



EUROPEAN CENTRAL BANK
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FINANCIAL STABILITY REVIEW

NOVEMBER 2013





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FOREWORD

The ECB has been publishing its *Financial Stability Review* for nearly a decade. During this time, the Review has strived to identify and prioritise the main risks and vulnerabilities for the euro area financial sector. It has done so to promote awareness of these risks among policy-makers, the financial industry and the public at large, with the ultimate goal of promoting financial stability. Capturing the notion of financial stability is not easy; the ECB defines it as a *condition* in which the financial system – intermediaries, markets and market infrastructures – can withstand shocks without major disruption in financial intermediation and in the effective allocation of savings to productive investment.

The last years have seen many challenges to euro area financial stability. Among them, feedback loops among banks and sovereign borrowers have become a major cause of financial stress in some countries since 2011. The establishment of a banking union in the euro area has the potential to mitigate such a source of risk based on five mutually reinforcing elements: (i) a single rulebook for banks; (ii) a single framework (or “manual”) for banking supervision; (iii) a single mechanism for resolving banks; (iv) a common backstop in case temporary fiscal support is needed; and (v) a common system for deposit protection.

Progress continues to be made in all five areas, though at an uneven pace. Fast and substantive progress has been made towards the establishment of a single supervisory mechanism (SSM), which will become operational in November next year. Accordingly, the group of banks analysed within this Review has been enlarged to approximate that of the institutions that will be under the direct supervision of the ECB.

This Review also includes three thematic special features. An update on preparatory work for banking supervision at the ECB is contained in Special Feature A. Moreover, taking into account that the ECB’s new role will include a macro-prudential dimension, Special Features B and C provide perspectives that can be used to analyse two broad classes of macro-prudential instruments – that is, in the *time-series* (i.e. cyclical) and *cross-sectional* (i.e. across banks) dimensions of systemic risk.

The Review has been prepared with the involvement of the ESCB’s Financial Stability Committee. This Committee assists the decision-making bodies of the ECB, and in the future the Supervisory Board of the SSM, in the fulfilment of their tasks.

Vítor Constâncio
Vice-President of the European Central Bank

OVERVIEW

Financial stress has remained moderate in the euro area in recent months, despite periods of considerable global financial market turbulence. Measures of systemic stress in the banking sector have declined markedly since the peaks that followed the intensification of the sovereign debt crisis in mid-2011 (see Chart 1). A broad composite measure of systemic stress across major euro area financial asset classes has fallen even further, to lows not seen since global financial strains first emerged in the summer of 2007.

This resilience partly reflects the improvement of euro area fundamentals since the height of the euro area crisis in 2011. Fiscal consolidation and structural reforms have continued in the euro area, though at an uneven pace across countries. At the same time, higher capital and liquidity buffers are being built up in the banking sector, strengthening shock-absorption capacity, which should improve bank performance over time. Complementing national policy measures, tangible progress has been made towards building a banking union. The progress in the area of banking is matched by developments in financial markets, where bond and equity market indicators – such as yield differentials and curve slopes – reflect a favourable re-evaluation of euro area fundamentals vis-à-vis other economic regions (particularly emerging market economies), as well as somewhat lower intra-area fragmentation over the last half-year.

Notwithstanding these advances, the euro area adjustment process remains incomplete. Further efforts are needed to remove the risk of further negative interactions, at the country level, among stressed sovereigns, diverging economic growth prospects and bank fragility. First, there is a need to correct a loss of competitiveness which has restrained economic growth in some countries, as well as to further address remaining public and private sector indebtedness. Second, the outlook for bank profitability remains weak; this is partly because the process of bank restructuring – including downsizing – remains incomplete, and partly due to the protracted impact of loan losses on provisions and reported earnings. Aggravating this, considerable (albeit diminished) fragmentation in the availability and cost of bank funding persists in some countries. To help resolve these hurdles, further progress towards establishing a banking union will make an important contribution. As preparations for the operational start of the single supervisory mechanism gain momentum, complementary steps are needed to establish a single and effective European common bank resolution framework.

The above-mentioned vulnerabilities, as well as the challenges inherent in a global economy only slowly emerging from the financial and economic crisis, help explain the prospective risks for euro area financial stability depicted in Table 1. The four risks in the table are listed separately for clarity, but are not independent – rather, if triggered they have the potential to be mutually reinforcing.

Euro area stress moderate amid financial market stress...

... as euro area fundamentals continue improving

But financial stability conditions remain fragile

Chart 1 Measures of financial market and banking sector stress in the euro area

(Jan. 2007 – 15 Nov. 2013)

- probability of default of two or more LCBGs (percentage probability; left-hand scale)
- composite indicator of systemic stress (CISS) (right-hand scale)



Sources: Bloomberg and ECB calculations.
Note: See Charts 2.3 and 3.13 for more details on these indicators.

Four key risks to euro area financial stability

Table 1 Key risks to euro area financial stability

	Current level (colour) and recent change (arrow)*
1. Economic and financial shocks that affect asset valuations and bank profitability, eroding confidence in the euro area financial sector	
2. Renewed tensions in sovereign debt markets as a result of delayed national reforms, unforeseen bank recapitalisation needs or a rise in global bond yields	
3. Global financial market turbulence, with asset mispricing and low market liquidity	
4. Bank funding challenges in stressed countries that force banks to deleverage excessively	
pronounced systemic risk	
medium-level systemic risk	
potential systemic risk	
* The colour indicates the current level of the risk which is a combination of the probability of materialisation and an estimate of the likely systemic impact of the identified risk, based on the judgement of the ECB's staff. The arrows indicate whether this risk has intensified since the previous FSR.	

Key risk 1: Economic and financial shocks that affect asset valuations and bank profitability, eroding confidence in the euro area financial sector

A weak economy is weighing on bank profitability...

Profit generation continues to be a challenge for euro area banks. The protracted economic downturn since 2011 has impacted credit quality, while interest margins have remained compressed. Subdued growth prospects and high unemployment continue to weigh on bank performance in a number of euro area countries, particularly when interacting with high private sector indebtedness (see Chart 2). Any upward spike in interest rates from low levels, for instance given turbulence in global bond markets, could also present challenges for bank profitability.

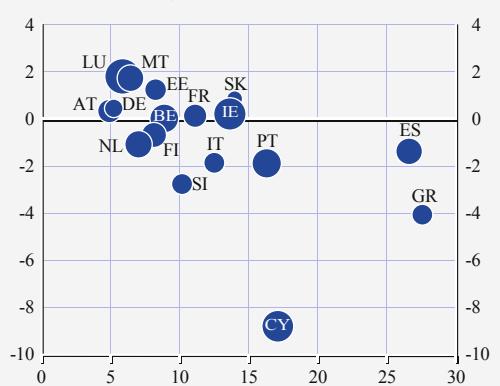
Recent macroeconomic data have contained promising signs that the euro area is emerging from a business cycle trough. Economic sentiment data, in particular, have been pointing to an expansion gaining traction following a year and a half of recession in the euro area. However, the recovery remains gradual, with the latest ECB staff macroeconomic projection of an increase in euro area real GDP of 1.0% in 2014. Moreover, downside risks surrounding the macroeconomic outlook for the euro area dominate, also aggravated by increasing downside risks to the health of emerging market economies, which have contributed strongly to global economic growth over the last years.

A potentially weak economic recovery presents challenges for a return to more profitable intermediation activity of banks. An increasing recognition of loan losses suggests banks are internalising the impacts of a weak economy on credit quality. Non-performing loans (NPLs)

Chart 2 Unemployment, economic growth and private sector indebtedness across euro area countries

(percentages)

x-axis: unemployment rate (September 2013)
y-axis: real GDP growth forecast for 2013



Sources: Eurostat and ECB.

Notes: The size of the bubbles shows the size of private sector indebtedness as a percentage of GDP as of the second quarter of 2013. Data on non-financial firms include cross-border inter-company lending, which may be particularly relevant for countries where international holding companies are traditionally located (e.g. Ireland and Luxembourg).

and the associated provisioning have grown to such an extent that they have been the major contributor to the low return on assets of euro area significant banking groups since 2009 (see Chart 3).

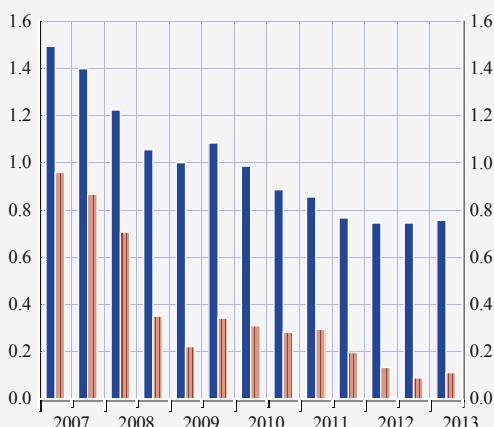
Around 130 significant euro area banks will fall under the direct supervision of the ECB in November 2014. Accordingly, this Review introduces a new set of “**significant banking groups**” (SBGs) – the consolidated group level analogue of these significant banks, which amounts to up to 90 banking groups (depending on data availability). Alongside this new group of banks, the Review also retains its traditional analysis of “**large and complex banking groups**” (LCBGs), both at the euro area and global level. Box 5 contains further details on these bank samples.

Up to now, impaired loan growth has been disproportionately affecting euro area banks outside the group of largest banks (see Chart 4). Determining an appropriate degree of provision coverage during periods of economic uncertainty is complex, given the multitude of decisions needed regarding the appropriate classification of loans and realistic collateral valuation. But on aggregate, although provisioning is increasing, it has barely kept pace with the deterioration in asset quality, on average, highlighting a potential further need for additional reserves to strengthen bank balance sheet resilience in case asset quality deteriorates further. *Prima facie*, provisioning needs would be greatest where there is a combination of exposures to highly indebted households and firms, volatile asset prices (notably property prices), rising unemployment and weak domestic demand. Such vulnerabilities might also interact in some countries with lengthy legal procedures in case of borrower insolvency, thereby fostering balance sheet uncertainty and constraining banks’ lending ability.

Chart 3 Pre- and post-provision return on assets of euro area banks

(H1 2007 – H1 2013; percentages; medians)

— pre-provision return on assets
■ return on assets



Source: SNL Financial.

Note: Based on publicly available data on significant banking groups that report semi-annual financial statements.

Chart 4 Impaired loans of euro area banks

(H1 2007 – H1 2013; percentage of total loans; 10th and 90th percentiles and interquartile range distribution across significant banking groups)

— median for significant banking groups
····· median for large and complex banking groups



Source: SNL Financial.

Note: Based on publicly available data on SBGs, including LCBGs, that report semi-annual financial statements.

... amid a continued strengthening of regulatory capital ratios...

These challenges, which are in many ways tied to the economic cycle, contrast with a structural improvement in the solvency positions of euro area banks. The median core Tier 1 capital ratio for euro area significant banking groups reached 11.3% in the first half of 2013 – a more than four percentage point increase from the beginning of the global financial crisis in 2008. This progress also corresponds to further steps towards meeting more stringent Basel III requirements over time. Progress in reducing simple (i.e. not risk-weighted) measures of balance sheet leverage has, however, been more mixed. Higher capital levels, complemented by contained use of balance sheet leverage, as foreseen in the Basel III guidelines, should provide a more solid buffer against possible losses and a more sustainable basis for banking activity going forward.

... but further action appears needed

Continued action is needed to mitigate lingering investor scepticism regarding euro area bank balance sheets. Market valuations for euro area banks have remained below their book valuation since 2009, while those of US peers have risen above 1 during 2013. While some of this difference may relate to subdued profitability prospects for euro area banks, it also relates to questions regarding asset quality transparency, which would benefit from more extensive disclosure, a cleaning-up of bank balance sheets and removal of legal obstacles to NPL resolution. Importantly, the ECB has started a comprehensive assessment of the most significant euro area banks, which are expected to fall under its supervisory remit in November 2014. The achievement of the three main goals of this exercise, namely to (i) enhance transparency, through the quality of information available on the condition of banks, (ii) provide the basis for repairing those balance sheets which are stretched by identifying and implementing necessary corrective actions as needed, and (iii) build confidence by assuring all stakeholders that banks are fundamentally sound and trustworthy, will be positive for financial stability. In settings where weak profits prevent banks from increasing capital via retention of earnings, banks need to consider alternative avenues for raising additional external capital.

Key risk 2: Renewed tensions in sovereign debt markets as a result of delayed national reforms, unforeseen bank recapitalisation needs or a rise in global bond yields

Sovereign tensions remain contained...

Following their significant easing in the second half of 2012, sovereign tensions have remained contained despite observed volatility in global financial markets. Spreads of ten-year sovereign bond yields over benchmark overnight index swap rates currently stand around the same levels as those that prevailed in May this year – prior to the onset of global bond market volatility – for most countries. Importantly, such spreads have fallen over the period for several countries subject to intermittent stress over the last years, to the tune of 55 basis points in Spain, 50 basis points in Ireland, 30 basis points in Italy and 25 basis points in Portugal. Relatively less favourable developments for the latter two countries can be linked to political uncertainty during the summer. In stark contrast to more severe stress phases over the last years, these uncertainties at the country level have been digested by markets as idiosyncratic rather than systemic in nature, with limited spillover effects on broader market sentiment. These bond market developments are also reflected in credit default swap (CDS) pricing, where CDS spread levels for sovereigns are well below the peaks witnessed during the more acute phases of the crisis. That said, the CDS-implied sovereign–bank link in the euro area still appears stronger than in other economies such as the United States (see Chart 5).

... but the need for further policy action remains

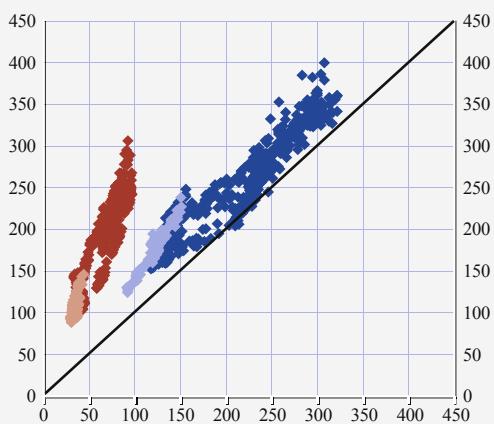
Continued adjustment towards sustainable fiscal positions has helped to underpin this improved market sentiment towards euro area sovereigns. Such adjustment nonetheless remains incomplete for several countries (see Chart 6). These fiscal imbalances, amplified by competitiveness shortfalls,

Chart 5 Sovereign and bank CDS spreads

(July 2011 – 15 Nov. 2013; basis points)

x-axis: sovereign CDS spreads
y-axis: bank CDS spreads

- ◆ euro area, July 2011 – May 2013
- ◆ euro area, May – Nov. 2013
- ◆ global, July 2011 – May 2013
- ◆ global, May – Nov. 2013



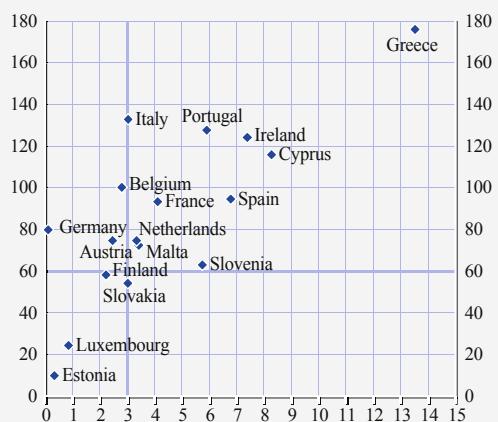
Sources: Bloomberg and ECB calculations.

Note: Average CDS spread for euro area and global LCBGs versus the average sovereign CDS spread where the LCBGs are headquartered (France, Germany, Italy, Spain and the Netherlands for euro area LCBGs and the United States, the United Kingdom, Switzerland, Denmark, Sweden and Japan for global LCBGs).

Chart 6 General government debt and deficits in the euro area

(2013; percentage of GDP)

x-axis: public deficits
y-axis: general government debt



Source: European Commission.

remain closely linked to prevailing sovereign bond market premia. While the fiscal and structural adjustment to date in several member countries has been noteworthy, implementation risks remain a cause for concern. These concerns relate to any potential for reform fatigue or complacency at the national level. Importantly, implementation risks are also present at the supra-national level, where strains could re-emerge should policy advances stall towards completing EMU and durably weakening the links between sovereigns and banks. Moreover, the current situation involving more benign market conditions remains fragile, and could be shattered in the event of renewed global bond market turbulence.

Fiscal vulnerabilities are only one element underlying the adverse feedback between sovereigns, domestic banks and macroeconomic conditions at the heart of past euro area strains. Weakening the negative feedback loop between banks and sovereigns requires a multi-pronged strategy at the national level to ensure public debt sustainability – balancing a need to address both fiscal imbalances and economic growth – while at the same time addressing the risk of contingent liabilities for sovereign balance sheets stemming from the banking sector. The European Commission's rules on state aid to banks have helped to clarify an EU-wide regime for public interventions in troubled financial institutions. Building upon this progress, further steps are needed to clarify backstops for financial sector distress – be they public or private – at the national or European level.

A global bond market correction...

... with differing impacts on benchmark rates and risk premia

Key risk 3: Global financial market turbulence, with asset mispricing and low market liquidity

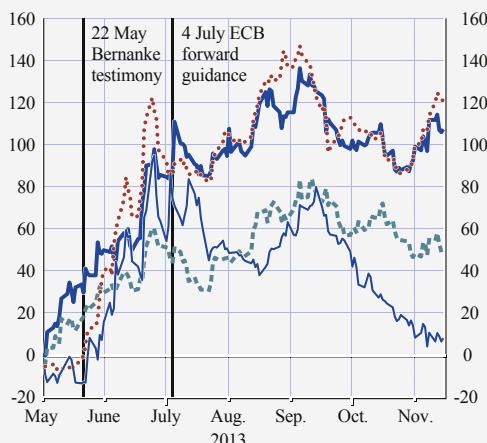
Starting in May, there was a significant repricing in global bond markets, which took place largely because of changing monetary policy expectations in the United States – with increased foreign exchange market volatility and stress borne largely by emerging market economies. Euro area bond market impacts were, however, also apparent – and can be differentiated by two key phases.

A first sovereign bond market adjustment phase involved sharp upward movements in key global benchmark interest rates, compounded by increased premia on riskier assets. What became a global bond market sell-off started in May and continued largely unabated until the end of June. Reflecting an uncertain global economic growth outlook, the sell-off was particularly pronounced for assets perceived as riskier – including sovereign debt of vulnerable euro area countries (see Chart 7). Timely forward guidance on monetary policy in July – from both the ECB and the Bank of England – attenuated unfounded upward movements in European money market rates. These measures contributed to a second phase of global bond market adjustment, this time involving a decline in global risk aversion and credit spreads. Ultimately, following this global bond market turbulence, benchmark yields have increased across the globe. The upward drift in yields was greatest in emerging market economies as well as perceived “safe havens”. Overall, ten-year US benchmark Treasury yields stand over 100 basis points higher than their early May level, similar to the average increase across a broad group of emerging market economies. For the euro area, benchmark German Bund yields are up by 50 basis points from their May levels, while on average bond yields in more vulnerable euro area countries such as Ireland, Italy and Spain have fallen back to their May 2013 levels.

Chart 7 Cumulative changes in ten-year sovereign bond yields since May

(2 May – 15 Nov. 2013; cumulative change in basis points since 2 May)

- United States
- emerging markets
- - - Germany
- stressed euro area countries



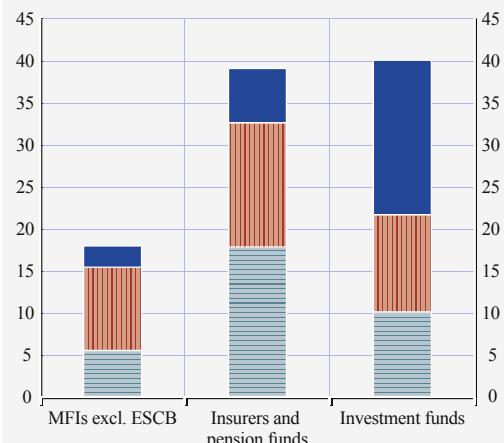
Source: Bloomberg.

Note: “Stressed euro area countries” refers to the average of bond yields in Ireland, Italy, Portugal and Spain.

Chart 8 Bond holdings of euro area MFIs, insurers and pension funds and investment funds

(Q2 2013; percentage of total assets)

- non-euro area corporate and government bonds
- euro area corporate bonds
- - - euro area government bonds



Sources: ECB and ECB calculations.

The financial stability consequences of this turbulence require an understanding of the distribution of losses – something which is unfortunately not possible to accurately measure given limited aggregate information on hedging. For the United States, estimates from the Federal Reserve suggest capital losses for US bond holders alone were around 10% through early summer 2013. Though significant, this figure was lower than the losses resulting from previous noteworthy bond market adjustments, in particular the turbulent episode in 1994. Within the euro area, direct exposure to debt markets as a proportion of assets appears to fall mainly on the side of institutional investors and less on banks (see Chart 8). That said, incomplete information on where absolute losses were greatest obfuscates a complete understanding of vulnerabilities which have resulted from bond market turbulence to date. It cannot be ruled out that ultimate exposures are concentrated among a limited number of entities which may now be more vulnerable to any further severe market shock. Such losses are potentially compounded by an environment of historically low prevailing yields in some countries, which continues to constitute a risk for institutional investors such as insurance companies.

The recent global financial market turbulence might be a harbinger of further realignment of risk premia with fundamentals in bond markets (or even an overshooting), not least as yields on higher-rated sovereign and high-yield corporate bonds remain at historically low levels. Moreover, recent outflows from bond funds have been low compared with the substantial inflows since 2009, while the outflows to date have depleted cash cushions, in particular for emerging market funds, leaving them more vulnerable to further redemptions. Reduced cash buffers, combined with low secondary market liquidity in emerging and corporate bond markets, could amplify future asset price developments. In addition, recent bond losses may place additional pressure on investors to seek yield and avoid duration, which could push investors into leveraged positions and/or lower-quality assets with low liquidity. Lastly, euro area financial stability could suffer should spillovers accompany any onset of stress in key emerging market economies.

As the potential for further adjustment remains significant, supervisors need to ensure that banks, insurers and pension funds have sufficient buffers and/or hedges to withstand a normalisation of yields by stress-testing their balance sheets. Stable and predictable macroeconomic policies, as well as efforts (such as forward guidance) to reduce market uncertainty surrounding central banks' reaction functions, are key to ensuring a smooth exit from non-standard central bank measures without an abrupt rise in bond yields.

Key risk 4: Bank funding challenges in stressed countries that force banks to deleverage excessively

Bank funding conditions in the euro area continue to normalise. Average composite bank funding costs reached their lowest level for more than three years for most countries (see Chart 9) and across all major debt instruments. In addition, country fragmentation in deposit-based funding has subsided, with continued deposit inflows in most countries, including for several countries under stress. As a result, euro area banks' funding structures have continued to shift towards arguably more stable – and away from more volatile – funding sources. Indeed, the shares of wholesale funding and foreign deposits have fallen further, in part stemming from a gradual deleveraging process in the euro area banking sector. A fall in excess liquidity in the euro area has corresponded to reduced reliance on central bank funding, with around half of the initial amount of the three-year longer-term refinancing operations (LTROs) repaid before maturity.

These positive developments on aggregate have not been sufficient to eliminate fragmentation in bank funding markets. Funding remains fragmented in terms of the availability and the cost

*Uncertain
distribution of
losses...*

*... while the
possibility of further
corrections remains*

*Stable and
predictable policies
are key to prevent
abrupt risk reversal*

*Bank funding
conditions continue
to improve on
aggregate...*

*... but fragmentation
persists...*

Chart 9 Composite bank cost of deposit and unsecured market debt funding in selected euro area countries

(Jan. 2010 – Sep. 2013; percentages; maximum-minimum range across the four largest euro area countries)

— maximum-minimum range
.... euro area average



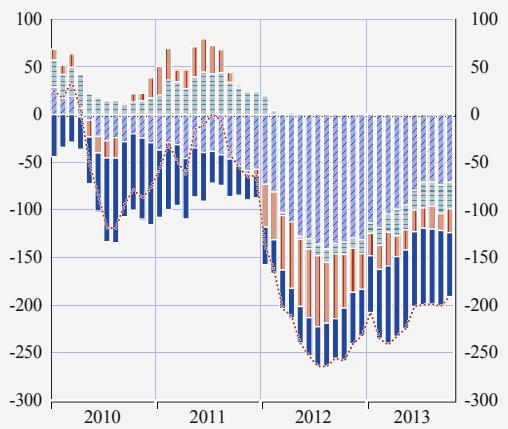
Sources: ECB, Merrill Lynch Global Index and ECB calculations.

Note: Deposit rates (for both retail and institutional investors) and cost of market-based debt financing for Germany, France, Italy and Spain, weighted using outstanding amounts taken from the ECB's MFI balance sheet statistics.

Chart 10 Net issuance of senior unsecured (debt and covered bonds in the euro area)

(Jan. 2010 – Oct. 2013; EUR billions; 12-month net issuance; moving sum)

— covered bonds (non-stressed countries)
— senior unsecured debt (non-stressed countries)
— covered bonds (stressed countries)
— senior unsecured debt (stressed countries)
.... net issuance (total)



Source: Dealogic.

Note: Excludes retained deals.

of market funding both according to the country where banks are located and their balance sheet strength (which, in turn, is tightly correlated with bank size). While debt issuance has fallen markedly for most banks since 2010 (see Chart 10), issuance by smaller banks from vulnerable countries over the last 12 months is 70% down from a comparable period leading up to mid-2011. Clearly, access to medium- and longer-term funding at sustainable costs remains a challenge for a number of mid-sized and smaller euro area banks in stressed countries. With sizeable amounts of bank debt maturing over the coming months, persistently high funding costs for a set of challenged banks could amplify pressures for deleveraging of a disorderly nature – with an associated negative impact on economic welfare and growth.

... and confidence in banks needs to be reinforced

While much of the prevailing fragmentation appears to have economic underpinnings, regulatory uncertainty regarding the potential for bailing-in of creditors might also play a role. In this respect, work continues to clarify resolution arrangements. While such measures are necessary, further steps towards a genuine euro area banking union would durably address fragmentation, assuaging remaining concerns of not only bank investors but also depositors.

ONGOING REGULATORY INITIATIVES

Strengthening of the regulatory and supervisory frameworks has continued...

Progress towards a safer post-crisis financial environment continues, with advancements in European and global regulatory initiatives in the areas of financial institutions, markets and infrastructures. Much of the progress made refers to banks – in particular the adoption of the Capital Requirements Regulation and Directive (CRR/CRD IV) that implements the Basel Committee's new global standards for capital and liquidity (Basel III) in the EU as of 1 January 2014.

*... in particular with
a banking union for
the euro area*

But perhaps the most significant achievement within the euro area concerns the advances towards a banking union. Among the various facets of a genuine banking union, progress has been greatest in moving towards a single supervisory mechanism (SSM), where concrete progress continues towards effective micro- and macro-prudential oversight being conferred upon the ECB. At the same time, headway continues to be made in relation to a second pillar of banking union and a necessary complement to single supervision – namely in the area of common resolution. This includes the establishment of an EU framework for bank recovery and resolution (BRRD), which will help to foster ex-ante clarity on the application of bail-in at the EU level, following instances earlier this year where a heterogeneity of approaches with respect to bail-ins of banks' unsecured creditors created some uncertainty regarding consistency of creditor treatment in the event of bank distress. Progress in the area of common resolution has also been made with the European Commission's proposal for a Single Resolution Mechanism (SRM) aimed at setting up a unique system for resolution, with a Single Resolution Board and a Single Bank Resolution Fund, for the resolution of banks in SSM-participating Member States. Advances in supervision and resolution require an eventual complement of a third pillar of banking union, namely a European system for deposit protection.

Financial stability will benefit from continued progress in completing regulatory reform not only for banks, but also financial markets and infrastructures. From a euro area perspective, a swift and complete implementation of the building blocks of the banking union is arguably the most pressing need – given its potential to durably address key financial stability threats outlined in this Review, including by weakening feedback loops between banks and national authorities, whilst also fostering a reintegration of euro area financial markets which is a necessary complement to European Monetary Union. Notwithstanding the considerable regulatory progress to date, continued momentum is needed to strengthen oversight not only of banks, but also of a growing shadow banking sector and derivatives markets.

I MACRO-FINANCIAL AND CREDIT ENVIRONMENT

Macro-financial risks remain significant in the euro area, despite some first tentative signs of economic recovery following a year and a half of economic downturn. Continued real and financial fragmentation, coupled with legacy balance sheet issues in several countries, continue to weigh on euro area growth prospects. At the global level, risks relate to fragilities associated with an ongoing rotation of growth, as an incipient pick-up in growth among advanced economies contrasts with a slowing of activity in emerging economies where accumulated financial vulnerabilities have come to the fore as financial conditions have tightened in the late phase of the credit cycle. There are risks that this shift in regional growth dynamics may yet become more pronounced, in particular if a broad-based adjustment in global capital flows takes place along the path to normalisation of macroeconomic policies in key advanced economies.

Amid some initial promising signs of economic recovery, *sovereign tensions* in the euro area have remained contained through much of 2013, after receding considerably in the second half of last year. Not perturbed by increased volatility in global sovereign bond markets, reduced sovereign stress comes amid ongoing adjustment of fiscal fundamentals. Nevertheless, fiscal vulnerabilities persist in several countries, relating to the continued weak economic environment, high levels of public indebtedness and/or the continued potential for adverse feedback loops between banks and sovereigns. Although much progress has been made in terms of fiscal adjustment, implementation risks in the event of reform fatigue or complacency, as well as any delay in completing EMU, in particular those measures related to weakening the sovereign-bank nexus, remain a cause for concern.

Risks in the euro area *non-financial private sector* have remained significant, though a modest economic recovery might gradually translate into improved income and earnings prospects. This still muted income and earnings outlook is compounded by high household and corporate indebtedness in several countries, as well as a combination of the limited availability and high cost of credit in more vulnerable countries, in particular for small and medium-sized firms. Residential and commercial property markets continue to show marked heterogeneity in terms of both price developments and valuations. Possible further corrections in property values in some jurisdictions represent a risk going forward.

I.1 A GRADUAL, FRAGILE AND UNEVEN ECONOMIC RECOVERY

Macroeconomic conditions in the euro area remain challenging despite the first tentative signs of economic recovery. In line with private and public sector forecasts, the euro area economy bottomed out in the first half of 2013. As with any macroeconomic turning point, sustainability remains a key challenge, in particular in this case, as legacy balance sheet issues as well as the fragile earnings and income position of firms and households continue to present headwinds to economic growth.

Economic recovery is under way in the euro area, but remains fragile

Leading indicators suggest an improving near-term economic outlook for the euro area, with survey-based PMI composite output indicators running at two-year highs. At the same time, uncertainty regarding the strength and pace of economic recovery remains considerable (see Chart 1.1), while the growth rates seen to date remain weak. The September 2013 ECB staff macroeconomic projections for the euro area suggest an annual real GDP growth of -0.4% in 2013, which is expected to accelerate to 1.0% in 2014. Nevertheless, the economic growth prospects for the euro area remain well below those for other major advanced and emerging market economies (see Chart 1.2). Moreover, this improving euro area outlook masks continued cross-country heterogeneity, albeit with a decreasing downside skew in the distribution of growth prospects across individual euro area countries.

