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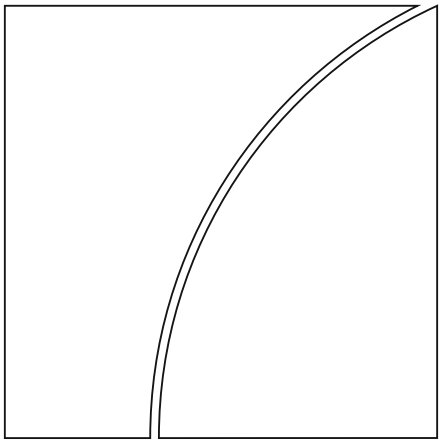

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Financial crises and bank funding: recent experience in the euro area

by Adrian van Rixtel and Gabriele Gasperini

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JEL classification: G01, G21.

Keywords: euro area, financial crisis, bank funding, renationalisation, secured issuance, debt retention.

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Financial crises and bank funding: recent experience in the euro area

Adrian van Rixtel and Gabriele Gasperini[1]

Abstract

This paper provides an overview of bank funding trends in the euro area following the 2007–09 global financial crisis and the euro area crisis. It shows that funding has become segmented along national borders and that secured instruments are much more prevalent than previously. Rising debt retention by euro area banks has accompanied greater dependence on liquidity provided by the ECB.

JEL classification: G01, G21.

Keywords: euro area, financial crisis, bank funding, renationalisation, secured issuance, debt retention.

[1] Monetary and Economic Department, Bank for International Settlements. We would like to thank Claudio Borio, Robert McCauley, Martin Hood and Christian Upper for helpful comments. All remaining errors are ours. The views expressed here are the authors' and do not necessarily reflect those of the BIS.

Contents

1. Introduction

Banks fund themselves through a wide range of financial instruments, from both retail and wholesale sources. Accounting for most of the former sources are customer deposits, predominantly from households. The latter consists broadly of funding from private markets, used to supplement customer deposits in financing bank operations (IMF (2012)). On the short end, wholesale funding includes interbank loans, with a prominent role for short-term US dollar funding and other short-term debt, most notably repurchase agreements (repos) and commercial paper (CP), as well as certificates of deposit. At longer maturities, banks issue medium-term notes (MTNs) and bonds. In addition to deposit and wholesale funding, banks can access central bank liquidity and raise capital, much of which consists of equity.

During the past few decades, the composition of bank funding has changed significantly owing to various structural developments. First, financial markets and banks became strongly interconnected (Borio (2009), Boot and Thakor (2010); CGFS (2010c), Song and Thakor (2010)). Banks improved their risk-hedging abilities through financial markets and opened new avenues of funding, such as the "originate-to-distribute" securitisation model. Second, the rapid growth of investment banking activity, both by pure investment banks and universal banks, led to a growing reliance on wholesale funding, especially at short maturities (Merck et al (2012)). Third, financial globalisation let banks tap funding markets beyond national borders, promoting the rapid growth of international interbank US dollar markets on which banks from various countries became heavily dependent (McGuire and von Peter (2009); Fender and McGuire (2010a and b)). In all of this, changes to supervisory and regulatory frameworks often played a crucial role.

The funding pattern that emerged from these structural changes underwent unprecedented dislocations during the 2007–09 global financial crisis. This acted as a catalyst for major adjustments in banks' business and funding models – adjustments that, in many cases, were reinforced by the subsequent euro area crisis. While the 2007–09 episode was predominantly a banking crisis, the euro area's problems have centred on strongly interconnected sovereign and banking crises.

This paper investigates the development of bank funding within the euro area in the context of these two major crises. Experience over this period shows that, when financial markets are severely stressed, even highly rated banks can struggle to access wholesale funding markets, including those for secured financing.

Our analysis points at the following key trends in the main funding segments of euro area banks. First, banks reduced their interbank unsecured liabilities and securitisations. As a corollary, they relied more on secured sources of financing, in particular covered bonds, which have become the main instrument of longer-term wholesale funding for the banks of several euro area countries. Second, direct and indirect funding support from both governments and the Eurosystem has been crucial in stabilising funding conditions during episodes of severe market stress. Third, at the height of the crisis, funding markets in the euro area became increasingly segmented according to bank nationality, as the access of banks to specific funding instruments was no longer determined primarily by their standalone credit rating but by their country of origin. Fourth, various institutional investors that had become important sources of funding for euro area banks, such as US money market funds, sharply reduced their exposure as the crisis deepened. Finally, an increasing fraction of bank debt from the most crisis-hit countries has

been retained by the issuing banks. In several episodes of extreme market turbulence, banks retained most of their bond issuance, as the investment appetite of their traditional investor base had faded and the bonds were eligible as collateral for ECB liquidity operations.

The structure of this article is as follows. Section 2 provides a brief overview of the interconnection between financial crises and bank funding (2.1) and a classification of financial crises (2.2). In addition, it describes how the 2007–09 global banking crisis affected bank funding structures (2.3) and summarises the findings of recent empirical research on this topic (2.4). Section 3 gives background information on the euro area financial crisis. Section 4 discusses developments in various sources of funding in relation to the crisis, ie customer deposits (4.2), short-term (4.3) and long-term (4.4) wholesale funding, ECB liquidity (4.5) and bank capital (4.6). Section 5 concludes.

2. Financial crises and bank funding

2.1. How crises and funding are interconnected

Financial crises and developments in bank funding are strongly intertwined, as weaknesses on the asset side of banks' balance sheets tend to trigger funding problems (Borio (2009)). Ultimately, these strains expose growing problems in the quality of the underlying assets, leading to fire sales of assets which accelerate declines in asset prices, resulting in further balance sheet pressures. Throughout this process, funding liquidity crises can exacerbate solvency concerns. These tensions feed on imbalances in bank funding structures, such as excessive recourse to debt financing that is reflected in historically high degrees of leverage. As the increase in debt often finances expansion into riskier business areas, this spills over into a deterioration of the quality of bank assets. If it goes unchecked, the process may lay the foundation for future financial crises and severe dislocations in bank funding markets.

Experience shows that many financial crises have been characterised by major currency and maturity mismatches between banks' assets and liabilities, while in others a prominent role has also been played by large off-balance sheet exposures in the banking sector (Laeven and Valencia (2008); Reinhart and Rogoff (2009); Karim et al (2012)). In numerous cases, these mismatches were of systemic proportions and helped to propagate shocks across countries, exposing shortcomings in existing measures of system-wide funding risk (Fender and McGuire (2010b)).

2.2. A classification of financial crises

Financial crises may be categorised into banking, currency and sovereign debt crises. Recent research showed that, for a large sample of both mature and emerging market economies during the 1970–2011 period, currency crises occurred most frequently, (218), followed by banking crises (147) and sovereign debt crises (66).

The links between financial crises and bank funding may be strongest during banking crises. Such crises tend to arise primarily from deteriorating economic

fundamentals, notably declines in asset quality (Borio and Lowe (2002, p 44)). Banking crises often originate in credit-induced asset price boom-bust cycles, during which banks build up large exposures to specific asset classes such as real estate or equity. During the bust, plummeting asset prices lead to a sharp rise in non-performing loans, thus eroding the banking sector's financial strength. Examples of important banking crises – which are all related to shocks originating from the real estate sector – are the Nordic and Japanese crises of the 1990s and the 2007–09 global crisis (for the former, see van Rixtel (2002)).

Banking crises have been amplified by banks' overreliance on specific sources of financing. With the growing diversification and complexity of funding instruments, the variety of channels through which these imbalances may develop into systemic banking crises has greatly increased. These vulnerabilities relate to the composition of funding in terms of type of instrument, maturity and currency. The 2007–09 global banking crisis showed the shortcomings of business models that depended disproportionately on short-term wholesale funding, such as those adopted by Northern Rock in the United Kingdom and Bear Stearns and Lehman Brothers in the United States. The crisis revealed particularly serious problems with funding instruments in the realm of structured finance and the quality of the underlying assets, which included asset-backed commercial paper (ABCP) and mortgage-backed securities (MBS) (Borio (2008); Criado and van Rixtel (2008); Van Rixtel and Criado (2010)). It also helped to trigger a shift towards more stable sources of bank funding.

The overreliance of banks on specific funding sources has also been implicated in currency crises – as characterised by large declines in exchange rates and foreign reserves. A case in point is the 1997–98 East Asian crisis (World Bank (1998)). This episode was precipitated partly by domestic banks' sudden loss of access to large-scale, short-term borrowing in foreign currency that had been insufficiently hedged in terms of both maturity transformation and currency risk (Lamfalussy (2000)). The resulting banking and currency crises exposed major problems in the banking systems of countries hit by exchange rate depreciations.

The sovereign debt crisis, our third main category of financial crisis, is at the centre of our exposition. Since the first quarter of 2010, sovereign debt tensions and their spillovers into banks and funding markets have dominated financial and economic developments in the euro area. Events have thrown into stark relief the strong two-way interaction between government finances and banks (Caruana (2011); Caruana and Avdjiev (2012); Caruana and van Rixtel (2012)). Sovereign risk may affect bank funding through several channels (CGFS (2011a)). First, many banks hold significant amounts of predominantly domestic sovereign bonds on their balance sheets and these large exposures may easily lead to valuation losses and solvency concerns when sovereign yields rise sharply. Second, sovereign debt serves as collateral for various financial transactions, including private repos. Sovereign tensions may result in lower collateral values, due to larger haircuts or margin requirements, which effectively reduce the ability of banks to obtain funding. Third, sovereign downgrades may spill over to banks, affecting both their access to funding and its cost, while reducing the funding benefits they derive from implicit and explicit government guarantees.

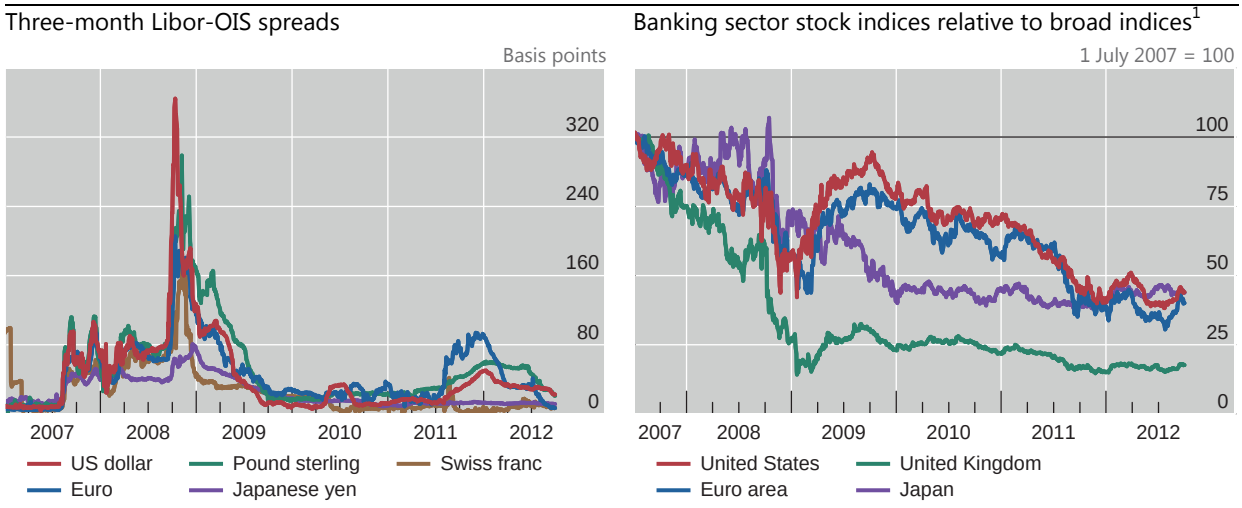
In the next section we focus in more detail on the 2007–09 global banking crisis, and its role as a catalyst for changes in bank funding models (Merck et al (2012)).

