# B THE IMPACT OF BANK FUNDING MARKET FRAGMENTATION ON CREDIT INTERMEDIATION DURING THE SOVEREIGN DEBT CRISIS

The persistent feedback loop between tensions in the sovereign debt market and the banking sector has increased the fragmentation within the euro area bank funding market, with banks in distressed countries facing much greater funding difficulties than banks operating in other countries.

This special feature analyses how, against the background of the sovereign debt crisis, funding market fragmentation has affected the capacity of banks to provide credit to the economy. A quantitative assessment based on macroeconomic models provides estimates on the effect that the market fragmentation could exert on economic activity. Overall, while the impact on the euro area as a whole is assessed to be limited, some regions have been affected disproportionately.

## **INTRODUCTION**

A central feature of the global financial crisis, which has now lasted five years, has been the severe disruption to bank funding markets. The latest phase of this ongoing crisis – characterised by stress in sovereign bonds in several euro area countries, as well as underlying macroeconomic adjustments to balance of payment rebalancing flows – has been no exception, with the intermittent emergence of liquidity and capital constraints in the euro area banking sector resulting in banks' access to and cost

of funding becoming divided largely along national lines. A closer look at the geographic and regional component of these strains has suggested that funding conditions faced by sovereign issuers, the financial sector and – importantly – the economy as a whole have played a pivotal role in this fragmentation. One clear illustration of this phenomenon can be seen in the pricing of sovereign and resident financial institution credit default swaps (CDSs), where there has been an increasing divergence in financing conditions between jurisdictions under sovereign stress and those perceived to be "safe havens" within the euro area (see Chart B.1).

For countries under stress, impediments to banks' access to funding have clearly hampered the ability of the banking sector to continue channelling funds from lenders to borrowers. In the longer term, such financial market fragmentation affects financial stability via the distortions that it can generate in both asset prices and economic allocation. At a shorter horizon, supply restrictions represent a major risk for the non-financial private sector, which may in turn fuel negative feedback effects to the financial system and hence be detrimental to financial stability. Chart B.I Bank and sovereign credit default swap spreads in the euro area



Sources: Thomson Reuters and ECB calculations. Notes: The sovereign CDS spreads for the euro area are calculated as a weighted average of the five-year CDS spreads of 11 euro area countries using the ECB's capital key as weights. The countries included are Belgium, Germany, Ireland, Spain, France, Italy, the Netherlands, Austria, Portugal, Slovakia and Finland. The bank CDS spreads are calculated as the simple average across ten large banks in the euro area. Each dot represents both the sovereign and the bank CDS spreads on a certain day in each quarter. SPECIAL FEATURES

The financial crisis led to severe disruptions in bank funding markets...

... in the euro area this dysfunctioning was further exacerbated by the sovereign debt crisis...

... in particular affecting banks in countries with distressed sovereigns, effectively implying a fragmentation of euro area financial markets The increasing fragmentation is reflected through a number of channels...

... first, by significant strains in wholesale and retail bank funding markets...

... second, by an increasing "home bias" in investment decisions...

... third, by a widening divergence in the cost and availability of external financing to the non-financial private sector Three key aspects of the increasing fragmentation of the euro area financial markets during the sovereign debt crisis are particularly worth highlighting.

First, some euro area countries have been exposed to significant *funding strains* in recent months – both in retail and wholesale markets. Perhaps most worryingly, banks resident in countries characterised by sovereign stress have suffered from some reallocation of bank deposits; investors and corporates in particular have shown a high sensitivity to stress, while retail deposits have been comparatively more stable. As a result, from the end of 2011 up until September 2012 there was an outflow of (non-interbank) deposits from the distressed countries amounting to  $\in$ 80 billion.<sup>1</sup> Some of the money flowing out of distressed euro area countries has instead moved into the banking systems of other euro area countries where, since the end of 2011, an inflow of (non-interbank) deposits from the distress is not the only factor driving deposit outflows in those countries; the weak macroeconomic conditions are also likely to exert downward pressure on non-financial corporations' liquidity in particular and hence on the funds they deposit with the banks. Furthermore, it must be acknowledged that even within the group of distressed countries, bank deposit developments mask significant differences across jurisdictions.