Substantial cross-country heterogeneity...

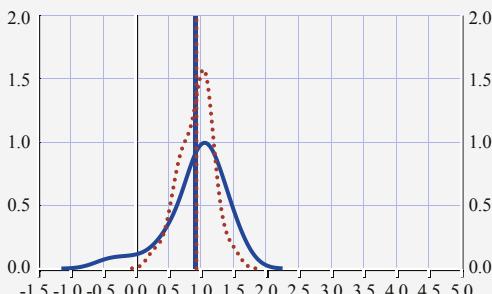
Chart I.1 Distribution of the 2014 real GDP growth forecasts for the euro area and the United States

(probability density)

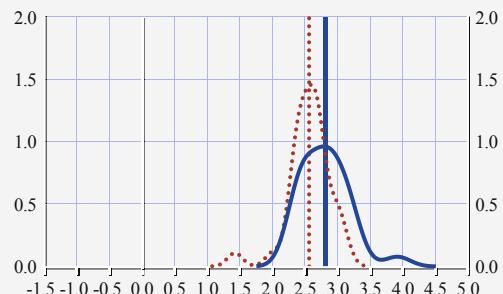
x-axis: real GDP growth rate

— January 2013 forecast for 2014
···· October 2013 forecasts for 2014

a) euro area



b) United States



Sources: Consensus Economics and ECB calculations.

... highlights the need for further rebalancing across the euro area

Efforts are ongoing to restore competitiveness in a number of euro area countries, not least by ensuring sufficient responsiveness in wages and prices, as well as by taking other measures to boost productivity. There have been significant improvements in overall competitiveness in countries under stress, as reflected in large improvements in cyclically adjusted current account balances. However, price adjustment has been sluggish partly due to indirect tax measures, but also due to price rigidities. In addition, private sector wage adjustment has only been moderate in the context of high unemployment rates. Such adjustment is, however, essential in the euro area not only to enhance growth potential in the medium term, but also to close the relatively sizeable negative output gaps in the nearer term, particularly for countries under stress (see Chart 1.3). In particular, a sizeable disparity in labour market conditions across euro area countries has underscored the role of employment and growth-enhancing structural reforms in supporting a broad-based and inclusive economic recovery and in reducing the persistent fragmentation in both the real and financial realms (see Chart 1.4).

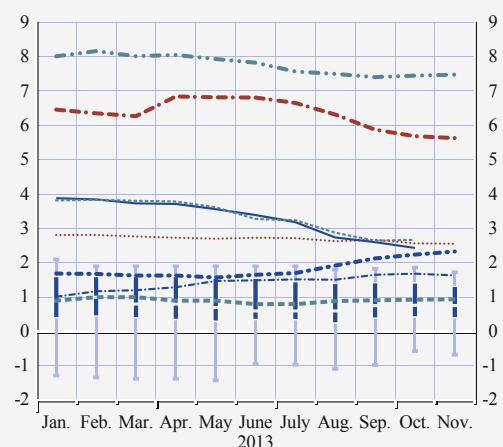
Muted global growth with underlying changes in regional growth dynamics

Mirroring economic developments in the euro area, the **global economy** has remained stuck in a low gear in 2013, with notable changes in the underlying regional growth dynamics. While economic activity in advanced

Chart I.2 Evolution of the forecasts for real GDP growth in selected advanced and emerging economies for 2014

(Jan. 2013 – Nov. 2013; percentage change per annum)

···· euro area	···· United Kingdom
— Brazil	— India
···· United States	···· China
···· Russia	···· Japan

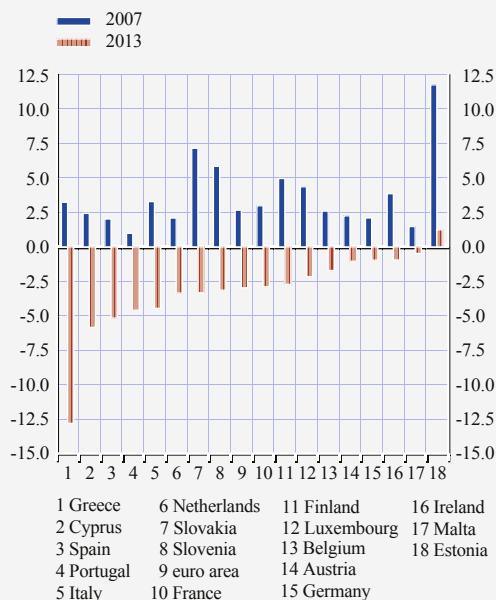


Source: Consensus Economics.

Note: The chart shows the minimum, maximum, median and interquartile distribution across the euro area countries surveyed by Consensus Economics (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and Spain).

Chart 1.3 Output gap across the euro area

(percentage of potential GDP)



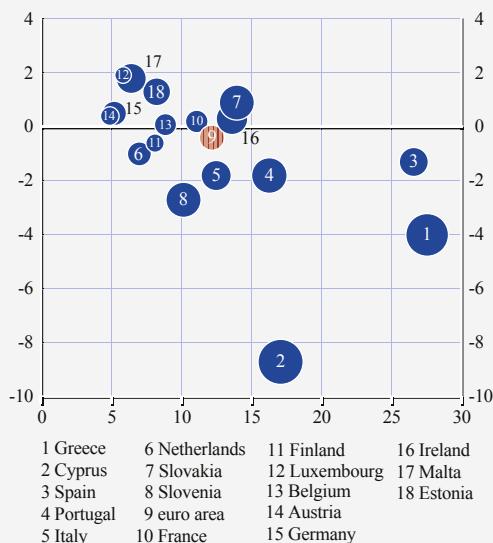
Source: European Commission.

Note: Output gap estimates for 2013 are calculated using forecasts for real GDP.

Chart 1.4 Unemployment rates, GDP growth and lending rates to the non-financial private sector in the euro area

(Sep. 2013; percentages)

x-axis: unemployment rate
y-axis: real GDP growth



*... but downside
risks remain*

adjustment in the financial and non-financial private sectors, continued tight private sector credit conditions and progressing albeit still incomplete fiscal consolidation in some countries continue to weigh on the medium-term growth outlook. However, most such growth-inhibiting factors are expected to dissipate, as the ongoing strong monetary policy support, further improving financial market conditions and a declining drag from fiscal consolidation bolster business and consumer confidence and slowly translate into more buoyant economic activity.

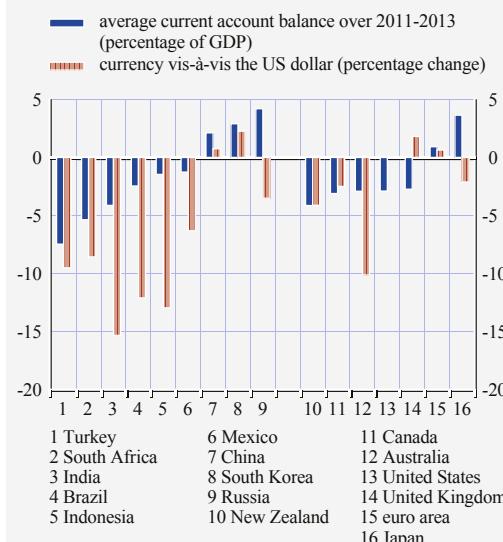
In the **United States**, economic recovery has continued on its moderate course, driven by a gradual recovery in labour and housing markets and easing headwinds from household deleveraging. Also, the monetary policy stance remains highly accommodative, despite the likely forthcoming reduction in asset purchases. Fiscal risks remain elevated as political impasses have become rather commonplace in the last years. Although the prospect of debt default was avoided in mid-October, the likelihood of this tail risk materialising cannot be fully ruled out going forward, particularly if possible ongoing political brinkmanship over the next fiscal deadlines continues, which could potentially translate into far broader financial market tensions and negative confidence effects. A financial stability risk relates to the rapid expansion of mortgage real estate investment trusts (MREITS). In particular, MREITS are vulnerable to rising interest rates due to their reliance on short-term borrowing to finance longer-term mortgage-backed security (MBS) purchases. A sharp sell-off in MBS holdings in the face of rising interest rates could expose banks to declines in the value of MBS holdings. In **Japan**, a positive near-term growth outlook is buttressed by supportive monetary and fiscal policy action, as well as the recent considerable financial market gains, which have had positive wealth effects. However, high fiscal imbalances and rising public debt levels remain a cause for concern in terms of both the sustainability of public finances and financial stability. In fact, banks hold large amounts of domestic government bonds on their books, so that any risk reassessment by financial markets could negatively affect the profitability and solvency of Japanese banks. In the **United Kingdom**, economic activity has accelerated recently, but the pace of recovery is likely to be limited by the still unfinished balance sheet repair in the private and public sectors as well as continued tight credit conditions. The recent modest pick-up in residential house prices could provide some relief for a highly indebted private sector in the short term, but it may also increase the risk of unsustainable price and debt dynamics in the longer term.

*Emerging markets
have lost momentum,
but remain the engine
of global growth*

In contrast to the gradually improving activity in major developed countries, **emerging economies** have gradually lost steam over the course of 2013 as economic growth decelerated (see Chart 1.2). Financial conditions have tightened as lingering uncertainty regarding the US monetary policy stance and the economic growth outlook in major emerging economies, including concerns related to the stability of China's financial system, has taken its toll. Such uncertainty and concerns became manifest in capital flow reversals and strongly

Chart 1.6 Current account and foreign exchange rate developments in selected emerging and advanced economies

(2011 – 2013)



Source: Haver Analytics.

Note: Foreign exchange rate developments reflect the change during the period from 1 May to mid-September 2013.

depreciating exchange rates in a number of countries, particularly in those with poorer fundamentals (see Chart 1.6). For most emerging markets, the recent capital outflows have been relatively modest compared with similar episodes in the past (see Box 1) and mostly reflect a normalisation in asset prices after a prolonged period of accommodative financial conditions. Notwithstanding this adjustment, emerging economies are expected to remain the driving force behind global growth, but in some emerging economies structural factors – such as infrastructure bottlenecks and capacity constraints – may restrain potential growth. At the same time, a number of countries with large external imbalances and weaker growth prospects, or those in the late stage of the credit cycle, remain vulnerable to a deeper and more protracted deterioration in financing conditions.

Box 1

GAUGING THE MACROECONOMIC IMPACTS OF CHANGING FINANCIAL CONDITIONS IN EMERGING MARKET ECONOMIES

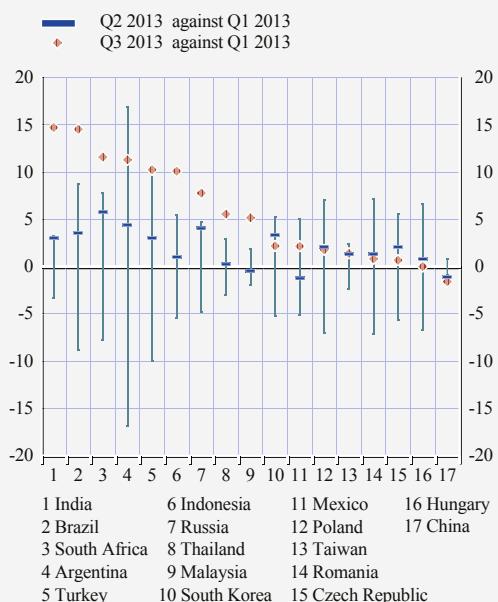
As macroeconomic conditions in advanced economies have started to improve, financial markets have priced in a normalisation of accommodative macroeconomic policies that have underpinned the recovery from the financial crisis. A corollary of this has been a capital flow reversal – sharp at times – in several emerging market economies, which intensified in early May after the US Federal Reserve signalled its intention to taper its bond-buying programme in late 2013. As the latest investment fund asset allocation data show a tendency to further rebalance portfolios away from emerging markets, this box assesses the growth implications of this activity and discusses potential repercussions for the euro area.

During the second and especially the third quarter of this year, conditions in foreign exchange, equity and sovereign bond markets deteriorated sharply in many emerging economies. Exchange rates weakened vis-à-vis the US dollar by more than 10% in India, Brazil, South Africa, Argentina, Turkey and Indonesia when compared with the first quarter of 2013 (see Chart A), while equities and government bonds experienced selling pressures across most regions (see Charts B and C).

Countries with perceived fragilities in macroeconomic fundamentals have generally been those subject to larger exchange rate and asset price drops. In more detail, concerns regarding Turkey relate to a substantial current account deficit which is largely financed by short-term portfolio flows and its unfavourable (short-term) external debt metrics. India, South

Chart A Exchange rate developments in selected emerging market economies

(percentage changes vis-à-vis the US dollar)



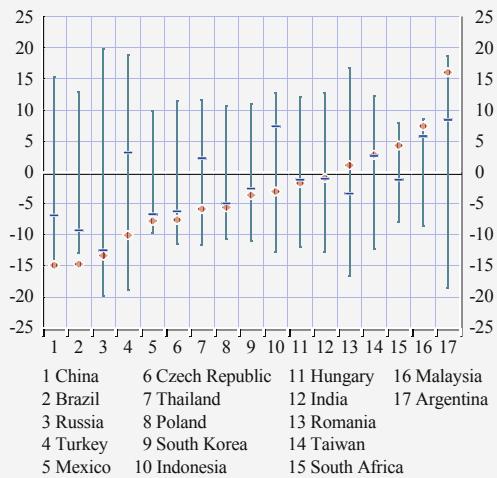
Source: Haver Analytics.

Notes: The green error bars denote one standard deviation of quarterly changes between 2000 and 2012. A rise in exchange rates indicates a depreciation of the currency.

Chart B Equity market developments in selected emerging market economies

(percentage changes)

- Q2 2013 against Q1 2013
- ◆ Q3 2013 against Q1 2013



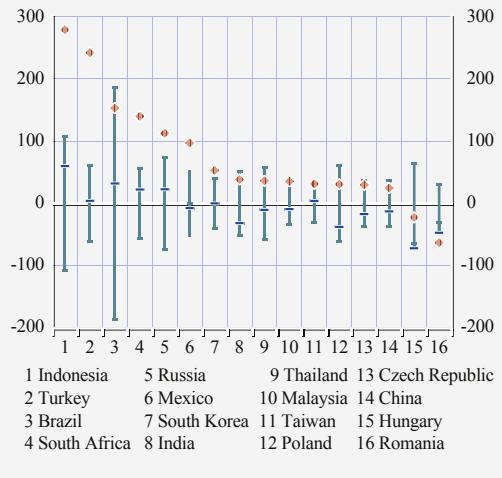
Sources: National sources and Haver Analytics.

Note: The green error bars denote one standard deviation of quarterly changes between 2000 and 2012.

Chart C Ten-year local currency sovereign bond yields in selected emerging market economies

(change in basis points)

- Q2 2013 against Q1 2013
- ◆ Q3 2013 against Q1 2013



Sources: JPMorgan and Haver Analytics.

Notes: The green error bars denote one standard deviation of quarterly changes between 2000 and 2012. Sovereign bond yields for Argentina are not available.

Africa and – to a lesser extent – Indonesia are displaying twin deficits in combination with a dependence on portfolio investment (South Africa) or buoyant credit growth (Indonesia). The latter is also a cause for concern in Brazil and China. Russia, by contrast, seems less vulnerable when compared with other emerging economies, but has nevertheless witnessed sizeable stock market losses and a significant depreciation of its currency. In spite of the prevalent macroeconomic and financial imbalances, countries in central and eastern Europe have been generally less affected by the global events, which is likely due to the ongoing adjustment of these imbalances.

The heterogeneous link between capital flow activity and domestic fundamentals suggests that elements that are not captured by the indicators most commonly used to assess domestic and external imbalances have possibly also played a role in the current emerging market asset repricing. These might include *credit* factors, such as other structural impediments to higher (potential) growth, exposure to a slowdown in Chinese output or the gradual recovery in economic activity in the euro area. However, they might also comprise *liquidity* factors, such as access to foreign currency in case of intense capital flight.

Results from two different models are used (see the notes to Table A for details) to estimate the impact of the changes in financial conditions for key emerging market economies on GDP growth. The models capture trade and financial linkages between the economies. For each country, the size of the shock to long-term bond yields and equity prices is given in Table A, based on the respective cumulative change in the second and third quarters of 2013. The model-based assessment of the substantial deterioration of financial conditions for selected emerging markets suggests that its impact on growth would be rather contained in emerging Asia, while some countries in Latin America would be more affected, owing to larger bond market spillovers from the United States.

Table A Estimated cumulative impact of changes in financial conditions on GDP growth in selected emerging market economies

(percentage point deviation from baseline levels)

	Cumulative impact		Shock		Equities (%)
	2013	2014	10-year sovereign yields (bps)		
Brazil	-0.17	-0.60	155		-14.7
Russia	-0.11	-0.20	115		-13.3
India	0.06	0.00	39		-0.9
China	-0.05	-0.27	29		-14.9
South Africa	0.08	0.05	140		4.3

Source: ECB calculations.

Notes: The GDP impacts are average impacts across two models: NiGEM (maintained by the UK National Institute for Social and Economic Research) and a global VAR model, which includes 33 countries and is based on Dees, S., di Mauro, F., Pesaran, M. H. and Smith, V., "Exploring the International Linkages of the Euro Area: A Global VAR Analysis", *Journal of Applied Econometrics*, 2007. The Russia impact is modelled by NiGEM only.

Estimates range from a near-zero impact in India to a 0.6 percentage point cumulated output loss in Brazil by 2014. These results, while illustrative, could be subject to upside risks, such as a continuation or re-acceleration of the recently recorded tentative flows of capital back into emerging equity and bond markets, which may alleviate negative growth effects. At the same time, financial stability risks would arise if financing conditions in key emerging economies were to worsen beyond what has been observed to date, including the prospect of correlated declines with more widespread contagion.

For the euro area, the transmission of a deteriorating economic environment in emerging markets could stem from both trade and financial channels, which, however, suggest relatively contained direct impacts.

Table B Direct bilateral exposures of the euro area vis-à-vis selected emerging economies

	Cross-border bank claims (percentage of total claims) (Q2 2013)	Euro area exposure		Merchandise exports (percentage of total euro area exports) (2012)
		Portfolio assets (percentage of total assets) (2011)		
Czech Republic	3.0	0.4		3.8
Hungary	1.4	0.5		2.2
Poland	4.0	1.0		5.1
Romania	1.6	0.1		1.6
Russia	2.1	0.7		4.7
Turkey	2.3	0.6		3.3
China	1.7	1.1		7.0
India	0.9	0.6		1.6
Indonesia	0.2	0.5		0.4
South Korea	0.7	1.2		1.5
Malaysia	0.2	0.5		0.6
Taiwan	0.3	0.5		...
Thailand	0.1	0.3		0.6
Argentina	0.4	0.1		0.4
Brazil	3.6	1.5		1.7
Mexico	2.8	0.7		1.3
South Africa	0.2	0.6		1.0

Sources: IMF, BIS and national sources.

Notes: Net of intra-euro area exposure. Cross-border bank claims are based on data for Austria, Belgium, Finland, France, Germany, Greece, Italy, Luxembourg, the Netherlands, Portugal and Spain.

Economic growth prospects in emerging Europe hinge on the strength of euro area recovery...

... while tighter financing conditions may weigh on the economic outlook in Asia and Latin America

Trade linkages tend to be the strongest with emerging economies in the geographical neighbourhood of the euro area as well as with China, even though the prevailing global economic environment is clearly important, for instance, if economic conditions in the United States provide some offset. Concerning the financial channels of transmission, euro area portfolio investments in emerging bond and equity markets are relatively low and cross-border bank loans are predominantly geared towards selected countries in central and eastern Europe and Latin America (see Table B). Clearly, however, any sharper or more disruptive adjustment in emerging market economies needs to be closely monitored, given the potential for stronger and more persistent euro area impacts.

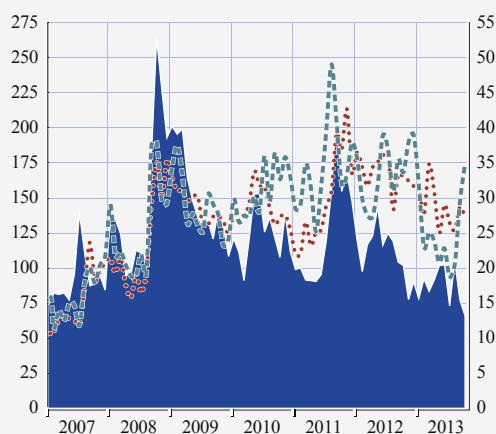
Although not fully insulated from the global repricing of risk, **emerging European economies**, notably the EU countries in central and eastern Europe, have seen only limited effects compared with other emerging market regions. Clearly, reduced external and domestic imbalances as well as less abundant capital inflows over recent years serve as explanatory factors, but the prominent role of investors from the euro area in the region may have played a role too. The gradual economic recovery that seems to be under way in the region is a function of the strength and sustainability of the economic recovery in the euro area given close trade and financial linkages. On the domestic side, headwinds to economic recovery include the legacy balance sheet issues in the private and public sectors, as well as the ongoing contraction of credit to the private sector in a number of countries. In addition, declining residential house prices, existing currency mismatches on households' balance sheets as well as the high and often further increasing share of non-performing loans on banks' balance sheets continue to pose risks to economic recovery and financial stability in some countries. On the other hand, the ongoing gradual rebalancing of banks' funding structure towards a more self-sustained, domestically funded banking model should help mitigate risks to financial stability in the region.

The impacts of global rebalancing have perhaps been greatest for emerging economies in **Asia** and **Latin America**. After a prolonged period of strong capital inflows in the context of an increasing global search for yield, domestic and external vulnerabilities have come to the fore in a number of economies in the region. Although a number of countries might now be better prepared to cope with shocks compared with previous crises due to sizeable foreign reserves, the tightening of financial conditions following the global repricing of risk and the

Chart 1.7 Economic policy uncertainty in the United States and Europe

(Jan. 2007 – Oct. 2013; points)

— EURO STOXX 50 volatility (right-hand scale)
••• Europe (left-hand scale)
- - - United States (left-hand scale)



Source: Baker, S., Bloom, N. and Davis, S. J., at www.policyuncertainty.com.

Notes: Europe comprises the five largest European economies France, Germany, Italy, Spain and the United Kingdom. The economic policy uncertainty index for the United States is constructed from three types of underlying components. The first quantifies newspaper coverage of policy-related economic uncertainty. The second uses disagreement among economic forecasters as a proxy for uncertainty. The third reflects the number of federal tax code provisions set to expire in future years. For Europe, the index is constructed on the basis of the first two components.

related capital outflows highlighted external funding risks, with a negative impact on asset prices. In both regions, risks remain tilted to the downside and mainly relate to stronger than expected spillovers from major advanced economies in the form of weak external demand, the potential renewed worsening of the euro area sovereign debt crisis as well as increased and more broad-based capital outflows which might stem from the US Federal Reserve's tapering. On the domestic side, recent years' rapid credit growth may pose a challenge to some countries in the context of slowing economic growth and the shift in the composition of financing away from bank lending towards non-bank lending.

Taking all of the above regional developments into account, it is apparent that the global recovery remains muted and uneven across countries and regions. The recent volatility in financial markets underscores the fragility of the recovery and the uncertainty surrounding the global outlook. Risks are clearly tilted to the downside and continue to relate to a still high (and recently again increasing) level of economic **policy uncertainty** both in the United States and Europe (see Chart 1.7), possibly testing investor and consumer confidence going forward and posing a threat to economic recovery across the globe. While in the United States the uncertainty about the sustainability of public finances and the stance of monetary policy remains the main cause for concern, risks in the euro area predominantly relate to the possible resurfacing of the sovereign debt crisis, as mounting domestic political pressures and rising social tensions in some countries may ultimately translate into waning policy determination and reform commitment.

A major underlying vulnerability at the global level stems from the real and financial **global imbalances** that remain high by historical standards, albeit narrowing considerably since the start of the global crisis. The largely cyclical nature of this rebalancing to date underscores the need to address long-lasting structural deficiencies. Also, despite marked corrections in some segments,

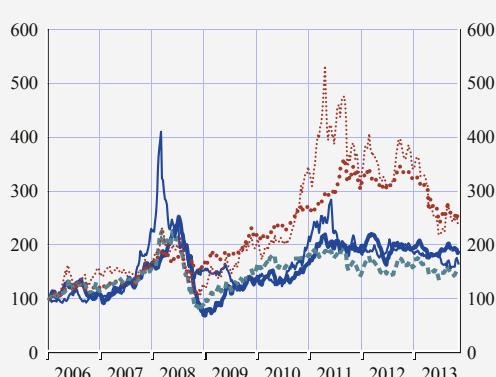
Continued economic policy uncertainty weighs on global growth prospects...

... as do persistent global real and financial imbalances...

Chart I.8 Selected commodity price developments

(Jan. 2006 – Nov. 2013; index: Jan. 2006 = 100)

- oil
- gold
- platinum
- wheat
- silver

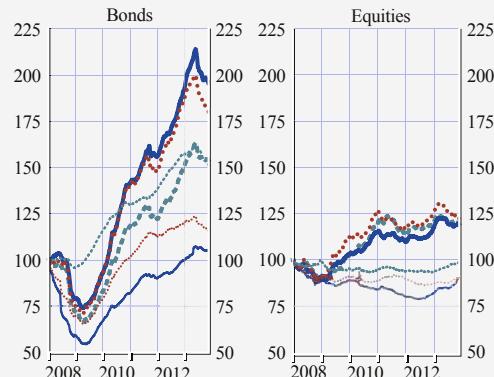


Source: Bloomberg.

Chart I.9 Equity and bond flows to advanced and emerging market economies

(Jan. 2008 – Nov. 2013; index: Jan. 2008 = 100)

- Asia
- Latin America
- eastern Europe, the Middle East and Africa
- euro area countries under stress
- other euro area countries
- other advanced economies



Source: EPFR.
Note: Bonds include both sovereign and corporate bonds.

*... with related
risks to euro area
financial stability*

high and potentially further rising commodity prices (see Chart 1.8) that are largely driven by supply-side factors, such as the renewed flare-up of geopolitical tensions, may give rise to downside risks to global economic activity and may also contribute to preserving global imbalances. Finally, as indicated by the most recent episode of global risk reassessment and the related corrections in emerging bond and equity markets (see Chart 1.9), the risk of an abrupt, disorderly and possibly more broad-based unwinding of global safe-haven or search-for-yield flows in the context of the prospective exit from accommodative monetary policies by major central banks around the globe remains a cause for concern – particularly in bond markets with abundant inflows over the last years, where quantitative easing by the US Federal Reserve played a key role.

Overall, in contrast to the last years, macro-financial risks to euro area financial stability increasingly originate from outside the euro area. These external risks predominantly stem from continued uncertainties regarding the near-term economic growth path of major emerging markets and advanced economies outside the euro area, potential further corrections in financial markets across the globe and the possible further rise in commodity prices. Nonetheless, internal risks on the macro-financial side also remain and continue to comprise a potential resurfacing of the euro area sovereign debt crisis given continued policy uncertainty regarding the implementation of necessary structural and institutional reform measures, the ongoing process of balance sheet repair in the private and public sectors as well as the persistent fragmentation in the real and financial spheres. The materialisation of any of these risks may imply higher credit risk for banks, with possible negative implications for their asset quality, profitability and capitalisation. In this context, banks with high and rising non-performing loan levels, low coverage ratios and subdued profitability seem particularly vulnerable, even though broadly strengthened capital positions will serve as a risk-mitigating factor in the current uncertain and fragile macro-financial environment.

1.2 REDUCED SOVEREIGN STRESS, YET CONTINUED ADJUSTMENT REQUIRED

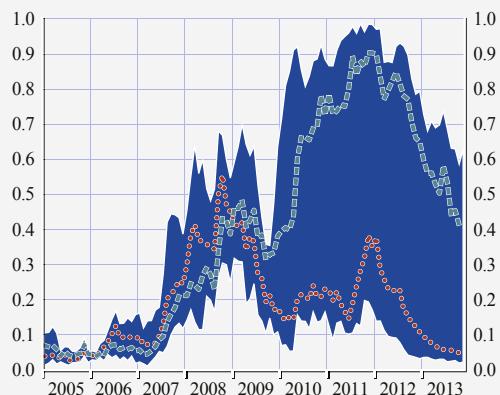
*Sovereign stress
in the euro area
has remained
contained...*

Sovereign tensions in the euro area have remained contained due to better than expected macroeconomic data and improving confidence indicators, which have shown some first tentative signs of a gradual economic recovery and have helped to improve financial market sentiment. There has nonetheless been a temporary flare-up of sovereign tensions in more vulnerable euro area countries (see Chart 1.10) in the context of market participants' reassessment of the US monetary policy stance and, at times, heightened political risk in some countries. Overall, governments in vulnerable euro area countries have undertaken considerable reform efforts over the past two years as measured by the OECD's reform responsiveness rate indicator (see Chart 1.11) and have made notable progress in reducing fiscal imbalances. However, progress has been uneven across

**Chart 1.10 Composite indicator of systemic
stress in euro area sovereign bond markets
(SovCISS)**

(Jan. 2005 – Nov. 2013)

— minimum-maximum range
··· non-stressed euro area countries
— stressed euro area countries

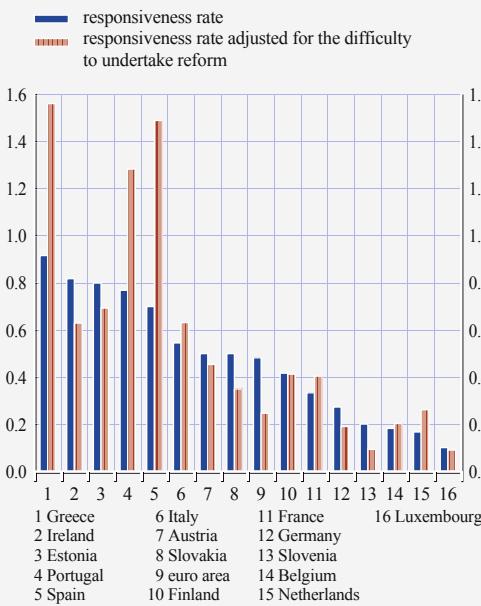


Sources: ECB and ECB calculations.

Notes: Aggregation of country indicators capturing several stress features in the corresponding government bond markets (changing default risk expectations, risk aversion, liquidity risk and uncertainty) for "non-stressed" (Austria, Belgium, Germany, Finland, France and the Netherlands) and "stressed" (Greece, Ireland, Italy, Portugal and Spain) countries. The range reflects the maximum and minimum across the entire set of above-mentioned countries. For further details on the CISS methodology, see Hollo, D., Kremer, M. and Lo Duca, M., "CISS – a composite indicator of systemic stress in the financial system", *Working Paper Series*, No 1426, ECB, March 2012.