2.3. The 2007–09 global banking crisis and its impact on funding

During the global banking crisis, banks experienced unprecedented shocks to their funding models, in terms of both market access and cost. Large internationally active banks had built up considerable maturity and currency mismatches between assets and liabilities, exposing them to major vulnerabilities (CGFS (2010a)). In particular, investment banking-oriented institutions had significantly leveraged up their funding structures (FCIC (2011); Kalemli-Ozcan et al (2012)); mainly through short-term wholesale funding from repo and commercial paper (CP) markets. Hence, strong growth in total assets was supported by relatively low levels of equity. Banks had also resorted to other volatile funding sources on the "originate-to-distribute" model, such as direct loans sales and securitisation (Brunnermeier (2009); Van Rixtel and Criado (2010)).

In the summer of 2007, tensions from the US subprime mortgage markets spilled over to banks' short-term wholesale funding markets, causing liquidity conditions to deteriorate rapidly, particularly for highly leveraged banks. Contagion through the interconnectedness of major global banks and their funding models led to sharp and unprecedented increases in interbank spreads (Graph 1, left-hand panel). European banks experienced severe difficulties in obtaining US dollar liquidity. Moreover, highly leveraged US investment banks were hit by severe dislocations in their predominantly short-term debt funding markets (Adrian and Shin (2010)). The failures of Bear Stearns and Lehman Brothers in March and September 2008 were precipitated when investors lost confidence in their business models and the firms were shut out of these markets. These problems were not limited to US investment banks, as exemplified by the demise of Northern Rock in the United Kingdom with its dependence on short-term wholesale financing (Shin (2009)). With solvency concerns on the rise, bank share prices tumbled across the globe (Graph 1, right-hand panel).

Indicators of bank stress — Graph 1



[1] Simple average across major banks; for the United States, Bank of America, Citigroup, JPMorgan Chase, Goldman Sachs, Morgan Stanley; for euro area, Banco Santander, BNP Paribas, Crédit Agricole, Deutsche Bank, ING Group, Société Générale, UniCredit SpA; for the United Kingdom, Barclays, Lloyds, HSBC, RBS; for Japan, Mitsubishi UFJ, Mizuho, Sumitomo Mitsui.

Sources: Bloomberg; Datastream; authors' calculations.

The disruptions in short-term funding markets prompted central banks worldwide to provide unprecedented amounts of funds. Indeed, central bank liquidity became a major source of wholesale funding. At the same time, governments across the globe provided support through a range of measures, including capital injections, guaranteed issuance programmes for bank bonds and higher deposit insurance ceilings. The crisis led many banks to adjust their funding models towards more stable sources, with an increasing reliance on customer deposits, while reducing their recourse to short-term debt (ECB (2009); Merck et al (2012)). International banks also gradually started to increase funding through local sources of financing in the foreign markets where they operate (CGFS (2010b)).

2.4. Recent empirical research on the 2007–09 crisis and bank funding

An increasing body of empirical studies suggests that banks that relied more heavily on deposit funding fared better in the global financial crisis than those more dependent on other sources. Deposit-funded banks continued to lend during the crisis relative to other banks, showed better overall performance and were less risky (Ivashina and Scharfstein (2010); Demirguç-Kunt and Huizinga (2010); Raddatz (2010); Cornett et al (2011); Beltratti and Stulz (2012); Dagher and Kazimov (2012); Vasquez and Federico (2012)). Providers of short-term wholesale funding may have little incentive to monitor banks and instead may simply withdraw their funds at the first negative market signal regarding the client bank's financial health, thus triggering immediate funding tensions (Bologna (2011); Huang and Ratnovski (2011)). This funding behaviour seems to be the most relevant systemic factor across a set of large international banks in general and those from the euro area in particular (López-Espinosa et al (2012)). In the same vein, the degree of dependence on sources of funding other than deposits and equity has significant predictive power for various types of financial crises (Hahm et al (2012)).

In addition, there exists considerable academic support for the view that innovations in bank funding instruments contributed to the 2007–09 crisis. For example, securitisation undercut the credit standards of both bank and non-bank lenders, reduced the incentives of lenders to carefully screen borrowers and increased loan delinquency rates, while at the same time hiding increases in de-facto leverage (Mian and Sufi (2009); Keys et al (2010); Dell'Ariccia et al (2012); Nadauld and Sherlund (2012)). More broadly, financial innovation interacting with financial market imperfections was a central contributory factor to the credit and real estate booms in the United States that led up to the financial crisis (Boz and Mendoza (2010)).

That said, recent research has emphasised the positive aspects of wholesale funding and financial innovations as well as their negative externalities. It may be a rational strategy for banks to resort to wholesale funding in the face of economic uncertainty and volatile demand for bank loans (Dinger and Craig (2012)). But the advantages of such funding flexibility during normal times are overshadowed in a crisis by the prohibitively high adjustment costs of short-term wholesale funding in particular. Regarding financial innovation, both empirical and theoretical research has emphasised its positive contribution to economic growth. For example, various financial innovations may have helped to stabilise economic activity in the mid-1980s (the "Great Moderation") (Dynan et al (2006); see also Jermann and Quadrini (2006)). Moreover, financial and technological innovations can interact to support

economic growth. Hence, impediments to financial innovation in the form of certain institutions, policies and regulations may slow technological change and economic growth (Michalopoulos et al (2011)).

3. The euro area sovereign debt crisis

The first tremors of euro area's financial crisis were felt in the first quarter of 2010. They emanated from growing market concerns about the sustainability of public finances in view of rising government deficits and debts in Greece and other peripheral European countries. These strains built up before many European banks had fully purged their balance sheets of impaired assets from the 2007–09 financial crisis. Sovereign concerns spilled over to banks, as reflected in marked increases in bank CDS spreads in parallel to the sovereign ones (Graph 2). During these episodes of severe market stress, all banks in the euro area, even the strongest, experienced significant difficulties in terms of both access to funding and its cost. Thus sovereign tensions morphed into a banking crisis. In this context, interbank funding costs rose sharply for both euros and other currencies such as the dollar and sterling (Graph 1, left-hand panel). Once again, euro area banks experienced strains in US dollar short-term funding markets (Fender and McGuire (2010a)). International spillovers were also visible in the often sharp declines in US and UK bank stock prices, which fell in sympathy with those of euro area banks (Graph 1, right-hand panel). To make matters worse, this crisis became increasingly intertwined with setbacks to economic growth and competitiveness. These factors, in turn, exacerbated the sovereign debt and banking crises, putting further pressure on bank funding (Lane (2012); Shambaugh (2012)).

The strong interconnection between sovereigns and banks can be gauged by the development of various indicators. One is the correlation between sovereign and bank CDS spreads. For most countries in the euro area, the 90-day moving correlations between these spreads have been predominantly positive, showing an overall rising trend as the euro area crisis developed (Graph 3).[2] The co-movement of sovereign and bank CDS spreads strengthened across euro area countries after the nationalisation of Allied Irish Bank in January 2009, a trend that subsequently helped to transmit sovereign risks to banks even more vigorously (Mody and Sandri, 2011). It was particularly high for most euro area countries during crisis periods involving various peripheral countries, such as Greece, Ireland and Portugal, joined later in the crisis by Italy and Spain.

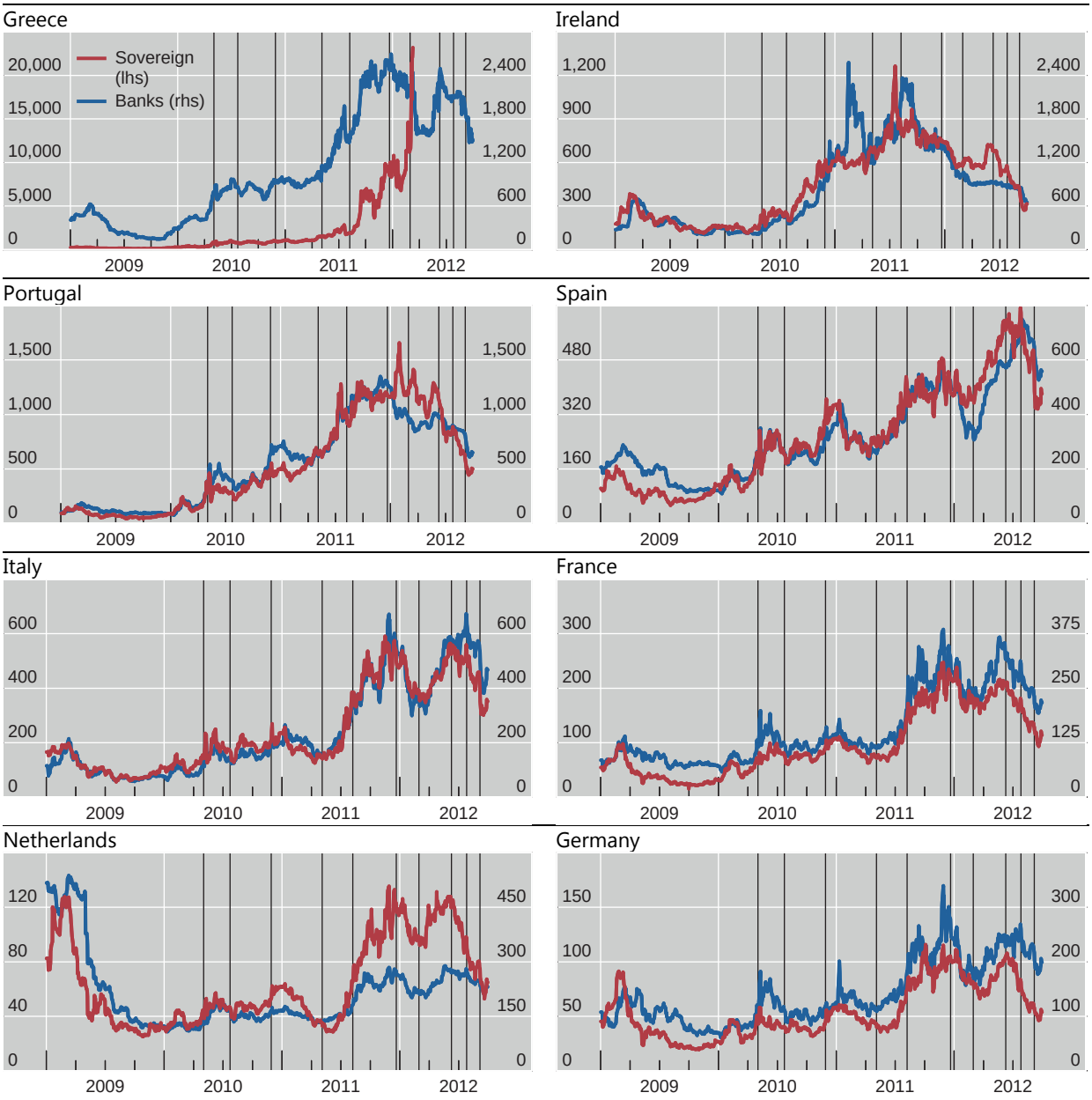
At the same time, the correlations between the sovereign and bank CDS spreads of these countries declined sharply after they received supranational support. This was the case for Greece with the joint EU-IMF programme in May 2010 and its second bailout in March 2012; and for both Ireland and Portugal with the joint EU-IMF programmes in November 2010 and May 2011 respectively; and

[2] These correlations may be influenced by changing determinants of sovereign and bank CDS spreads over time. For example Annaert et al (2012) show that euro area bank CDS spreads were driven by credit risk, as well as liquidity premia for both individual CDS and market-wide factors, whose significance varied strongly during the financial crisis.

