable and, at the same time, broadly in balance. In fact, since 1999, the financial account balance has been averaged 0.1% of GDP and fluctuated within a narrow band of approximately ±1% of GDP (see Chart 5).

Chart 5 Euro area financial account by type of investment

(quarterly flows; four-quarter sum in percentage of GDP)



Source: ECB.
Note: Last observation refers to the third quarter of 2011.

Box 2

THE FINANCIAL ACCOUNT OF THE EURO AREA BALANCE OF PAYMENTS

The economic transactions between the euro area and the rest of the world are accounted for in the euro area balance of payments.[1] In the balance of payments, the sum of the current account balance's capital account balance, which is typically much smaller in the case of most major advanced and emerging economies, equals the financial account balance (subject to errors and omissions),

1 The ECB follows the recommendations of the IMF Balance of Payments Manual in the compilation of its external statistics.

which includes all external transactions involving financial capital.[2] In the particular case of the euro area balance of payments, the transactions recorded are only those that involve the rest of the world, i.e. intra-euro area transactions are excluded. The transactions recorded are typically divided into five sub-components: direct investment, portfolio investment, financial derivatives, other investment and reserve assets.

First, direct investment reflects the objective of a resident entity in one economy to obtain a lasting interest in an enterprise resident in another economy. A lasting interest implies both the existence of a long-term economic relationship and a significant degree of influence on the management of the enterprise on the part of the direct investor. In line with international standards and best practices, as laid out in the IMF's Balance of Payments Manual, foreign direct investment is comprised of transactions where an acquiring entity has obtained a stake of at least 10% in the target enterprise.

Second, portfolio investment includes transactions in debt and equity securities, except those included in direct investment and reserve assets (see below).

Third, financial derivatives are financial instruments linked to a specific underlying asset or underlying index. The most common types of financial instruments included in the financial derivatives item are options, futures, swaps, forward foreign exchange contracts and credit derivatives.

Fourth, the reserve assets of the euro area consist of the Eurosystem's holdings of foreign assets, i.e. the ECB's reserve assets and the reserve assets held by the national central banks of euro area Member States. These comprise monetary gold, Special Drawing Rights, the reserve position in the International Monetary Fund, foreign exchange assets (consisting of currency and deposits, as well as securities) and other claims.

Fifth, "other investment" refers to a residual category that comprises all external financial transactions that are not included in the aforementioned sub-components of the financial account and do not reflect changes in the reserve assets of the euro area. Most notably, it includes cross-border loans and deposits, as well as trade credit and other assets or liabilities.

2 For the sake of simplicity and following general usage in the economic literature, both "financial flows" and "capital flows" are used throughout the article to refer to transactions in the financial account.

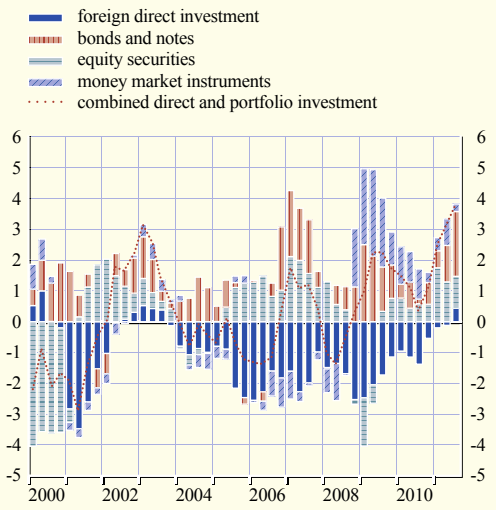
The main source of funding for the euro area has typically been portfolio investment. Since 2001 the euro area has, without interruption, been a net importer of portfolio investment, in both debt securities (in the form of bonds, notes and money market instruments), reflecting the size and depth of euro area debt securities markets, and equity securities (see Charts 5 and 6).

At the same time, the euro area has typically been a net exporter of foreign direct investment, mostly in the form of equity capital and, to a lesser extent, re-invested earnings and other capital, the latter consisting mainly of inter-company loans.