Chart I.11 Responsiveness to the OECD's Going for Growth recommendations across the euro area

(2011 – 2012)



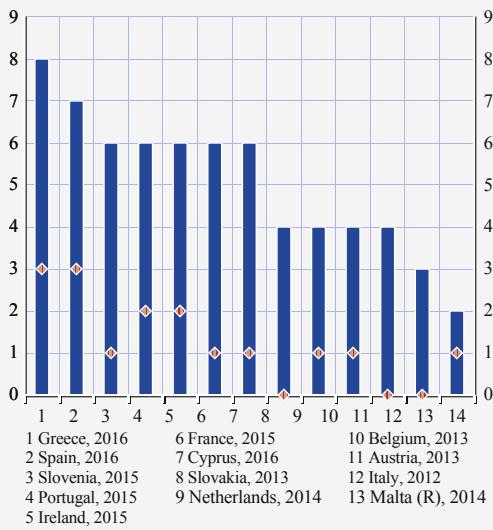
Source: OECD.

Notes: The reform responsiveness rate indicator is based on a scoring system in which recommendations set in the previous edition of *Going for Growth* take a value of one if significant action is taken and zero if not. The adjusted responsiveness rate weighs the responsiveness on each individual priority according to the difficulty of undertaking the relevant reform. The difficulty is measured by the inverse of average responsiveness to priorities in this area in non-crisis circumstances across the OECD. The indicators measure the extent to which OECD countries have followed up on *Going for Growth* recommendations, but they do not aim to assess overall reform intensity *per se*, as the indicators do not account for reforms carried out in non-priority areas and do not quantify the importance of each individual measure. For methodological details see Annex 2.A1 in OECD, *Going for Growth 2010*, March 2010.

Chart I.12 Timetable for the correction of excessive deficits

(years; number of deadline extensions under EDP to bring fiscal deficits below 3% of GDP)

— number of years to correct the excessive deficit
◆ number of EDP deadline revisions



Sources: ECB and European Commission.

Notes: The year next to the country abbreviation denotes the latest EDP deadline for correction of excessive deficits. The blue bars denote the total number of years (including revisions) granted for the correction of excessive deficits (one year after their identification). Malta (R) denotes the reopening of the EDP for Malta.

countries, pointing to the need for further structural and fiscal reforms in countries with persistent macroeconomic imbalances.

Notwithstanding the efforts made in consolidating public finances, **fiscal deficits** remain excessive – that is, projected by the European Commission to be above the 3% of GDP threshold in 2013 – in most euro area countries.¹ Several countries under stress could not reduce their excessive deficits by the originally envisaged deadlines, primarily on account of weaker than expected macroeconomic conditions and/or explicit or implicit support to their financial sectors. In some cases, these deadlines had already been extended several times (see Chart 1.12), most recently under the 2013 European Semester in mid-June, when Portugal and the Netherlands received a one-year extension, while two extra years to correct their excessive deficits were granted to France, Slovenia and Spain. The excessive deficit procedure (EDP) was reopened for Malta and stepped up for Belgium, while it was abrogated for Italy.

... but vulnerabilities continue to persist in many countries...

¹ All euro area countries with the exception of Austria, Belgium, Estonia, Finland, Germany and Luxembourg, as well as Italy and Slovakia (in the latter two countries, deficits are projected to be at the reference value).

... hence, reform fatigue and complacency should be avoided

The fiscal outlook for 2013 has deteriorated slightly...

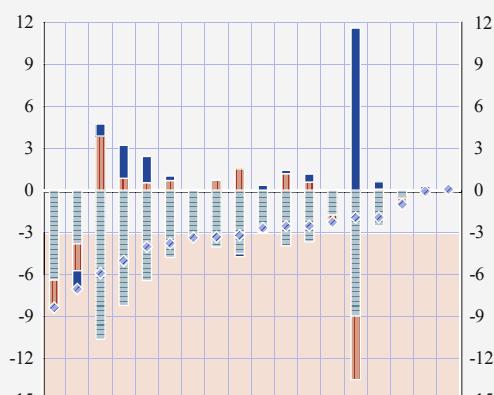
In this context, concerns mainly relate to governments' willingness and ability to continue with the implementation of fiscal and structural reforms in the context of a still weak, albeit improving, economic outlook, domestic political pressures and social tensions. Moreover, the recent relative calm in euro area financial markets, while in many ways a welcome respite from the stressed conditions only a little over a year ago, may breed complacency in terms of fiscal consolidation and structural reforms. Any associated wavering in the credibility of public finances harbours the potential to increase uncertainty and, at the limit, even to trigger further negative rating actions on sovereigns, with adverse feedback loops to the financial sector. Thus, firmly abiding by fiscal commitments under the European governance framework would help to create sufficient fiscal space to support credible national backstops for banking sector distress.

Under current government plans, the fiscal deficit for the euro area as a whole is projected to decline from 3.7% of GDP in 2012 to 3.1% in 2013 and further to 2.5% in 2014. The projected deficit in 2013, as reflected in the European Commission's autumn 2013 forecast, has deteriorated slightly compared with what was anticipated six months ago, as the better than expected GDP performance – mainly export-driven in many countries – has often not translated into higher tax revenues. At the country level, the fiscal outlook for 2013 is less optimistic compared with the previous forecast for 11 out of the 17 euro area countries. Still, compared with 2012, fiscal balances are expected to improve or remain broadly unchanged in the majority of countries, with more pronounced negative changes being projected only for Cyprus, Greece and Slovenia (see Chart 1.13), in the latter two due to temporary banking sector-related factors (particularly large and expected to be reversed in 2014 in Greece).

Chart 1.13 Fiscal positions across the euro area over the period 2012-14

(2012 – 2014; percentage of GDP)

- change 2014
- change 2013
- 2012
- ◆ 2014

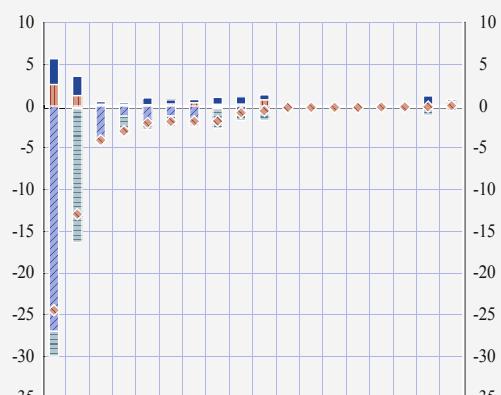


Source: European Commission autumn 2013 economic forecast.
Note: Figures for 2013 and 2014 are projections.

Chart 1.14 Cumulative impact of financial sector support on the fiscal balance by type of operation

(2008 – Sep. 2013; percentage of GDP)

- other impact on revenue
- guarantee fees receivable
- other impact on expenditure
- capital injections recorded as deficit increasing
- ◆ total impact on deficit



Source: ESCB.

*... but the outlook
for 2014 has
improved due
to continued
consolidation*

As part of the latest euro area institutional reform, with the “two-pack” having entered into force in May 2013, draft budgetary plans have to be prepared earlier than in previous years in some countries for peer scrutiny at the EU level. These plans will be assessed by the European Commission, which will issue opinions on whether they are in compliance with the budgetary policy obligations laid down in the Stability and Growth Pact. In the event that the European Commission arrives at an assessment of “particularly serious non-compliance”, it is expected to request a revised draft budgetary plan. If strictly applied, the two-pack regulation will be an important tool to further strengthen the effectiveness of fiscal surveillance in the euro area. Taking into account the additional consolidation measures specified in the 2014 national budgets so far, the European Commission’s autumn 2013 forecast indicates for the euro area as a whole an improvement of the structural fiscal position by around 0.3 percentage point. This is also reflected in the reduction of the headline deficit figure to 2.5% of GDP from 2.8% projected six months ago.

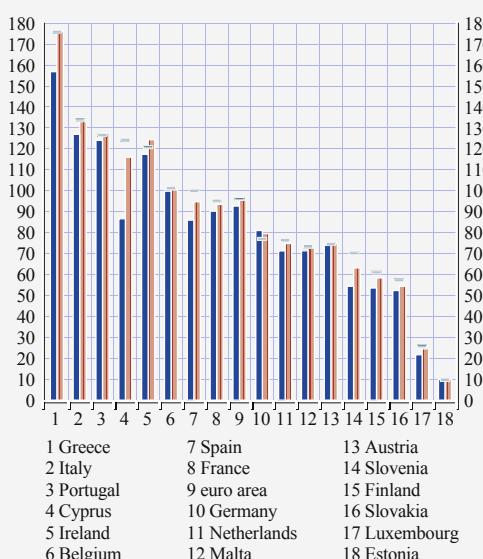
In some cases, fiscal positions are expected to be affected (albeit to differing degrees) by public support granted to the financial sector. This had, up to September 2013, the most marked negative impact on the budget deficits in Ireland, Greece and, to a lesser extent, Spain. Since the onset of the financial crisis, public support to the financial sector has taken various forms, but the largest deficit-increasing impact relates in most countries, as well as at the aggregate euro area level, to capital injections. On the revenue side, fees in exchange for state guarantees extended to financial institutions, and other temporary levies, have had a deficit-reducing impact, so far with a slight positive net effect on the balance in France, Italy, Luxembourg and Cyprus (see Chart 1.14).

*Financial sector
support continues
to weigh on public
finances*

Chart 1.15 Public debt levels across the euro area

(2012 – 2014; percentage of GDP)

— 2012
— 2013
— 2014

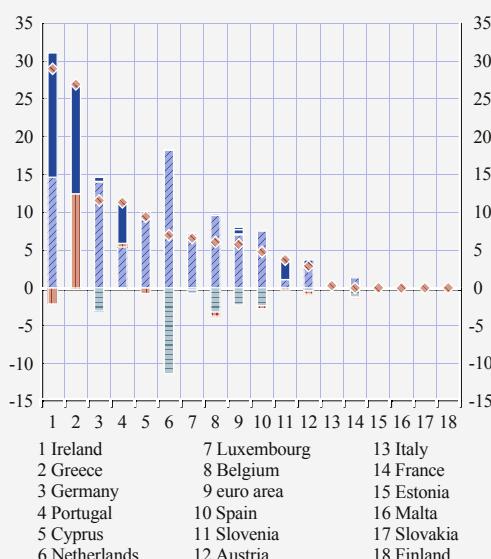


Source: European Commission autumn 2013 economic forecast.

Chart 1.16 Cumulative impact of financial sector support on public debt by type of operation

(2008 – Sep. 2013; percentage of GDP)

— other direct impacts
— indirect impacts
— redemption
— total acquisition
— total impact on debt



Source: ESCB.

*Public debt levels
remain elevated
and continue to rise
in most countries
in 2014*

*Financing needs are
expected to decline
in 2014, but they
remain sizeable in
some countries*

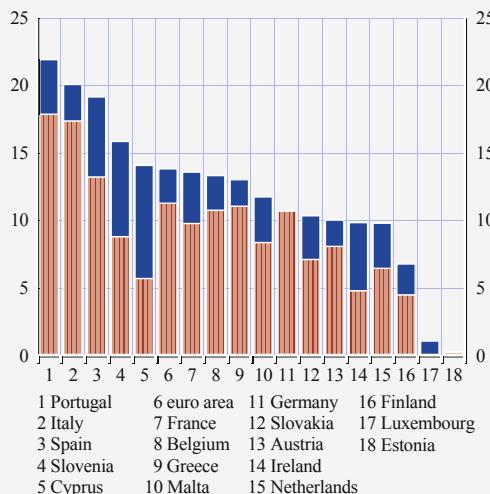
At the euro area level, the **public debt-to-GDP ratio** has exhibited a mild increase over the course of this year. The European Commission expects the debt ratio to peak in 2014 at around 96% of GDP, mainly on account of adverse interest rate-growth differentials and stock-flow adjustments. Public debt ratios are projected to rise in 2014 in all euro area countries with the exception of Austria, Estonia and Germany, as well as three programme countries (Greece, Ireland and Portugal). Overall, the largest increase in the debt ratio for 2014 is projected in Cyprus, followed by Slovenia and Spain (see Chart 1.15). This stems from liabilities related to the financial sector, adverse interest rate-growth differentials and still high primary deficits in some countries. Concerning the operations to support the financial sector since 2008, the acquisition of assets (comprising new shares, provision of new loans and other asset purchases) has added most to gross public debt in the majority of countries (see Chart 1.16). In particular in countries which extended support to the financial sector at the beginning of the crisis, such as Austria, Belgium, Germany, France and the Netherlands, the (partly early) repayment of state aid by banks is starting to have a debt-reducing impact.

Financial stability risks may also emanate from near-term **sovereign financing needs**, in particular in euro area countries under stress. Based on available information on securities redemptions up to end-September – thus excluding part of the short-term debt refinancing requirements in

**Chart 1.17 Maturing securities
and projected deficit financing
needs of euro area governments in 2014**

(percentage of GDP)

general government deficit
maturing government securities



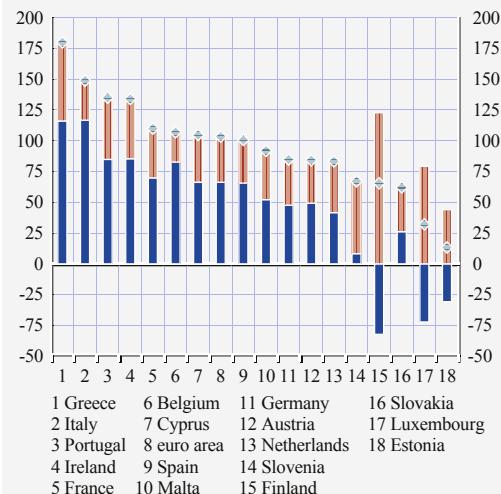
Sources: European Commission autumn 2013 economic forecast, ECB and ECB calculations.

Notes: Data on maturing securities as at end-September 2013. The gross financing needs for 2013 are broad estimates consisting of redemptions of government debt securities maturing in 2013 and the government deficit. The estimates are subject to caveats. First, they only account for redemptions of securities, while maturing loans are not included, given the lack of data. Second, some government securities do not fall into the definition used in the ESA 95 for general government debt. Third, estimates disregard that some maturing government securities are held within the government sector. Finally, refinancing needs corresponding to short-term debt issued after September 2013 are not reflected in the 2013 data.

**Chart 1.18 Euro area governments' net
debt, market value of government liabilities
as well as financial assets**

(Q2 2013; percentage of GDP)

net debt
financial assets
market value of government liabilities



Sources: Eurostat, national sources and ECB calculations.

2013 – the 2014 gross financing needs, though declining given lower deficits and broadly lower redemptions, remain significant in many euro area countries (see Chart 1.17).

Maturing sovereign debt in the near-to-medium term remains considerable in the euro area, albeit with major cross-country differences. As at end-September 2013, securities with a residual maturity of up to one year accounted for 20% of total debt securities outstanding in the euro area, while slightly below one-third of the debt securities outstanding will mature within two years, and somewhat below 60% within five years. The average residual maturity of outstanding euro area government securities was 6.3 years as at end-September 2013, ranging from 3.4 years in Cyprus to 12.1 years in Ireland.

To some extent, sovereign financing needs could be mitigated via recourse to existing financial assets. As at mid-2013, the average amount of consolidated financial assets held by euro area governments stood at 37% of GDP, with some variation across countries, while the market value of consolidated government liabilities was in the order of 103% of GDP (see Chart 1.18). Accordingly, the net debt of euro area governments totalled 66% of GDP. Overall, the use of financial assets for smoothing governments' financing needs depends on their liquidity and marketability, which is arguably lower in times of crisis. Nevertheless, government holdings of financial assets are relevant for assessing sovereign debt sustainability over the medium term, in that a larger proportion of these financial assets could be sold off.

The sale of financial assets could mitigate financing needs

1.3 A MUTED MACROECONOMIC OUTLOOK AND PERSISTENT FRAGMENTATION WEIGH ON THE NON-FINANCIAL PRIVATE SECTOR

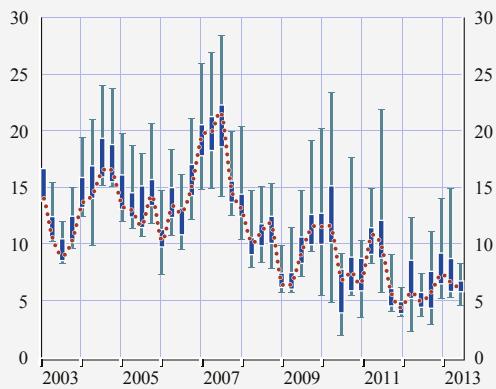
Weak economic conditions amplify income and earnings risks

As euro area macroeconomic conditions have remained weak, **income and earnings risks** in the euro area non-financial private sector have remained significant. For households, the distance-to-distress indicator has remained close to its historical low, thereby signalling continued high credit risk derived from household balance sheets, albeit amid a rather high degree of cross-country dispersion (see Chart 1.19). Although some first tentative signs of economic recovery in the euro area have emerged, euro area households still remain relatively pessimistic with regard to their unemployment expectations and their financial situation (see Chart 1.20). In fact, high – albeit recently stabilising – unemployment rates continue to weigh on households' income prospects in many euro area countries, while the continued decline in household saving rates in some countries indicates reduced buffers going forward, leaving households in a fragile position in case of further adverse income shocks (Box 2 presents an analysis of the sensitivity of household debt burden indicators to interest rate and house price shocks).

A challenging macroeconomic environment also puts the earnings-generating capacity of euro area non-financial corporations (NFCs) to the test, as indicated by rather low levels of corporate profitability as well as the high – and in more vulnerable countries further increasing – number of corporate insolvencies. That said, some first tentative signs of improvement in corporate profitability are already visible, as reflected by a slight pick-up in gross operating income and the drop in corporations' expected risk of default. While these signs are promising, with an only gradual economic recovery, corporate earnings in the euro area are expected to increase slowly and to remain at a relatively low level going forward. Hence, firms' capacity to accumulate capital through retained earnings is likely to remain limited, implying a higher degree of dependence on external financing, while at the same time slowing down the process of corporate deleveraging.

Chart I.19 Households' distance to distress in the euro area

(Q1 2003 – Q2 2013; number of standard deviations)



Sources: ECB, Bloomberg, Thomson Reuters Datastream and ECB calculations.

Notes: A lower reading of distance to distress indicates higher credit risk. The chart shows the median, minimum, maximum and interquartile distribution across 11 euro area countries for which historical time series cover more than one business cycle. For details on the indicator, see Box 7 in ECB, *Financial Stability Review*, December 2009.

Chart I.20 Euro area households' financial situation and unemployment expectations

(Jan. 2003 – Oct. 2013; percentage balances; three-month moving averages)

- expectations about unemployment prospects over the next 12 months (left-hand scale)
- expectations about households' financial situation over the next 12 months (right-hand scale)



Source: European Commission Consumer Survey.

Note: Unemployment expectations are presented using an inverted scale, i.e. an increase (decrease) of this indicator corresponds to more (less) optimistic expectations.

Box 2

FINANCIAL FRAGILITY OF EURO AREA HOUSEHOLDS

The severity of the global financial crisis has entailed significant consequences for the real economy. Households, which account for the largest component of economic activity, have experienced the effects of this crisis in different ways, also translating into growing financial strains. Monitoring households' debt servicing capability is therefore vital from a financial stability perspective, not least given the associated impact on the profitability and solvency of banks.

One rich source of information on euro area households' balance sheets is the recently published Eurosystem Household Finance and Consumption Survey (HFCS), a novel dataset which collects information on the wealth, income and consumption patterns of more than 62,000 euro area households.¹ This box makes use of micro data from the survey to provide a simple gauge of households' potential sensitivity to changes in interest rates and house prices.

The first sensitivity analysis captures an interest rate shock to households' debt service-to-net income ratio, as a means to assess the capacity of households to repay debt without recourse

¹ All euro area countries are included in the survey except for Estonia and Ireland. For a complete picture of euro area households' balance sheet composition, see "The Eurosystem household finance and consumption survey – results from the first wave", *Statistics Paper Series*, No 2, ECB, April 2013.

to their assets.² The effect of a 300 basis point interest rate increase on the debt service-to-net income ratio is assessed,³ which is equivalent to the total interest rate cuts carried out by the ECB between October 2008 and mid-2010. The rise in interest rates affects the ratio via the increase of debt payments and the increase of financial income received from interest-paying accounts.⁴ In both cases, a 100% pass-through of the official interest rate is assumed. It is also assumed that loans with a fixed interest rate are not affected by the shock. The ratios are updated mechanically with the new debt payment and income stream after the shock, so any behavioural reactions by households are ignored.

The results show that the impact of the interest rate shock on the median debt service-to-net income ratio for the euro area is rather small, increasing from 18.7% to 21.0%. However, there is substantial variability in the impact across countries. The median ratio increases the most in the Netherlands and Portugal, while in other countries like France and Germany the impact is minimal (see Chart A). Looking at the proportion of households which have a debt service-to-net income ratio greater than 0.4 – a threshold that is used in the literature as an indication of household distress – the increase in interest rates would have a substantial impact on the number of households in this situation. For the whole euro area, 16.0% of households find themselves

Chart A Impact of an interest rate shock on the median household debt service-to-net income ratio

(2010; percentages; median of indebted households)

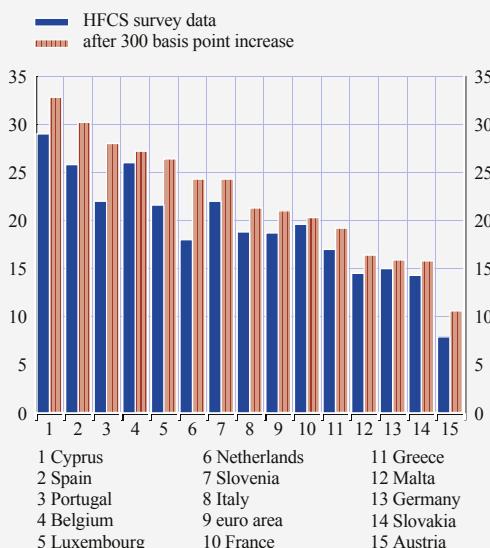
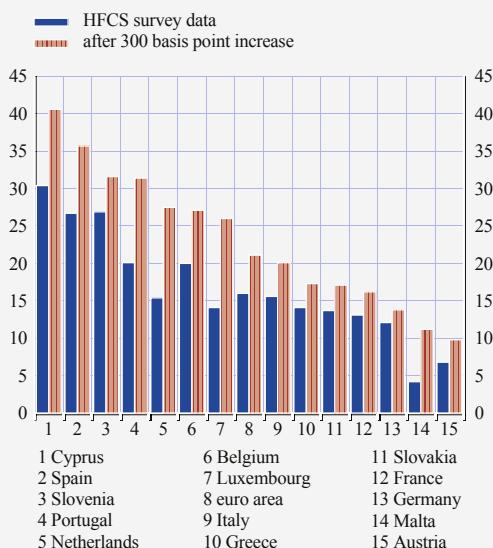


Chart B Impact of an interest rate shock on the proportion of households with a debt service-to-net income ratio above 0.4

(2010; percentage of indebted households)



Sources: HFCS, OECD and ECB calculations.

Notes: Income is the income after tax, based on own calculations using tax brackets reported by the OECD. Finland is excluded because no data are collected on debt service. HFCS survey data refer to 2010 in all countries, except for Finland, Greece and the Netherlands (all 2009) and Spain (2008).

Sources: HFCS, OECD and ECB calculations.

Notes: Income is the income after tax, based on own calculations using tax brackets reported by the OECD. Finland is excluded because no data are collected on debt service. HFCS survey data refer to 2010 in all countries, except for Finland, Greece and the Netherlands (all 2009) and Spain (2008).

2 The numbers presented in this box for the debt service-to-net income ratio differ from those published in the HFCS. As it is a more relevant measure for assessing households' debt servicing capability, net (instead of gross) income is used.

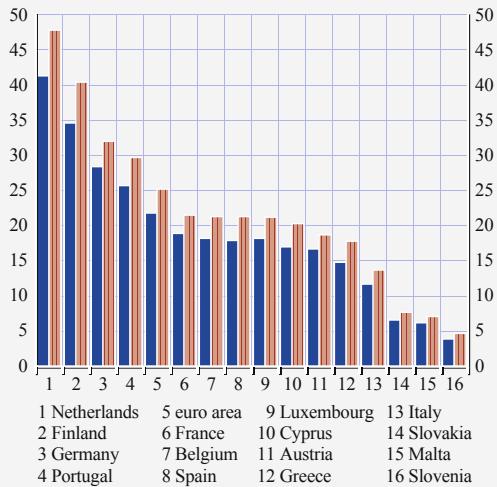
3 A similar simulation has been conducted by Ehrmann, M. and Ziegelmayer, M., "Household risk management and actual mortgage choice in the euro area", January 2013 (paper presented at the EEA Annual Congress in August 2013). However, they do not take into account the effect of the interest rate change on the income derived from deposits and they consider gross instead of net income.

4 We ignore the fact that in some countries deposits might be non-interest-bearing or subject to fixed rates.

Chart C Impact of a house price shock on the median debt-to-assets ratio

(2010; percentages; median of indebted households)

— HFCS survey data
■ after 20% house price decline



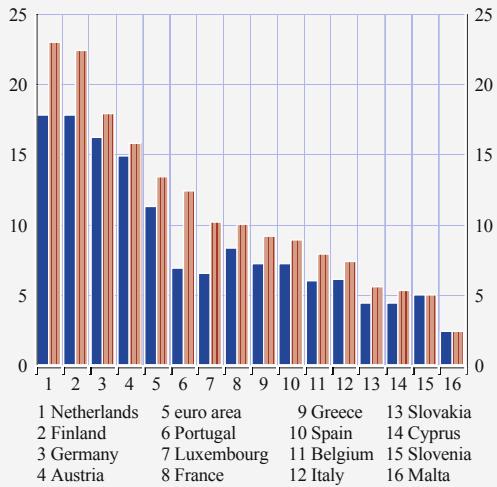
Sources: HFCS and ECB calculations.

Note: HFCS survey data refer to 2010 for all countries, except for Finland, Greece and the Netherlands (all 2009) and Spain (2008).

Chart D Impact of a house price shock on the proportion of households with a debt-to-assets ratio above 1

(2010; percentage of indebted households)

— HFCS survey data
■ after 20% house price decline



Sources: HFCS and ECB calculations.

Note: HFCS survey data refer to 2010 for all countries, except for Finland, Greece and the Netherlands (all 2009) and Spain (2008).

in this situation, a number that increases to 21.1% after the interest rate shock. Again, there is considerable variability in the impact across individual countries. In some countries, such as Cyprus and Spain, more than one-third of the indebted households have debt service-to-net income ratios greater than 0.4 after the interest rate shock. In others like France or Germany the numbers are still contained (see Chart B).

The second sensitivity analysis applied is a shock to house prices, with net worth impacts captured through the debt-to-assets ratio and associated information about the solvency of households.⁵ The impact of a 20% decline in house prices on this ratio is analysed, in line with average shocks used in other studies.⁶ The impact of the shock is relatively small, despite some variability across individual countries in the sample. The drop in house prices increases the debt-to-assets ratio by somewhere between 0.8 and 6.5 percentage points (see Chart C).

Households with a debt-to-assets ratio greater than 1 are said to have negative equity and pose a specific threat to financial stability. According to the HFCS data, 11.3% of indebted households in the euro area have negative equity. Again, there is a large degree of cross-country heterogeneity, ranging from 2.4% in Malta to almost 18% in Finland and the Netherlands (see Chart D). Households' sensitivity to changes in house prices is also uneven across the countries in the sample. For example, in the case of Malta or Slovenia the house price shock would have no effect on households' debt-to-assets ratios at all, while in both Finland and the Netherlands the number of households in negative equity would increase to some 23.0%.

⁵ Assets include both real and financial assets. Public and occupational pension plans are excluded due to the lack of coverage of these assets by the HFCS.

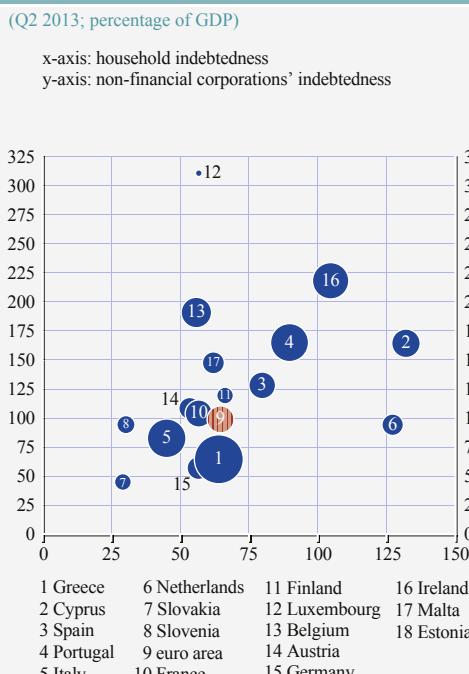
⁶ See IMF, *Financial Sector Assessment Program Update: Spain*, June 2012, and Albacete, N. and Fessler, P., "Stress Testing Austrian Households", *Financial Stability Report*, Oesterreichische Nationalbank, June 2010.

All in all, the findings presented in this box suggest that at the euro area level the impact of these shocks tends to be relatively small, although this aggregate masks substantial cross-country heterogeneity. The effect of an interest rate shock on the debt service-to-net income ratio tends to be greater for countries with a high proportion of adjustable interest rate mortgages, such as Cyprus, the Netherlands, Portugal and Spain, and rather small for euro area countries like France or Germany, in which fixed interest rate mortgages prevail. In the case of a house price shock, the debt-to-assets ratio of Dutch and Finnish households seems to be affected the most.

In contrast to the rather widespread weak income and earnings prospects within the euro area non-financial private sector, the level of **indebtedness** continued to differ considerably across countries. On aggregate, the indebtedness of euro area households and non-financial corporations has remained fairly stable at some 66% and 100% of GDP, respectively (see Chart 1.21), for several years now. However, the divergence of these aggregates across countries appears to have risen. This development can partly be explained by cyclical factors, including the strong contraction of economic activity, in particular (but not only) in countries under stress. At the same time, in the case of non-financial corporations, structural factors may have played a role too. In fact, firms' access to finance differs between large and mature firms which have access to market-based funding, on the one hand, and small and infant firms which are more reliant on bank-based financing and face tight credit conditions, on the other hand.

*Indebtedness
remains high amid
increasing cross-
country divergence*

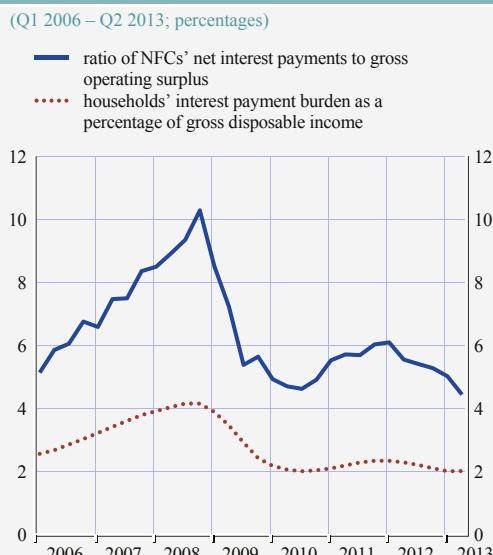
Chart 1.21 Indebtedness in the euro area non-financial sector



Sources: ECB and Eurostat.