Euro area sovereign and bank CDS premia[1]

In basis points

Graph 2



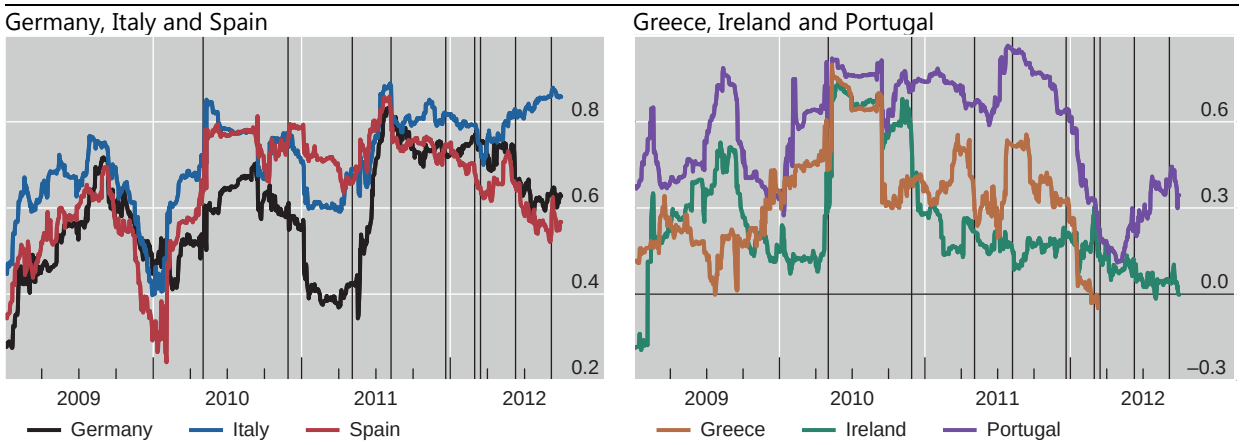
The vertical lines correspond to the following dates: 2 May 2010: agreement on financial assistance for Greece; 23 July 2010: publication of CEBS stress test results; 28 November 2010: agreement on financial assistance for Ireland; 4 May 2011: agreement on financial assistance for Portugal; 8 August 2011: re-activation by ECB of SMP to purchase Italian and Spanish sovereign debt; 21 December 2011: first ECB LTRO; 29 February 2012: second ECB LTRO; 9 June 2012: announcement that Spain will seek financial assistance for its banking sector; 26 July 2012: speech by Mario Draghi, President of the ECB, at the Global Investment Conference, where he promised that the "ECB is ready to do whatever it takes to preserve the euro"; 6 September 2012: decision by ECB's Governing Council on the modalities of OMTs.

[1] Premia of the most recent five-year sovereign CDS and simple average of five-year on-the-run CDS premia across major banks. For Greece, Alpha Bank, National Bank of Greece, EFG Eurobank Ergasias; for Ireland, Allied Irish, Anglo Irish, Bank of Ireland, Irish Life & Permanent PLC; for Portugal, Banco Comercial Português, Banco BPI, Caixa Geral de Depósitos, Banco Espirito Santo; for Spain, Banco de Sabadell, Banco Bilbao Vizcaya Argentaria, Banco Popular Español, Caja de Ahorros y Pensiones de Barcelona, Caja de Ahorros y Monte de Piedad de Madrid, Banco Santander; for Italy, Banca Monte dei Paschi di Siena, UniCredit SpA, Intesa Sanpaolo; for France, BNP Paribas, Crédit Agricole, Société Générale; for Germany, Commerzbank, Deutsche Bank; for the Netherlands, Aegon, Fortis Bank, ING, NIBC Bank, Rabobank, SNS Bank.

Sources: Datastream; Markit; authors' calculations.

for the more limited official funding for Spain in support of its banking sector recapitalisation in June 2012. Moreover, the ECB's re-activation of its Securities Markets Programme (SMP) for Italian and Spanish sovereign debt in August 2011 was associated with decreasing correlations between these countries' sovereign and bank CDS spreads. Correlations also declined, especially for peripheral countries, after the ECB's Governing Council decided on 6 September 2012 on the modalities for undertaking Outright Monetary Transactions (OMT).[3] This all seems to suggest that the various policy actions helped to allay market concerns about the negative interaction between sovereign and bank tensions (Barth et al (2012); Blundell-Wignall (2012); see also Acharya et al (2011)).

Correlation between sovereign and bank CDS spreads[1] Graph 3



The vertical lines correspond to the following dates: 2 May 2010: agreement on financial assistance for Greece; 28 November 2010: agreement on financial assistance for Ireland; 4 May 2011: agreement on financial assistance for Portugal; 8 August 2011: re-activation by ECB of SMP to purchase Italian and Spanish sovereign debt; 21 December 2011: first ECB LTRO; 29 February 2012: second ECB LTRO; 15 March 2012: agreement on second bailout for Greece; 9 June 2012: announcement that Spain will seek financial assistance for its banking sector; 6 September 2012: decision by ECB's Governing Council on the modalities of OMTs.

[1] Ninety-day moving window of the correlation between daily changes in sovereign and bank CDS. See Graph 2 for sample of banks.

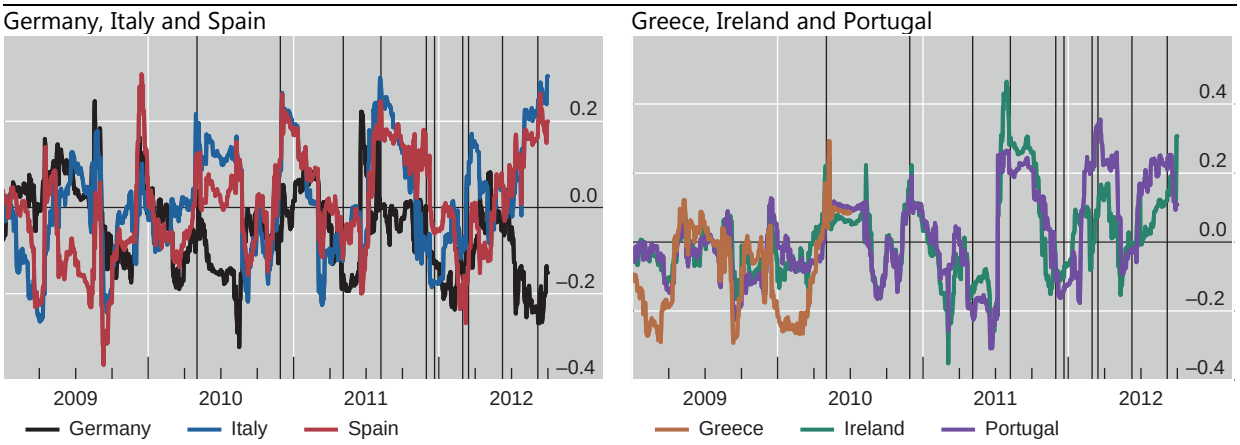
Sources: Markit; authors' calculations.

The movement of correlations between interbank funding costs and government bond spreads also shows the high degree of interconnectedness between sovereigns and banks. The intensification of the euro area crisis in the second half of 2011, when it started spreading to Italy and Spain with spillovers to German, French and Dutch banks (Graph 2), put increased pressure on various funding market segments, including short-term interbank US dollar markets (Graph 1, left-hand panel). This was partly driven by the sharp reduction in the exposure of US money market funds to euro area banks (see Section 4.3). These tensions were reflected in marked increases in 90-day rolling correlations between US dollar Libor-OIS spreads and the sovereign swap spreads of Ireland, Portugal, Italy and Spain

[3] The ECB defined OMTs as outright transactions by the Eurosystem in secondary sovereign bond markets that aim at safeguarding an appropriate monetary policy transmission and the unity of monetary policy. See ECB (2012e).

(Graph 4).[4] Hence, the dependence of euro area banks on ebbing short-term US dollar funding triggered concerns that various sovereigns might be forced to fund their banks, with the potential burden pushing up sovereign risk premia. The worsening of the crisis in the summer of 2011 initially also led to higher correlations between US dollar Libor-OIS and German sovereign swap spreads, but these turned rapidly negative when bank funding and sovereign risks for Germany decoupled (Graph 4, left-hand panel). While German bank CDS premia increased further, safe haven flows into German sovereign debt sharply lowered its yield (Graph 2). Dollar Libor-OIS and sovereign spread correlations declined across the euro area when on 30 November 2011 the Federal Reserve in coordination with several other central banks broadened US dollar swap arrangements at lower cost.

Correlation between three-month USD Libor-OIS and sovereign swap spreads[1] Graph 4



The vertical lines correspond to the following dates: 2 May 2010: agreement of financial assistance for Greece; 28 November 2010: agreement of financial assistance for Ireland; 4 May 2011: agreement of financial assistance for Portugal; 8 August 2011: re-activation by ECB of SMP to purchase Italian and Spanish sovereign debt; 30 November 2011: US dollar swap agreement between Fed and other Central Banks; 21 December 2011: first ECB LTRO; 29 February 2012: second ECB LTRO; 15 March 2012: agreement of second bailout for Greece; 9 June 2012: announcement that Spain will seek financial assistance for its banking sector; 6 September 2012: decision by ECB's Governing Council on the modalities of OMTs.

[1] Ninety-day moving window of the correlation between daily changes in three-month USD Libor-OIS spread and sovereign swap spread (Iboxx Euro and Merrill Lynch indices; difference in the yield on a basket of euro-denominated sovereign bonds and interest rate swaps, all maturities).

Sources: Barclays; Merrill Lynch; authors' calculations.