The general pattern of net foreign direct investment outflows offsetting net portfolio investment inflows is a common characteristic of advanced economies' cross-border financial flows. The reasons for this are as follows. First, advanced economies offer security markets that are large and deep enough to attract sizeable portfolio investment inflows. Second, investors from advanced economies often prefer direct investment – granting immediate ownership and

Chart 6 Euro area combined direct and portfolio investment

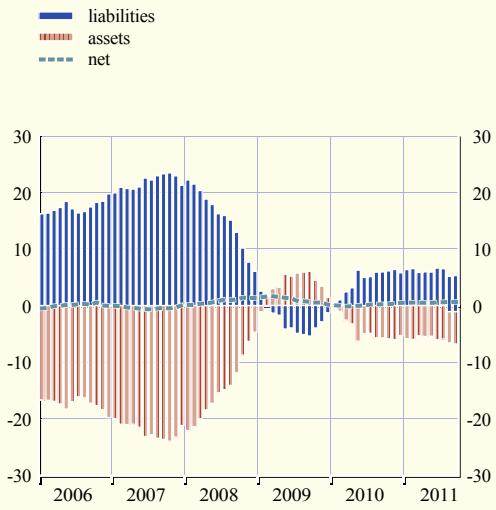
(quarterly flows; four-quarter sum as a percentage of GDP)



Source: ECB.
Note: Last observation refers to the third quarter of 2011.

Chart 7 Euro area asset and liability financial flows

(monthly flows, 12-month cumulated as a percentage of GDP)



Source: ECB.
Note: Last observation refers to September 2011.

control over a firm – to portfolio investment in emerging economies, which tend to have less deep financial markets and a less developed institutional framework, with poorer public and corporate governance.[3] In addition, foreign direct investment often forms part of the market penetration strategies of large multinational firms with headquarters in advanced economies.

While financial derivatives and official reserves typically account for only a small fraction of the financial account, the residual component of "other investment" is typically large and volatile. This is mostly a reflection of the nature of the euro area banking sector activities involving loans, currency and deposits.

3 DRIVERS OF EURO AREA FINANCIAL FLOWS SINCE THE CRISIS

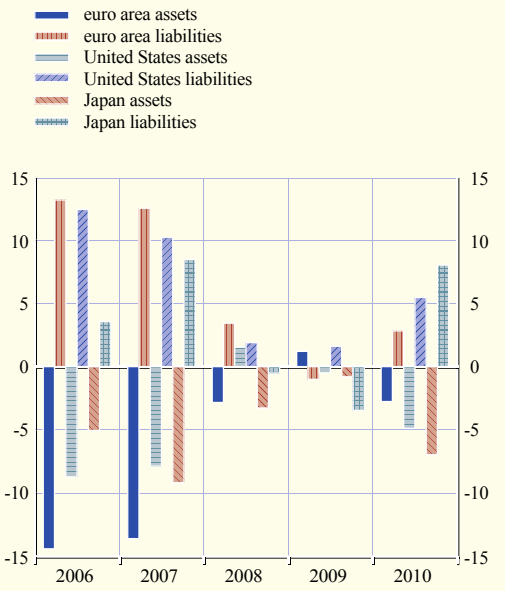
Although the general patterns of net financial flows have not changed dramatically during the global financial crisis, the stability of the net financial account and its breakdown according to instrument masks significant changes in asset and liability cross-border financial flows and their sectoral composition. In this respect, the recent financial retrenchment serves to highlight three important aspects that need to be taken into account in the analysis of cross-border financial flows. First, asset and liability flows can be far larger than net flows. Second, external financial flows can be volatile and easily reversible. And third, balanced net flows may mask the gradual build-up of macroeconomic imbalances and financial risks as the parallel growth of assets and liabilities in relation to GDP increases the vulnerability of a country to abrupt changes in financial market conditions and to adverse wealth and balance sheet shocks.

Following the emergence of the first period of financial market turbulence which marked the onset of the global financial crisis in 2007, euro area asset and liability financial flows fell sharply, from 20% of GDP to less than 5% of GDP in 2008, and global investors – both in the euro area and in other major economies – repatriated foreign investments in net terms in 2009 (see Chart 7).

3 See also Daude, C. and Fratzscher, M., "The pecking order of cross-border investment", *Journal of International Economics*, Vol. 74, No 1, 2008, pp. 94-119.