Notes: The size of the bubbles reflects the indebtedness of the general government. Data on non-financial corporations include cross-border inter-company lending, which may be particularly relevant for countries where international holding companies are traditionally located (e.g. Ireland and Luxembourg).

Chart 1.22 Interest payment burden of the euro area non-financial private sector



Sources: ECB and Eurostat.

*Favourable interest
rate conditions
facilitate debt service*

With a delicate economic recovery, the balance sheet repair in the non-financial private sector will be a gradual and longer-term process, in particular in the case of households given institutional obstacles to household defaults and subdued prospects for income growth as a result of persistent labour market weaknesses. In countries with high levels of non-financial private sector indebtedness, the deleveraging process may also continue to affect loan demand for a protracted period of time and to weigh on domestic demand. Thus, a solid and sustained recovery, coupled with an enhanced restructuring process in the financial and non-financial sectors, seems indispensable for households and non-financial corporations to be able to repair their balance sheets more swiftly.

In the current low interest rate environment, households' interest payment burden as a share of disposable income fell to 2%, one of the lowest levels since the start of the third stage of Economic and Monetary Union. In addition to the favourable interest rate conditions, non-financial corporations' debt servicing capacity is also supported by the low cost of market-based funding in some countries, so that on average euro area firms' net interest payments relative to their gross operating surplus fell to the lowest level on record (see Chart 1.22). In view of the subdued outlook for prices and activity, interest rates should stay at low levels for an extended period of time, as emphasised by the ECB's forward guidance. Looking further into the future, balance sheet adjustment should help households and non-financial corporations in case of an eventual normalisation of interest rates to avoid challenges associated with a rising debt servicing burden. Such challenges might be greatest in particular for those countries where loans with floating rates or with rates with a relatively short fixation period predominate. Obviously, a higher debt service burden for borrowers in a rising interest rate environment is likely to be partly offset by the related positive impact of an economic recovery on households' and firms' income and earnings situation.

*Bank lending to the
non-financial private
sector remains
muted amid first
signs of improving
financing conditions*

Lending flows to the non-financial private sector have remained weak, reflecting the ongoing balance sheet repair as well as weak income and earnings flows in both the financial and non-financial sectors. Bank lending to euro area households has remained subdued, but appears to

Chart 1.23 MFI lending to euro area households

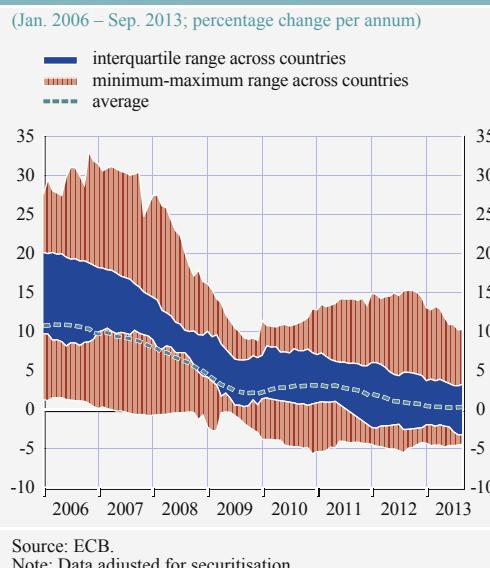
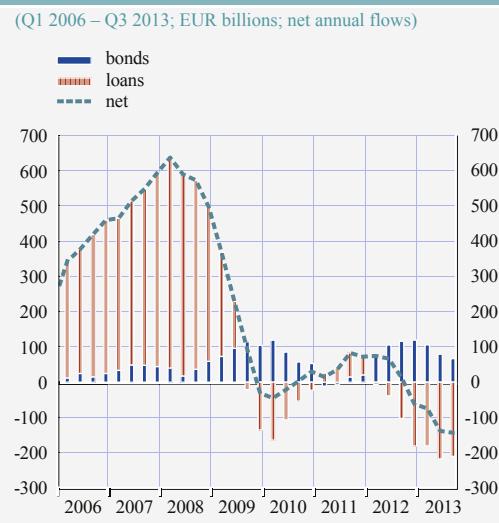


Chart 1.24 External financing of euro area non-financial corporations



have stabilised. However, rather heterogeneous developments at the country level form the basis of the relatively weak aggregate picture (see Chart 1.23). Looking at the components of bank lending by purpose, a mild but still positive annual growth in loans for house purchase is offset by net redemptions in consumer credit and other types of lending. The generally subdued bank lending to households reflects more prominently demand-side factors, even though supply-side constraints underpinned by both cyclical and structural effects also continue to play a role, in particular in countries under stress. Nevertheless, in line with the first tentative signs of economic recovery, the October 2013 euro area bank lending survey suggests an improvement of households' financing conditions, as reflected by the further decline in the degree of net tightening of credit standards on loans to households and the net increase in demand for such loans recorded for the first time since the end of 2010.

Supply-side constraints on lending appear to be easing particularly concerning euro area households. As reported by the euro area bank lending survey for the third quarter of 2013, the net tightening of credit standards applied to housing loans and consumer credit decreased to a level below historical averages (the survey was first conducted in the first quarter of 2003). Improving supply-side conditions indicate not only lower pressures coming from the cost of funds and balance sheet constraints, but also improved expectations concerning the economic outlook and the creditworthiness of consumers. In terms of credit demand, enhanced housing market prospects and consumer confidence have translated into a net increase in the demand for both housing loans and consumer credit for the first time since late 2010.

The net external financing of euro area firms continued to fall in 2013 (see Chart 1.24). The lower demand for external financing was partly related to the weak economic conditions and muted investment dynamics. According to the latest euro area bank lending survey, the demand for corporate loans in the euro area continued to contract, albeit at a slower pace. This reflected lower financing needs for investments which more than compensated for the increase in financing needs due to inventories. However, the availability of internal funds may also explain the moderate dynamics of external financing in some countries, in particular for large firms. Regarding small firms, the survey on the access of small and medium-sized enterprises (SMEs) to finance in the euro area portrayed a bleaker picture. Turning to credit supply, euro area banks' credit standards for loans to enterprises have remained tight, but the net percentage changes in credit standards reveal some stabilisation in credit conditions for firms since the beginning of 2013. Since then, risk perceptions appear to have had a stronger effect on credit supply conditions, while, following the ECB's standard and non-standard policy measures, balance sheet or funding constraints of banks exerted less pressure on the tightening of credit standards.

In terms of the components of external financing, corporate disintermediation continued, but the issuance of market-based debt fell short of compensating for the decline in new MFI loans to non-financial corporations (see Chart 1.24). These developments suggest that some firms were able to diversify their funding sources in response to tighter bank lending standards, although such substitution has mainly remained limited to larger companies and those which are mostly domiciled in countries with more developed corporate bond markets. At the same time, those corporations that are more dependent on bank funding, like SMEs and firms located in stressed countries, have remained vulnerable to persistently tight credit supply conditions. In fact, the latest survey on SMEs' access to finance confirmed that financing conditions for SMEs remained diverse across the euro area, with clear financing obstacles for SMEs in countries that have been more strongly affected by the crisis. To alleviate some of these constraints and improve the funding conditions

*A drop in bank
lending to NFCs...*

*... is partly offset
by the issuance of
market-based debt*

Chart 1.25 Euro area bank lending rates on new loans to households

(Jan. 2006 – Sep. 2013; percentages)

- consumer lending
- lending for house purchase
- - - other lending



Source: ECB.

Chart 1.26 Cost of external financing of euro area non-financial corporations

(Jan. 2006 – Nov. 2013; percentages)

- cost of quoted equity
- overall cost of financing
- - - long-term MFI lending rates
- cost of market-based debt
- short-term MFI lending rates



Sources: ECB and ECB calculations.

for SMEs, the ECB extended the range of collateral accepted from banks under more favourable conditions in its refinancing operations to include asset-backed securities backed by loans to SMEs. In addition, a number of public initiatives have been launched at both the national and European levels (e.g. guarantee schemes or funding availability via international financial institutions) to ease the credit constraints facing SMEs.

Chart 1.27 The ECB policy rate and the composite cost-of-borrowing indicator for non-financial corporations

(Sep. 2011 – Sep. 2013; cumulative percentage point changes)

- minimum bid rate in main refinancing operations
- minimum and maximum change across countries

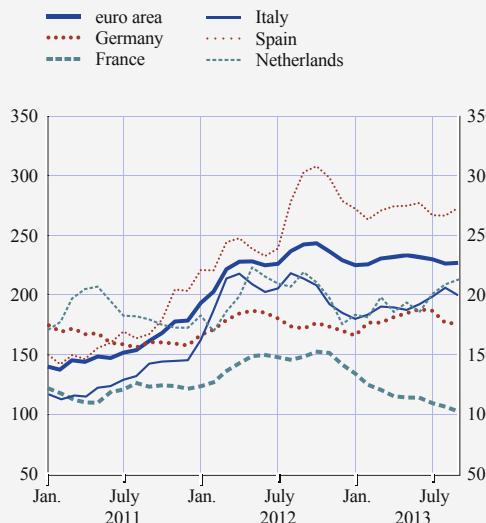


Sources: ECB and ECB calculations.

Notes: For methodological details on the construction of the cost-of-borrowing indicator, see ECB, "Assessing the retail bank interest rate pass-through in the euro area at times of financial fragmentation", *Monthly Bulletin*, August 2013.

Chart 1.28 Spread between lending rates on very small and large loans in selected euro area countries

(Jan. 2011 – Sep. 2013; basis points; three-month moving averages)

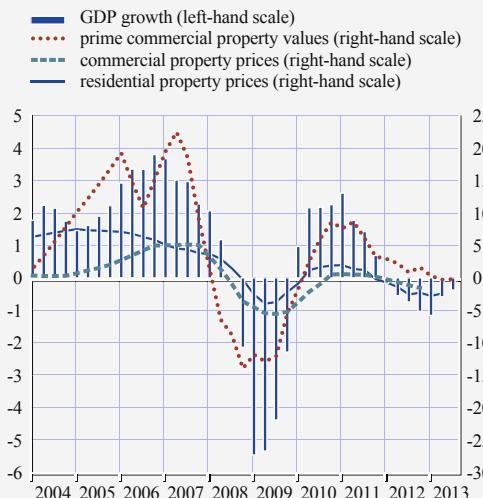


Sources: ECB and ECB calculations.

Notes: Very small loans are loans of up to €0.25 million, while large loans are those in amounts of more than €1 million. Aggregation is based on new business volumes.

Chart 1.29 Euro area commercial and residential property values and the economic cycle

(Q1 2004 – Q3 2013; percentage change per annum)



Sources: Eurostat, ECB, experimental ECB estimates based on IPD and national data, and Jones Lang LaSalle.

Funding costs of the euro area non-financial private sector have continued to decline more or less significantly across most business lines, maturities and funding sources. In fact, the financing costs borne by euro area households declined marginally further between March and September 2013, mainly reflecting developments in loans for house purchase and other lending (see Chart 1.25). The financing cost for households for all categories of lending except consumer credit is now at or very close to the lowest levels since the start of the statistical recording in 2003. At the same time, cross-country heterogeneity in the euro area, as measured by the range between the lowest and highest interest rate charged on loans to households, remained at elevated levels, reflecting different country-specific risk constellations, as well as a still impaired monetary transmission in some euro area countries.

Household financing costs have declined amid marked cross-country heterogeneity

Similarly, the overall financing costs of non-financial corporations have continued to fall across most external financing sources (see Chart 1.26). While it is difficult to pin down a universally shared set of common factors given the multitude of country- and firm-specific factors at play, this outcome appears to stem mainly from favourable financial market sentiment after the announcement of the ECB's OMT programme and an ongoing search for yield. At the same time, the pass-through of the cut in the monetary policy rate implemented in May 2013 may have also played a role, especially with regard to the cost of market funding. Bank lending rates have declined marginally, but the latest cut in monetary policy rates has not yet been fully passed through (see Chart 1.27). In fact, lending rates have remained widely dispersed across the euro area. On the one hand, this may be explained by the deteriorating creditworthiness of some of the corporations in more vulnerable jurisdictions due to a prolonged period of weak economic activity and strong uncertainty regarding the growth outlook, inducing banks to charge higher risk premia and therefore higher lending rates. On the other hand, the wide divergence in lending rates may reflect the spillover

Funding costs for NFCs have dropped, but the monetary transmission mechanism remains impaired

The availability and cost of NFC funding is dependent on the firm size

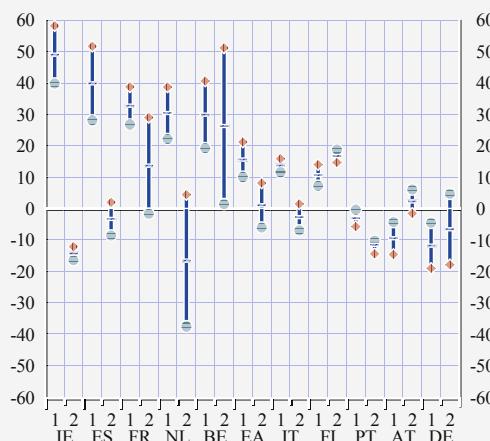
effects of sovereign market tensions on bank funding conditions, as well as some possible impact from banks' deleveraging strategies in the context of adjustment towards higher regulatory capital and liquidity requirements.

The spread between bank lending rates for very small loans and those for large loans to non-financial corporations has widened in most of the larger euro area economies (see Chart 1.28). However, the pace of increase decelerated more recently and, for some economies, some reversal was even recorded. The difference between the loan pricing conditions for small and large firms, which primarily results from the divergence in firm-specific risks, highlights the more adverse conditions faced by small firms, particularly in countries under stress. In part, these spreads may also reflect the fact that SMEs are more dependent on their respective domestic banking sectors and are subject to tighter credit conditions, compared with larger firms that have better access to global financial markets. Developments in firms' financial conditions continue to vary markedly in terms of firm size, with balance sheet vulnerabilities being significantly more pronounced for SMEs than for large firms. According to the ECB's latest survey on the access to finance of SMEs in the euro area, profit developments remained more adverse for SMEs than for large firms in the first half of 2013. This is also mirrored by the less favourable evolution in the credit history of SMEs.

Chart 1.30 Valuation estimates of residential property prices in selected euro area countries

(percentages; distribution of estimates)

- difference
- ◆ average statistical ratios
- average model-based estimations
- average statistical indicators and model-based estimations



1 Q2 2013
2 Q2 2013

IE - Ireland BE - Belgium PT - Portugal
ES - Spain EA - euro area AT - Austria
FR - France IT - Italy DE - Germany
NL - Netherlands FI - Finland

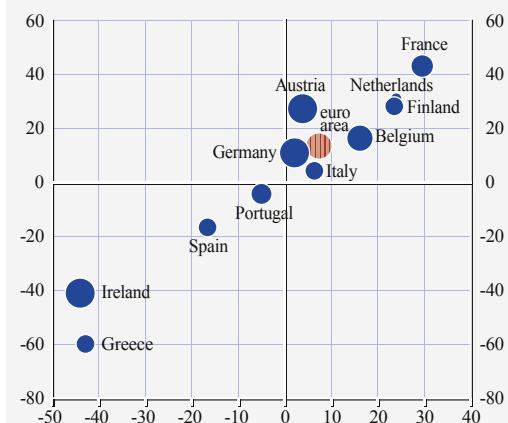
Sources: ECB and ECB calculations.

Notes: Estimates are based on four different valuation methods: price-to-rent ratio, price-to-income ratio and two model-based methods. For methodological details, see Box 3 in ECB, *Financial Stability Review*, June 2011. For each country, the average of the two statistical ratios, the average of the model-based methods and the overall average are shown.

Chart 1.31 Valuation estimates of prime commercial property and expected economic growth in selected euro area countries

(percentages)

x-axis: under-/overvaluation (Q3 2013)
y-axis: change in property value (Q1 2009 - Q3 2013)



Sources: European Commission, Jones Lang LaSalle, ECB and ECB calculations.

Notes: The size of the bubbles reflects the expected change in real GDP growth in 2014. For further details, see Box 6 in ECB, *Financial Stability Review*, December 2011.

Developments in euro area **property markets** have remained muted on average. Residential property prices continued their annual decline over the course of 2013 (see Chart 1.29). Commercial property prices decreased less markedly, albeit with a clear bifurcation in the market, whereby prime commercial property continues to fare better than the non-prime segment. Property prices continue to exhibit a high degree of cyclical across both market segments (see Box 3), amid marked divergence at the country level (see Charts S.1.17 and S.1.18). Indeed, commercial and residential property prices continued to drop mainly in more vulnerable euro area countries like Cyprus, Greece, Italy and Spain, but also in the Netherlands, while they were still rising in other countries like Austria, Belgium and Finland. On a positive note, country-level data suggest that after a prolonged steep decline in residential and commercial property prices, there are some first tentative signs of stabilisation at low levels in some countries, most notably Ireland. Having said this, the outlook for euro area property markets remains weak, reflecting not only subdued developments in the demand for housing, but also potential further corrections in some countries.

Valuations in euro area property markets continued to diverge across countries, although the large range of estimates underlines the high degree of uncertainty surrounding any particular estimate. The annual decline of *residential* property prices in the euro area as a whole has continued and prices are largely in line with fundamentals (see Chart 1.30), while estimates suggest that *commercial* property valuations for the euro area are still somewhat above their long-term average (see Chart 1.31). However, these aggregate figures mask highly heterogeneous developments at the country level, which also hide strong regional disparities, as suggested for example by the estimated strong overvaluation of residential property in some large German cities. Residential and commercial property market valuations have come down strongly from previous peaks, as the continued unwinding of pre-crisis excesses has brought prices down to the level suggested by the underlying values or even lower. In Belgium, Finland and France, by contrast, estimated overvaluation remained high in both market segments. Such signals, while illustrative, should be interpreted with caution in view of the mixed quality of data, the limitations of some proxies for fundamentals (particularly to capture country-level specificities) and the possible presence of structural breaks.

Three key downside risks underpin the outlook for euro area property markets. A first relates to a re-intensification of the sovereign debt crisis resulting in higher long-term interest rates. A second more general downside risk stems from the high observed cyclicity in property markets – whereby risks to macroeconomic growth in an environment of high uncertainty could potentially trigger further property price corrections, present challenges in terms of debt servicing and contribute to rising rollover risks. Lastly, any spillover of turmoil in global bond markets to euro area property markets could yield higher de facto financing costs and borrower distress given the leverage inherent in property market lending. For all of these risks, newly available macro-prudential tools in the property market sphere may help to counteract such risks in the future.

Euro area property prices continued to decline, with first signs of stabilisation in some countries

Overvaluation remains a concern in some countries

Box 3

HOUSE PRICE CYCLES ACROSS EUROPE

Housing markets are prone to boom and bust cycles. Within the euro area, striking recent cases include the Irish and Spanish housing markets, where a prolonged strong rise in house prices with origins over 15 years ago was followed by a marked downturn which is still affecting

Chart A European countries in a high- and low-growth housing market regime

(Q1 1992 – Q2 2013; percentage of total number of countries)

- low-growth regime
- high-growth regime



Sources: ECB and ECB calculations.

Chart B European countries with house prices persistently above the long-run trend

(Q1 1992 – Q2 2013; percentage of total number of countries)



Sources: ECB and ECB calculations.

these economies. These two country cases illustrate an implicit asymmetry in housing market dynamics: booms tend to build up gradually, but busts occur swiftly. Given the tight link between housing market developments and lending activity, the early detection of costly booms is key to avoid house price bust episodes with financial stability consequences in the form of increasing mortgage default risk.

One means of capturing these dynamics in house prices is a regime-switching model which screens out those housing market phases in which house prices differ markedly from what would be implied by underlying economic fundamentals. To this end, a model is applied to 13 countries in the European Economic Area (including eight euro area countries) in which the mean rate of house price growth switches between three regimes (high, medium and low growth).¹ The model first establishes a long-run equilibrium relationship between house prices and macro-fundamentals at the country level, while the various regimes apply to the short-run dynamics of house price changes around these long-term relationships. The country-specific factors influencing house prices include affordability (disposable income), the cost of financing house purchases (long-term interest rate) and the general economic climate (unemployment rate).

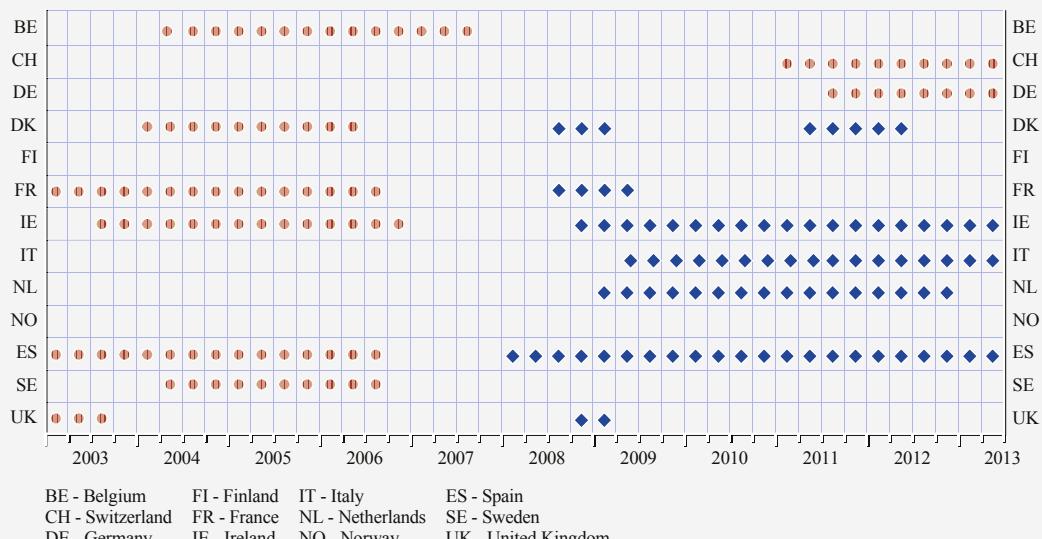
The model produces estimates of the time-varying probabilities of being in a given regime at each point in time and it allows the housing market cycle to be identified. Based on this probability for each country, the model allows for a construction of indicators aiming to measure to what extent the high- and low-growth phases of housing markets across Europe are synchronised with each other.

An application of this approach suggests considerable synchronisation of both booms and busts across countries. In particular, housing markets in Europe seem to have become more

¹ The sample comprises those countries for which a complete dataset is available: Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland and the United Kingdom. For model set-up details, see Corradin, S. and Fontana, A., "House price cycles in Europe", *ECB Working Paper Series*, forthcoming.

Chart C European countries in a high- and low-growth housing market regime

(Q1 1992 – Q2 2013)



Sources: ECB and ECB calculations.
Note: Red indicates a high-growth regime, while blue indicates a low-growth regime.

synchronised with each other since the 2000s – a trend equally applying to the pre- and post-global financial crisis phases (see Chart A). First, in the run-up to the global financial crisis (between June 2004 and September 2006) European housing markets were generally on an upward trend. Approximately 46% of the countries were in a high-growth regime and the remaining countries were in a medium-growth regime.² In this period, Belgium, Denmark, France, Ireland, Spain and Sweden were in the same high-growth regime (see Chart C). Second, during the global financial crisis (between December 2008 and June 2012), approximately 41% of the countries were in a low-growth regime and the remaining ones in a medium-growth regime. In this period, Denmark, Ireland, Italy, the Netherlands and Spain were in the same low-growth regime (see Chart C).

The approach also allows for an estimation of housing market valuation with respect to its modelled fundamental. The results suggest that high-growth phases typically coincide with overvaluation between June 2004 and September 2006 (see Chart B). Finally, low-growth phases also tend to be characterised by overvaluation at the beginning when a downturn follows after a prolonged rise in house prices.

In sum, the analysis suggests that almost half of the 13 European countries analysed experienced a housing market boom over the period leading up to 2006, which was indeed unusual compared with the more regular house price dynamics observed in those economies. This situation eventually led to the – in some cases still ongoing – phase of house price corrections in most of the countries that experienced a prolonged period of house price appreciation. Such findings further reinforce the need for judicious use of policies to combat such country-specific build-ups of imbalances – notably country-specific policies in the macro-prudential area.

² The percentage of European countries in the low-growth regime is zero.

2 FINANCIAL MARKETS

Global financial markets have been shaken by bouts of volatility linked to uncertainties regarding the timing of a tapering of the Federal Reserve's asset purchase programme, changes in the growth outlook for advanced and emerging economies, and political challenges in some countries. Adjustments to expectations regarding the timing of a tapering in the Federal Reserve's asset purchase programme triggered a significant increase in yields on US Treasuries, which reverberated globally. Emerging markets were hit hardest, as changes in expectations regarding the monetary stance in the United States and the continued deterioration of the growth outlook contributed to a reversal of some of the strong capital inflows observed since 2009. The rise in US interest rates also had an impact on euro area markets, in particular the money and bond markets. The introduction of forward guidance by the ECB limited contagion, while signs of a strengthening of euro area economic activity supported euro area markets, in particular stressed segments. However, developments within stressed markets diverged according to domestic conditions, with political uncertainty in certain countries offsetting otherwise improving sentiment.

Notwithstanding the adjustments in bond markets over the last few months, yields on higher-rated government bonds and speculative-grade corporate debt securities remain low by historical standards, suggesting scope for further corrections. The possibility of additional adjustments arising from changing expectations regarding a normalisation of monetary policy cannot be ruled out. Experience to date indicates that the impact of shifting expectations regarding the timing of a normalisation of the US monetary policy stance might be broad-based in scope, triggering spillovers via asset prices and capital flows. However, the magnitude of the spillovers on markets will depend on prevailing risk sentiment, the domestic growth outlook, current account deficits and the related reliance on foreign capital. At the same time, low market liquidity in certain bond market segments, combined with depleted cash cushions and low bank inventories of corporate bonds, could amplify future price developments.

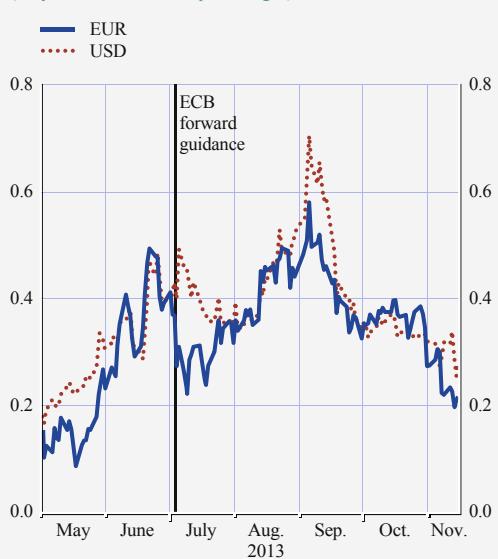
2.1 VOLATILITY IN EURO AREA MONEY MARKETS AS A RESULT OF GLOBAL AND DOMESTIC UNCERTAINTIES

Volatility in money market interest rates emerged early in the summer, as evolving expectations regarding the timing of a tapering of the Federal Reserve's asset purchase programme led to pockets of rising pressure in US money markets. The spillover to the euro area was evident in a relatively pronounced correlation between US and euro area rates from late May to early July, and in a sustained upward and steepening trend in the term structure of euro area money market interest rates (see Chart 2.1 and lower quadrant of Chart 2.2). This trend led to a situation in which part of the accommodation introduced by the ECB's earlier monetary action was not being fully transmitted.

The introduction of forward guidance by the ECB on 4 July resulted in a delinking of US and

Chart 2.1 One-year forward overnight index swap rates over one year in the euro area and the United States

(May 2013 – Nov. 2013; percentages)



Sources: Bloomberg and ECB calculations.

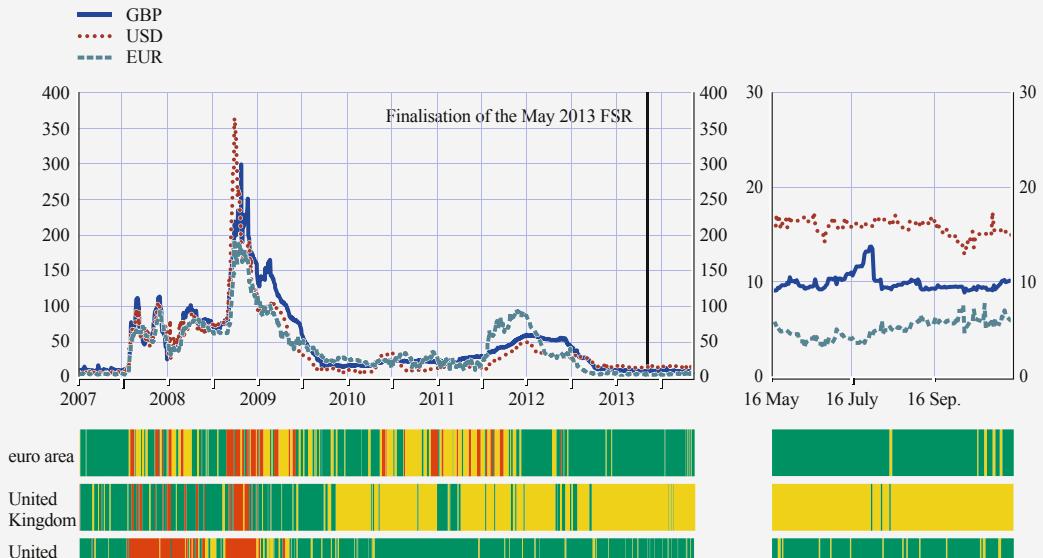
... has been allayed by the introduction of the ECB's forward guidance

ECB

Financial Stability Review
November 2013

Chart 2.2 Spreads between unsecured interbank lending and overnight index swap rates

(Jan. 2007 – Nov. 2013; basis points; three-month maturities)



Sources: Bloomberg and ECB calculations.

Notes: Red indicates rising, yellow moderating and green falling pressure in the respective money markets. For more details, see Box 4, entitled “Assessing stress in interbank money markets and the role of unconventional monetary policy measures”, in ECB, *Financial Stability Review*, June 2012.

euro area developments, and in a reduction of uncertainty about future euro area money market rates, as confirmed by the changes in option-implied risk-neutral densities for options on three-month EURIBOR futures (see Chart 2.3). In addition, the composite indicator of systemic stress (CISS) in the financial system began to decline, falling to the lowest level on record in September and remaining at low levels since (see Chart 2.4). Following decisions of the Federal Open Market Committee (FOMC) to maintain asset purchases at their current level, and the ECB’s decision of November to cut the main refinancing rate, euro area money market rates have declined, yield curves have flattened and market volatility has decreased.