[4] Sovereign swap spreads are calculated as the difference between the 10-year government bond yields for each country and an interest swap rate with a similar maturity. The swap rate is viewed as the more risk-free rate; hence the spread is indicative for financial market strains related to credit and liquidity risks on the sovereign debt.

4. Impact on euro area bank funding

4.1. Introduction

When analysing the impact of the euro area financial crisis on bank funding, one needs to be aware that banks finance themselves in a wide variety of ways. In fact, the specific funding of euro area banks is shaped by a range of different factors (Romo González and van Rixtel (2011)).

First, national characteristics play an important role in the specific pattern of bank funding across different euro area countries. Such variation may be related to differences in national legal frameworks, historical customs and the structure of the domestic banking sector. For example, funding through debt securities has traditionally been negligible in the banking sectors of several small euro area countries, whereas it has represented almost a quarter of the funding structure in some larger countries (ECB (2012a)). Even among the larger countries, however, banks vary considerably in their use of wholesale funding, with Italian banks relying significantly more on it than German, French or Spanish counterparts (ECB (2010c)). At the same time, traditionally the latter group of banks have been the main issuers in the covered bond segment of European debt markets.

Second, the funding structure is often heavily influenced by bank-specific characteristics such as the bank's size, type and financial strength. For example, small European banks resort to wholesale funding much less than do medium-sized and large European banks (ECB (2010c)). And when it comes to specific debt instruments, academic research suggests that securitisations, which involve substantial and mostly fixed costs, should be particularly costly for smaller banks and thus they are less likely to employ this funding source (Affinito and Tagliaferri (2010); Panetta and Pozzolo (2010)). The same is true of covered bonds and securitisations: a sample including banks from the five largest European economies suggests that small banks are less likely to issue these debt instruments than are large banks (Carbó-Valverde et al (2011)).[5] Moreover, the funding of different types of banks, such as commercial banks vis-à-vis savings banks, is structured through the use of different instruments (Cardone-Riportella et al (2010)).

Third, the funding of euro area banks also depends on macroeconomic factors. For example, buoyant economic and asset prices in the pre-crisis years went hand in hand with a considerable build-up of bank leverage. In contrast, the crisis forced banks to deleverage sharply, a development which the euro area crisis has further intensified. As banks often looked to debt financing while leveraging up, they have much less need to issue debt while deleveraging. But a distinction should be made between banks in countries that experienced strong credit growth (eg in long-term mortgages) and banks in countries with weaker credit demand that expanded their

[5] At the same time, these costs seem not to be so high that they are insurmountable for smaller banks (Bannier and Hänsel (2008)). Moreover, securitisation provides in relative terms more liquidity advantages for small than for large banks, so that the relatively large benefits should be worth the relatively high cost for small banks (Loutskina (2011)). Overall, when they occur, securitisations are more important for small and medium-sized European banks than for large ones (Uhde and Michalak (2010)). It has also been established that banks that are less locally concentrated (and which tend to be the larger banks) are more likely to issue covered bonds, with similar but somewhat weaker results for securitisations (Martín-Oliver and Saurina (2007)).

balance sheets mainly through purchases of debt securities. While the former need to roll over financing or refinance, either in funding markets or through the ECB, the latter group may simply let securities mature and hence do not face such severe funding challenges.

While acknowledging the various factors that determine the specific funding models of individual banks across different countries, we concentrate here on the broader trends in euro area bank funding in recent years. We start with the recent trends in funding through customer deposits (4.2). Then we provide an overview of wholesale funding, taking into account its important role in the financial crises, and analyse the development of both short-term (4.3) and long-term wholesale funding markets (4.4). Subsequently, we discuss the ECB's provision of short- and medium-term liquidity (4.5). Finally, we summarise recent changes in the use of capital (4.6).[6]

4.2. Deposit funding

In the search for more stable funding sources, banks have sought deposits. Deposits are assumed to be more "sticky" than wholesale market sources of funding, especially when protected by deposit guarantee schemes. As such, deposits pose a funding risk only in exceptional circumstances such as a bank run.

The worsening of the euro area financial crisis resulted in a growing divergence in deposit growth rates across the euro area. Most peripheral countries have seen deposit withdrawals while core countries continue to register deposit inflows.[7] This divergence accelerated in the first half of 2012, with outflows in Greece, Portugal and Spain and inflows in Germany and the Netherlands (Graph 5, left-hand panel). Although the drop in deposits in these peripheral countries was significant, it proceeded at a pace more suggestive of a "bank walk" than a "bank run" (Portes (2012)). In terms of cumulative changes since January 2010, Spanish and Greek banks had lost a respective EUR 159 billion and EUR 80 billion in deposits by end-September 2012, followed by Ireland with EUR 21 billion. Portuguese banks, on the other hand, managed a modest increase of EUR 4 billion (Graph 5, centre panel).

In contrast, French, German, Italian and Dutch banks registered significant cumulative increases in deposit funding (of respectively EUR 296, 265, 203 and 57 billion). Although these may be related to safe haven flows from savers in peripheral countries, major changes in banks' business models may have played an important role as well. It has been well documented that, in the wake of the 2007–09 global financial crisis, several large investment banking-oriented banks from these countries adjusted their funding towards a greater reliance on retail and wholesale deposits (Merck et al (2012)). The increased dispersion in deposit funding rates during the first half of 2012 was partly mirrored in the development of short-term deposit rates, with banks from peripheral countries offering significantly higher rates than those in Germany and France (Graph 5, right-hand panel). At the same time, with the stabilisation of the euro area financial crisis in the third quarter of

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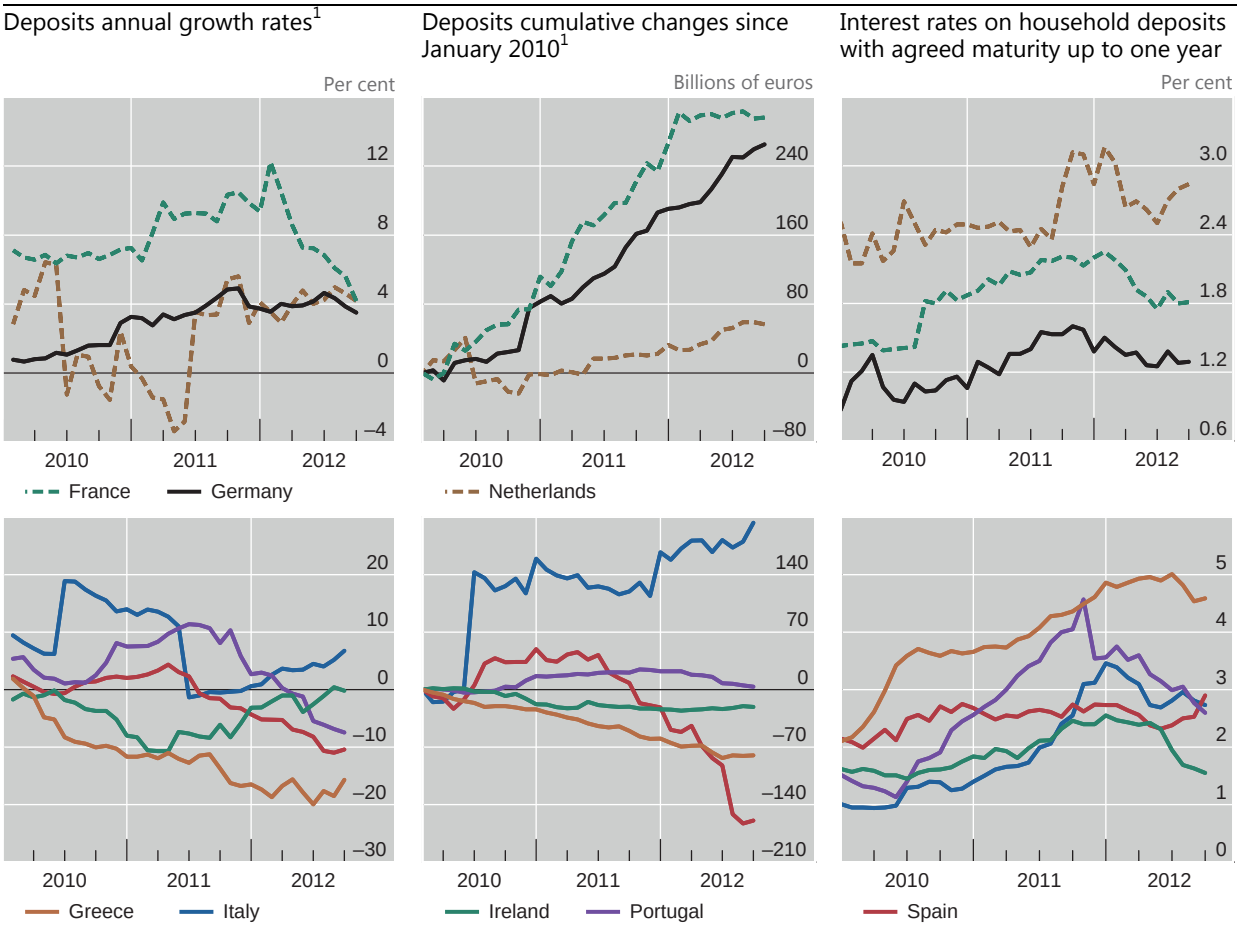
[6] Following Dinger and Craig (2012), we exclude equity from wholesale liabilities and hence discuss it – and capital more broadly – in a separate section.

[7] It has to be emphasised that deposit withdrawals were not driven purely by safe haven motives, but that precautionary savings were reduced amidst sharp economic downturns and higher unemployment.

2012, the deposit funding of banks from most peripheral countries also improved,[8] largely at lower deposit rates.

Deposit funding in the euro area

Graph 5



[1] Deposits of non-MFIs (excluding central government) at MFIs (excluding the central bank).

Sources: ECB; authors' calculations.