Chart 8 Asset and liability financial flows of selected advanced economies

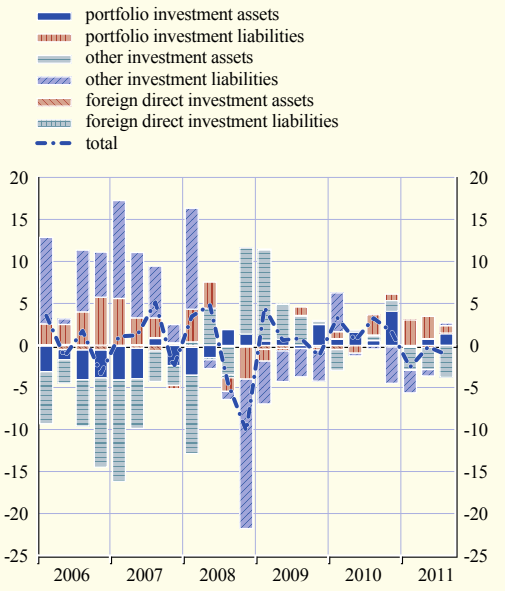
(annual flows as a percentage of own stock)



Sources: Haver and ECB staff calculations.

Chart 9 Financial account of the euro area MFIs

(quarterly flows; percentages of GDP)



Sources: ECB and ECB staff calculations.
Notes: Last observation refers to the third quarter of 2011. Financial derivatives are excluded.

Although a resumption of capital flows has since led to an increase in both global and euro area cross-border financial flows, global cross-border financial activity still remains far below the pre-crisis levels prevailing prior to the retrenchment of global financial flows during 2008 and 2009 (see Chart 8).

The deleveraging process also involved a significant restructuring of euro area banks' balance sheets, which resulted in a reduction in cross-border lending on the part of the euro area banking sector. Banks decreased their assets held abroad, while their liabilities vis-à-vis foreign investors declined. This was particularly the case in the last quarter of 2008, immediately after the collapse of Lehman Brothers, as reflected in the reduction in other investment liabilities – mostly deposits and loans – by more than 20% of euro area GDP (see Chart 9).

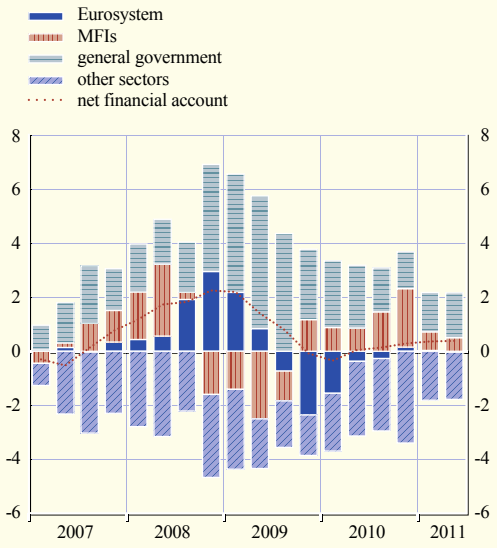
Further extraordinary circumstances amplified the reduction in asset and liability cross-border investment. First, liquidity shortages resulting from the breakdown of the interbank and asset-backed securities markets initially triggered significant sales of other assets as global investors endeavoured to raise liquidity. Second, heightened uncertainty and asymmetric information between lenders and borrowers resulted in a sudden rise in risk aversion, and it is likely that this led to herd behaviour among international investors. As a result of the liquidity shortage in the global banking sector, euro area banks went from being net borrowers to being net lenders in the last quarter of 2008 and for most of 2009 (see Chart 10).[4]

The deleveraging of the banking sector was accompanied by an increase in the leveraging of euro area governments, which acted as a substitute for private leverage during the global financial crisis (see Chart 10).

4 See also Forster, K., Vasardani, M. and Ca' Zorzi, M., "Euro area cross-border financial flows and the global financial crisis", *Occasional Paper Series*, No 126, ECB, Frankfurt am Main, July 2011.