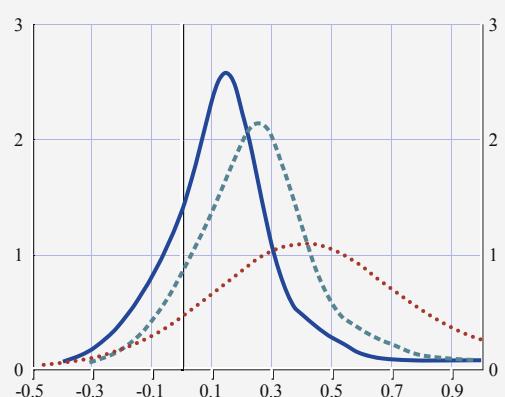
Persistent declines in excess liquidity have not contributed to rising pressures on rates

Money market rates remained low despite further declines in excess liquidity, which fell to below €200 billion in October (see Chart 2.5). The limited direct bearing of the prevailing level of excess liquidity on the evolution of money market rates suggests that the level below which declines in liquidity can trigger shifts in money market rates is positively related

Chart 2.3 Risk-neutral densities of 12-month options on the three-month EURIBOR

(percentages)

— 2 May 2013
··· 24 June 2013
--- 15 November 2013

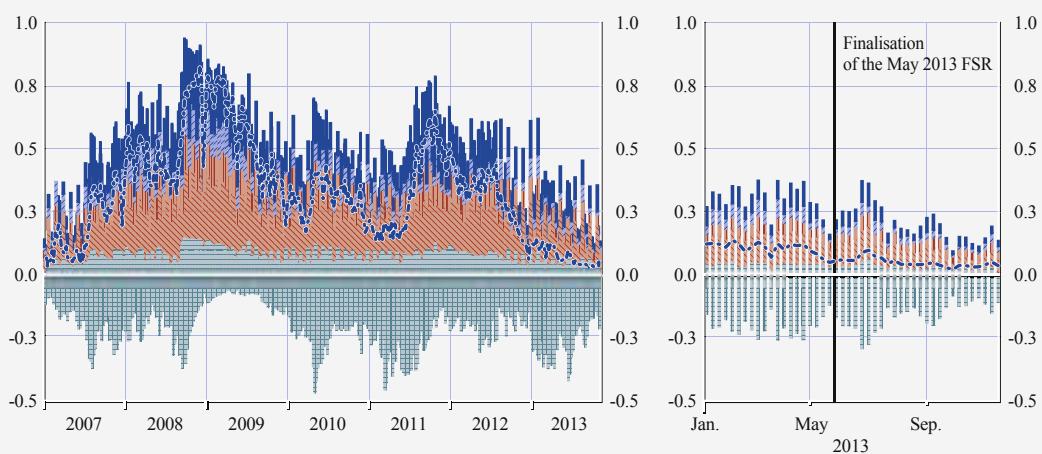


Source: LIFFE-NYSE Euronext.

Chart 2.4 Composite indicator of systemic stress for the euro area and contributions of its components

(Jan. 2007 – Nov. 2013)

- equity market contribution
- bond market contribution
- money market contribution
- forex market contribution
- financial sector contribution
- correlation contribution
- composite indicator of systemic stress (CISS)



Sources: Bloomberg and ECB calculations.

Note: For further details, see Hollo, D., Kremer, M. and Lo Duca, M., "CISS – a composite indicator of systemic stress in the financial system", *Working Paper Series*, No 1426, ECB, March 2012.

to the degree of fragmentation in the market. Indeed, excess liquidity would be expected to completely dissipate without an observable impact on rates in an extreme case of a fully and perfectly functioning interbank market. Declining excess liquidity has partly been a function of early repayments of longer-term refinancing operations (LTROs), which have reflected an improvement in funding conditions: balance sheet data show an increase in lending by monetary financial institutions (MFIs), excluding the Eurosystem, located in non-stressed euro area countries to MFIs located in stressed euro area countries in the first half of 2013. The pace of LTRO repayments was slower in the summer months, perhaps reflecting a cautious management of liquidity or the aforementioned difficulties in repo markets, as well as indications of a decline in cross-border non-repo interbank funding, but has picked up since September, in line with improving conditions in funding markets (see Section 3).

Chart 2.5 Excess liquidity and outstanding LTRO loans

(Jan. – Nov. 2013; EUR billions)

- longer-term refinancing operations outstanding (left-hand scale)
- excess liquidity (right-hand scale)



Sources: ECB and ECB calculations.

Note: Excess liquidity refers to deposit facility plus current account holdings less reserve requirements.

Activity in unsecured markets continued to decline and remained limited to a small number of banks...

Activity in **unsecured money markets** remained subdued, limited to a small number of banks and concentrated on maturities of less than one week. The euro area money market survey for the second quarter of 2013 showed a further decline in turnover in the second quarter, and activity has remained broadly stable since then. The survey also indicated that market activity remains highly concentrated, with 20 banks accounting for 86% of total lending and for 80% of total borrowing. Although transactions among stronger euro area banks accounted for the bulk of unsecured activity, willingness to lend at maturities beyond one week appeared limited (see Chart 2.6). In the second quarter, the share of loans with maturities of over one week in total lending remained at half its pre-sovereign debt crisis level. Fragmentation within unsecured markets has deteriorated slightly since the second quarter of 2013, as access for certain banks from stressed countries became more limited in the wake of further rating downgrades.

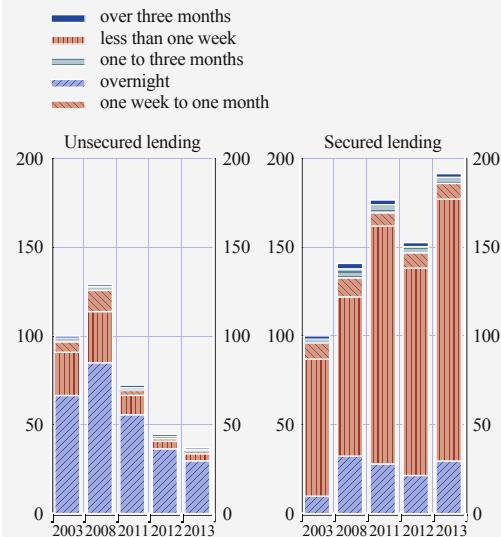
... while lending in secured markets increased

Activity in **secured money markets** continued to recover from the low levels observed last year. However, lending remained concentrated on maturities of less than one week, and the improvement in fragmentation observed in the first half of this year stalled or, in the case of repo markets, reversed on account of political uncertainties in specific euro area countries during the summer months. The cost of repo funding for Spanish and, to a greater extent, Italian banks rose in June and July, to levels not observed since June 2012. Market access has been challenging for these banks since end-May, on account of either a lack of counterparties for bilateral trades or a high cost of access. In the case of Italian banks, these developments were exacerbated by the decision taken by LCH Clearnet in August in favour of cash settlement in the event of a default by the Italian clearing house Cassa di Compensazione e Garanzia. This measure contributed to a short-lived increase in rates for collateralised funding, with the ability of Italian banks to raise funding through transactions with central counterparties (CCPs) being temporarily affected. According to the ECB's money market survey, transactions via CCPs accounted for roughly two-thirds of total turnover in the euro area repo market in the second quarter of 2013, compared with approximately one-half in 2012.¹ Fragmentation persists in repo markets, but conditions have improved for Italian and Spanish banks since August, reflecting a lower general risk aversion, a re-opening of foreign credit lines and, in the case of Italian banks, improvements in their liquidity situation.

Looking ahead, market sources indicate concerns that the inability to offset repos against reverse repos under the revised Basel III leverage ratio will lead to a retrenchment of activity. According to the balance sheet data for euro area credit institutions, repos only account for a small proportion

Chart 2.6 Maturity breakdown for cumulative quarterly turnover in unsecured and secured lending

(index: lending volume in 2003 = 100)



Source: ECB money market surveys.

Notes: The panel consists of 104 credit institutions. The data are for the second quarter of each year displayed.

¹ According to market sources, increasing interactions with CCPs, as well as the decision by LCH Clearnet, have prompted a higher surveillance of CCPs by banks. During systemic events, a lack of risk management by CCPs has the potential to unduly increase liquidity stress for its members and can, in extreme cases, lead to cliff effects. With respect to their increased surveillance, market participants mentioned closer analysis of CCPs' operations, stress testing and regular monitoring, including reports on exposures to senior officials.

of total bank liabilities in the euro area (less than 5%), although the share varies across banking sectors.² Moreover, the importance of repo markets lies in the liquidity they provide to the underlying collateral, largely government bonds. A number of market participants have also raised concerns that LCH Clearnet's decision could impact market liquidity for Italian sovereign bonds, especially if risk aversion returns.

2.2 POTENTIAL FOR FURTHER CREDIT MARKET TURBULENCE DESPITE RECENT CORRECTIONS

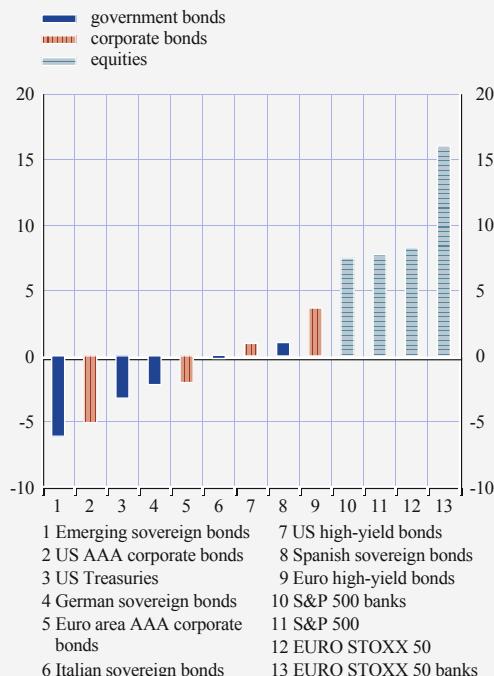
Significant price adjustments across a wide range of asset categories accompanied the financial market turbulence that was triggered in the summer by changing market expectations regarding the timing of a phasing-out of US quantitative easing. The shift in expectations coincided with the Federal Reserve Chairman's testimony before the US Congress on 22 May. Adjustments since that date have varied greatly, in terms of magnitude and nature, across regions and market segments (see Chart 2.7). While higher-rated bonds experienced noteworthy declines, the prices of riskier assets, in particular bank equity, increased. In terms of regions, emerging markets were hit hardest, as the key drivers of sustained foreign capital inflows – the accommodative US monetary policy, high growth and interest rate differentials vis-à-vis advanced economies – began to reverse. The declines in broad emerging market equity and bond indices have been more substantial than those of the euro area or the United States. In fact, compared with the United States, euro area markets emerged relatively unscathed from the recent turbulence, largely on account of both the introduction of forward guidance by the ECB, which limited the spillover from global volatility, and a brightening of the euro area growth outlook, which resulted in an improvement in risk sentiment, particularly towards stressed market segments. Recent global adjustments are reminiscent of developments in 1993-94 when a strengthening of the US economy triggered a tightening of monetary policy that coincided with spikes in volatility and significant price corrections in global bond markets, particularly in those for emerging market bonds (see Box 4).

While a precise estimate of the distribution of the losses associated with recent global bond market turbulence is difficult to arrive at, given the unavailability of information on hedging, the nature of market moves suggests that significant losses were most likely to be related to exposures to emerging markets and higher-rated sovereign bonds (see Chart 2.7). Among **euro area institutional investors**, investment funds appear to have been most exposed to recent market corrections, given their significant holdings of debt securities in

Adjustments to market prices varied across regions and segments

Chart 2.7 Developments in prices of selected global assets

(22 May – 15 Nov. 2013; percentage changes)



Sources: Bloomberg, Bank of America Merrill Lynch, iBoxx, Thomson Reuters and ECB calculations.

Note: Data for high-yield bonds refer to total return rather than price indices.

Among euro area institutional investors, investment funds seem most exposed to recent volatility...

2 Repos account for 16%, 8% and 7% of the funding of banks located in Malta, France and Finland respectively.

... although balance sheet data imply some losses for MFIs and ICPFs

the order of 40% of their balance sheets, almost half of which is accounted for by non-euro area bonds, which experienced the sharpest price declines during recent turbulences (see Chart 2.7). Nonetheless, these funds continued to increase their exposure to non-euro area bonds in the third quarter of 2013, albeit at a slower pace. By contrast, balance sheet data for euro area hedge funds indicate a swift reaction to the changing environment; these entities reduced their overall holdings of non-euro area debt securities in the second quarter of 2013 and decreased their exposure to US bonds in the third quarter. Data on investment returns indicate that most hedge fund strategies, in particular directional strategies, suffered losses in June.

As a percentage of total assets, investment by euro area *monetary financial institutions* (MFIs) in bonds is comparatively low, at 18%, although substantial heterogeneity is evident across national banking sectors. Moreover, among euro area institutional investors, these entities hold the largest proportion of euro area government and corporate bonds. MFI data on revaluation adjustments imply that euro area banks experienced larger than average losses on fixed income portfolios in May and June. During this period, MFIs continued to reduce their non-financial corporate bond holdings, but increased their holdings of domestic government bonds, which remain high despite recent reductions. Similar to investment funds, euro area *insurance corporations and pension funds* (ICPFs) have large exposures to bond markets, equivalent to almost 40% of their balance sheets. However, in contrast to the investment funds, the bulk of these assets are euro area bonds, evenly split between the government and corporate segments. Financial results for the second and third quarters of 2013 indicate that the increase in yields on high-rated government debt securities since May resulted in a decline in the capital buffers of large, in particular internationally active, euro area insurers, although they remain comfortable (see Section 3.2 for further details).

Box 4

CHANGING EXPECTATIONS OF US MONETARY POLICY AND GLOBAL ASSET PRICES: WHAT CAN WE LEARN FROM THE 1994 EPISODE?

The global asset market volatility that accompanied changing expectations regarding a tapering-off of the Federal Reserve's asset purchases since May resembled previous episodes when the withdrawal of accommodative US monetary policy was associated with significant global market sell-offs. From a financial stability perspective, one past episode stands out, namely that of developments in 1993-94. During this period, an abrupt change in US monetary policy caught financial markets by surprise, resulting in sharp adjustments to expectations regarding the US monetary policy stance that led to considerable bond market turbulence.¹ Although much has changed since 1994 – central bank communication has improved significantly and monetary policy tools have become more complex – an examination of the mechanics of the 1993-94 episode, and a comparison with recent events, can provide some useful insights into potential vulnerabilities associated with changing expectations regarding the US monetary policy stance.

The US economic recovery gained strength in late 1993, triggering a tightening of monetary policy that went hand in hand with spikes in volatility and significant price corrections in global bond markets. The Federal Reserve's policy rate rose by 300 basis points in seven steps from

¹ See also Box 1, entitled "Interest rate risk and the Federal Reserve's tightening cycle: comparison with the events of 1994", *Financial Stability Review*, ECB, June 2010.

early 1994 to early 1995, and US Treasuries followed suit: yields on one-year and ten-year US government bonds increased by 320 basis points and 200 basis points respectively. The ten-year US Treasury benchmark lost 15% of its value between the end of 1993 and mid-1994. Developments in US Treasuries quickly spilled over to other bond markets, in particular US corporate bond markets, as well as to advanced and emerging market government bond markets (see the chart).

Between the end of 1993 and mid-1994, the price of the ten-year gilt had fallen by almost 20%, while prices of ten-year German, Swiss and Japanese government bonds had declined by around 10%. Similar to recent developments, the most marked price corrections were observed in emerging markets. US dollar-denominated bonds in Latin America (so-called “Brady bonds”) had lost almost 25% of their value by March 1994, and tighter financial conditions linked to the Mexican crisis brought the total price decline to 35% by early 1995.

Although recent developments have been more muted than those observed in 1994, there appear to be some parallels between the two events (see the chart below). In May 2013, a change in expectations regarding a tapering of the Federal Reserve’s bond purchase programme was associated with large-scale sales of assets across the globe, particularly of emerging market assets. Similar to events in 1994, developments in the United States appear to have been a catalyst for bond market corrections, although the magnitude of the adjustment was clearly linked to underlying domestic vulnerabilities, in particular a deteriorating growth outlook, combined with large current account deficits. Price adjustments in emerging bond and equity markets in the period from late May to early July amplified those of advanced markets. In particular, the euro area emerged relatively unscathed from the recent financial market turbulence. While a deteriorating growth outlook for emerging markets has amplified adjustment challenges,

Sovereign bond indices during the 1993-94 and 2013 market turbulences

(indices: Dec. 1993 = 100; May 2013 = 100)



Sources: Thomson Reuters Datastream and ECB calculations.

Note: With respect to the period 1993-94, t refers to December 1993, while it refers to May 2013 in the case of the year 2013.

improving growth prospects have mitigated the impact of global financial turbulence on the advanced economies.

These episodes illustrate how reassessments of the US monetary policy stance can have significant global consequences, particularly for regions where domestic vulnerabilities are high. While the exit from quantitative easing may lead to some volatility and investor portfolio shifts at the global level, determining the extent of these shifts and their impact on yields remains an arduous task. Estimates by some market participants that point to a low impact of a tapering of the Federal Reserve's asset purchase programme on asset prices seem to contrast with the sharp interest rate movements observed over last summer, perhaps indicating that recent fluctuations embedded in expectations regarding rate increases (conventional policy) may have been equally or even more important for markets than those regarding the tapering (unconventional policies). It should be noted that history suggests that the strength of global spillovers from changing US monetary policy expectations depend on country-specific vulnerabilities, notably unsustainable external positions.

Movements in yields of higher-rated euro area sovereign bonds have been closely correlated with those of US Treasuries...

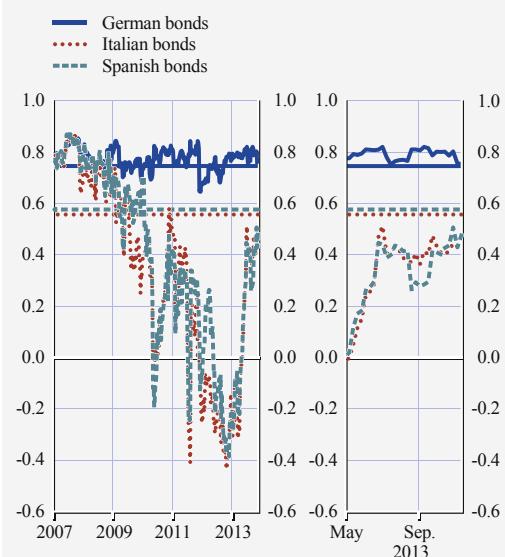
Movements in the yields on **higher-rated euro area government bonds** reflected developments in money market rates, and have thus closely mirrored those of US Treasuries, with an increase in correlations evident after the sharp adjustment in late May of market expectations regarding a tapering of the Federal Reserve's asset purchase programme (see Chart 2.8). Although the introduction of forward guidance triggered some decoupling between rates, correlations remain elevated. Some of this may relate to a parallel improvement in economic conditions on both sides of the Atlantic, which contributed to a further rise in the yields on US Treasuries and higher-rated euro area sovereign bonds. Despite these increases, yields on ten-year German government bonds remain low – roughly half their historical average. Measures of modified duration – which expresses the change in the value of a security in response to a change in interest rates – for German government bond portfolios have generally declined since May, implying that investors are slightly less sensitive to rate adjustments than they were in May. However, these measures are quite elevated for both German bond and US Treasury portfolios in comparison with their respective 20-year averages (see Chart 2.9).

... while developments in stressed segments have reflected prevailing levels of risk aversion and domestic vulnerabilities

Since the outbreak of the sovereign crisis, developments in the **stressed segments of the euro area government bond market** have become less correlated with movements in higher-rated bonds and more reflective of prevailing levels of risk aversion and domestic conditions (see Charts 2.10 and S.2.1). During the initial bond market sell-off from late May to late June, movements in the yields on stressed

Chart 2.8 Correlations between government bonds in the United States and selected euro area countries

(Jan. 2007 – Nov. 2013; correlation coefficient)



Sources: Thomson Reuters and ECB calculations.

Notes: Correlations in ten-year instruments, extracted from dynamic conditional correlation (DCC) models. Averages for Germany refer to the period from January 1994 to October 2013. Averages for Spain and Italy refer to the period from July 1996 to November 2013.

Chart 2.9 Developments in the duration of higher-rated government bond portfolios

(Jan. 2007 – Nov. 2013; duration in number of years; 30-day averages)

— US Treasuries
..... German government bonds



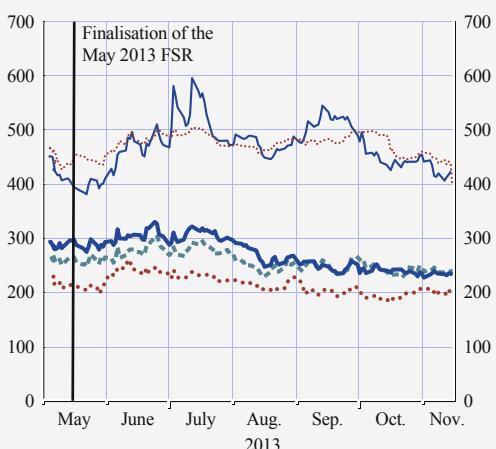
Sources: Bank of America Merrill Lynch, iBoxx, Thomson Reuters and ECB calculations.

Note: Historical averages refer to the period from January 1999 to November 2013.

Chart 2.10 Government bonds in stressed euro area countries vis-à-vis German Bunds

(May – Nov. 2013; ten-year spreads in basis points)

— Spain
..... Ireland
--- Italy
— Portugal
.... Slovenia



Sources: Bloomberg and ECB calculations.

government bonds amplified developments in US Treasuries as concern about the global growth outlook led to a retrenchment in risk-taking. The release of better than expected economic data in the United States and the euro area, and forward guidance from major central banks, resulted in an increase in risk appetite, in particular for stressed euro area bonds. For most segments, spreads vis-à-vis German government bonds narrowed. Conditions across national markets varied, however, according to domestic vulnerabilities. In particular, political uncertainty in Italy and Portugal, combined with bank closures in Slovenia, weighed on those domestic markets.

Outside the euro area, yields on other **benchmark global government bond markets** – including those in the United States, the United Kingdom and Japan – remain low by historical standards (see Chart S.2.5). Although changing expectations regarding a tapering of the Federal Reserve's asset purchase programme were not linked to any actual policy change, the yield on the ten-year Treasury is quite perceptibly higher than its level on 22 May. Nonetheless, the nominal yield remains quite low at close to half its long-run average, while the real yield is negative. The spillover from the increase in the yield on US Treasuries was evident in rising yields on UK gilts, with the interest rate on the ten-year gilt hitting a two-year high in early September, before falling back to historically low levels. In contrast to other high-rated government bond markets, yields on Japanese government bonds decreased when those on US Treasuries were rising. This development reflected a decline in market volatility from a relatively high level earlier in the year when the Bank of Japan announced a programme of “quantitative and qualitative easing”.³

Yields on high-rated global sovereign bonds have increased, but remain below historical averages

³ “Quantitative and qualitative easing” involves a doubling of the monetary base, an extension of the expected average maturity of Japanese government bond purchases and an increase in the Bank of Japan’s purchases of risky assets.

*A persistent search
for yield and
attempts to avoid
duration are keeping
yields on speculative-
grade corporate debt
at historical lows*

*Lower market
depth/liquidity
could amplify the
ramifications
of a snapback in
interest rates...*

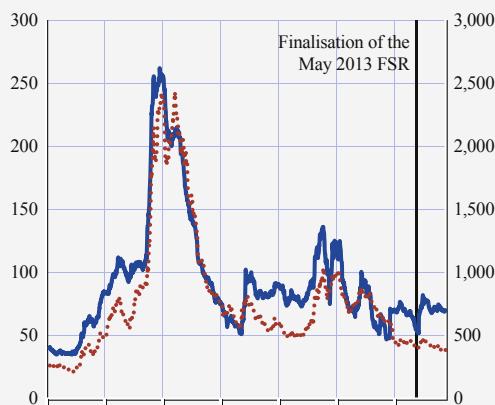
While spreads on investment-grade **bonds issued by non-financial corporations** (NFCs) have increased in line with global market corrections, spreads on high-yield debt securities have continued to fall (see Chart 2.11). The persistent decline is likely to reflect demand factors as issuance by NFCs in both the investment-grade and high-yield market segments has been comparable with that in the same period in 2012. Further declines in speculative-grade corporate bond spreads are consistent with a continuous decline in expected default frequencies (EDFs) at the euro area level, the level in July 2013 marking the lowest recorded in almost two years (with yields on speculative-grade debt securities falling consistently since then).⁴ The improvement in the euro area growth outlook has contributed to a further decline in EDFs and additional downward pressure on yields owing to increased risk appetite for euro area assets. In recent months, the decline in spreads on high-yield bonds of euro area NFCs was more marked than that of their US counterparts, despite the relatively more favourable outlook for growth in the United States and the resulting lower EDFs for US firms. This development may reflect efforts by investors to avoid interest rate risk in the light of recent market fluctuations, as measures of modified duration of euro area bond portfolios are lower than their US counterparts (see Chart 2.12).

Persistent imbalances in higher-rated government and lower-rated NFC bond markets raise concerns regarding the possibility of a sharp adjustment in yields, which could be amplified by a number of vulnerabilities in financial markets. Perhaps the most concerning of these relates to market liquidity. Ongoing changes owing to the reassessment of credit risk and regulatory initiatives may be affecting the ability and willingness of market participants to provide market-making and similar liquidity-enhancing services. While the stock of US and euro area corporate debt securities has

Chart 2.11 Spreads of bonds issued by euro area non-financial corporations

(Jan. 2007 – Nov. 2013; basis points)

— investment-grade (left-hand scale)
····· high-yield (right-hand scale)



Sources: Bank of America Merrill Lynch and Thomson Reuters Datastream.

Chart 2.12 Duration of bonds issued by US and euro area non-financial corporations

(Jan. 2007 – Nov. 2013; duration in number of years;
30-day averages)

— euro area BBB-rated portfolio
····· euro area high-yield portfolio
- - - US BBB-rated portfolio
— US high-yield portfolio



Sources: Bank of America Merrill Lynch, iBoxx and Thomson Reuters Datastream.

Note: Euro area high-yield portfolio refers to bonds issued by non-financial corporations.

4 The EDFs for euro area firms continued to decline from July.

Chart 2.13 Cumulative net issuance of debt securities by non-financial corporations in the euro area

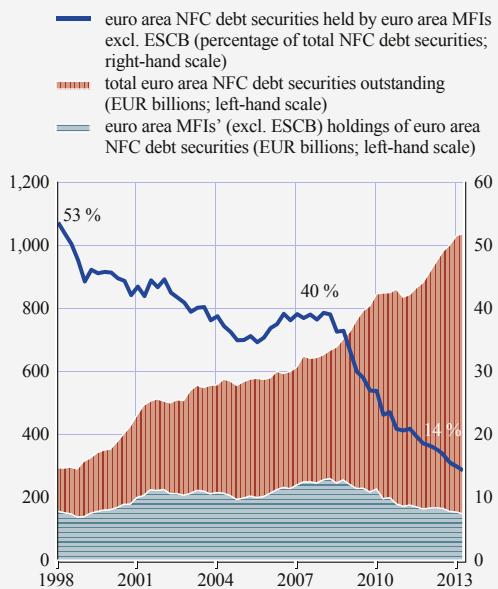
(Q1 2009 – Q4 2013)



Sources: Dealogic and ECB calculations.
Note: Q4 data refer to the period up to 15 November.

Chart 2.14 Debt securities issued by euro area non-financial corporations and amounts held by euro area MFIs (excluding the European System of Central Banks)

(Q1 1998 – Q2 2013; percentages)



Sources: ECB and ECB calculations.

expanded significantly during the crisis, US and euro area banks' holdings of NFC debt securities have been falling, raising concerns that market liquidity may not be as high as it was before the crisis (see Charts 2.13 and 2.14). Market feedback suggests a number of interrelated reasons why bond inventories of euro area banks have fallen, including more conservative risk management, carrying risk associated with potential rating downgrades, implications of higher volatility for risk-absorption capacities and reduced hedging possibilities due to, for example, short-selling restrictions and lower correlations, thereby increasing base risk. The decline in bank inventories has been accompanied both by lower trading turnover and by indications of a bifurcation of liquidity conditions, with conditions for larger and more recently issued bonds being more favourable than those for smaller, off-the-run issues. Tensions in illiquid markets can quickly spill over into more liquid markets, for instance if trading in liquid advanced economy markets acts as a substitute for more illiquid emerging market exposure in order to meet redemptions. Low market liquidity also adds to NFC bonds' rollover risk as investors who have been forced to hold onto illiquid corporate debt securities until maturity may be unwilling to re-invest.

Additional developments that could also amplify price movements include the increased importance of bond-oriented mutual and exchange-traded funds, heightened investor sensitivity to interest rate adjustments and low cash buffers for bond funds following recent market adjustments. Global mutual funds and exchange-traded funds (ETFs) have been among the largest buyers of global corporate debt securities in recent years. To the extent that investors in these funds are sensitive to total returns, redemptions may drive sales of underlying bonds in the event of an increase in interest rates, leading to further price corrections. Regarding investor sensitivity, measures of modified duration for higher-rated US and euro area government bond portfolios and speculative-

... along with changes in the investor universe, heightened duration and low cash buffers for funds

Demand for corporate hybrids remains strong, but investors may be mispricing risk

grade US bond portfolios are above their long-term averages, suggesting that investors are now more sensitive to interest rate adjustments than in the past. Finally, a J.P. Morgan client survey of global asset managers indicates that, following redemptions over summer, cash cushions of bond funds are modest or, in the case of emerging market funds, worryingly low (3% above the record post-Lehman low).⁵ Low cash buffers could mean that future interest rate shocks are amplified as a result of an increased pressure to sell bonds in order to generate cash to meet redemptions.

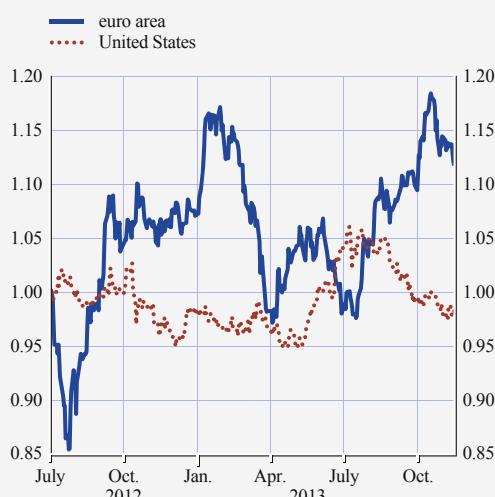
Issuance of euro-denominated **hybrid instruments by non-financial corporations** has remained strong, with year-to-date issuance by euro area NFCs already twice as high as total issuance over the previous five years. However, the size of the market, at around €50 billion, is still small when compared with broader debt and equity markets. Hybrids offers a high-yield exposure to investment-grade firms, but cause investors to incur extension risk, i.e. the probability that, given high refinancing costs on the call date or issuers finding it difficult to access alternative sources of funding, they may not be called on their first call date. In a scenario marked by a significant widening of spreads, or by a general rise in the level of interest rates, investors not only face the risk of immediate losses, but could also end up holding securities with longer duration and higher interest rate risk than initially assumed. A significant test case might occur in 2015 when a large volume of hybrids issued over the past decade (more than €8 billion) will become callable.

Continued growth in equity prices, supported by increased risk appetite

Supported by increased global risk appetite and better than expected economic data, prices in **global equity markets** continued along the upward trend observed since mid-2012 (see Chart S.2.10). The persistent rally in global equities has defied bouts of geopolitical tensions, as well as political uncertainty. Within the euro area, a broad-based increase was observed across all large national equity markets, owing to an improving euro area growth outlook, along with higher global risk appetite. Despite differences in the outlook for growth in individual countries, inflows into euro

Chart 2.15 Developments in US and euro area bank stock prices relative to overall equity markets

(July 2012 – Nov. 2013; 1 July 2012 = 1)



Sources: Bloomberg and ECB calculations.