4.3. Short-term wholesale funding

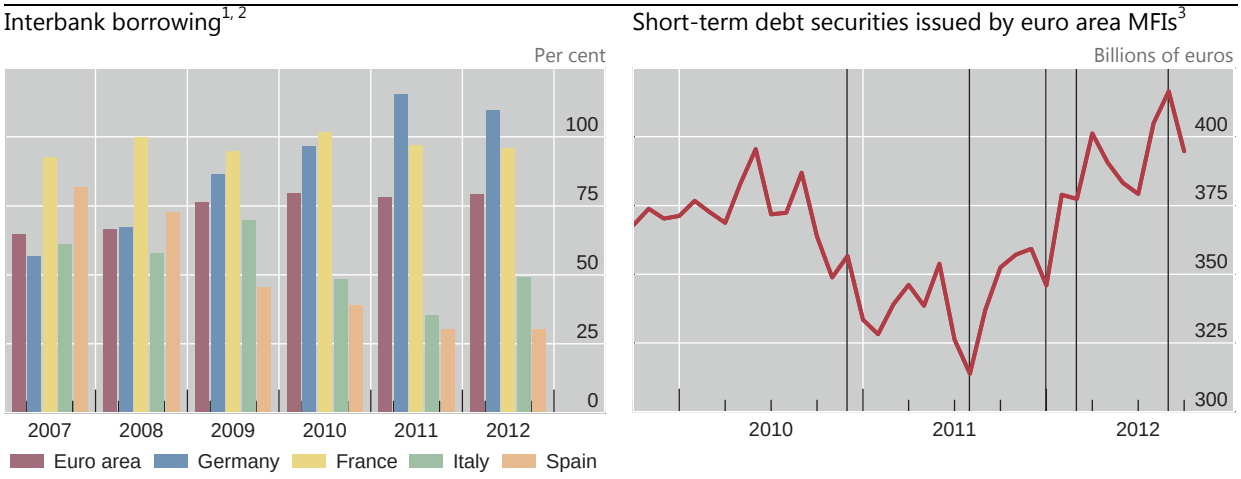
Banks' short-term wholesale funding involves unsecured and secured (or repo) borrowing in money markets and the issuance of other short-term debt such as commercial paper (CP). The euro area financial crisis has seen marked reduced activity in unsecured interbank markets during episodes of severe financial stress. At the same time, banks resorted increasingly to repo financing, especially that cleared by CCPs (ECB (2010b, 2011b); Fitch (2011); Bornhorst et al (2012)). For example, Spanish banks obtained significant amounts of funding through international CCPs in the second half of 2010, as bilateral trades with non-Spanish banks became

[8] Support was derived particularly from the remarks by ECB President Mario Draghi on 26 July at the Global Investment Conference in London that the ECB would be "ready to do whatever it takes to preserve the euro" and from the specification of the ECB's OMTs.

increasingly difficult to realise (S&P (2012)). As the crisis deepened, they increased their interbank borrowing, which includes repo financing, from 2009 to 2010 and again from 2010 to 2011, much as Italian banks did (Graph 6, left-hand panel).[9] In contrast, German banks became net lenders in 2011, as opposed to consistent net borrowers in previous years, demonstrating the segmentation of euro area money markets along national borders. The crisis has also seen a "flight to quality" in euro area repo markets with respect to the choice of counterparties and acceptable collateral. The use of certain peripheral countries' sovereign debt as collateral has dropped significantly, with CCPs repeatedly raising haircuts, while the share of collateral provided by core euro area countries and the United Kingdom has increased (ICMA (2011, 2012); CGFS (2011a)).[10] The crisis also affected the issuance of short-term debt securities by euro area banks, partly driven by changes in their eligibility as collateral in ECB liquidity operations. The relaxation of these criteria in September 2011 led to a sharp increase in the gross issuance of Short-Term European Paper (STEP) (Graph 6, right-hand panel).[11]

Short-term wholesale funding banks

Graph 6



The vertical lines correspond to the following dates: 28 November 2010: agreement on financial assistance for Ireland; 8 August 2011: re-activation by ECB of SMP to purchase Italian and Spanish sovereign debt; 21 December 2011: first ECB LTRO; 29 February 2012: second ECB LTRO; 6 September 2012: decision by ECB's Governing Council on the modalities of OMTs.

[1] Data for 2012 refer to 2012 Q2. [2] Ratio between loan and advances to banks and funding from banks (both including repos); a ratio below 100 indicates net interbank borrowing; the sample includes the corresponding major banks. [3] Short-Term European Paper (STEP).

Sources: Bankscope; ECB; authors' calculations.

Institutional investors such as US money market funds (MMFs) used to be important providers of short-term funding for euro area banks. Before early 2010, indeed, such funds were the largest suppliers of dollar funding to non-US banks, providing around USD 1 trillion to European banks (Baba et al (2009)). From then

9 A breakdown between unsecured and secured borrowing is not available.

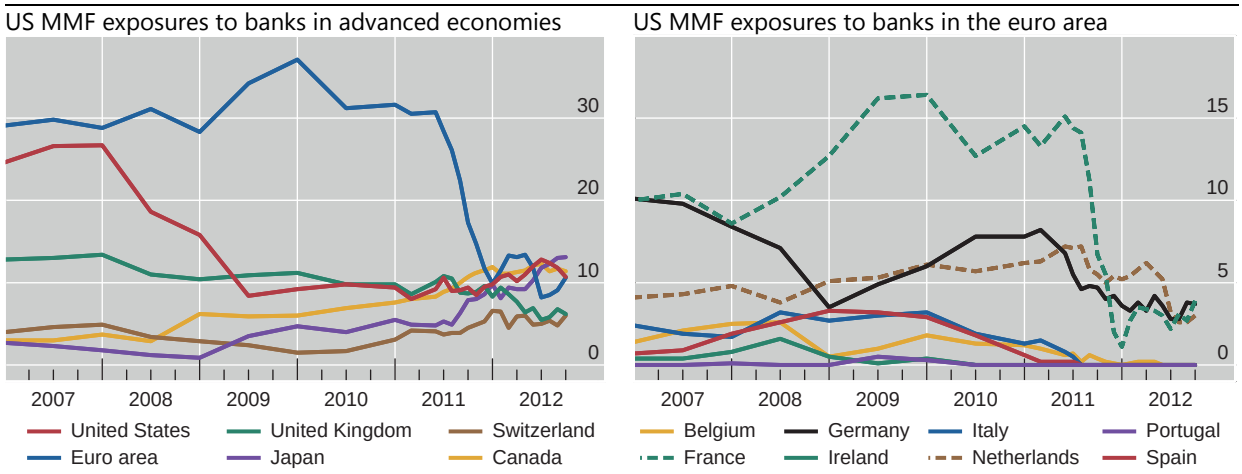
10 German sovereign debt has actually been used less as collateral, given its status as a safe haven asset that borrowers have been increasingly reluctant to lend.

11 See ECB (2011d). The STEP market started in June 2006 following the signing of the STEP Market Convention that aimed to foster the integration of the European markets for short-term securities through the voluntary adoption of the standards it sets out.

onwards, however, US MMFs started to sharply reduce their exposure to euro area banks, particularly to those of France and the peripheral countries (Graph 7).[12] As the crisis deepened in the summer of 2011, US MMFs cut their exposure to the five peripheral euro area countries to negligible levels, and they also reduced their purchases of short-term funding instruments issued by core euro area banks. This reduction was most clearly seen in the case of French banks, driven by concerns about their exposures to peripheral sovereign debt, but German and Dutch banks were also affected (Graph 7, right-hand panel). In the first half of 2012, the euro area exposures of US MMFs stabilised at very low levels, which was followed by a modest pick-up in the third quarter.

US MMF exposures[1]

As a percentage of their assets under management — Graph 7



[1] Claims of the 10 largest US prime money market funds.

Source: Fitch Ratings.

4.4. Long-term wholesale funding

The euro area financial crisis also impaired longer-term wholesale funding markets, notably during episodes of market tension.[13] The banks of certain peripheral countries all but lost market access at the height of the crisis in the second half of 2011 and the first half of 2012; particularly during this period, longer-term funding markets became increasingly segmented according to bank nationality. In the process, banks from Greece, Ireland and Portugal were virtually shut out from primary bond markets, while those from Italy and Spain at times experienced severe

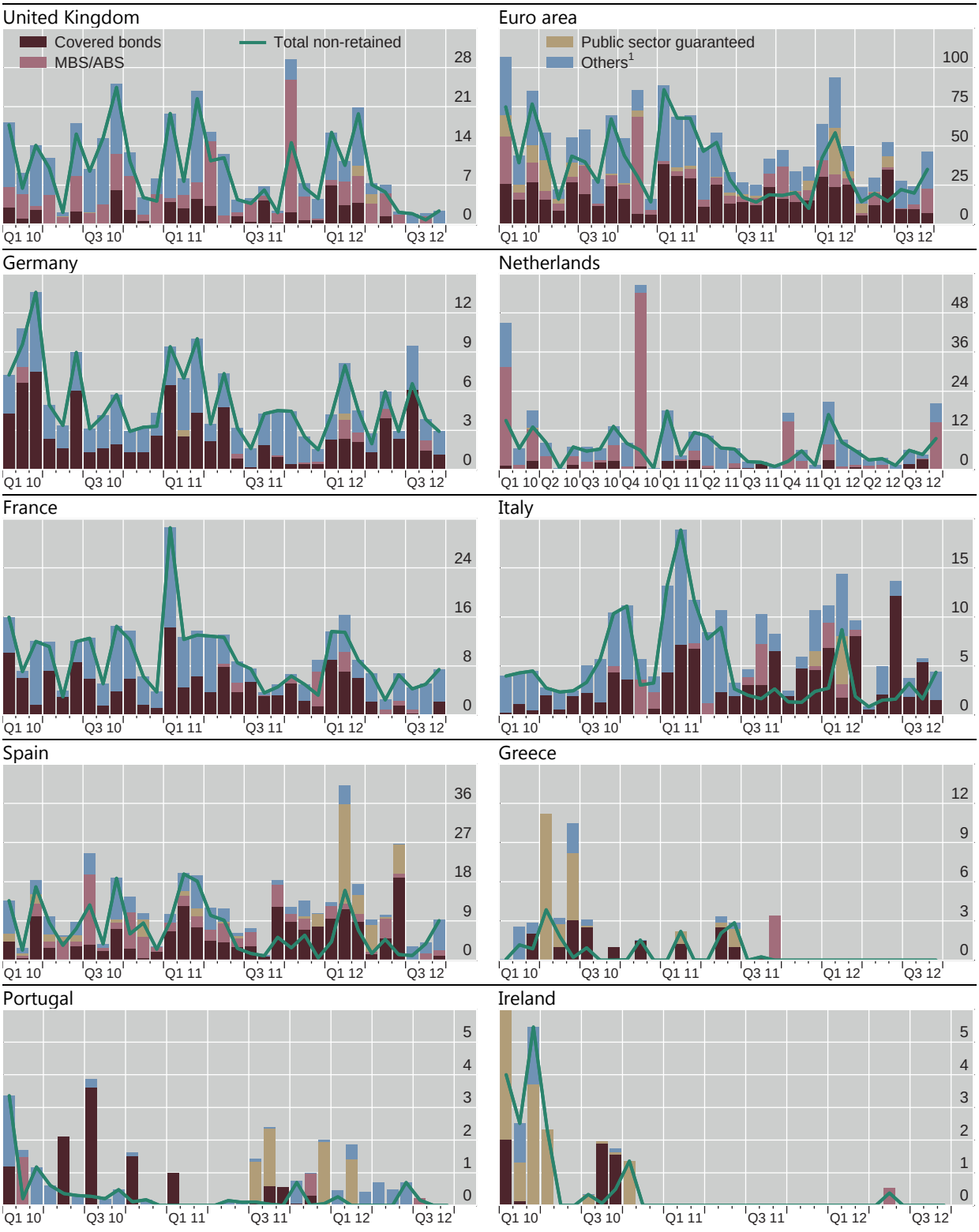
[12] These reductions were also driven to some extent by changes in the regulatory framework for US money market funds.