Chart 10 Euro area financial account by sector

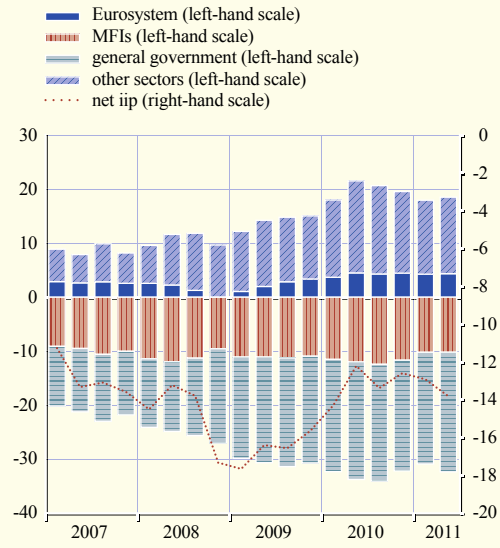
(quarterly flows; four-quarter sum as a percentage of GDP)



Sources: ECB and ECB staff calculations.
Notes: Last observation refers to the second quarter of 2011. Financial derivatives are excluded.

Chart 11 Euro area net international investment position (iip) by sector

(quarterly end-period outstanding amounts as a percentage of GDP)



Sources: ECB and ECB staff calculations.
Notes: Last observation refers to the second quarter of 2011. Financial derivatives are excluded.

On account of the rising funding needs of euro area governments due to automatic stabilisers, and on account of the fiscal stimulus packages that were implemented in response to the global financial crisis, the general government sector's net financial account, i.e. public net external borrowing, rose from about 2% of GDP in the years prior to the crisis to over 4% of GDP in the last quarter of 2008 and the first three quarters of 2009 (see Chart 10). The increase in the leverage of the euro area government sector – reflected in rising portfolio investment inflows absorbing part of the issuance of euro area government debt – and the temporary extension of foreign currency swap lines in coordination with foreign monetary authorities were the main factors behind the moderate increase in the financial account balances during the global financial crisis. Furthermore, the subsequent reversal, reflecting the fiscal consolidation measures, reduced the funding needs of the euro area government sector.

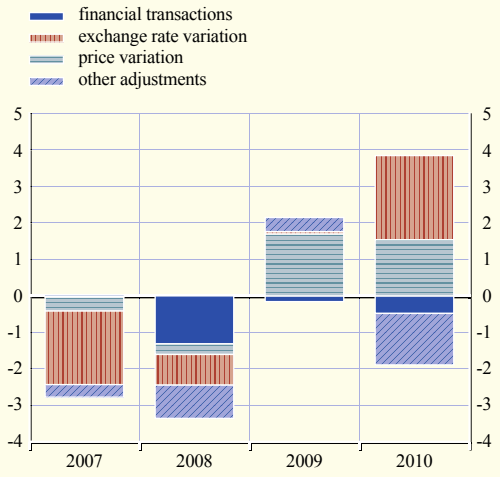
The temporary increase in net inflows to the euro area also led to the euro area's international investment position, which comprises external assets and liabilities, recording a temporary increase in the net liability position. This development was mainly accounted for by the increase in the general government sector's net liability position of almost 10% of GDP, which was only partly offset by an increase in the net asset position of "other sectors" (see Chart 11).[5] Since 2009 the euro area's international investment position has moved closer to its pre-crisis levels on account of the slowdown in net inflows to the euro area, the depreciation of the euro in 2010 – which increased the value of non-euro-denominated foreign assets – and the relatively weaker equity market performance in the euro area compared with the rest of the world (see Chart 12).

The overall stability of euro area net cross-border financial flows and the euro area's international investment position nevertheless

5 Other sectors include non-financial corporations, financial corporations other than MFIs – i.e. investment funds, insurance corporations, pension funds and other financial corporations – and households.