Chart 2.16 Investment by euro area investment funds in euro area shares and other equity

(Q1 2010 – Q3 2013; EUR billions; four-quarter moving sum)



Sources: ECB and ECB calculations.

⁵ See J.P. Morgan, "Flows and Liquidity", 28 June 2013.

area equity funds for both stressed and non-stressed markets have been sustained (see Chart 1.9). Bank equities continued to outperform the general market, perhaps reflecting banks' efforts to increase provisions for bad assets, as price-to-book ratios rose (see Chart 2.15). Euro area institutional investors have been increasing their holdings of euro area equities over the past year, with annual purchases in June reaching pre-sovereign crisis levels (see Chart 2.16). The sustained inflows did not reflect a relocation of funds from bonds or non-euro area equities, although the pace of investment by euro area investors in non-euro area markets did decelerate in the second and third quarters of 2013.

3 EURO AREA FINANCIAL INSTITUTIONS

The economic and financial environment for euro area financial institutions remains challenging. Despite the alleviation of financial market tensions, the economic environment and the outlook for euro area banks and insurers remain subdued, pulling down profitability and exposing credit risk. For banks, **financial performance** suffers from elevated loan loss provisioning levels and sluggish revenue growth. While euro area insurers' profitability has been impacted less directly by the crisis, performance has also been hampered by weak macroeconomic prospects. More generally, real and financial fragmentation in the euro area has implied considerable heterogeneity across financial institutions – closely tied to the respective country of residence.

These challenges, which are in many ways linked to the economic cycle, contrast with more generalised, sustained steps towards structural balance sheet repair. With a more than 4 percentage point increase in regulatory capital ratios since the onset of the global financial crisis, the **capital positions** of large and complex banking groups (LCBGs) in the euro area have risen to levels comparable with those of their global peers. At the same time, deleveraging in the euro area banking sector has accelerated somewhat, mainly in activities unrelated to domestic bank lending. Where euro area insurers are concerned, capital buffers remain resilient, despite some increased volatility in global debt markets throughout the summer. Meanwhile, balance sheet repairs have also extended to banks' funding models, where there is a continued move towards more stable sources, benefiting from a lesser fragmentation of deposit flows.

Notwithstanding ongoing progress, the **risk outlook** for banks and insurers remains elevated in four main areas. First and foremost, while progress is continuing to be made in loss recognition, as witnessed by rising non-performing loan ratios, concerns remain regarding asset quality and profitability prospects in a weak economic environment. Second, while conditions in euro area sovereign debt markets have indisputably strengthened over the past year, there remains a risk of renewed tensions on account of low growth and a slow implementation of reforms. Third, euro area financial institutions remain vulnerable to a possible reassessment of risk premia in global markets – including a potential for further fluctuations in global bond markets such as those witnessed this summer. Lastly, the euro area bank funding situation has normalised somewhat, but still remains challenging given the persistent fragmentation of market-based funding sources, mainly for smaller banks from countries under stress. Scenario-based analysis suggests that a materialisation of key risks could have significant implications for euro area financial institutions, as well as for the wider economy – although ongoing actions at the bank and policy level may ultimately mitigate the severity of these estimated impacts.

Alongside these developments in euro area financial institutions, a concerted strengthening of the **regulatory and supervisory framework** for financial institutions, markets and infrastructures continues. The most noteworthy development in this sphere at the EU level has been the adoption of the Capital Requirements Regulation and the Capital Requirements Directive (CRR/CRD IV), through which the Basel Committee's new global standards for capital and liquidity (Basel III) will be implemented in the EU as from the beginning of 2014. At the same time, steady progress is continuing to be made along the path towards a banking union in the euro area.



Box 5

A NEW BANK SAMPLE FOR THE ECB'S FINANCIAL STABILITY REVIEW

The financial crisis illustrated that the size of banks, along with other factors such as complexity or interconnectedness, can lend a systemic dimension to financial instability. This has led to a global effort to improve the regulation and supervision of the financial sector. Stress specific to mainly the euro area involved a vicious circle between banks and sovereigns, thereby underscoring the need for a better governed and deeper economic and monetary union to support the single currency. A key pillar of these efforts was the European Council's decision of December 2012 to embark on the creation of a banking union in the European Union.

In particular, this includes the conferral of new euro area banking supervision powers on the ECB. Within the scope of the single supervisory mechanism (SSM), banks that are either large or of domestic significance – currently estimated at around 130 entities¹ – will fall under direct ECB supervision towards the end of next year, with an option also in place for bringing other banks under direct ECB supervision when warranted.

With a view to these new SSM-related tasks, the set of euro area banks analysed in this FSR has been extended to include all significant banking groups that publish financial statements, while a focus on large and complex banking groups (LCBGs) has also been retained for purposes of comparison with, and benchmarking with respect to, large global banks.

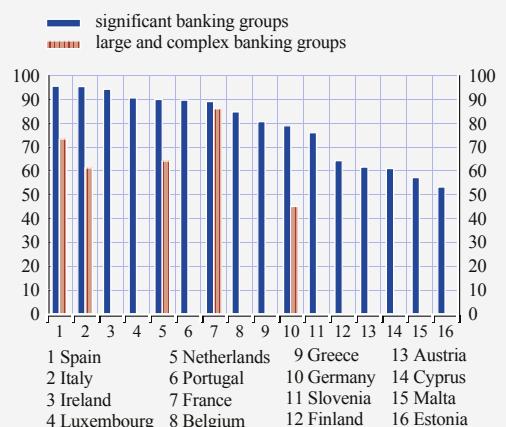
1. A new set of “significant banking groups” for euro area analysis

The approximately 130 banking entities that are currently seen as being subject to direct supervision by the ECB include around 90 parent institutions and stand-alone banks, referred to as “significant banking groups” (SBGs) in this FSR, on the basis of group-level consolidation.²

A focus on group-level dynamics for purposes of monitoring financial stability stems from the desire to present a consolidated analysis of the financial stability of banking groups as a whole.

Total assets of significant banking groups and large and complex banking groups relative to estimated total domestic banking sector assets

(H1 2013; percentage of total domestic banking sector assets)



Sources: SNL Financial and ECB.

Notes: In most cases, the reported figures are somewhat overstated as the consolidated accounts for the banking groups considered also include assets related to insurance activities that are not covered by the data on total banking sector assets.

1 The ECB will directly supervise banks with total assets in excess of €30 billion, or in excess of €5 billion if they represent more than 20% of notional GDP, and at least the three largest banks in each country. Other criteria mentioned in Article 6(4) of the SSM Regulation that involve supervisory judgements for classifying institutions as significant were not considered, since such judgements should be made at a later stage, i.e. once the SSM's operational arrangements have been published in accordance with Article 33(2) of the SSM Regulation.

2 Around 30 bank subsidiaries and six banks that are currently undergoing orderly *resolution processes* are not considered.

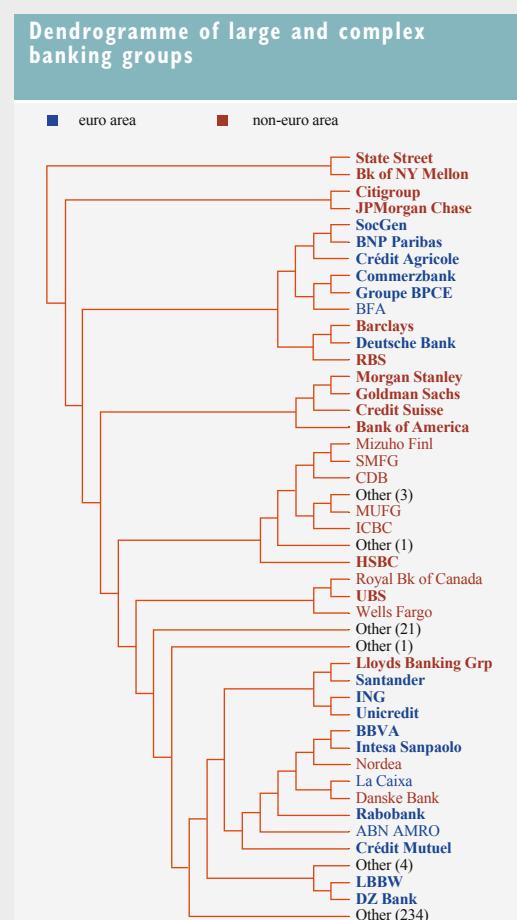
The SBGs under consideration had combined assets of around €23 trillion in mid-2013, which represent about 80% of total euro area banking sector assets. However, the proportion of each country's total domestic banking sector assets accounted for by the banks covered differs across countries as a result of both differences in bank concentration and the large number of foreign banks operating in some euro area countries (see the chart on the previous page).

Moreover, in countries with a high proportion of foreign bank ownership, actual coverage of domestic banking sector activity is higher than suggested in the chart because domestic assets are in some cases accounted for in the consolidated accounts of banks' domiciled in other euro area countries.

Until such time as the SSM has become operational and the ECB can make use of data collected for supervisory purposes, the analysis in the FSR will continue to rely on publicly available information. Such information is not available for all SBGs, and some banks only report at a lower frequency (annually or semi-annually). This means that data for all of the banks in the samples cannot be included for all individual analyses in the FSR.³ Although this gives rise to some inconsistencies with respect to the number of banks included in the different sections/charts across the FSR, it does not unduly impact overall consistency since many of the banks are the same, and those that are omitted are often the smaller entities.

2. Retention and refinement of “large and complex banking groups” for euro area and global benchmarking purposes

The updated sample of LCBGs includes 18 euro area and 22 global banks – identified on the basis of clusters reported in the adjacent figure. The largest, less substitutable and most interconnected banks play a particularly important role for financial stability, and the group of LCBGs – which is a subset of the SBGs – is still considered separately, in addition to the broader SBG sample for some financial stability analyses, also when benchmarking these often internationally active euro area banks against their peers around the globe.



Sources: SNL Financial, Dealogic, Globalcustody.net, ECB and ECB calculations.

Notes: Bold font indicates banks that were identified as LCBGs in the last update and normal font indicates newly identified LCBGs. A dendrogramme is a branching diagram representing similarities among a group of entities – it can be thought of as a tree where the leaves' proximity within the tree is determined by the similarity of their characteristics. The category “Other” represents banks not identified as LCBGs in the analysis.

³ For example, the analysis of quarterly financial statements includes data for around 50 banking groups for which quarterly data are available from public data sources (although all the indicators considered are not available for all banks). Likewise, some of the analysis presented in Section 3.3 relies on data published by the European Banking Authority, which is available for 62 banks.

The clustering methodology used to identify LCBGs was introduced in December 2006,⁴ with the aim of incorporating the “importance” of institutions in characteristics extending beyond the volume of their total assets, such as their complexity.

Several improvements have been made to the original LCBG identification procedure since the initial application of the methodology in 2006.⁵ Instead of a strict ranking, the identification of LCBGs by means of cluster analysis categorises banking groups as similar or unique in terms of the characteristics of systemic importance – deemed to be given in the case of (i) banks with large balance sheets, (ii) banks with a substantial share of non-traditional activities, (iii) banks focused on investment banking, (iv) custodian banks and (v) highly interconnected banks.

⁴ See ECB, “Identifying large and complex banking groups for financial system stability assessment”, *Financial Stability Review*, December 2006, and ECB, “Identifying large and complex banking groups for financial system stability assessment: an update”, *Financial Stability Review*, December 2007.

⁵ First, banks with consolidated assets in excess of €30 billion are considered, and global and euro area banks are treated equally. Second, the indicators used concentrate on succinctly capturing the three characteristics that determine the importance of banks, namely size (total assets), substitutability (assets other than loans as a percentage of total assets, proceeds from issuance and assets under custody) and interconnectedness (bilateral exposures via loans, securities, derivatives and off-balance-sheet positions). The interconnectedness indicator is available primarily for banks with operations in Europe, which results in some bias towards banks operating there. Finally, the distance between banks in the clustering methodology has been changed (*Mahalanobis* instead of the *Euclidean* distance) to take into account the correlation between variables.

3.1 THE EURO AREA BANKING SECTOR: CONTINUING BALANCE SHEET REPAIR

Bank profitability remains subdued...

The **profitability** of significant euro area banks remained subdued in the first three quarters of 2013, dragged down by still elevated loan loss provisioning levels and sluggish revenue growth. While the results for the second and third quarters of this year show a slight improvement in banks’ return on equity (ROE) on a year-on-year basis, the wide dispersion of bank ROEs suggests continued challenges for several banks and, indeed, banking sectors (see Chart 3.1). In the latter respect, both the *geographic location* and the *size* of banks remain crucial determinants of financial performance. A close link to sovereign and macroeconomic conditions suggests that cyclical as well as structural challenges are at play, with banks from stressed countries typically showing weaker profitability than their peers in other euro area countries, mainly on account of higher loan loss provisions. Similarly, euro area large and complex banking groups (LCBGs) have outperformed smaller significant banking groups (SBGs) in recent years and quarters, thanks largely to their lower credit risk costs (see Chart 3.2).

... as revenue growth remains modest amid weak growth and low interest rates...

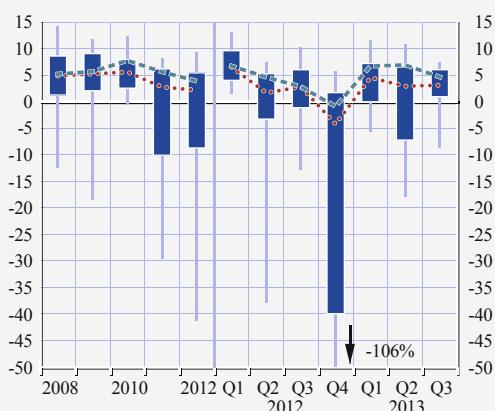
A modest development of income remains at the core of muted profitability (see Chart 3.2), not least given a relatively stable or improving cost base. Euro area banks’ net interest income continued to face headwinds from weak or negative lending growth, as well as from low interest rates, which negatively affect deposit margins (see Chart S.3.6) and the lending margins of banks with a high proportion of variable rate mortgage loans.

At the same time, improvements on the funding cost side over recent quarters have also been witnessed, helped by the gradual shift in the funding structure away from wholesale funding towards lower-cost customer deposits. A deeper look into the sources of interest income in 2012 reveals notable differences across countries. Although interest income from loans and receivables

Chart 3.1 Euro area banks' return on equity

(2008 – Q3 2013; percentages; 10th and 90th percentile and interquartile range distribution across SBGs)

- median for significant banking groups
- median for large and complex banking groups



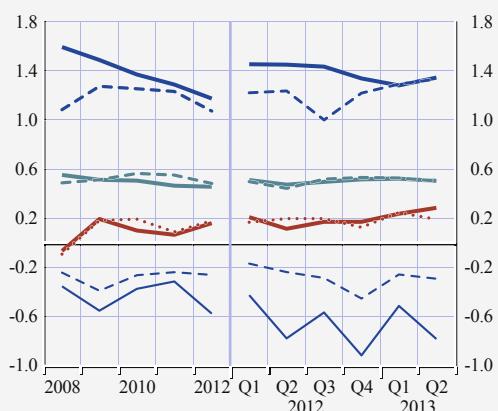
Source: SNL Financial.

Note: Based on publicly available data on SBGs, including LCBGs, that report annual financial statements and on data on a subset of those banks that report on a quarterly basis.

Chart 3.2 Breakdown of euro area banks' sources of income and provisioning costs

(2008 – Q2 2013; percentage of total assets)

- net interest income
- trading income
- - - net fee and commission income
- loan loss provisions



Source: SNL Financial.

Notes: Based on publicly available data on SBGs, including LCBGs, that report annual financial statements and on data on a subset of those banks that report on a quarterly basis. The solid lines indicate SBGs and the dotted lines show LCBGs.

accounted for most of total interest income in all countries, its share varied from around 50% to more than 90% (see Chart 3.3). In some countries, interest income from other financial assets – mainly bonds – was also significant, suggesting the use of carry trade strategies by some banks, in particular those characterised by weak credit trends.

The evolution of non-interest income appears to reflect some adaptation of business models, as well as some efforts to keep costs contained. Fees and commissions have seen slight increases as a percentage of total assets in recent quarters (see Chart 3.2). For some banks, higher fee and commission income reflects a gradual shift in business models towards those that generate fees (e.g. asset management). Banks' trading income benefited from more buoyant equity markets in the second and third quarters of 2013, but this was offset by falling revenues related to fixed-income trading, in particular in the third quarter of the year. At the same time, the improvement in pre-provisioning profits was supported by banks' efforts to contain costs. This contributed to the decline in SBGs' median cost-to-income ratio from 64% in 2012 to 60% in the first half of 2013. Nevertheless, the ratios remain above their previous lows in 2009, indicating that there is scope for further efficiency gains.

The main factor behind differences in banks' financial performance relates to diverging patterns in loan loss provisioning (see Chart 3.4). Differences in provisioning trends across banks have been driven mainly by factors related to the economic cycle, with banks in stressed countries recording a sharp rise in loan loss provisions since 2011, along with a deterioration of their asset quality. For some of these banks, provisioning costs have eaten up an increasing part of their pre-provisioning profits, making a return to profitability unlikely before macroeconomic conditions improve further.

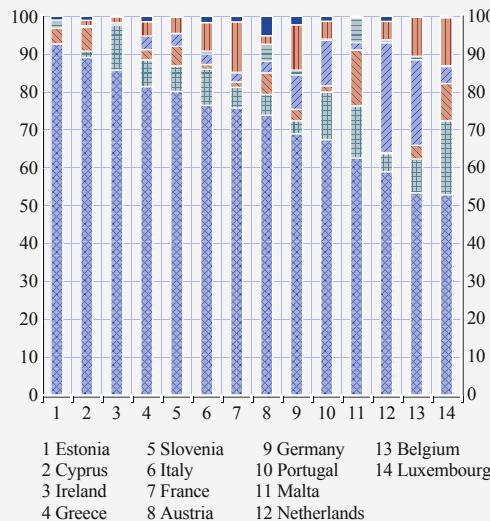
... and provisioning needs remain high, mainly in stressed countries...

... amid a continued deterioration in asset quality

Chart 3.3 Structure of interest income in euro area banking sectors

(2012; all domestic banks; percentage of total interest income)

- other assets
- derivatives – hedge accounting, interest rate risk
- financial assets designated at fair value through profit or loss
- financial assets held for trading
- held-to-maturity investments
- available-for-sale financial assets
- loans and receivables

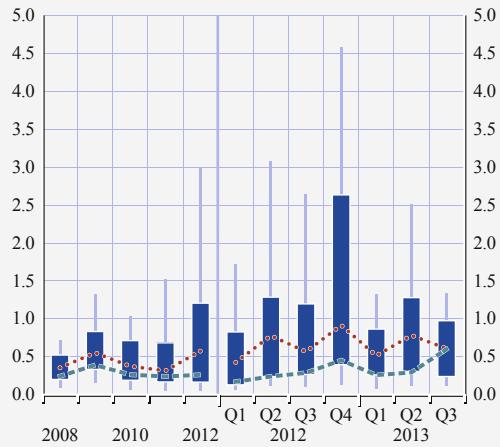


Source: ECB/FSC Consolidated Banking Data statistics.
Note: Data are not available for Finland, Spain and Slovakia.

Chart 3.4 Loan loss provisions of euro area banks

(2008 – Q3 2013; percentage of total assets; 10th and 90th percentile and interquartile range distribution across SBGs)

- median for significant banking groups
- median for large and complex banking groups



Source: SNL Financial.

Note: Based on publicly available data on SBGs, including LCBGs, that report annual financial statements and on data on a subset of those banks that report on a quarterly basis.

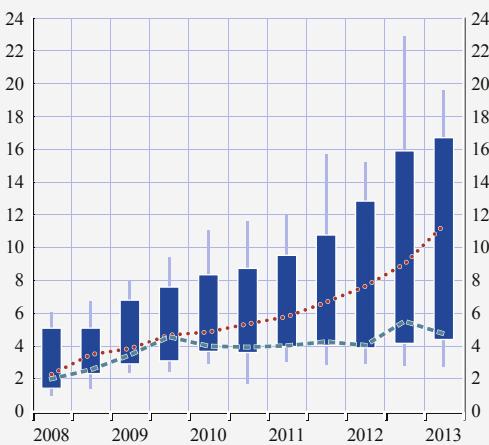
Asset quality developments continued to diverge between banks of different size, with broadly stable impaired loan ratios in the case of LCBGs contrasting with a continued deterioration of asset quality in that of smaller SBGs (see Chart 3.5). There is some evidence that, at least for some banks, some of the newly recorded non-performing loans (NPLs) are related to the reclassification of restructured loans as NPLs, also on account of new supervisory requirements (as in Spain, for instance).

It is noteworthy that, more generally, NPL ratios have been diverging considerably when viewed in terms of bank size since the start of the crisis (see Chart 3.5), while coverage ratios, when viewed in the same terms, have tended to move rather more in tandem (see Chart 3.6). Ultimately, however, the expansion of reserves has only kept pace with the deterioration in asset quality. As a result, coverage ratios have remained broadly flat, albeit with some improvement in recent quarters, in particular in the case of LCBGs. The dispersion across banks remains wide, which is partly due to national differences in the definition of NPLs and/or differences in the collateralisation of loans. However, the recent divergence of coverage ratios across banks even within countries suggests that part of the variation in coverage ratios reflects differences in banks' provisioning policies.

Chart 3.5 Impaired loans of euro area banks

(H1 2008 – H1 2013; percentage of total loans; 10th and 90th percentile and interquartile range distribution across SBGs)

..... median for significant banking groups
---- median for large and complex banking groups



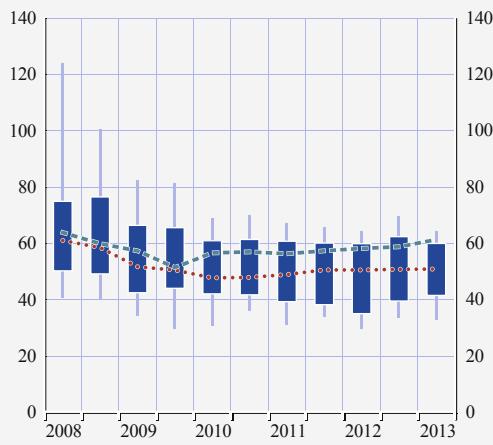
Source: SNL Financial.

Note: Based on publicly available data on SBGs, including LCBGs, that report semi-annual financial statements.

Chart 3.6 Coverage ratio in euro area banks

(H1 2008 – H1 2013; loan loss reserves as a percentage of impaired loans; 10th and 90th percentile and interquartile range distribution across SBGs)

..... median for significant banking groups
---- median for large and complex banking groups



Source: SNL Financial.

Note: Based on publicly available data on SBGs, including LCBGs, that report semi-annual financial statements.

Box 6

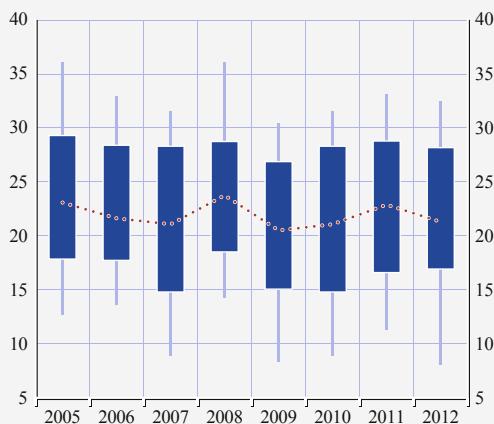
THE DYNAMICS OF FEE AND COMMISSION INCOME IN EURO AREA BANKS

The financial crisis has tested the resilience of banks across advanced economies – in terms of not only the composition of their balance sheets, but also the robustness of their business models in generating profits even in times of acute distress. While fee and commission income has been a key and relatively stable mainstay of profitability in euro area banks, it is more closely linked to macro-financial conditions than is often assumed. Indeed, this source of income tends to be loosely modelled in forward-looking analyses such as stress tests.

The evolution of fee and commission income in euro area banks since 2005 has been characterised by three broad tendencies. First, it has continued to account for a relatively significant share of euro area SBGs' income in the face of marked changes in the prevailing operating environment. Indeed, revenues from this source have hovered at around one-fifth to a quarter of banks' total income – and in some cases, even accounting for up to one-third of their income (see Chart A). The share is clearly linked to the business model – and includes the shares accounted for by traditional retail customer business, such as granting loans and managing deposit accounts, as well as investment banking activities (e.g. securities underwriting, merger and acquisition-related business, brokerage services, etc.) and asset management.

Chart A Euro area banks' fee and commission income

(2005 – 2012; percentage of total income; median, 10th and 90th percentile and interquartile range distribution across SBGs)



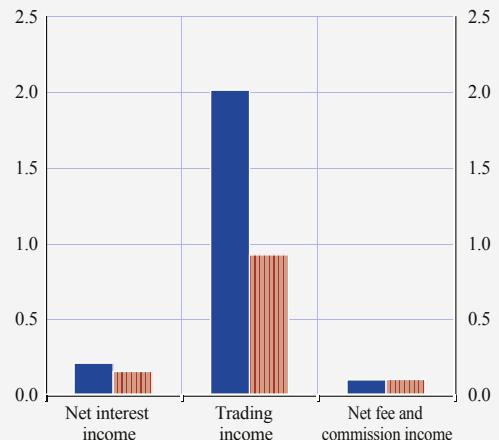
Source: SNL Financial.

Note: Sample of 62 euro area SBGs.

Chart B Changes in euro area banks' income sources

(2006 – H1 2013; coefficient of variation)

■ financial and sovereign debt crisis
■ pre-crisis



Source: SNL Financial.

Notes: Sample of 62 euro area SBGs. "Pre-crisis" refers to the period from January 2006 to June 2008, while "financial and sovereign debt crisis" refers to the period from July 2008 to June 2013.

Second, fee and commission income – together with net interest income – has been a certain anchor for profitability in the face of marked volatility in trading income (see Chart B). This observation is also confirmed when standard portfolio theory is used to decompose the contributions of different income sources to the volatility of total net operating income growth.¹ For the sample of euro area SBGs analysed in this box, the contribution of the volatility of fee and commission income to the variation of total operating income was around eight times lower than the contribution of other income sources. These results are corroborated by findings in the academic literature that suggest that fees and commissions are a more stable source of income than banks' other sources of income (trading income in particular).²

Third, notwithstanding the limited volatility, fee and commission income has proven to exhibit some relatively pronounced cyclical tendencies. Indeed, the fee and commission income of euro area SBGs has generally tended to correlate strongly with net interest income over the last few years (see Chart C). This suggests that both sources of income are driven by some common underlying factors, such as broad macroeconomic activity and retail customer business activities.³ Activities of a cyclical nature probably relate to economic and financial market activities, such as financial services (including those to retail customers), securities and loan underwriting, advisory services related to mergers and acquisitions (M&As) and

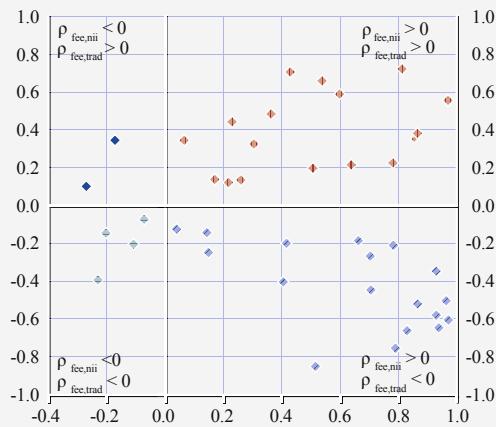
1 This analysis follows C. Calmés and Y. Liu, "Financial structure change and banking income: A Canada-U.S. comparison", *Journal of International Financial Markets*, Vol. 19(1), February 2009, for the United States and Canada respectively.

2 See, for example, A. Saunders and I. Walters, *Universal banking in the United States: What could we gain? What could we lose?*, Oxford University Press, 1994, and H. Kwan and S. Laderman, "On the portfolio effects of financial convergence – a review of the literature", *Federal Reserve Bank of San Francisco Economic Review*, 1999.

3 This is not surprising as many products offered by banks have both an interest rate and a fee component (e.g. customer accounts and various forms of credit agreements).

Chart C Correlation between the subcomponents of significant banking groups' income

(2005 – 2012; correlation coefficient of fee and commission income with net interest income ($\rho_{fee,nii}$; x-axis) and with trading income ($\rho_{fee,trad}$; y-axis) for each bank)



Source: SNL Financial.

Note: Sample of 62 euro area significant banking groups.

securities brokerage business. However, also more structural factors, such as payment transactions, safe custody administration and bank competition, are important determinants.

By contrast, the movement of fee and commission income in relation to trading income has been more heterogeneous across banks in the SBG sample, as evidenced by both positive and negative correlation coefficients.⁴

This cyclicalities, even in relation to other income sources, is confirmed by simple correlation analysis. This suggests a link to real economic activity (e.g. GDP), as well as to equity price developments – not least because securities and M&A transactions affect banks' trading and underwriting activities. Positive relationships are also found with regard to overall bank business volumes (e.g. operating expenses, total assets and loan volumes).

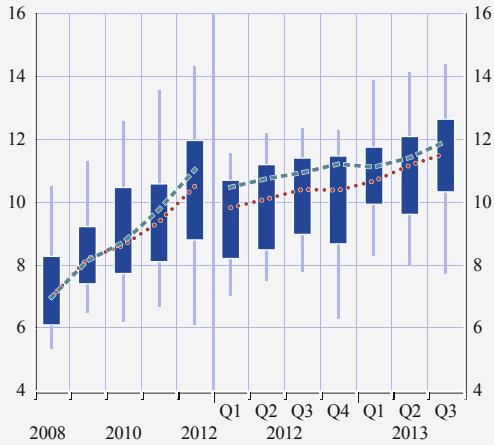
This analysis suggests that fee and commission income provides a good source of relative stability in generating profitability through turbulent times. At the same time, while simple and illustrative, the results suggest that fee and commission income is also impacted by the cyclicalities of general economic activity and is related to changes in banks' other income components. For that reason, a more systematic modelling of fee and commission income in relation to underlying macro-financial drivers could help in forward-looking exercises such as stress tests – in contrast to the frequently applied assumption of a constant or judgemental evolution.

⁴ This may reflect the fact that, although trading activity can trigger fee and commission income, it can be highly volatile (on account of price valuation adjustments) during periods of turbulence that do not necessarily affect banks' trading-related fees and commissions (which are linked to business volumes). Although such an imperfect correlation may suggest some potential diversification effects, the findings of the academic literature are ambiguous in this regard (see, for example, K. Stiroh and A. Rumble, "The dark side of diversification: The case of US financial holding companies", *Journal of Banking & Finance*, Vol. 30(8), August 2006).