[13] These episodes were May and November–December 2010 with the crises involving Greece and Ireland respectively and their subsequent bailouts, the sharp intensification of the crisis in the second half of 2011 when the crisis spread to Italy and Spain, and the second quarter of 2012 when Spain in particular was the focus of market stress.

Gross bond issuance by banks

In billions of euros

Graph 8



[1] All bonds and medium-term notes issued except covered bonds, public sector guaranteed bonds and MBS/ABS.

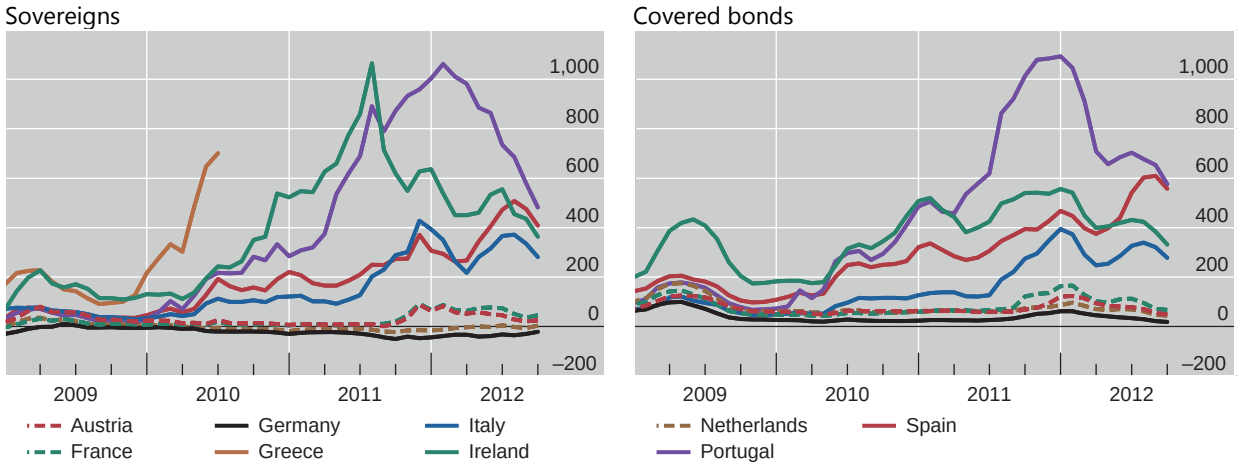
Source: Dealogic.

difficulties in issuing longer-term debt (Graph 8). At the same time, funding stress frequently spilled over to core countries' banks, leading to very low levels of gross bond issuance by banks from Germany, France and the Netherlands in months of severe market turmoil. Overall, gross bond issuance by euro area banks declined as the crisis deepened, by 16% in 2011 vis-à-vis 2010 and by 11% in the first three quarters of 2012 compared with the same period one year earlier.[14]

The composition of gross bond issuance by instrument has changed significantly over the past few years, especially for banks from peripheral countries. The euro area financial crisis has reinforced the trend towards greater recourse to secured longer-term funding, especially through covered bonds (ECB (2009); Romo González and van Rixtel (2011); ECB (2011c, 2012a); ECBC (2011)). The share of covered bonds in total gross bond issuance by euro area banks increased from 26% in the first half of 2007 to 32% and 42% in the first halves of 2010 and 2012 respectively. For many banks from peripheral countries, most notably from Spain and Italy, this instrument became the main source of long-term wholesale funding, as their access to unsecured markets was partially or fully closed (Graph 8).[15] But the situation improved significantly in the third quarter of 2012, when Italian and especially Spanish banks were able to issue considerable amounts of unsecured bonds.

Euro area swap spreads[1]

In basis points — Graph 9



[1] Iboxx Euro indices and Merrill Lynch indices. Difference in the yield on a basket of euro-denominated sovereign (covered) bonds and interest rate swaps, all maturities.

Sources: Barclays; Merrill Lynch; authors' calculations.

The growing recourse to covered bonds in recent years occurred despite the strong co-movement of covered bond swap spreads with those of sovereign debt

[14] The year-on-year decline was 15% during the first half of 2012 when tensions in the euro area escalated and increasingly involved Italy and Spain.

[15] Covered bond issuance has also been spurred by more structural factors, such as favourable regulatory treatment under Basel III and Solvency II, "bail-in" proposals, and several national legislative initiatives. See for example CGFS (2011b).

(Graph 9). In parallel with rising sovereign tensions, Irish, Portuguese, Italian and Spanish covered bond spreads increased markedly. This is reflected in high covered and sovereign swap spread correlations for specific countries at times of severe market stress, such as Spain and Italy in April-July 2012 (Table 1). By contrast, these correlations became very low or even negative for countries with safe haven status during the crisis, such as Germany, the Netherlands, the United Kingdom and Scandinavian countries (and France too in the third quarter of 2012). This may be due to the fact that their sovereign debt markets are more liquid than their covered bond markets, which may contribute to driving up demand and pushing sovereign yields down relative to those for covered bond yields in times of severe market stress. The more apparent disconnection between the covered bond and sovereign spreads of these safe haven countries may also be related to supply constraints affecting covered bonds. These partly relate to the question of asset encumbrance. Covered bond issuance by banks requires a substantial proportion of their assets to be "encumbered", ie pledged with priority to investors in covered bonds. The deepening of the crisis led banks to offer larger degrees of over-collateralisation, thus reducing the availability of unencumbered assets that could serve as collateral for new covered bonds. Asset encumbrance also reduces access to unsecured senior debt issuance, as the larger pool of encumbered assets underlying covered bonds implies that holders of unsecured bank debt have a claim on fewer assets in the event of the bank's insolvency, substantially reducing the attractiveness of such bonds as an investment (Oliver-Wyman (2011); BIS (2012); ECBC (2012); IFR (2012); ECB (2012a); Fitch (2012)).

Correlations between covered bond and sovereign swap spreads[1] Table 1

	April 2009–March 2010	April 2010–June 2011	July 2011–December 2011	January 2012–March 2012	April 2012–25 July 2012	26 July 2012 – Sep. 2012
Peripheral countries						
Ireland	0.85	0.71	-0.53	0.87	0.52	0.85
Portugal	0.54	0.87	0.69	0.40	-0.38	0.67
Spain	0.38	0.85	0.67	0.64	0.91	0.85
Italy	0.85	0.63	0.92	0.96	0.93	0.92
Other countries						
France	0.85	-0.14	0.72	0.83	0.50	-0.34
Germany	0.67	-0.46	-0.29	-0.64	-0.40	-0.82
The Netherlands	0.91	0.01	0.12	-0.88	0.34	-0.71
United Kingdom	-0.63	0.11	-0.80	-0.15	-0.31	-0.55
Scandinavia and Denmark	0.70	0.17	-0.26	-0.70	0.53	-0.28
Euro area	0.71	0.40	0.79	0.94	0.86	0.73

[1] Iboxx Euro indices and Merrill Lynch indices.

Sources: Barclays; Merrill Lynch; authors' calculations.

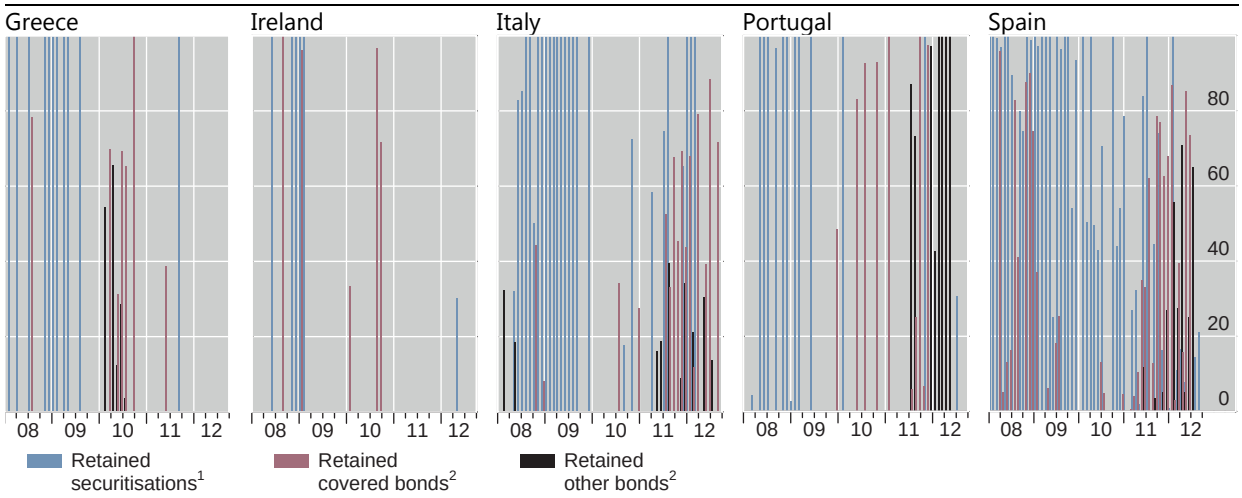
Demand from euro area banks for longer-term wholesale funding also prompted a revival in government-guaranteed bond issuance. As the crisis

deepened in the second half of 2011, such programmes were re-activated or extended in all peripheral countries, as well as in Germany.[16] Government-guaranteed issuance became a very important source of longer-term bank funding in 2008 and 2009 at the height of the global financial crisis, and has generally been assessed positively, although it does entail some costs (Panetta et al (2009); CGFS (2011a); Muller et al (2011)). The reactivation of the programmes in Italy and Spain allowed solid issuance in the first quarter of 2012 (Graph 8), indicating that the worsening of these countries' fiscal positions had not substantially reduced the value of these explicit guarantees. In the third quarter of 2012, recourse to government-guaranteed issuance fell to negligible levels.

Retained securitisations and bonds

In per cent

Graph 10



[1] As percentage of total securitisations. [2] As percentage of total bonds issued.

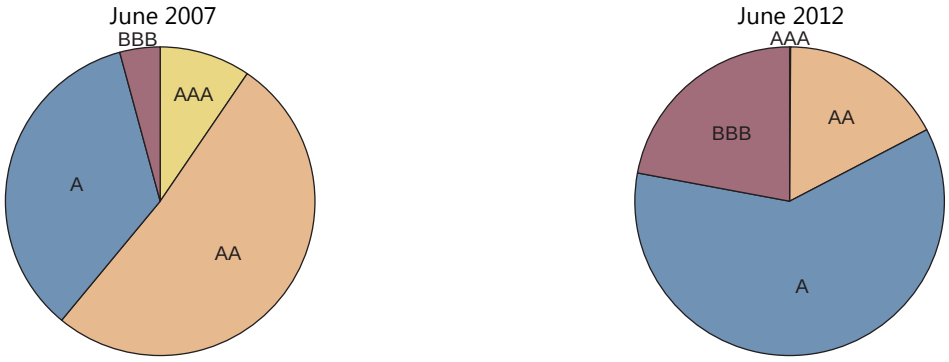
Sources: Dealogic; authors' calculations.