Second, there have been increased signs of *home bias in investment decisions*, with sovereign debt and credit markets becoming more domestically oriented. Notably, interbank lending from banks resident in countries less affected by the sovereign debt crisis to banks in the distressed countries has fallen substantially and anecdotal evidence suggests that many banking groups are increasingly trying to fund their cross-border branches and subsidiaries locally to limit any cross-border exposures. Overall, in the distressed countries, deposits from monetary financial institutions (MFIs) (excluding the Eurosystem) have fallen by  $\in$ 133 billion since the end of 2011 and, by the end of the third quarter of 2012, cross-border interbank deposits in those countries from banks in other euro area countries represented only around 20% of total interbank deposits, compared with around 45% in early 2008. Indeed, since the end of 2011, cross-border interbank loans have fallen by 17% for banks located in distressed countries, compared with a 2% decline recorded in the rest of the euro area.

Third, and partly as a consequence of the other two features, a widening *divergence in the cost and availability of external financing to the non-financial private sector* has been observed. For instance, loan growth in the distressed countries has fallen into negative territory in recent months (with an annual growth rate of around -5% by the end of the third quarter of 2012), but remains positive in the other countries. At the same time, the cost of bank lending has displayed diverging dynamics across jurisdictions, increasing relatively more in those countries particularly affected by the financial tensions. While acknowledging that demand for loans may differ substantially across the euro area, the lower loan growth in the distressed countries has generally not been accompanied by lower bank lending rates, suggesting that bank loan supply effects are playing an important role as well.<sup>2</sup> In addition, according to the latest survey on small business financing conditions, between a quarter and a third of small and medium-sized enterprises in the distressed countries report that getting access to finance is their biggest challenge, compared with around 10% to 15% in the remaining euro area countries.<sup>3</sup> These bank loan supply effects are intensified by the fact that companies in the distressed countries are comparatively more reliant on bank lending.

1 In this special feature, euro area countries are grouped along the major fault lines of financial market fragmentation. Thus, the group of "distressed" countries consists of Cyprus, Spain, Greece, Ireland, Italy, Portugal and Slovenia.

2 Apart from pure bank balance sheet effects affecting loan supply, supply constraints may also be related to the deterioration of macroeconomic prospects and increased risk aversion.

<sup>3</sup> See ECB, "Survey on the access to finance of small and medium-sized enterprises in the euro area", November 2012.

This special feature examines how bank funding markets have become increasingly fragmented since the beginning of the sovereign debt crisis. First, the increasing fragmentation of these markets is analysed on the basis of market prices and bank balance sheet data. In the second part of the special feature, the implications of funding strains and bank valuation losses are then estimated for credit supply and the real economy.

## **BANK FUNDING MARKET FRAGMENTATION**

Sovereign tensions have impaired credit intermediation across the euro area through various channels and feedback loops, as illustrated in Chart B.2, thereby increasing risks to financial stability.<sup>4</sup> In particular, tensions in the sovereign bond markets may adversely affect the ability of banks to provide credit to households and firms. Increased perceived credit risk associated with euro area banks as well as the ongoing gradual loss of access to funding by euro area banks located in the distressed countries may, in turn, be a further consequence of distress in sovereign markets.

Money markets – including notably interbank markets – represent one area where such fragmentation has been apparent. Following a temporary increase in 2011, daily turnover in the unsecured segment has declined again in 2012. The declining trend in unsecured interbank lending activity observed as





## SPECIAL FEATURES

A pernicious triangle between sovereign debt markets, credit intermediation and the real economy

Cross-country fragmentation has been clearly visible in the money markets... ... with crossborder interbank lending declining, and being replaced by Eurosystem financing...

... and strong divergence in the cost of funding between banks in the distressed countries and banks in other euro area countries

the financial crisis unfolded in 2007 thus appears to have resumed. Furthermore, secured lending activity has also declined in 2012. This is quite striking given that the secured money market had been steadily increasing during the crisis, acting as a substitute – together with ECB refinancing – for the declining unsecured money market. The decline in money market activity observed in 2012 should however be seen in the light of the substantial amount of liquidity injected via the two three-year longer-term refinancing operations (LTROs) conducted in December 2011 and February 2012, respectively. This liquidity may, to some extent, have crowded out the money market. Market fragmentation is also illustrated by the steady decline in the share of cross-border intra-euro area money market loans in the overnight segment since the intensification of the financial crisis in late 2008. This trend has been reinforced in the distressed countries since mid-2011. In mid-2012 cross-border interbank deposits from banks in other euro area countries represented only around 20% of total interbank deposits, compared with around 45% in early 2008 (see Chart B.3). In parallel, interbank lending among domestic banks also declined over the same period. On the other hand, private sector interbank liquidity has largely been substituted by funding from the Eurosystem which, by the end of the third quarter of 2012, provided close to 50% of total interbank deposits placed with MFIs in the distressed countries.