Chart 3.7 Core Tier I capital ratios of euro area banks

(percentages; 10th and 90th percentile and interquartile range distribution across SBGs)

- median for significant banking groups
- median for large and complex banking groups



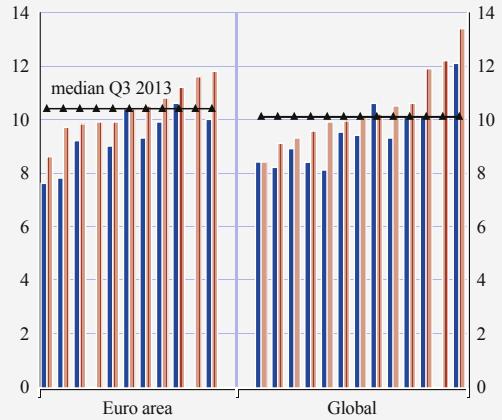
Source: SNL Financial.

Note: Based on publicly available data on SBGs, including LCBGs, that report annual financial statements and on data on a subset of those banks that report on a quarterly basis.

Chart 3.8 Basel III common equity Tier I capital ratios of euro area and global large and complex banking groups

(percentages)

- Q4 2012
- Q3 2013



Source: SNL Financial.

Note: Based on publicly available data on euro area and global LCBGs that report fully loaded Basel III Common Equity Tier 1 ratios in their financial statements.

Euro area banks improved their capital positions further

Despite relatively weak profitability, euro area banks have continued to steadily strengthen their **capital positions**, although the extent of the improvement differed across banks, depending on the various available metrics used to assess capital strength. On the one hand, euro area banks continued to increase their risk-weighted capital ratios bringing the median core Tier 1 capital ratio for euro area SBGs to over 11% in the third quarter of 2013 – a more than 4 percentage point increase from the beginning of the global financial crisis in 2008 (see Chart 3.7). Similarly, many large banks that already report Basel III Common Equity Tier 1 ratios reached or surpassed levels of 9% by September 2013. As a result, the Basel III Common Equity Tier 1 ratios of euro area LCBGs at the end of the third quarter of this year were broadly comparable with those of their global peers (see Chart 3.8). These improvements in euro area banks were achieved through a combination of capital increases and reductions of risk-weighted assets, with the relative contribution of these two factors varying, in particular across SBGs. As for the measures used to raise capital, many SBGs increased their core Tier 1 capital further both via rights issues and by retaining earnings, or through the repurchase of hybrid capital instruments in some cases. Amid a continued deleveraging and de-risking of balance sheets, risk-weighted assets of both LCBGs and other SBGs continued to decline in the first three quarters of 2013. In the case of some banks, this partly reflected a shift towards assets with lower risk weights (including government bonds).

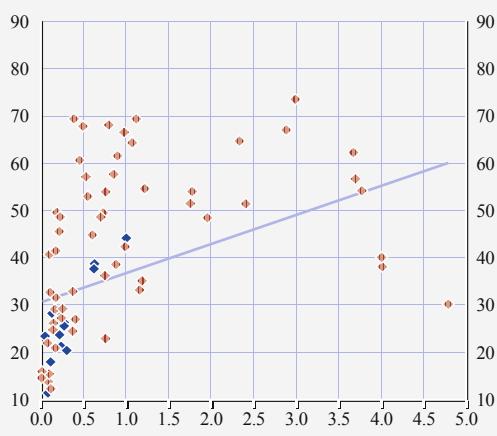
Notwithstanding continued efforts by regulators, including reviews by the Basel Committee and the European Banking Authority (EBA), uncertainty remains with regard to the consistency of calculations of risk-weighted assets and whether the risk weights derived from internal models truly reflect the riskiness of bank portfolios. While there is generally some correlation between risk weightings and losses incurred – as internal rating models use historical loan losses as input modelling the risk weighting – some banks have suffered higher loan losses than would have been expected on the basis of the average risk weight of their portfolios (see Chart 3.9).

Chart 3.9 Risk-weighted assets for credit risk and loan losses of euro area banks

(percentages)

x-axis: loan loss provisions (2011-12 average; percentage of total assets)
y-axis: risk-weighted assets for credit risk (2012; percentage of total assets)

- ◆ large and complex banking groups
- ◆ significant banking groups



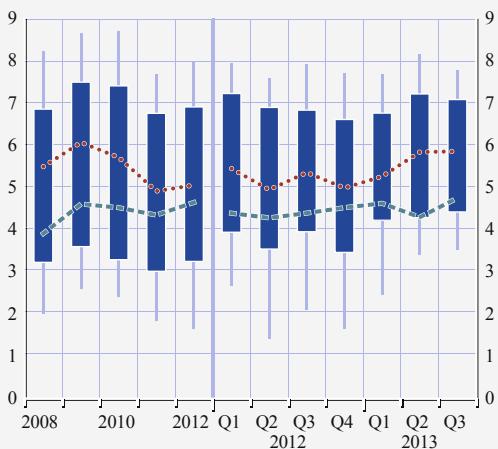
Source: SNL Financial.

Note: Based on publicly available data on SBGs, including LCBGs, that report annual financial statements and on data on a subset of those banks that report on a quarterly basis.

Chart 3.10 Euro area banks' ratios of total equity to total assets

(2008 – Q3 2013; percentages; 10th and 90th percentile and interquartile range distribution across SBGs)

- median for significant banking groups
- median for large and complex banking groups



Source: SNL Financial.

Note: Based on publicly available data on SBGs, including LCBGs, that report annual financial statements and on data on a subset of those banks that report on a quarterly basis.

Against this background, analysts' attention has increasingly shifted towards **leverage** ratios, despite their shortcomings in signalling the riskiness of bank balance sheets. Notwithstanding the marked improvement in regulatory capital ratios, improvements in balance sheet-based leverage ratios have been more modest and dispersion remains significantly wider than in the case of risk-weighted capital ratios (see Chart 3.10). This partly relates to business models, whereby some LCBGs with large capital market operations remain highly leveraged (see Box 7). While regulatory decisions on the implementation of leverage ratios in the euro area are still outstanding, some large banks seem already to be taking action or have announced plans to improve reported leverage positions by reducing their non-core assets, derivatives exposures (for instance, via trade compression), reverse repos, liquidity pools or off-balance-sheet commitments.

Box 7

EURO AREA BANKS AND LEVERAGE RATIO REQUIREMENTS

As disillusionment has grown with heterogeneous and opaque risk weighting calculations of banks, the use of simple leverage (i.e. leverage that is not adjusted for risk) has been gaining prominence among analysts, investors and regulators alike to serve as a backstop for risk-based requirements. While Basel III reforms already foresaw the use of such a leverage ratio, there

have been some calls for a more rapid and stringent implementation than currently envisaged.¹ This box evaluates euro area banks' capitalisation by comparing their leverage ratios with their risk-weighted capital ratios and investigates the relationship between these ratios and market-based indicators. Finally, it attempts to compare euro area LCBGs' leverage ratios to those of their global peers.

While, conceptually, a simple leverage ratio should be just that – simple (and transparent) – in practice, details such as the netting of derivative positions, the treatment of securities financing transactions or, more generally, differences between accounting frameworks can obfuscate any meaningful comparison of banks' currently reported leverage ratios. In addition, although regulators are regularly monitoring banks' preparedness to meet forthcoming leverage ratio requirements,² it is not possible at present to calculate fully comparable leverage ratios using publicly available information.³

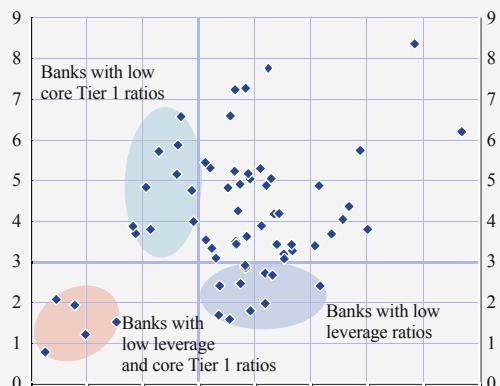
Pending clarification of a commonly accepted measure of bank leverage and adequate public disclosure by banks, illustrative insights into euro area banks' preparedness to meet leverage ratio requirements can be gleaned by analysing a simple proxy for leverage ratios (tangible equity-to-tangible asset ratios) and comparing the outcome with regulatory (risk-based) measures.⁴ While this measure of leverage ratios corresponds to the core Tier 1 capital ratio in the case of most euro area banks, for some banks, these two measures send conflicting signals with regard to solvency (see Chart A).

This may reflect the diversity of banks' business models, in particular in cases where they have large investment banking businesses or large amounts of low risk-weight mortgages on their balance sheets. Interestingly, market pricing of banks appears to bear a closer resemblance to traditional measures of solvency than to leverage ratios, despite the latter's heightened prominence in the current

Chart A Leverage versus core Tier 1 capital ratios of euro area banks

(2012; euro area SBGs)

x axis: core Tier 1 ratio (percentage)
y axis: tangible equity-to-tangible assets ratio



Source: SNL Financial.

1 A revised Basel III leverage ratio framework was published for consultation in June 2013. In principle, implementation of leverage ratios of 3% as a Pillar 1 requirement is only envisaged as of 2018, but the monitoring phase has begun with bank-level reporting to supervisors since January 2013, and public disclosure starting in January 2015. Final adjustments to the definition and calibration of the leverage ratio will be made by 2017. In practice, there are proposals for an early implementation of Basel III requirements in the United Kingdom and for increased leverage ratio requirements in the United States where regulators have proposed a significant tightening of the Basel III leverage ratio (based on the initial version of the leverage ratio framework, however, which was generally less conservative) for large banks from the current level of 3% to 5% for bank holding companies and to 6% for subsidiaries with insured deposits.

2 See Basel Committee on Banking Supervision, "Basel III Monitoring Report", September 2013, and European Banking Authority, "Basel III monitoring exercise – results based on data as of 31 December 2012", September 2013.

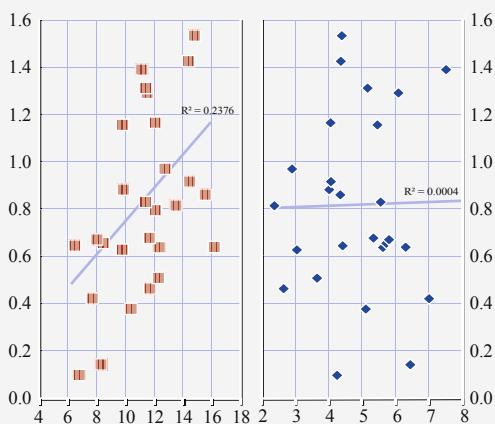
3 Some analysts have identified at least nine different ways of calculating leverage ratios and have highlighted that, for some banks, the ratio halves or doubles depending on the definition used. See Barclays, "European banks and the leverage ratio", September 2013.

4 However, the Basel III leverage ratio has a broader scope since it is defined as Tier 1 capital divided by total exposure including off-balance-sheet exposures.

**Chart B Capital and leverage ratios vs.
price-to-book value ratios of listed euro
area banks**

(H1 2013; SBGs)

x-axis: left panel; core Tier 1 ratio (percentages)
right panel; tangible equity-to-tangible assets ratio
y-axis: price-to-book value ratios

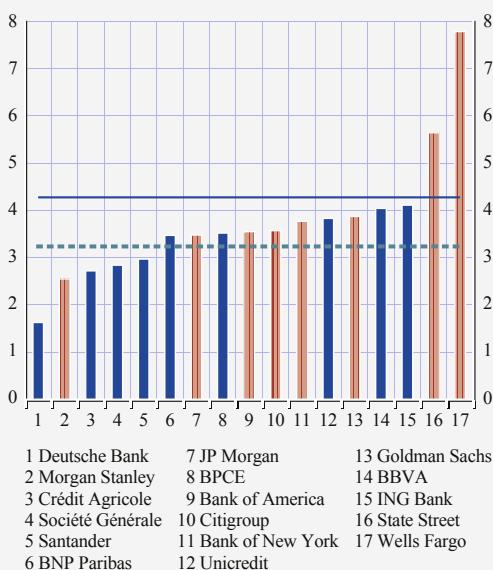


Source: SNL Financial.

**Chart C Leverage ratios of selected large
euro area and US banks**

(Q4 2012; percentages; IFRS-equivalent estimates of adjusted
tangible equity over adjusted tangible assets)

— euro area banks - - - euro area banks - average
■■■■■ US banks — US banks - average



Source: Federal Deposit Insurance Corporation (FDIC).

Notes: For US banks, assets are adjusted to account for the different treatment of derivatives under US GAAP and IFRS rules. Adjusted tangible equity and adjusted tangible assets do not include goodwill, other intangibles and deferred tax assets.

debate (see Chart B).⁵ This could be explained by a multitude of measures of leverage, or by the fact that implementation is only envisaged as of 2018.

Viewed in international terms, while price-to-book ratios of euro area banks tend to be lower than those of their US peers, leverage ratios do not appear to be a consistent explanatory factor – at least not on a comparable basis.⁶ Specifically, even when corrected for accounting differences such as the treatment of derivative positions,⁷ the leverage ratios of large euro area banks still tend to be lower than those of their US peers on an IFRS-equivalent basis (see Chart C). This holds particularly true of euro area banks with large or significant investment banking activities. The remaining differences between euro area and US banks' leverage ratios can be explained, to some extent, by the different frameworks for regulation on capital requirements. Indeed, there is some evidence that euro area/European banks tended to have a higher share of assets with a low risk weight, allowing them to report strong capital ratios under Basel II rules. By contrast,

5 Similarly, no positive relationship was found between SBGs' share price changes between June and September, a period when the focus of analysts and investors shifted towards leverage ratios, and their leverage ratios.

6 See, for example, Thomas M. Hoenig, "Financial Stability: Incentives Matter", speech presented by the Vice Chairman of the Federal Deposit Insurance Corporation (FDIC) at the Asian Banker Summit, April 2013.

7 Banks reporting under the Generally Accepted Accounting Principles (GAAP) in the United States only report the net value of derivative positions under a single master agreement with the same counterparty. The same treatment is also allowed for repurchase agreements and reverse repurchase agreements.

*Deleveraging process continued,
mainly affecting
assets other than
domestic loans*

US banks have traditionally been subject to binding leverage ratios and the less risk-sensitive Basel I requirements, which may have induced them to focus on assets with higher returns.⁸

All in all, from a financial stability perspective, the inclusion of a simple, transparent, non-risk based leverage ratio in the regulatory toolbox as a complementary measure to the risk-based capital requirements is welcome, since it will help to contain the build-up of leverage in the banking sector. At the same time, such a measure on its own has clear limitations, such as its indiscriminate treatment of collateralised lending (e.g. mortgages) alongside assets of a clearly riskier nature (e.g. unsecured lending to risky borrowers). As such, its calibration and implementation needs to be careful and well thought out, so that it is indeed complementary to risk-weighted measures as foreseen, and not a binding substitute with a potential to create incentives for banks to shift their businesses towards higher-risk assets. Moreover, in finalising the rules related to the Basel III definition of the leverage ratio, particular attention should be paid to avoiding unintended consequences for repo markets, which may affect the liquidity of related financial markets, and could potentially impair the transmission of monetary policy. Parallel initiatives should be fostered to shed light on the opacity of risk-weighting formulas by enhancing transparency and disclosure.

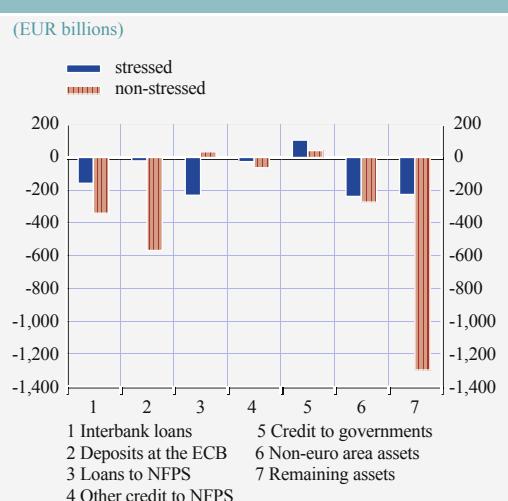
⁸ See V. Le Lesle and S. Avramova, "Revisiting Risk-Weighted Assets", *IMF Working Paper*, No 12/90, International Monetary Fund, March 2012.

Looking more generally at the **deleveraging** process in the broader euro area banking sector, after reaching a peak in May 2012, total assets of MFIs located in the euro area have fallen by 10% (€3.5 trillion) on an aggregated balance sheet basis. Apart from two small increases in July 2012 and February 2013, the downward trend has been persistent. A substantial decline in remaining assets of €1.5 trillion – mainly driven by the fall in the market values of derivatives – accounted for almost half the overall reduction in total assets since May 2012.

A comparison of changes in total assets in non-stressed countries with those in stressed countries reveals significant differences in the extent and nature of deleveraging (see Chart 3.11).

For banks in non-stressed countries, a reduction in deposits with the Eurosystem, strongly correlated with repayments of longer-term refinancing operations, was one of the key drivers of balance sheet shrinkage. Loans to the non-financial sector (adjusted for sales and securitisation) declined significantly in stressed countries, while a modest increase was recorded by banks in non-stressed countries. Banks' plans to target non-domestic assets in their asset reductions were reflected in a drop of over €500 billion in credit to non-euro area residents, which accounted for 15% of the overall decline, with banks in both stressed and non-stressed countries reducing their foreign exposures. Within the euro area, reductions in interbank lending persisted, accounting for 14%

Chart 3.11 Changes in euro area MFIs' key assets since May 2012



Sources: ECB and ECB calculations.

Notes: NFPS refers to non-financial private sector. Loans to the non-financial private sector are adjusted for sales and securitisation.

Volatility in market indicators and lingering concerns

of the decline. The only broad category to record an increase over this period was credit to domestic governments, in particular for banks located in stressed countries.

BANKING SECTOR OUTLOOK AND RISKS

Outlook for the banking sector on the basis of market indicators

Despite some volatility, as a consequence of increased risk aversion in global bond markets, most market-based indicators have shown some improvement in the outlook for euro area banks since the finalisation of the last FSR. Nevertheless, the latest reading of some indicators also suggests that concerns continue to linger about banks' asset quality and earnings outlook. Indeed, the implied volatility of euro area bank share prices, although declining, remained higher than that of general market indices (see Chart S.2.11), indicating that uncertainty regarding the outlook for the banking sector is relatively high in comparison with, for instance, that for the non-financial sectors. Similarly, while euro area LCBGs' price-to-book ratios rose after July 2013, thanks to some improvement in the growth outlook and investors' increasing appetite for euro area bank stocks, LCBGs' average ratios of prices to book values remain well below 1 and still compare unfavourably with the average for their US peers (see Chart 3.12).

At the same time, a key measure of banking sector stress that draws on market-based pricing suggests that, following a temporary rise induced by increased volatility in debt markets, systemic risk within euro area banks is currently at the lowest level recorded in two and a half years (see Chart 3.13). At the individual bank level, the median spread of credit default swaps (CDSs) of large euro area banks has followed a similar pattern, but the dispersion of CDS spreads, while narrowing in recent months, remained wide, partly highlighting financial fragmentation and also indicating differences in the outlook for asset quality (see Chart S.3.27). The equity price and balance sheet-based SRISK measure, an alternative measure of systemic risk, also declined in the last few months, falling to a level similar to that observed in mid-2011 (see Chart 3.14).

Chart 3.12 Price-to-book ratios of large and complex banking groups in the euro area and the United States

(Jan. 2006 – Nov. 2013; average)



Sources: Bloomberg and ECB calculations.

Note: Average for LCBGs in the United States and the euro area.

Chart 3.13 Measure of euro area banking sector stress

(Jan. 2007 – Nov. 2013; probability; percentages)

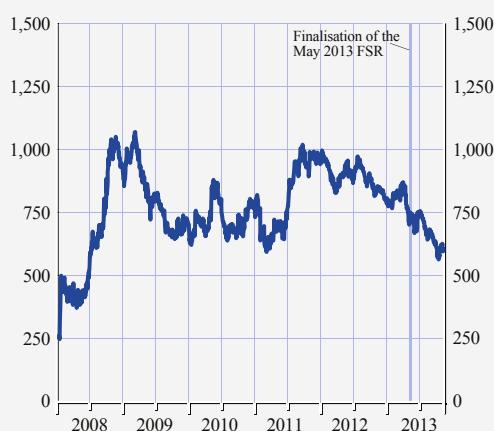


Sources: Bloomberg and ECB calculations.

Notes: The measure contains the credit default swap-implied probability of two or more of a sample of 15 banks defaulting simultaneously over a one-year horizon. See Box 8, *Financial Stability Review*, ECB, June 2012, for further details.

Chart 3.14 SRISK for euro area financial institutions

(Jan. 2008 – Nov. 2013; USD billions)

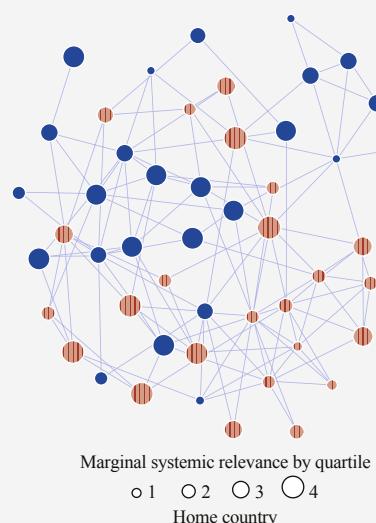


Sources: NYU VLAB and ECB calculations.

Chart 3.15 Estimated systemic risk contributions of individual banks to EU banking sector risk

(estimation sample: July 2011-July 2013)

- stressed EU countries
- non-stressed EU countries



Source: F. Betz, N. Hautsch, T. Peltonen and M. Schienle, "Measuring systemic risk contributions of European banks", *Working Paper Series*, ECB, forthcoming.
Note: The sample includes 51 large listed EU banks.

At the individual bank level, market indicator-based systemic risk contributions continue to exhibit a high degree of tail-dependence in the banking system. Chart 3.15 illustrates market measures of tail dependence, combining a value-at-risk (VaR) concept with time-varying interconnectedness within the banking sector. Specifically, for each included bank, relevant tail-risk drivers of the bank's VaR are identified on the basis of a set of macro-financial fundamentals, bank-specific characteristics and risk spillovers from other banks. A bank's contribution to systemic risk is then defined as the effect of an increase in its individual tail risk on the VaR of the whole banking system, conditional on the bank's position within the financial network, the structural balance-sheet characteristics of the individual bank and overall macro-financial conditions.¹ These results reveal a high degree of tail-dependence among large European banks, with several banks from both stressed and non-stressed countries in the highest quartile of the systemic risk distribution.

Credit risks emanating from banks' loan books

Much of the decline in reported asset quality, particularly among smaller entities, appears to stem from the **credit risk** confronting the euro area banking sector, particularly in countries experiencing strong cyclical declines in economic activity.

To some extent, subdued growth in credit at the aggregate euro area level reflects a more global phenomenon of relatively weak credit developments in relation to recent historical norms. This is readily apparent in a global credit gap indicator which, despite some further improvement at

¹ For more detail, see Box 6, entitled "Measuring systemic risk contributions of European banks", *Financial Stability Review*, ECB, May 2013.

Chart 3.16 Global credit gap and optimal early warning threshold

(Q1 1980 – Q2 2013; percentages)



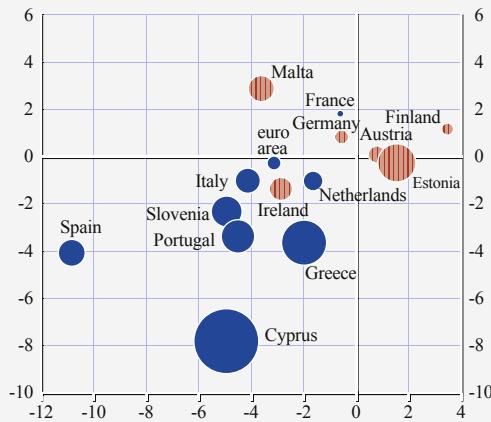
Sources: ECB and ECB calculations.

Note: Index for 18 OECD countries – see L. Alessi and C. Detken, “Quasi real time early warning indicators for costly asset price boom/bust cycles: A role for global liquidity”, *European Journal of Political Economy*, Vol. 27(3), September 2011.

Chart 3.17 Credit and GDP growth in euro area countries

(Dec. 2012 – Sep. 2013; percentage change year-to-date)

x-axis: credit growth to non-financial corporations
y-axis: credit growth to households



Sources: ECB and European Commission.

Notes: The size of the bubble indicates the GDP growth forecast for 2013. Blue bubbles denote a decrease in GDP, while red bubbles show an increase in GDP.

the beginning of 2013, is still well below its early-warning threshold for costly asset price booms (see Chart 3.16).

Within the euro area, MFI lending to the non-financial private sector has remained generally muted. The greatest source of weakness is still to be found in lending to non-financial corporations, in contrast to broadly stable lending to households. Clearly, country developments remain diverse, with continuing sharp declines in lending volumes to the non-financial private sector in countries under stress being partly offset by moderate lending growth in other countries (see Chart 3.17).

The latest results of the ECB's bank lending survey suggest that a more prominent role of demand-side factors might underlie the subdued lending activity to the non-financial private sector (see Chart 3.18). Indeed, the latest bank lending survey results indicate that cost-of-funds and balance-sheet constraints had a lesser part in the further moderate tightening of lending standards, which can instead be attributed to worsening macroeconomic or sectoral outlooks. Furthermore, for the first time in four years, euro area banks expected, in net terms, some easing of credit standards on loans to non-financial corporations for the fourth quarter of 2013, as well as a slight easing of those for household loans for the first time since the fourth quarter of 2010.

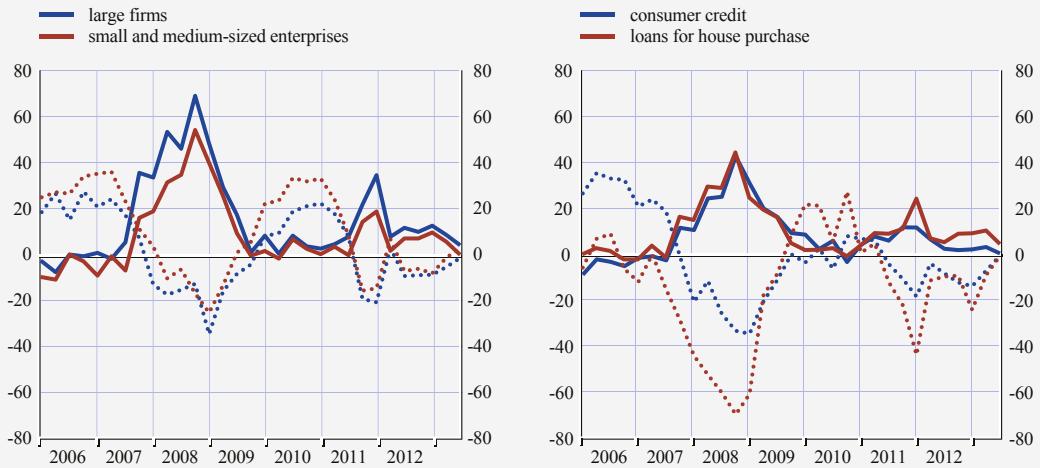
The longer weak economic conditions persist, the more income and earnings of both households and non-financial corporations are at risk. The interplay of any protracted economic weakness with legacy balance sheet issues, amid continued corrections in residential and commercial property markets in some countries, has a clear potential to negatively affect borrowers' debt servicing capabilities.

While the above interplay appears to be a compelling explanation for the rise in non-performing loans (NPLs) that is particularly visible in countries under stress, a key question is whether the

Asset quality outlook remains negative...

Chart 3.18 Credit standards and demand conditions in the non-financial corporate and household sectors

(Q1 2006 – Q3 2013, weighted net percentages)



Source: ECB.

Note: The solid lines denote credit standards, and the dotted lines demand.

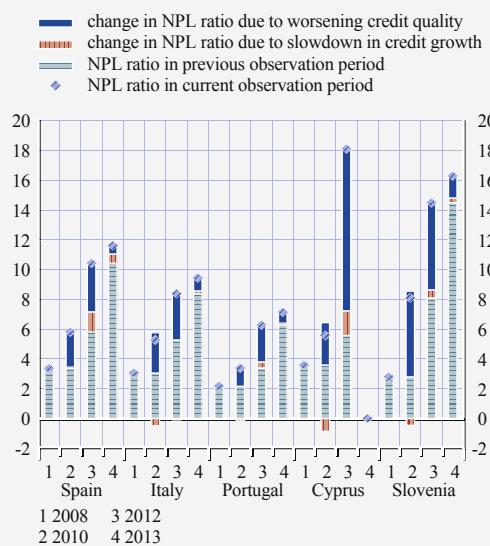
increase is structural (i.e. related to balance sheets) or cyclical (i.e. related to economic factors which might dissipate with time). The decomposition of NPL ratios indicates that worsening credit quality is indeed the main driving force behind the increase in these ratios, although more recently, the slowdown of credit growth in some countries has also contributed to rising NPL ratios there (see Chart 3.19). Furthermore, in some cases, NPL ratios might underestimate asset quality problems to the extent that banks exercise forbearance towards borrowers with low creditworthiness. This in turn can reduce banks' capacity to extend new loans to productive sectors/firms as the high proportion of NPLs and loans involving forbearance tie up capital and funding. Uncertainty remains, however, about the scope and extent of loan forbearance. This also highlights the importance of a thorough assessment of banks' asset quality and the subsequent rapid cleaning-up of banks' balance sheets.

*... further progress
is needed in cleaning
up bank balance
sheets*

A further breakdown using available sectoral data suggests that the increase in NPLs is being driven mainly by deteriorating credit quality in the corporate sector, and rather less so by worsening asset quality in the household sector (see Chart 3.20). Ultimately, write-off rates on MFI loans to non-financial corporations have continued to increase, albeit only slightly after a sharp rise in late 2012 and early 2013, largely on account of the transfer of NPLs by Spanish banks to Spain's bad bank SAREB (see Chart 3.21).

Chart 3.19 Decomposition of changes in non-performing loan ratios in selected euro area countries

(Q4 2008 – Q2 2013; percentages)

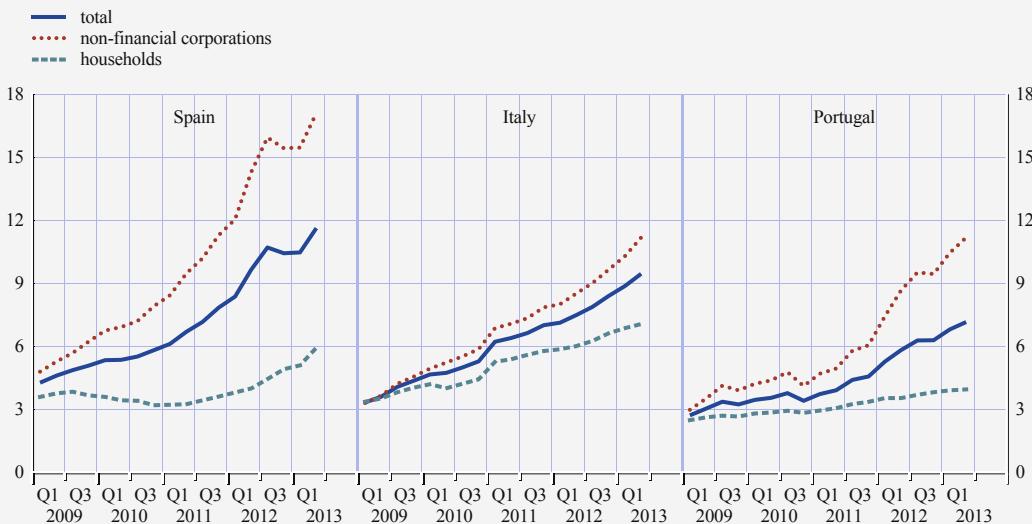


Source: National central banks and IMF (FSI statistics).