Chart 12 Breakdown of changes in the euro area international investment position

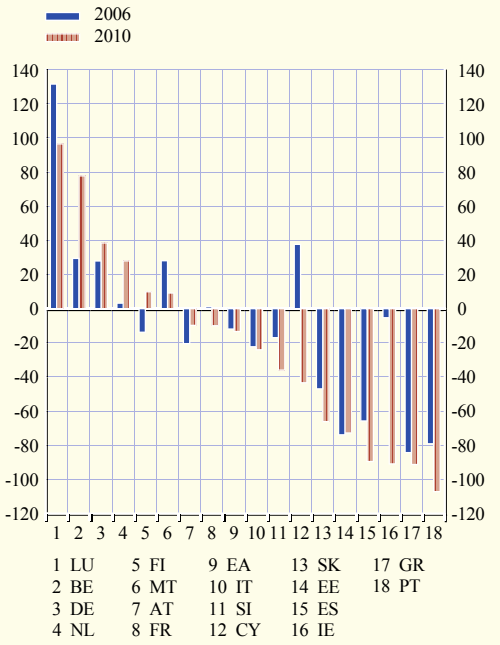
(annual flows; percentages of GDP)



Source: ECB.
Note: Last observation refers to 2010.

Chart 13 International investment position of euro area countries in 2006 and 2010

(percentages of GDP)



Source: ECB.
Note: Countries are positioned according to their international investment position as a percentage of own GDP in 2010.

masks significant heterogeneity across individual euro area countries (see Chart 13). Some euro area countries have been net capital exporters in recent years, while other euro area countries have exhibited large and persistent funding needs and have been net capital importers over a prolonged period. In the case of some countries, persistent net financial inflows have also been a reflection of protracted periods of strong growth in domestic demand leading to overly optimistic expectations of future income and profits. This development has often been accompanied or intensified by imbalanced domestic policies and, in particular, an insufficiently tight fiscal stance that has ultimately undermined the long-run growth potential and triggered a progressive loss in competitiveness.

As a result, the net international investment position of some euro area countries has worsened further in recent years, giving rise to growing concerns in global financial markets about the funding needs of such countries, with tensions intensifying further since the first half of 2010, when risk aversion re-emerged and volatility in financial markets increased.

Events during the crisis have shown that capital flows can react quickly to adverse shocks. Specifically, episodes that lead to uncertainty can generate rapid changes in investment sentiment, which may manifest themselves in sudden swings. Although the global economic and financial outlook was initially the main factor affecting the dynamics of euro area cross-border flows, country-specific risk factors have steadily gained in importance. This was, for instance, demonstrated in early 2010, when cross-border financial flows into euro area debt instruments declined as the tensions in some financial market segments re-emerged. With a view to gaining further insight into the impact of risk aversion on the dynamics of capital flows, Box 3 draws on an analysis of correlations between capital flows and measures of risk aversion during the crisis, as well as other potential drivers.

Box 3

THE ROLE OF RISK AVERSION IN EURO AREA CAPITAL FLOWS SINCE THE CRISIS

The existence of a large body of literature on the determinants of international financial flows is not surprising, given that financial integration and cross-border capital flows are typically found to play an important role in promoting investment and growth in domestic economies participating in the international trade of assets (as discussed in Box 1 of this article).[1] At the same time, the volatility of financial flows over recent decades, and especially during periods of heightened financial tension, has further spurred academia's interest in the determinants of cross-border financial flows. More recently the literature has devoted increasing attention to the determinants behind different "waves" of financial flows, identified as either "stops", "surges", "flights" or "retrenchments" depending on their direction and origin – i.e. from or to the domestic economy or abroad.[2]

However, the focus of the literature has typically been on longer samples of data, given the long-run nature of the process of financial integration. Here, therefore, in order to assess the determinants of euro area cross-border financial flows over the relatively short period of time that has elapsed since the crisis erupted, a methodology has been used that tries to capture time-varying factors that have affected euro area cross-border capital flows at different stages of the crisis.

The quantification of the time-varying impact of different drivers on net portfolio flows of the euro area is based on a model in which the regression coefficients are allowed to change in each period. Time-varying regression coefficients are used to capture possible changes in market sentiment, since the focus of market participants changes over time, as, therefore, do the determinants of portfolio flows.[3]

More specifically, monthly euro area net portfolio investment and net other investment flows are modelled on the basis of the following reduced-form regression equation:

$$y_t = \sum_{i}^{n} \beta_{i,t} x_{i,t-1} + \varepsilon_t,$$

where the variable y_t corresponds to net portfolio investment or, alternatively, net other investment, four variables x_{it} correspond to (i) an index of implied volatility in stock markets proxying for the degree of global risk aversion, (ii) the yield differential between euro area government bond yields and an aggregate measure of non-euro area advanced economies' government bond yields, (iii) the change in the effective exchange rate of the euro, and (iv) the difference in growth of industrial production between the euro area and non-euro area advanced economies proxying for fundamentals affecting the state of the real economy.