These distortions in interbank markets have taken place in a context of a generalised fragmentation of bank funding conditions – with a significant tightening (also in relative terms) of financing conditions for banks located in distressed countries. This is visible in the large disparities in the cost of market-based debt financing of banks across countries. Moreover, these developments have been reinforced by the fact that the cost of banks' non-market-based funding sources (e.g. retail deposits) has increased significantly in countries subject to difficult funding conditions, while it has declined markedly in those countries exhibiting a funding surplus.<sup>5</sup> Overall, the gap between bank funding costs in markets in distressed economies and the rest of the euro area, which was close to zero at the beginning of 2010, has averaged more than 200 basis points since the beginning of 2012 (see Chart B.4).

5 See also Box 8 in ECB, Financial Stability Review, June 2011.



# Chart B.4 Nominal cost of market-based debt for euro area banks



The disparities between distressed countries and the other euro area countries have not only been visible with respect to funding costs but also funding availability. A gradual loss of access to funding by euro area banks located in distressed countries has also become more pronounced in the course of 2012 (see Chart B.5). While MFIs resident in distressed countries are facing increasing funding pressures (practically only offset by higher recourse to Eurosystem refinancing), MFIs resident in the countries less affected by the sovereign debt crisis face funding surpluses reflected in considerable deposit inflows. One notable implication of this development is that many banks in fiscally vulnerable economies are excluded from the market, and the Eurosystem is increasingly playing an intermediation role in those countries. Symmetrically, on the asset side, banks in the other euro area countries are scaling down their exposures to the distressed economies in the euro area. Although part of this movement is explained by banks' deleveraging policy, the stronger reduction recorded in cross-border claims on distressed economies illustrates the increasing fragmentation between those euro area economies that are distressed and those that are not (see Chart B.6).<sup>6</sup>

The impact of developments in national sovereign debt markets on banks' funding conditions is not only apparent in market-based indicators but also survey-based information – notably banks' replies to the Eurosystem's bank lending survey (BLS). According to the surveyed banks, the intensification of the sovereign debt crisis deepened the divergences in banks' funding conditions for retail as well as wholesale funding across different market segments in the euro area.

For more details on EU banks' deleveraging process, see ECB, "EU bank deleveraging - driving forces and strategies", Financial Stability

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s area countries... n ... and there have been strong declin

**Deposit** outflows

flowing into banks

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from distressed countries are partly

... and incre have been strong declines in banks' exposures to the distressed countries

The negative impact of the sovereign debt crisis has also been reflected in banks' replies to the bank lending survey...



Financial Stability Review December 2012

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... with a reported worsening of banks' funding conditions and a net tightening of their credit standards ...

... in the most recent quarter, however, the OMT announcement seemed to have mitigated somewhat these negative effects

Concerning the negative impact of the sovereign debt crisis on banks' funding conditions, in mid-2012 banks indicated in their replies to the BLS a temporary rise in the detrimental impact for the euro area as a whole after some relief reported for the first quarter of 2012 following on from the two three-year LTROs (see Chart B.7; left-hand panel). At the same time, there was a notable divide between distressed countries more affected by the sovereign debt crisis and the other countries. While for the distressed countries, the rise in the reported negative impact on their funding conditions was, on average, quite substantial (42% in the second quarter of 2012, in net terms, after 10% in the first quarter of 2012), the rise remained rather contained for the other countries (9% in the second quarter of 2012, in net terms, after 0% in the first quarter of 2012). These developments confirm the temporarily deepening divergence in banks' funding conditions in mid-2012 on account of sovereign risk developments. By contrast, the announcement of Outright Monetary Transactions (OMTs) by the ECB in the third quarter of 2012 seems to have mitigated the adverse impact of sovereign risk on banks' funding substantially, particularly for the distressed countries. Concerning the ultimate impact of funding constraints related to the sovereign debt crisis on changes in banks' credit standards, these effects remained notable both in the second and third quarters of 2012 (see Chart B.7; right-hand panel). In the third quarter of 2012, 7% of the euro area banks, in net terms, reported a tightening of credit standards on account of these constraints, mainly driven by a tightening of, on balance, 13% of the banks in distressed countries.