Another noteworthy development is the increasing trend of retained issuance by peripheral countries' banks, which use this paper mainly as collateral in ECB liquidity operations. In the first half of 2012, significantly larger shares of gross bond issuance by Italian, Portuguese and Spanish banks were "retained", ie kept by the issuer to be used as collateral in financial transactions, rather than sold to investors (Graph 8). This was especially the case during crisis episodes, when these banks virtually ceased to issue bonds, due to lack of demand from institutional and other investors (Fitch (2012)). Strong peripheral debt retentions involved not only covered bonds, but also government-guaranteed bonds (Graph 10). In contrast, issuance by German, French and Dutch banks remained focused on primary public markets. This difference in bond issuance patterns between peripheral and core countries again underscores the segmentation of funding markets by bank nationality. Retained issuance became more prominent in euro area debt markets during the 2007–09 global financial crisis, when banks increasingly started to retain securitisations. This

[16] Italy, Spain and Germany re-activation authorised on 15 December 2011, 9 February 2012 and 5 March 2012 respectively; Portugal, Greece and Ireland prolongation authorised on 21 December 2011, 6 February 2012 and 1 June 2012 respectively.

was motivated by the acceptability of these bonds as collateral in central bank liquidity operations. As peripheral country banks progressively lost access to primary public markets, debt retentions grew in importance from mid-2011 onwards. This contributed to the sharp decline in retained securitisations, which also suffered from lower overall securitisation activity (AFME (2012)). When market conditions improved from the third quarter of 2012, debt retentions declined and non-retained issuance by Italian and Spanish banks in particular increased markedly (Graph 8).

Bond issuance by euro area banks, classified by ratings[1] Graph 11



[1] Percentages of outstanding amounts of bonds issued by financial institutions classified by rating categories.

Sources: Barclays; authors' calculations.

As the two financial crises proceeded, the ratings distributions of longer-term debt issued by euro area banks have deteriorated significantly. In June 2007, 61% of the outstanding amount of bonds issued by euro area banks achieved AAA or AA ratings. Five years later, this had dropped to just 17% (Graph 11). In contrast, bonds rated at A and BBB accounted for only 35% and 4%, respectively, of the total outstanding in June 2007 of all bonds issued. This increased to 61% and 22% in June 2012, respectively.[17] In fact, in the first six months of 2012, only six bonds were issued that received the highest credit rating (AAA), a sharp fall from 237 in 2007 (Table 2). The decline in creditworthiness has been reflected in marked increases in option-adjusted spreads (OAS), which provide an indication of the bonds' riskiness as perceived by financial markets.[18] These spreads increased across all rating categories, from an average option-adjusted spread of 0.4% in the first half of 2007 to 3.1% in the same period in 2012 (Table 2). This increase was corrected somewhat in the third quarter of 2012, when OAS fell across all rating categories to an average

[17] When considering the number of issues instead of the amounts outstanding, we find that 18% of all bonds issued by euro area banks during the period January–June 2012 were rated AAA or AA, which compared with 53% during the same period in 2007. The shares of bonds issued at A and BBB in the first half of 2012 increased to 55% and 27%, respectively, from 40% and 6% in the first half of 2007.

[18] The option-adjusted spread (OAS) indicates the market premium of a bond over a benchmark (usually a government bond). It corrects for the value of possible embedded options in the bond. More precisely, the OAS can be interpreted as the compensation an investor receives for assuming a variety of risks (eg liquidity premium, default risk, model risk), net of the cost of any embedded options (Society of Actuaries, 2012). In practice, it is used as a common market measure of the credit risk embedded in a bond. For more information see Windas (2007).

of 2.2%. At the same time, the original maturities of bonds issued by euro area banks declined sharply, from a weighted average of 5.7 years in 2007 to 4.4 years in 2012 (Table 2). Hence, investors both demanded higher compensation for bank debt, as indicated by higher OAS, and were less willing to hold this debt at longer-term maturities, especially lower rated debt (A and BBB).

Bonds issued by euro area banks

Table 2

	AAA-rated	AA-rated	A-rated	BBB-rated	Total
Outstanding amount (in billions of euros)					
June 2007	45	242	164	20	471
June 2012	0.6	96	339	123	559
September 2012	0.6	100	316	151	568
Number of issues					
Jan.–Jun 2007	237	1,828	1,561	249	3,875
Jan.–Jun 2012	6	630	1,952	947	3,535
September 2012	1	71	297	177	546
Maturity (in years)[1]					
Jan.–Jun 2007	5.7	5.8	5.6	5.6	5.7
Jan.–Jun 2012	4.8	5.1	4.3	4.3	4.4
September 2012	4.3	5.0	4.6	4.1	4.5
Option adjusted spread (in per cent)[1]					
Jan.–Jun 2007	0.2	0.4	0.6	0.8	0.4
Jan.–Jun 2012	1.7	1.7	2.8	5.1	3.1
September 2012	1.4	1.1	1.7	3.9	2.2

[1] Average over the period; for the total, weighted average by the outstanding amount.

Sources: Barclays; authors' calculations.

4.5. ECB liquidity provision

The growing tensions in wholesale funding markets significantly boosted demand for central bank liquidity. The ECB increasingly accommodated this demand through a wide range of open market operations.[19] The two three-year Long-Term Refinancing Operations (LTROs) conducted in December 2011 and February 2012, totalling around EUR 1 trillion, substituted for both short- and long-term wholesale funding markets. In combination with the more standard Main Refinancing Operations (MROs), the ECB increased the funding provided through its open market operations to EUR 1.0 trillion by the end of September 2012. This liquidity was absorbed predominantly by banks from countries either under joint EU-IMF programmes or experiencing severe sovereign tensions, showing again the distinct segmentation of bank funding according to bank nationality (Table 3). Funding was augmented by Emergency Liquidity Assistance (ELA) especially in Greece and

[19] Detailed overviews of these operations are provided by ECB (2010a), (2011a) and (2012c).

Ireland, where national central banks exercised their "lender of last resort" function.[20]

Liquidity provided by the ECB[1]

In billions of euros

Table 3

	MRO	LTRO	Other (incl. ELA)[2]	ECB dependence
Austria	-	-	-	18
Belgium	0	40	0	40
France	3	173	1	177
Germany	2	74	1	76
Greece	28	2	101	131
Ireland	12	67	38	117
Italy	4	273	0	277
Netherlands	-	-	-	26
Portugal	5	51	0	56
Spain	71	329	0	400

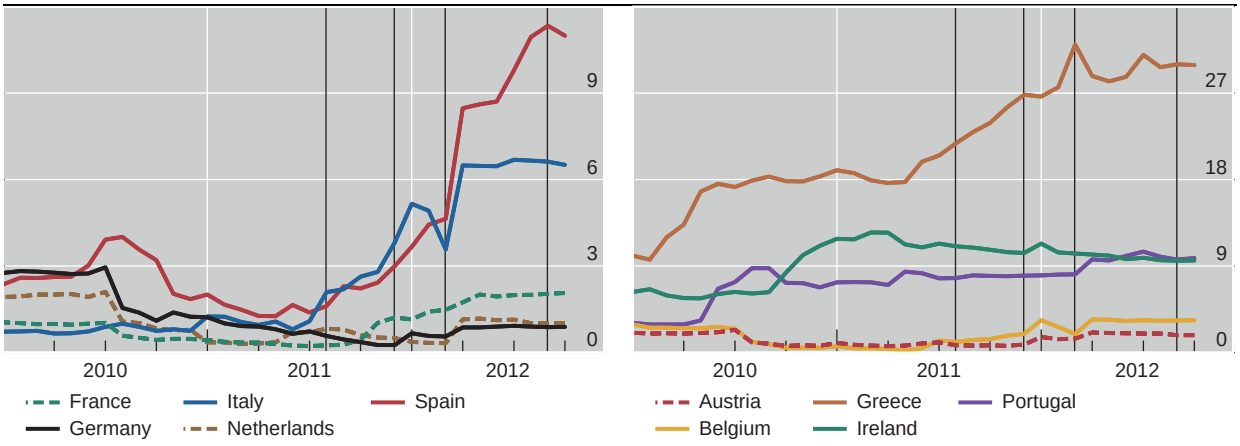
[1] Outstanding amounts on September 2012. [2] Data for the Emergency Liquidity Assistance (ELA) have been deducted from national central banks' balance sheets.

Sources: ECB; IMF, *International Financial Statistics*; Bloomberg; national data; authors' calculations.

Reliance on ECB funding[1]

As a percentage of banking sector assets

Graph 12



The vertical lines correspond to the following dates: 8 August 2011: re-activation by ECB of SMP to purchase Italian and Spanish sovereign debt; 21 December 2011: first ECB LTRO; 29 February 2012: second ECB LTRO; 6 September 2012: decision by ECB's Governing Council on the modalities of OMTs.

[1] Including Emergency Liquidity Assistance (ELA); data deducted from national central banks' balance sheets.

Sources: ECB; IMF, *International Financial Statistics*; Bloomberg; national data; authors' calculations.

[20] The granting of ELA by euro area national central banks requires the prior approval of the ECB Governing Council and is provided on the sole responsibility and at the exclusive risk of the central bank of the country concerned.

The euro area financial crisis substantially increased the dependence of national banking systems on central bank liquidity. This is the clearest for Greece, with almost 30% of total bank assets financed by ECB liquidity by the end of September 2012, while for Ireland and Portugal the proportion has reached about 10% (Graph 12, right-hand panel). When the crisis deepened abruptly from March 2012, with stresses that focused on Spain and spilled over to Italy, the dependence of these countries' banking systems on ECB liquidity also increased significantly (Graph 12, left-hand panel). This process was halted in the third quarter of 2012, when Spanish banks in particular started to reduce their dependence on ECB funding.

The two three-year LTROs permitted Spanish and Italian banks to build up much larger exposures to their respective sovereigns (Table 4). When growing market pressures led to rapidly increasing sovereign spreads towards the end of the first quarter of 2012, they started to scale down or even reduce these sovereign debt holdings.