1 The literature on the determinants of cross-border financial flows is too extensive to give a complete overview here. In addition to those cited elsewhere in this article, some insightful contributions include: Ahearne, A.G., Griever, W.L. and Warnock, F.E., "Information costs and home bias: an analysis of U.S. holdings of foreign equities", *Journal of International Economics*, Vol. 62, No 2, 2004, pp. 313-363; Chan, K., Covrig, V. and Ng, L., "What Determines the Domestic Bias and the Foreign Bias? Evidence from Mutual Fund Equity Allocations Worldwide", *Journal of Finance*, Vol. 60, No 3, 2005, pp. 1495-1534; and Rey, H. and Oh, Y., "Information and Capital Flows: The Determinants of Transactions in Financial Assets", *European Economic Review*, Vol. 45, No 4, 2001, pp. 783-796.

2 See, for example, Forbes, K. and Warnock, F., "Capital Flow Waves: Surges, Stops, Flight and Retrenchment", *NBER Working Paper*, No 17351, 2011.

3 For a detailed description of the methodology and how it applies to emerging economies' capital flows, see the special feature entitled "Portfolio flows to emerging market economies: determinants and domestic impact", *Financial Stability Review*, ECB, Frankfurt am Main, June 2011.

The degree to which net portfolio investment and net other investment flows respond to changes in each of their determinants, i.e. β_{it}, is in turn allowed to change over time in response to possible changes in market sentiment not explained in the model.[4]

$$\beta_{i,t} = \beta_{i,t-1} + \mu_{i,t}.$$

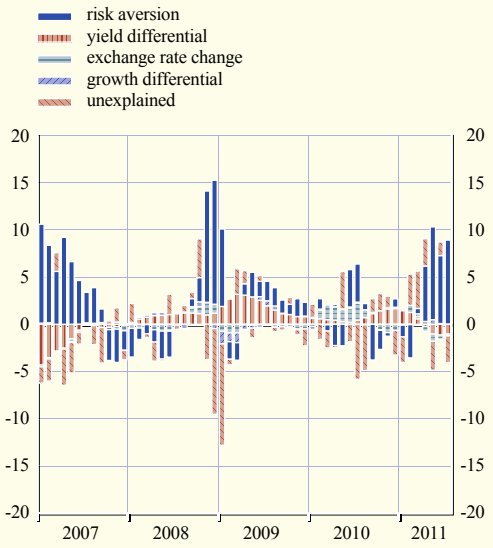
The resulting estimated responses of portfolio and other investment flows to their determinants can then, together with the actual changes in the determinants themselves, be transformed into contributions to the overall change in flows on the basis of the reduced-form model. In the absence of a structural model based on microeconomic foundations, these contributions can be interpreted econometrically as time-varying conditional correlations between net portfolio investment and net other investment flows and their determinants.

The central finding of the model-based analysis is that, since the onset of the global financial crisis, risk aversion has been the key driver of euro area financial flows. Notably, the impact of risk aversion on the direction of euro area financial flows has been changing throughout the different stages of the crisis. Other determinants of euro area cross-border financial flows that normally tend to be their main drivers, such as exchange rate developments and interest rate differentials, have, in contrast, only played a minor role. To some extent, however, the differential between the yield of euro area government bonds and that of other major advanced economies (in particular the United States), which has generally been positive since the onset of the crisis, has supported net financial inflows to the euro area (see Charts A and B).

4 The model can be estimated on the basis of Kalman filtering via maximum likelihood, as suggested in Kim, C-J. and Nelson, E., *State Space Models with Regime Switching: Classical and Gibbs-Sampling Approaches with Applications*, MIT Press, 1998, or alternatively by using Bayesian methods.