Across the different funding segments, further divergence was particularly noticeable for wholesale funding and somewhat less pronounced for retail funding (see Chart B.8). More specifically, after the temporary relief in the first quarter of 2012, deteriorations were reported, particularly for debt securities markets and securitisation and, to a somewhat more limited extent, for money markets. Likewise, the deepening divergence between distressed countries and the other countries in the euro area

## Chart B.7 Negative impact of the sovereign debt crisis on euro area banks' funding conditions and credit standards applied to enterprises and housing loans (net percentages of banks reporting a negative impact on funding conditions or on credit standards) euro area



#### Chart B.8 Deterioration in euro area banks' access to wholesale funding over the past three months



4 Financial Stability Review December 2012 was particularly pronounced in mid-2012 for these market segments, with for instance, on balance, 37% of the banks in distressed countries reporting deteriorations in their access to debt securities markets in the second quarter of 2012 (up from a net percentage of 35%, recording an actual improvement for the first quarter of 2012) compared with only 2% in the other countries (up from actual improvements recorded by, on balance, 29% in the first quarter of 2012).

The contagion from the sovereign debt crisis to the banking sector and the detrimental effects it may have on banks' ability to fund themselves could have serious repercussions on banks' capacity to provide credit to the real economy.<sup>7</sup> The funding constraints on banks, especially in the group of distressed euro area countries, are likely to reduce the amount of loans they are able to supply to households and firms. The ad hoc BLS questions on the impact of the sovereign crisis, presented in Chart B.7, confirm that the impact on the tightening of banks' credit standards was stronger (in terms of net tightening) in the distressed countries than elsewhere in the euro area.

# RISK ANALYSIS: SOVEREIGN TENSIONS, BANK FUNDING CONSTRAINTS AND REAL-FINANCIAL **INTERACTIONS**

Macro-financial models offer one means of providing a quantification of the potential impact that the funding market fragmentation stemming from the sovereign debt crisis may have on credit intermediation and the real economy. To this end, this sub-section analyses bank funding and solvency based on the adverse scenarios applied to the ECB's top-down bank solvency analysis framework presented in Section 4.3 combined with structural macroeconomic models that take into account financial frictions.

As illustrated in Chart B.2, there are a variety of channels through which fragmentation of funding markets has an impact on the economy. Perhaps most importantly, fragmentation in the form of the significant divergence observed in sovereign bond yields and bank funding constraints across euro area countries is likely to produce a number of effects on banks' balance sheets and their profit and loss accounts.8

First, it implies mark-to-market (MTM) valuation losses on euro area banks' sovereign exposures in their trading books. By contrast, securities held in the available-for-sale portfolio and in the banking book would largely be unaffected by an asset price shock. Second, the increase in sovereign credit spreads would be expected to raise the cost of euro area banks' funding (as shown above). This increase would be partly passed on to short-term retail loan and deposit rates, thus affecting banks' net interest income.<sup>9</sup> Since banks seek to counter the adverse impact of the funding shock on their earnings, lending margins tend to increase, exerting an adverse impact on real economic activity.

## **SPECIAL FEATURES**

The sovereign tensions and bank funding fragmentation could have real economic implications...

... through the *impairment it* mav exert on banks' credit intermediation function

Several channels through which intermediation may be affected...

... via MTM losses on banks' sovereign exposures...



See Chart B.2 for a stylised illustration of the various channels of transmission and feedback linkages between sovereign markets, banks and the real economy.

The quantification of the impact on banks' profits and balance sheets is based on the "joint" sovereign contagion and funding fragmentation scenario described in Section 4.3, which also includes details about the key assumptions and the methodology underlying the calculations. In summary, the simulated country-specific shocks to long-term government bond yields range from 0 to 545 basis points compared with present levels, while shocks to stock prices range from -2% to -43% across euro area countries. Bank funding costs are affected by a 40 basis point shock to the three-month EURIBOR (that affects its retail lending and deposit rates) and its wholesale funding costs are affected by country-specific shocks to bank CDS spreads calibrated via the shocks to long-term government bond yields.