MFI holdings of government bonds

In billions of euros

Table 4

	MFI euro area government bond transactions (F) and holdings (H) by country																			
	Austria		Belgium		France		Germany		Greece		Ireland		Italy		Netherlands		Portugal		Spain	
	F	H	F	H	F	H	F	H	F	H	F	H	F	H	F	H	F	H	F	H
Jan 11	0	30	4	110	8	336	5	328	3	49	–2	41	3	250	0	102	–1	26	–4	167
Feb 11	0	30	0	110	13	349	–3	326	0	49	1	41	–8	242	–2	100	–1	25	5	173
Mar 11	0	30	–1	109	–3	223	–2	323	–2	47	–1	40	–9	234	–3	96	0	25	6	180
Apr 11	0	29	0	109	9	232	3	326	0	47	–2	37	2	235	0	96	3	27	–3	176
May 11	0	30	2	111	–5	229	1	328	1	48	0	38	6	242	0	97	1	28	4	180
Jun 11	0	29	0	110	6	234	–6	322	2	50	0	38	8	249	6	103	2	29	10	190
Jul 11	0	30	–1	109	–15	218	–4	318	0	50	1	40	11	256	–2	103	0	28	–1	187
Aug 11	–1	30	–3	106	0	221	–2	315	0	45	–1	39	3	262	–4	101	–1	28	–8	182
Sep 11	0	30	1	106	–5	216	–4	311	1	46	4	43	–1	257	–5	97	0	28	–3	180
Oct 11	0	29	–4	102	0	215	3	314	0	46	–2	42	0	254	–7	89	–1	26	0	178
Nov 11	0	28	–1	102	8	221	–6	308	0	46	1	43	1	247	–1	87	0	26	2	178
Dec 11	–1	28	–6	103	–8	215	–11	295	1	46	4	46	–2	252	–4	85	0	26	23	205
Jan 12	1	29	–4	100	4	220	6	299	0	40	2	48	23	280	–1	83	1	26	23	230
Feb 12	0	29	–1	99	2	223	2	300	4	43	–6	43	23	302	6	89	2	30	16	247
Mar 12	0	30	–1	96	12	234	4	304	–4	24	–2	41	24	324	–3	86	2	33	15	265
Apr 12	1	31	0	96	1	235	–3	301	–1	22	3	45	6	327	–1	86	0	33	–1	261
May 12	0	31	1	96	14	250	–2	299	1	20	0	46	12	334	3	91	1	33	0	257
Jun 12	1	32	0	96	8	259	8	327	0	20	1	47	5	342	–3	87	–1	34	–1	257
Jul 12	0	32	–1	95	–9	252	0	326	0	19	1	49	1	342	0	88	–1	33	–7	247
Aug 12	0	33	–1	94	1	253	3	329	3	23	0	49	–6	341	–2	86	0	34	–3	244
Sep 12	0	33	0	94	11	264	6	335	0	23	0	49	5	351	3	89	1	35	9	255

Source: ECB.

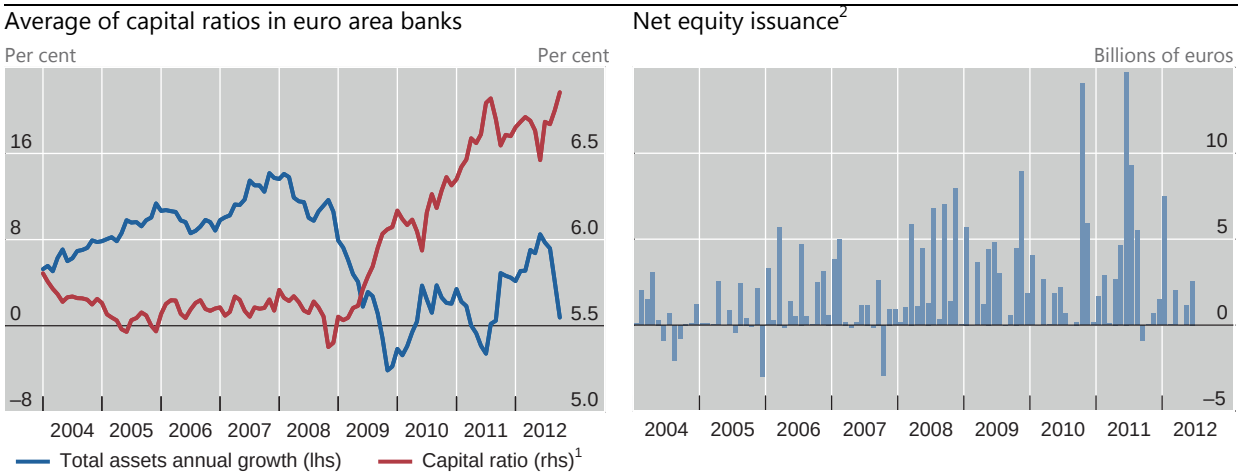
The significant increase in the dependency especially of peripheral banks on ECB liquidity has had some unintended consequences. According to the ICMA European repo market survey published in August 2012, European repos outstanding in June 2012 fell by 10% from December 2011 and by 14% year-on-year (ICMA (2012)). This was attributed by market analysts in large part to the effect of the ECB's two three-year LTROs, which reduced banks' need for repo funding. Moreover, in combination with other non-standard monetary policy actions, the

LTROs flattened the yield curve and reduced trading opportunities in European repo markets.

4.6. Capital

In parallel with the intensification of the euro area financial crisis and following the trend initiated by the 2007–09 global financial crisis, banks started to build up stable sources of funding and to improve their capital ratios. Bank capital consists of shareholders' equity and reserves, while certain forms of subordinated debt have been included as well.[21] We use as a practical definition of bank capital the one adopted by the ECB in its published data on euro area bank capital and reserves.[22]

Capital ratio and equity issuance by euro area banks — Graph 13



[1] Capital and reserves as a percentage of total assets. [2] Net issues of quoted shares by monetary financial institutions.

Sources: ECB; authors' calculations.

In the euro area, the proportion of banks' capital and reserves as a share of total assets remained broadly stable in the pre-crisis period (Graph 13). The ratio started to increase rather strongly from the end of 2008 onwards, as banks started to deleverage their balance sheets. On the one hand, the annual growth of euro area banks' total assets dropped sharply, even into negative territory in the course of 2009, as the global financial crisis intensified (Graph 13, left-hand panel). After a frequently interrupted and partial recovery, the annual total asset growth at euro

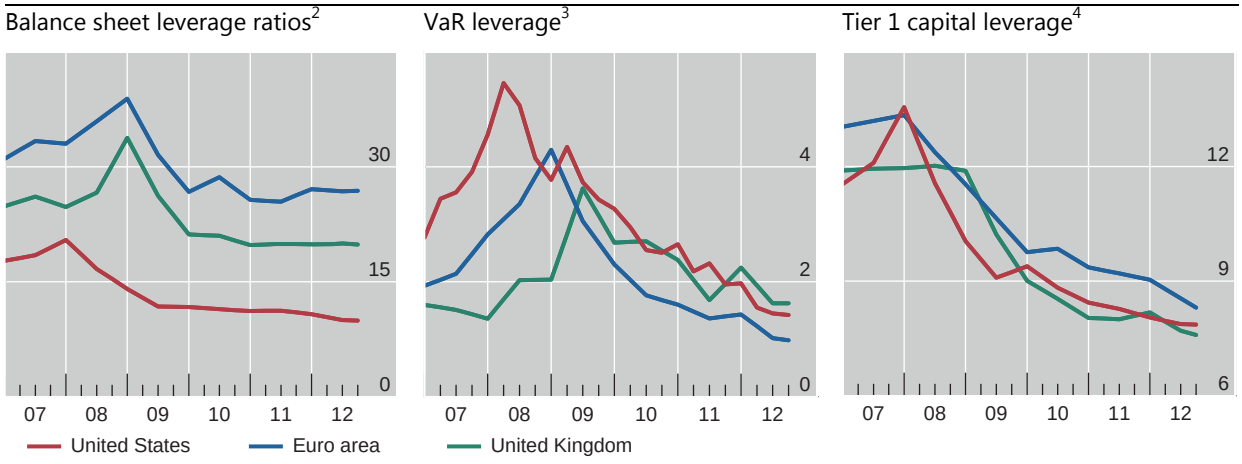
[21] In the Basel III framework, total regulatory capital is defined as the sum of Tier 1 capital, with the predominant form being common shares and retained earnings, and Tier 2 capital. The latter consists of various elements such as capital instruments not included in Tier 1 capital and which meet the criteria for inclusion in Tier 2 capital (such as issued and paid-in, subordinated to depositors and general creditors of the bank etc), stock surplus and certain loan loss provisions. Basel III aims at raising the resilience of the banking sector by strengthening banks' regulatory capital through raising both the quality and quantity of the regulatory capital base. For more details see BCBS (2011).

[22] Bank capital and reserves as published by the ECB are defined as equity capital, non-distributed benefits or funds and specific and general provisions against loans, securities and other types of assets. This is the definition used in the ECB's monetary financial institution (MFI) statistics. For more details see ECB (2012d).

area banks fell almost to zero in September 2012. On the other hand, banks in the euro area stepped up their raising of new equity (Graph 13, right-hand panel). Net equity issuance of euro area banks totalled EUR 33 billion during 2004–06, which accelerated to EUR 89 billion in 2007–09 and EUR 88 billion in 2010–September 2012.

The deleveraging of euro area banks can be illustrated by the movement of their leverage ratios in recent years. A relatively simple leverage ratio, measured as total assets divided by total equity, shows that leverage at euro area banks fell sharply in 2008, after which it stabilised during 2010–12 at a level well above that of UK and especially of US banks (Graph 14, left-hand panel). By contrast, leverage ratios that take more explicitly into account the risks associated with trading activities and balance sheets, such as value-at-risk (VaR)[23] and risk-weighted assets-based concepts, depict a strong decline in the leverage of euro area banks to levels rather similar to those of UK and US banks (Graph 14, centre and right-hand panels). The adjustment of leverage has been driven by the need to improve bank capitalisation levels in response to severe market pressures during the global and euro area financial crises. In particular, the restructuring of euro area bank balance sheets was prompted by the severe dislocations in bank wholesale funding markets, as described in Sections 4.3 and 4.4. Additionally, the anticipation of regulatory changes ahead of the implementation of the Basel III framework may have played a role in these adjustments.

Leverage ratios[1] Graph 14



[1] Samples of major national banks. The samples change across the indicators. [2] Total assets divided by total equities, weighted by asset size. [3] Annualised total trading VaR 99% confidence divided by total equities, weighted by asset size. [4] Risk-weighted assets divided by Tier 1 capital, weighted by asset size.

Sources: Bloomberg; Datastream; banks' financial statements; authors' calculations.

[23] Value-at-risk (VaR) expresses the statistical estimate of the maximum potential loss on the banks' positions measured to a specified level of confidence and a specified time horizon.

5. Conclusions

Recent experience in the euro area has again demonstrated the strong interconnection between financial crises and bank funding. During episodes of severe financial market stress, triggered predominantly by sovereign tensions, access to short- and longer-term wholesale funding markets became strained even for highly rated euro area banks, forcing them to resort to alternative funding sources or to shrink their balance sheets. For banks that did retain market access, funding became much more expensive, which eroded banks' financial strength and ultimately reduced their capacity to provide financing to both corporate and retail clients. These difficulties were the most pronounced for banks from peripheral countries where, regardless of a bank's credit rating, the difficulties faced by its sovereign became the arbiter of the bank's access to funding and its cost (see also ECB (2011b), (2012a) and (2012b)). Hence, funding markets increasingly became segmented along national borders, forcing banks from specific countries to resort to ECB liquidity.

These developments underpin the lesson from the 2007–09 global financial crisis to the effect that banks' business models should be adequately based on stable sources of financing, such as retail deposits, longer-term funding and, most importantly, equity. Moreover, events have shown that funding structures should be well balanced in terms of maturity and other risk exposures. They also highlight the strong interdependence of banks and sovereigns, underlining the principle that fiscal prudence is a prerequisite for bank stability.

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