Chart A Net portfolio investment – estimated determinants

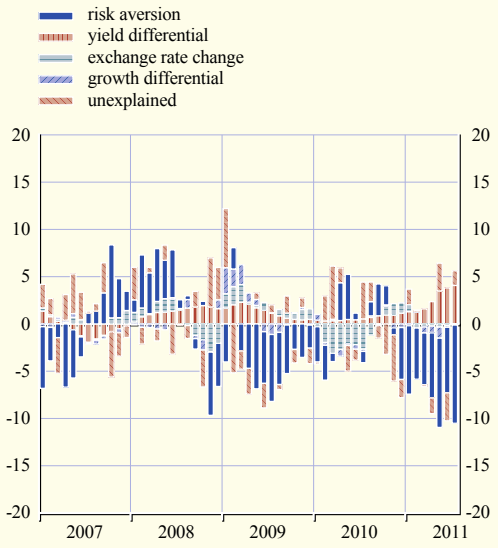
(percentages of GDP; three-month cumulated flows)



Source: ECB staff calculations.
Note: Last observation refers to July 2011.

Chart B Net other investment – estimated determinants

(percentages of GDP, three-month cumulated flows)



Source: ECB staff calculations.
Note: Last observation refers to July 2011.

As regards portfolio investment, the model associates the higher capital inflows recorded at the end of 2008 with the substantial increase in risk aversion in the aftermath of the Lehman Brothers failure (see Chart A). Thus, according to the model, risk aversion at the beginning of the crisis generally contributed to net inflows to the euro area, probably because the main source of risk was at that time perceived to be outside the euro area, making it a safe haven for both domestic and global investors.

In 2009 the re-intensification of financial market tensions, particularly in Europe, as evidenced in the renewed increase in risk aversion, seems to have supported a gradual reduction of portfolio investment inflows to – and later net portfolio investment outflows from – the euro area, probably as a result of strains in the sovereign debt markets of some countries becoming the centre of attention (see Chart A).

From 2010 to mid-2011 the model associates risk aversion with an overall surge in sizeable net portfolio inflows to the euro area. This could well reflect safe-haven flows from foreign investors to (sovereign) debt securities issued by core euro area countries (see Chart A). At the same time, risk aversion continues to support net outflows of other investment, a residual component mainly comprising transactions involving the euro area banking sector (see Chart B).

4 CONCLUSIONS

The current crisis has led to significant changes in the patterns of cross-border financial flows. These changes – prompted by sudden swings and increased volatility – have led to increased attention being paid to cross-border financial flows and a recognition of their importance for macroeconomic and financial stability in both advanced and emerging economies.[6] The following conclusions emerge from the analysis carried out in this article.

First, the build-up of imbalances should be carefully monitored, with particular attention being paid to deficits – which may go hand in hand with funding problems and currency crises – but also to surpluses, as they can be associated with credit and housing price booms to the extent that these are fuelled by speculative gross capital inflows.

Second, the size of asset and liability financial flows and positions matters even in the absence of large and persistent funding needs, i.e. in countries that have relatively balanced current accounts. Asset and liability financial flows or positions that are sizeable in terms of a country's economic activity may signal the potential for high exposure to spillovers from abroad. Furthermore, countries with a very high degree of financial openness are more exposed to periods of higher tension in the financial markets, leading to retrenchment behaviour or even the repatriation of foreign investment capital. The limited access to international capital markets resulting from this can rapidly lead to liquidity shocks and a sudden fall in asset prices, especially in busts, with significant negative consequences for the real economy.

Third, within the euro area, sector and country-specific factors need to be given due consideration. Notably, domestic imbalances should be closely monitored in order to identify possible vulnerabilities that are not apparent at the euro area level.

Finally, the crisis has also provided some lessons in macroeconomic discipline. The reason for this is that, despite the undeniably beneficial effects of financial integration on growth and on general societal welfare in the long run, imbalanced capital flows imply significant

6 See also Forster, K., Vasardani, M. and Ca' Zorzi, M., op. cit.

risks for economies whenever they are coupled with unsustainable domestic policies. Balanced and sustainable macroeconomic policies are a prerequisite if countries are to reap the benefits of global financial integration, as they enable countries to attract stable and balanced capital inflows, which are conducive to the long-run growth of the economy. Moreover, economic policies need to be carefully aligned with the objective of external sustainability, as the volatility that is inherent in cross-border capital flows can have a significant impact on the volatility of domestic macroeconomic variables in the absence of stability-oriented domestic economic policies.