<sup>9</sup> Overall, the direct impact on bank solvency ratios from the MTM losses and the increase in funding costs results in a change in the core Tier 1 capital ratio ranging from -5 percentage points to 1 percentage point across the euro area countries. In a few countries, banks experience positive core Tier 1 ratio changes, on account of the fact that MTM losses and wholesale funding cost increases in those countries were minor, while the increase in the short-term interest rate is found to have a stronger impact on their lending rates than on their deposit rates (i.e. increasing net interest income).

... via higher funding costs being passed on to retail lending and deposit rates

The combination of constrained access to wholesale markets, deposit outflows and more structural funding model adjustments can give rise to asset-side deleveraging and a reduction of loan supply

... that in turn may have negative real economic implications Pressure on sovereign bonds would most likely be accompanied by funding constraints and resulting balance sheet adjustments. In line with developments observed in recent quarters, funding constraints could be expected to emerge from at least three channels. First, they could emerge from deposit outflows from banks in the more distressed euro area countries, a share of which could flow into banks located in less distressed countries.<sup>10</sup> Second, banks may only be able to roll over part of their wholesale debt that is maturing over the next two years, with rollover rates likely to reflect differences across banks in terms of the degree of stress affecting their sovereign.<sup>11</sup> Third, the fragmentation of the funding market also forces many banks to advance with efforts to alleviate the more structural and medium-term funding-related pressures on their balance sheets, such as targeting specific loan-to-deposit ratio targets that reflect a more general need to reduce wholesale funding reliance (also in the light of upcoming Basel III-based liquidity requirements).<sup>12</sup>

In those countries where adverse developments are expected, such quantitative funding constraints on credit intermediation induce banks to engage in deleveraging policies. Overall, the funding constraints induce the affected banks to deleverage their balance sheets, producing a shock to loan supply that in turn has negative repercussions on economic activity. For many banks, these deleveraging forces exceed the acute pressures on their balance sheets from the short-term liquidity shortages observed towards the end of 2011 that were addressed by the two three-year LTROs. If it is assumed, in addition, that there is a pecking order of deleveraging whereby banks first shed their more liquid assets (such as non-domestic sovereign bonds and interbank exposures), followed by foreign credit exposures and, only as a last resort, reduce their domestic loan book, quantitative constraints on lending (loan supply shocks) result.<sup>13</sup> The size of the loan supply shocks ranges from slightly positive (mainly owing to deposit inflows) in a few countries to close to -10% of the outstanding loan book in the worst affected countries (see Chart B.9). It is, however, important to note that the derived magnitude of such disorderly deleveraging does not take into account the impact of potential mitigating policy actions by, for instance, regulators or central banks.

The macroeconomic impact resulting from the shocks to bank solvency positions is derived using a dynamic stochastic general equilibrium (DSGE) model, which includes a well-specified household and corporate sector subject to borrowing constraints (linked to the value of their collateral) as well as a capital-constrained, profit-optimising banking sector.<sup>14</sup> Overall, the effects of the joint sovereign contagion and funding stress configuration entail a country-specific impact on real GDP growth, in percentage point deviations from the baseline, ranging from -0.3 for the less affected countries (on a GDP-weighted average basis) to -1.9 for the distressed countries by the end of 2012 and from -0.4 for the less affected countries to -2.5 for the distressed countries by the end of 2013. On average, across the euro area countries, the impact in turn amounts to -0.8 by the end of 2012 and to -1.0 by the end of 2013, in percentage point deviations from the baseline. Obviously, in applying these estimates to actual economic conditions in countries under stress, some of these impacts may have already become apparent – as suggested by the wide range of economic projections for euro area countries reported in, for example, the European Commission's European Economic Forecast Autumn 2012.

- 10 The simulated deposit outflows range from 20% for banks in sub-investment grade countries to -1% in AA-rated countries. It is assumed that some of these flows end up in banks in AAA-rated countries.
- 11 The assumed rollover rates range from 90% for AAA-rated countries to 50% for sub-investment grade countries.
- 12 More stringent loan-to-deposit ratios are imposed on countries under distress (also reflecting concrete requirements in the context of the EU/IMF programmes). The target loan-to-deposit ratios range from 175% for AAA-countries to 110% in sub-investment grade countries.
- 13 See e.g. L. Maurin and M. Toivanen, "Risk, capital buffers and bank lending: a granular approach to the adjustment of euro area banks", ECB Working Paper Series, No 1499, 2012, and C. Kok and G. Schepens, "Banks' reactions after capital shortfalls", ECB Working Paper Series, forthcoming.
- 14 See M. Darracq Pariès, C. Kok and D. Rodriquez Palenzuela, "Macroeconomic propagation under different regulatory regimes: an estimated DSGE model for the euro area", *International Journal of Central Banking*, December 2011.

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Chart B.9 Size of country-specific loan supply shocks owing to sovereign contagion and funding fragmentation





### Chart B.10 Change in country aggregate core Tier I ratio owing to sovereign contagion and funding fragmentation

(percentage point change; end-2011 to end-2013; maximum, minimum, interquartile distribution and median)



These country-specific macroeconomic scenarios would subsequently affect banks' solvency position via the effects on their profit and loss accounts. The extent of this impact is estimated by projecting the main variables determining banks' solvency, such as the credit risk parameters, profits and risk-weighted assets (see Section 4.3 for details on the solvency analysis framework applied). Owing to the cross-country heterogeneity in the imposed shocks, the resulting impact on core Tier 1 ratios likewise varies substantially across banks in different countries (see Chart B.10). Notably, banks in the distressed countries are, on average, expected to be more severely affected in terms of their solvency (-2.5 percentage point change, on average, between the end of 2011 and the end of 2013), whereas banks resident in the less affected countries are (with few exceptions) more resilient to the funding market fragmentation considered here.

# **CONCLUDING REMARKS**

The analysis presented in this special feature suggests that the sovereign debt crisis combined with heightened distress in bank funding markets has contributed to the fragmentation of the euro area banking sector. Banks' funding conditions have been affected by sovereign risk via different channels. First, banks' direct exposures to sovereign debt, while in principle providing banks with a stable stream of revenues, have at the same time contributed to weakening their balance sheets in the eyes of investors and thereby decreased their creditworthiness as counterparties. Second, higher sovereign risk reduces the value of the sovereign collateral banks post to raise their wholesale funding. In addition, other effects emanating from implied effects on the value of implicit or explicit government guarantees or further financial contagion, from sovereign to sovereign or from sovereign to banks, contribute to the overall effect on banks' funding conditions.

Illustrative quantitative estimates exploring the combined effects of the fragmentation and the sovereign debt crisis vary widely across euro area countries, with the distressed economies most severely affected. The effect of the sovereign debt crisis on economic activity remains nonetheless contained at the euro area level – not least as redistributive effects associated with fragmentation may lead to a muted aggregate effect. While these estimates provide a useful means of quantifying

... which could further impair banks' lossabsorption capacity and exert pressure on their solvency position

Financial market fragmentation is a cause for concern...

... in particular, as it may seriously impair the credit intermediation process...

... entailing significant financial stability risks

The increasing fragmentation of euro area financial markets is also hampering the smooth transmission of monetary policy





prospective effects under clear assumptions, reality is, of course, far more complex. In particular, the weakening of economic activity predicted by model-based estimates could extend beyond the channels analysed, thereby potentially amplifying initial adverse effects.

Recent policy measures, including plans for the Single Supervisory Mechanism, should help break the adverse feedback loop between banks and sovereigns Ultimately, fragmentation has remained a key financial stability issue throughout the sovereign debt crisis. For the ECB, fragmentation has not only been a source of concern from a financial stability perspective, but also in its role in hampering the effective transmission of monetary policy – and the key need for regional lending conditions to adequately reflect Eurosystem key policy rates. This has motivated several non-standard policy measures to improve the effectiveness of monetary policy. Eurosystem support in itself presents only part of the solution – indeed, sustained political efforts at the national and pan-European level are needed to ultimately sever the "Gordian knot" which has emerged between sovereigns and their resident banks. In this regard, the June 2012 European Council agreement to allow for the direct recapitalisation of banks by the European Stability Mechanism once the Single Supervisory Mechanism has been established constitutes an important step towards breaking the adverse feedback loop between sovereigns and banks.