Note: Given differences in national NPL definitions, cross-country comparability is limited.

Chart 3.20 Non-performing loan ratios in selected euro area countries, broken down by economic sector

(Q1 2009 – Q2 2013; percentages)



Source: National central banks.

Note: Given differences in national NPL definitions, cross-country comparability is limited.

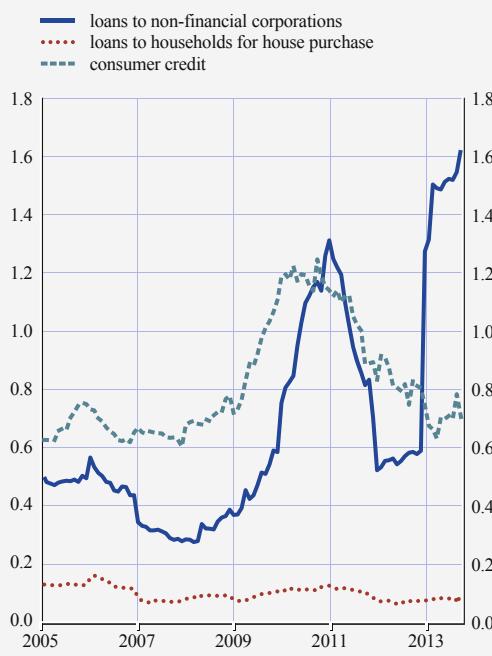
Counterparty credit risk

The median cost of protection against the default of a euro area LCBG, as reflected by CDS spreads, has declined since mid-May 2013, despite some increase in June (see Chart S.3.27). The difference between the median CDS spreads of euro area and non-euro area LCBGs has also decreased, but remained positive, suggesting that market participants continued to view euro area LCBGs as somewhat less creditworthy than their non-euro area counterparts.

In contrast to the results of the June 2013 ECB survey on credit terms and conditions in euro-denominated securities financing and over-the-counter derivatives markets (SESFOD) where large banks reported an easing of price terms (such as financing rates/spreads), on balance, for all of the important types of counterparties included in the survey, the responses to the September 2013 SESFOD² did not indicate any significant change in price terms over the three-month reference period ending in August 2013. Offered non-price terms (including, for example, the maximum amount of funding, haircuts,

Chart 3.21 Write-off rates on euro area MFIs' loans to the non-financial private sector

(Jan. 2005 – Sep. 2013: percentages)



Source: ECB.

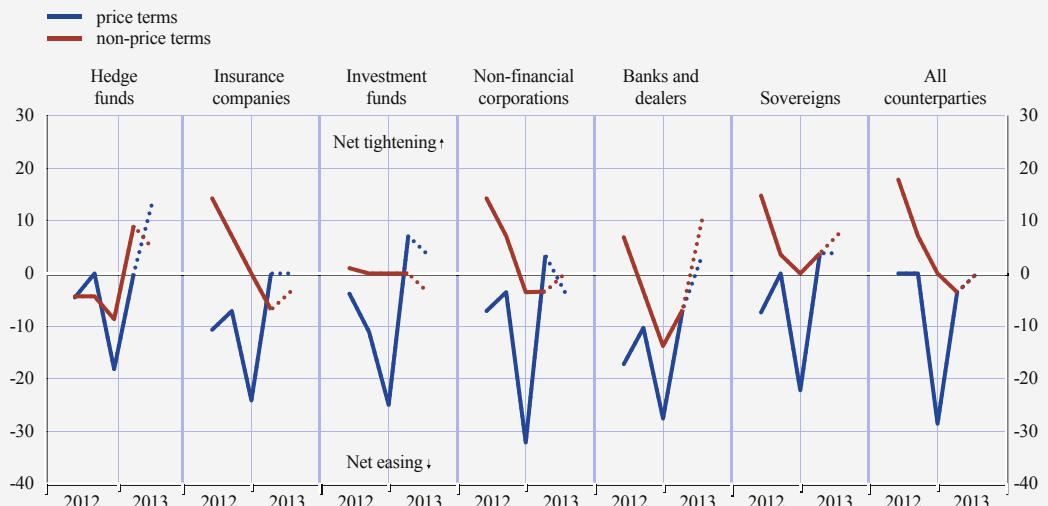
Perceived counterparty credit risk of euro area LCBGS has declined

Price and non-price credit terms for wholesale counterparties appear to have remained basically unchanged

² See ECB, "Results of the September 2013 ECB survey on credit terms and conditions in euro-denominated securities financing and OTC derivatives markets" press release of 14 October 2013, and Special Feature C in ECB *Financial Stability Review*, May 2013.

Chart 3.22 Actual and expected changes in credit terms for euro-denominated securities financing and over-the-counter derivatives markets for selected counterparties

(Q4 2012 – Q4 2013; net percentage of respondents)



Source: ECB.

Notes: The net percentage is defined as the difference between the percentage of respondents reporting "tightened considerably" or "tightened somewhat" and those reporting "eased somewhat" and "eased considerably". The group "investment funds" excludes hedge funds, but includes exchange-traded funds, pension plans and other institutional investment pools. The dotted lines refer to expected changes.

cure periods and covenants, and triggers), on balance, also remained basically unchanged for the covered types of counterparties (see Chart 3.22). However, five large banks (17% of all respondents) reported that price and non-price terms, taken together, had eased overall for banks and dealers.

Hedge fund leverage has declined somewhat

At the same time, high volatility in credit markets since late May 2013 seems to have led to some reduction in the use of leverage by hedge funds, which are important and usually very active leveraged non-bank counterparties (see Chart 3.23). Despite investment losses in June 2013, the year-to-date investment performance of the hedge fund sector as a whole has been rather positive in 2013, keeping the estimated proportion of hedge funds breaching triggers of cumulative total decline in net asset value (NAV)³ – an indicator of stress in the hedge fund sector – around its longer-term median (see Chart 3.24).

Increased focus on CCP exposures and attempts to create a single industry-wide initial margin model for non-CCP derivatives

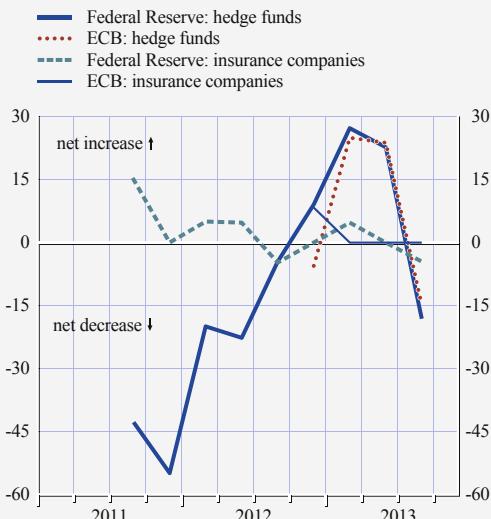
The focus on growing counterparty credit exposures to central counterparties (CCPs) has remained elevated. While this has recently been very much due to the forthcoming mandatory central clearing of standardised derivatives contracts, the increased attention is likely to become permanent in view of the role of a number of key CCPs as systemically important financial infrastructures. Of note are also market participants' attempts to create a so-called single industry-wide margin model for OTC derivatives transactions that will continue to be cleared non-centrally. This market initiative emerged largely because of a necessity for counterparties to reconcile different initial margin (collateral) estimates derived by using internal models, on the one hand, and a willingness to avoid the use of the standardised initial margin schedule, on the other, that only marginally takes into account the netting benefits and would thus lead to substantially higher collateral needs.⁴

3 NAV triggers can be based on a cumulative decline in either total NAV or NAV per share. They allow creditor banks to terminate transactions with a particular hedge fund client and to seize the collateral held. As opposed to NAV per share, a cumulative decline in total NAV incorporates the joint impact of both negative returns and investor redemptions.

4 Basel Committee on Banking Supervision and Board of the International Organization of Securities Commissions, "Margin requirements for non-centrally cleared derivatives", September 2013.

Chart 3.23 Changes in the use of leverage by hedge funds and insurance companies

(Q3 2011 – Q3 2013; net percentage of respondents reporting an increase in the use of leverage over the past three months)



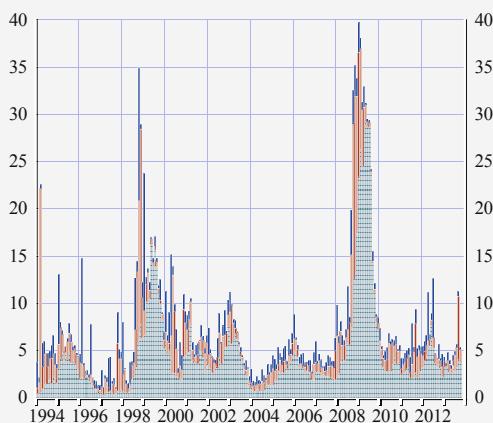
Sources: ECB and Federal Reserve Board.

Note: The net percentage is defined as the difference between the percentage of respondents reporting "increased considerably" or "increased somewhat" and those reporting "decreased somewhat" or "decreased considerably".

Chart 3.24 Estimated proportion of hedge funds breaching triggers of cumulative total NAV decline

(Jan. 1994 – Oct. 2013; percentage of total reported NAV)

■ -15% on a monthly basis
■ -25% on a rolling three-month basis
■ -40% on a rolling 12-month basis



Sources: Lipper TASS database and ECB calculations.
Notes: Excluding funds of hedge funds. Net asset value (NAV) is the total value of a fund's investments less liabilities (also referred to as capital under management). For each point in time, estimated proportions are based only on hedge funds which reported respective NAV data and for which NAV change could thus be computed. If several typical total NAV decline triggers were breached, then the fund in question was only included in the group with the longest rolling period. If, instead of one fund or sub-fund, several sub-fund structures were listed in the database, each of them was analysed independently. The most recent data are subject to incomplete reporting.

Funding liquidity risk

Market-based bank funding conditions are arguably the most favourable recorded since the euro area strains came to the fore in the course of 2010. In particular, average bank funding costs reached the lowest levels observed for more than three years across all major debt instruments in November (see Chart 3.25). Nevertheless, banks' debt issuance activity was temporarily affected by increased volatility in debt markets in the summer and – despite some recovery in September and October (see Chart 3.26) – year-to-date issuance of both senior unsecured debt and covered bonds remained well below 2012 levels. At the same time, issuance of subordinated debt, in particular by large banks, picked up considerably, albeit from low levels. This was partly driven by an increased supply of Basel III-compliant contingent capital instruments and by continued strong investor demand for high-yielding (hybrid) debt instruments.

At the same time, euro area banks' funding situation benefited from continued **deposit inflows** in most countries, including a reversal of the euro area fragmentation that had previously had a negative effect on deposits in some countries under stress. As a result, a generalised shift in euro area banks' funding structures towards more stable funding sources continued. Banks' reliance on funding sources that had proven to be volatile through euro area strains, such as wholesale funding and foreign deposits, dropped further, partly in conjunction with the continued deleveraging process (see Chart 3.27). Moreover, banks in many euro area countries, including some stressed countries, continued to reduce their dependence on central bank funding by repaying funds borrowed through

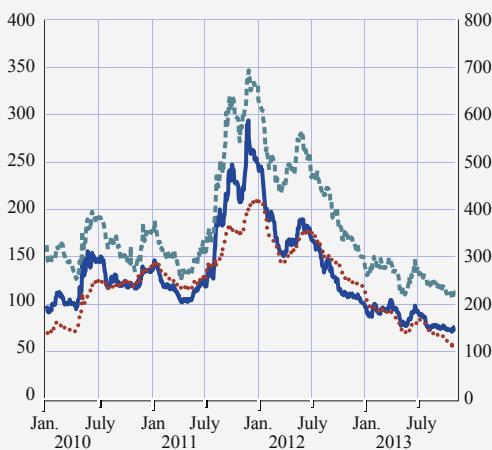
Funding conditions remained favourable...

... and the shift towards deposit funding continued...

Chart 3.25 Spreads on banks' senior debt, subordinated debt and covered bonds

(Jan. 2010 – Nov. 2013; basis points)

- iBoxx EUR banks senior (left-hand scale)
- iBoxx EUR covered (left-hand scale)
- - - iBoxx EUR banks subordinated (right-hand scale)

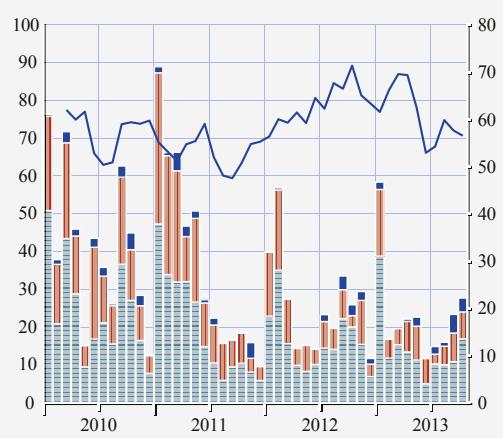


Source: Markit.

Chart 3.26 Monthly debt issuance by euro area banks, broken down by type of debt

(Jan. 2010 – Oct. 2013; EUR billions, percentage)

- subordinated debt (left-hand scale)
- covered bonds (left-hand scale)
- - - senior unsecured debt (left-hand scale)
- share of senior unsecured debt (3-month moving average, right-hand scale)



Source: Dealogic.

Note: Excludes retained deals.

three-year LTROs, although repayment rates still varied widely across banking sectors.

Following a significant increase from the previous lows of mid-2012, the exposure of US prime money market funds (MMFs) to euro area banks has remained broadly stable since May 2013 (see Chart 3.28). This development is noteworthy since it points, on the one hand, to increased confidence in euro area banks, but, on the other, also to renewed stronger reliance of some euro area banks on more volatile funding sources, although it remained well below the peak levels observed in mid-2011.

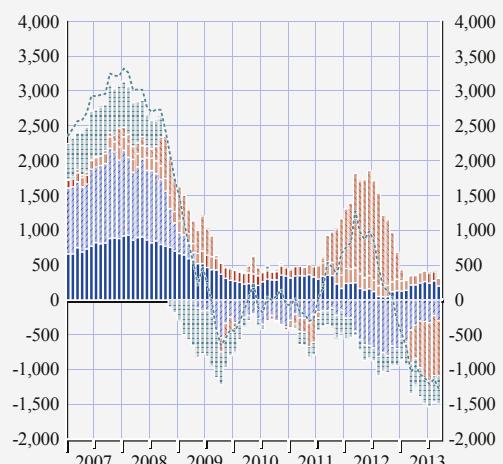
While **financial fragmentation** appears to have improved in the case of deposit funding, the fragmentation of the availability and cost of market funding remains significant in terms of both the country of residence and the balance sheet strength of banks. One aspect common to virtually all euro area banks was a marked fall in debt issuance during the sovereign debt crisis. This process, however, was most pronounced for smaller banks from stressed

... but fragmentation in market-based funding markets persists

Chart 3.27 Monthly flows in main liabilities of the euro area banking sector

(Jan. 2007 – Sep. 2013; 12-month flows, EUR billions)

- private sector deposits (euro area)
- capital and reserves
- - - foreign deposits
- wholesale funding (euro area)
- Eurosystem funding
- - - total assets (excl. remaining assets)



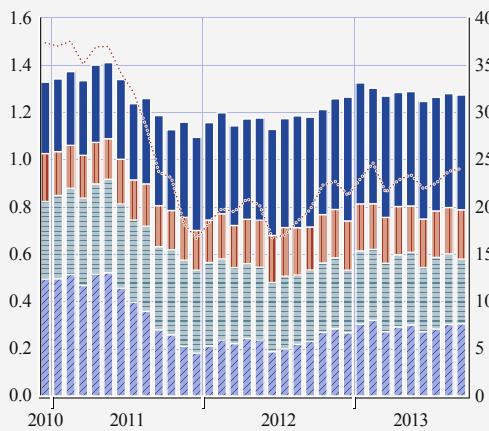
Source: ECB.

Note: Total assets are adjusted for remaining assets, which largely consist of derivatives.

Chart 3.28 US prime money market funds' bank exposure, by geographical area

(Dec. 2010 – Sep. 2013; EUR billions, percentage)

- Asia Pacific (left-hand scale)
- United States (left-hand scale)
- other Europe (left-hand scale)
- euro area (left-hand scale)
- share of euro area exposures (percentage, right-hand scale)



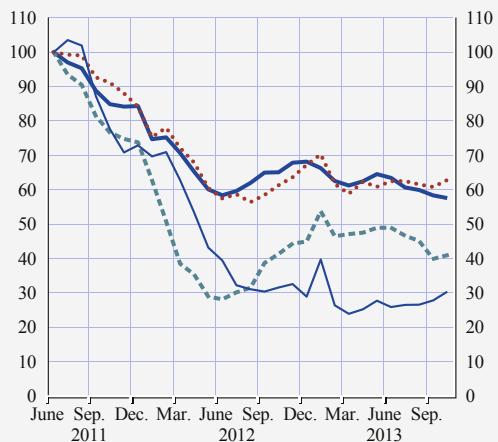
Source: US Securities and Exchange Commission.

Notes: "Other Europe" includes Norway, Sweden, Switzerland and the United Kingdom.

Chart 3.29 Debt issuance by large and complex banking groups and other banks in non-stressed countries versus that in stressed countries since mid-2011

(June 2011 – Oct. 2013; index: June 2011 = 100)

- LCBGs (non-stressed)
- other banks (non-stressed)
- - - LCBGs (stressed)
- other banks (stressed)



Sources: Dealogic and ECB calculations.

Notes: Excludes retained deals. Indices are based on 12-month moving sums. "Stressed countries" refer to Cyprus, Greece, Ireland, Italy, Portugal, Slovenia and Spain.

countries, where issuance over the year leading up to October 2013 was less than one-third of the corresponding level only two years ago. By contrast, debt issuance by banks in non-stressed countries was more resilient to changing conditions, given a decrease of between around 40% and 45% in the same period, compared with a drop of around 60% in issuance by LCBGs in stressed countries (see Chart 3.29).

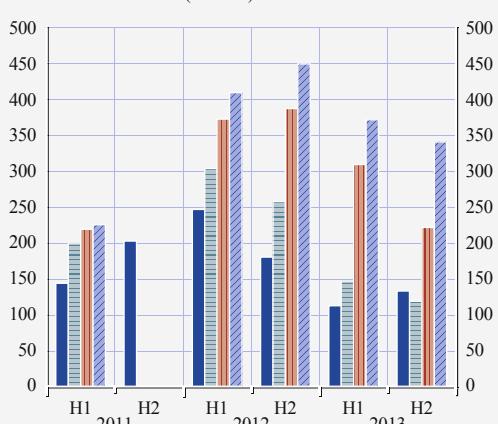
Similar patterns can be observed in the pricing of newly issued debt by euro area banks. In particular, smaller banks from stressed countries continue to have to pay higher spreads on their newly issued senior unsecured debt than their large counterparts, whereas the difference between the spreads for large and smaller banks in non-stressed countries is less significant (see Chart 3.30).

Overall, this suggests that, while sovereign risk perceptions remain a major factor in explaining financial fragmentation, bank-specific factors – such as differences in capital positions and

Chart 3.30 Spreads on senior unsecured debt for banks in non-stressed countries versus those in stressed countries

(H1 2011 – H2 2013; basis points; spread over benchmarks)

- LCBGs (non-stressed)
- LCBGs (stressed)
- other banks (non-stressed)
- other banks (stressed)



Sources: Dealogic and ECB calculations.

Notes: Based on euro-denominated fixed rate deals with an issue size of at least €250 million. Excludes retained deals and government-guaranteed debt. In the first half of 2011, only LCBGs from non-stressed countries issued debt that met the above-mentioned criteria.

Interest rate risk increased further...

asset quality – also play an important role in the differentiation across banks in terms of the availability and cost of market funding.

Market-related risks

Banks' **interest rate risk** has increased further in recent months, which is not surprising given the global bond market volatility following the start of the debate on the Federal Reserve's tapering-off of its bond purchases in May this year. Risk indicators have risen in terms of both interest rate volatility and yield curve developments – despite some stabilisation following central bank communications on both sides of the Atlantic in the summer.

Furthermore, a steepening of government bond yield curves is visible in the United States and Europe when compared with the term structures observed at the time of the finalisation of the May 2013 FSR (see Charts 3.31 and S.2.5). While rates at the long end of the euro area yield curve increased sharply, in particular from late May to early July, yields on bonds with shorter maturities rose only modestly. This steepening of the yield curve could, in principle, imply higher income from banks' maturity transformation activities, depending on the extent of fixed versus floating rate lending, while, more generally, this effect could vary across banks in line with differences in the repricing of assets. On the other hand, however, should long-term bond yields continue to rise, banks could suffer further valuation losses on their government bond portfolios, to the extent that their positions are not adequately hedged.

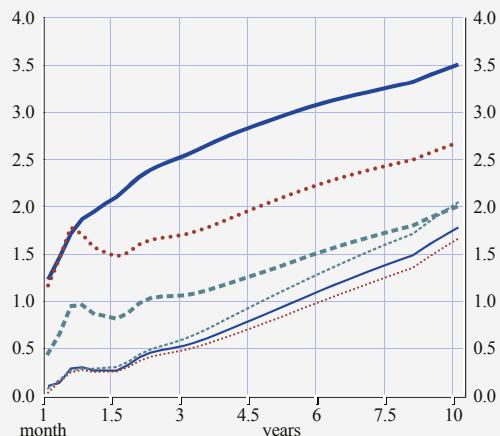
... and banks increased their exposures to sovereigns further...

Data on MFIs' **holdings of government debt** show a continuation of the expansion of domestic government debt holdings for banks in most euro area countries (see Chart 3.32). However, the degree to which these higher holdings reflect an increase in banks' holdings of domestic sovereign debt varies. For MFIs located in countries often characterised as safe havens, where interest rates remain rather depressed, exposure to domestic government debt remains limited. By contrast, banks' exposure to domestic sovereign debt in other

Chart 3.31 Developments in the euro area yield curve

(percentages)

— June 2011 FSR
··· December 2011 FSR
---- June 2012 FSR
— December 2012 FSR
··· May 2013 FSR
---- 15 November 2013

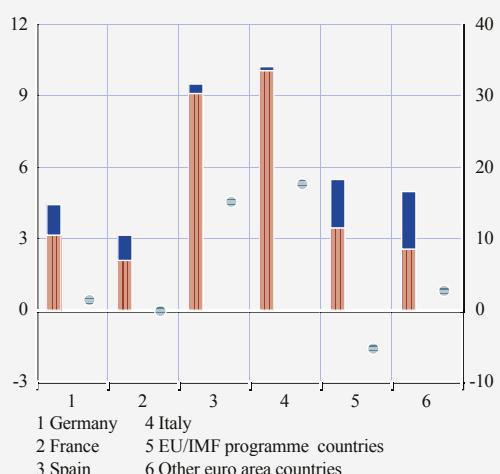


Sources: ECB and Reuters.

Chart 3.32 MFIs' holdings of domestic and other euro area sovereign debt, broken down by country

(Sep. 2012 – Sep. 2013; percentage of total assets; annual growth rate)

— holdings of other Member States' government debt as a share of total assets
■ holdings of domestic government debt as a share of total assets
● annual growth rate of holdings of euro area government debt (right-hand scale)



Source: ECB.

countries characterised by intermittent bank stress is far higher. For example, aggregate bank exposure to sovereign debt in both Italy and Spain have risen markedly to 10% and 9% respectively of total assets (see Chart 3.32) – increases of 2 and nearly 3 percentage points respectively in comparison with a year earlier.

Some of the increase in sovereign debt holdings may have been driven by banks' carry-trade activities, in particular in some stressed countries, in conjunction with low-cost financing available in the form of the ECB's LTROs. In fact, country-level data show that the contribution of interest income on available-for-sale assets (which account for most of the recent increase in government bond holdings) to total interest income increased significantly in some cases. This increase was most pronounced for Italian banks, with the share of interest income on available-for-sale assets rising from 4% in 2010 to 10% in 2012.

At the same time, euro area banks have, on average, reduced their **holdings of euro area non-financial corporate debt** – albeit with considerable country-level heterogeneity (see Chart 3.33). However, even in countries where banks increased their corporate bond holdings, the share of these securities in banks' balance sheets remains limited. This suggests that the direct impact of a sharp adjustment of risk premia would be contained at the aggregate level, although the indirect or second-round effects (e.g. increased corporate defaults, higher uncertainty, etc.) could be significant.

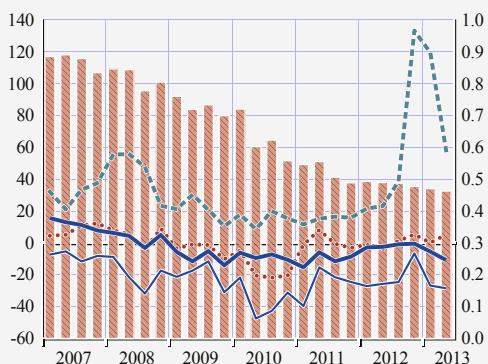
... while reducing their holdings of corporate bonds

Looking at overall bond holdings by bank group, data for LCBGs and other SBGs also suggest that smaller SBGs, in particular, increased their exposure to fixed income debt instruments between end-2011 and the first half of 2013, with the median share of debt instruments in total assets rising from 16% to 20%, which compares with a broadly stable median share for LCBGs (16%-17%) in the same period.

Chart 3.33 Annual growth rate of euro area MFIs' holdings of debt incurred by non-financial corporations and the share of such holdings in their total assets

(Q1 2007 – Q2 2013; percentage change per annum; share of total balance sheet)

- euro area annual growth rate
- median annual growth rate for countries in which LCBGs have their headquarters
- - - max. growth rate for countries in which LCBGs have their headquarters
- - min. growth rate for countries in which LCBGs have their headquarters
- share of NFC bondholdings in the total euro area balance sheet (right-hand scale)

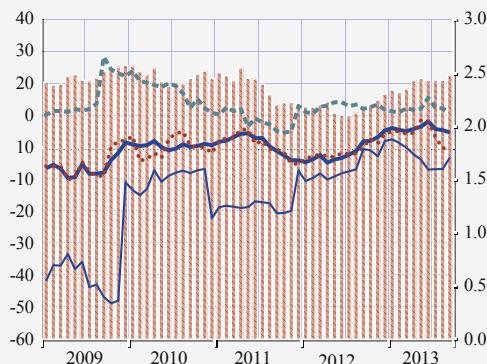


Source: ECB.

Chart 3.34 MFIs' holdings of shares and other equity

(Jan. 2009 – Sep. 2013; percentage change per annum; share of total balance sheet)

- euro area annual growth rate
- median annual growth rate for countries in which LCBGs have their headquarters
- - - max. growth rate for countries in which LCBGs have their headquarters
- - min. growth rate for countries in which LCBGs have their headquarters
- share of equity holdings in the total euro area balance sheet (right-hand scale)



Source: ECB.

Insurers' performance remained modest but stable despite low yields

In stark contrast to the relatively elevated bond market volatility, volatility in equity markets was relatively moderate in the third quarter of 2013 (see Chart S.2.11). MFI statistics on share holdings indicate that euro area banks have, on average, continued to increase their exposure to this asset class, albeit at a slowing pace, and that it remained limited at only 2.5% of euro area MFIs' total assets in September 2013 (see Chart 3.34).

3.2 THE EURO AREA INSURANCE SECTOR: ADJUSTING TO THE CHALLENGING AND HETEROGENEOUS ECONOMIC ENVIRONMENT

FINANCIAL CONDITION OF LARGE INSURERS⁵

Reported profitability of large euro area insurers has so far been little affected by the financial and economic crisis or the prevailing low-yield environment. On average, it was roughly double that of the large and complex banking groups (LCBGs). Solid investment income and underwriting performance have supported returns on equity (see Chart S.3.21 in the Statistical Annex). Investment income has continued to be resilient to the low yields on highly rated government bonds, which constitute the lion's share of many euro area insurers' investment portfolios. More broadly, the performance of large euro area insurers so far appears to retain a limited relationship with the present yield on domestic sovereign bonds (see Chart 3.35). The observed resilience of these insurers appears linked to the extent of diversification that large insurers display, on the one hand, and to the long-term nature of insurance business, where assets are generally held to maturity and investment income is therefore less vulnerable to market volatility, on the other.

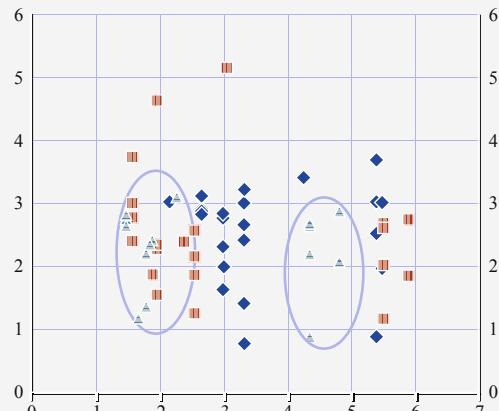
Profitability was somewhat impacted by insured losses over the last months. These stemmed primarily from floods and hailstorms in central and eastern Europe, which dented the second and third-quarter underwriting results of a few euro area primary insurers and reinsurers. Although this resulted in an increase in the average combined ratio (incurred losses and expenses as a proportion of premiums earned), the overall underwriting activity remained profitable as the indicator remained below 100% for most of the insurers in the sample for the second and third quarters of 2013 (see Chart S.3.23). Premium growth remained muted and in some cases clearly negative on account of weak economic activity, increases in taxes on premiums and competition in both life and non-life insurance. The diverse factors, and therefore the final impacts, varied greatly across euro area countries (see Chart S.3.22).

Chart 3.35 Investment income and domestic government bond yields

(2011 – H1 2013; percentages)

x-axis: average yield on a ten-year government bond in the country of residence
y-axis: investment return on assets for large euro area insurers

◆ 2011
■ 2012
▲ 2013



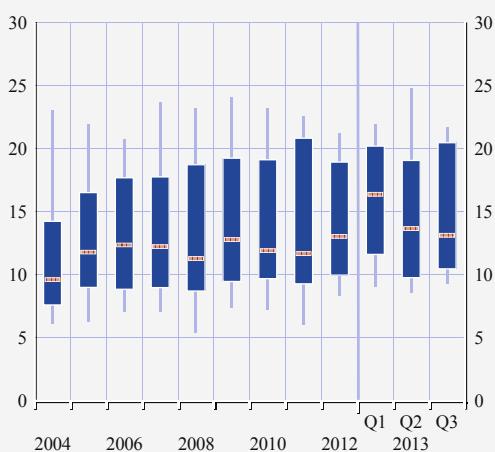
Sources: Bloomberg, individual institutions' financial reports and ECB calculations.

Notes: Data for 2013 refer to an average of first and second-quarter returns for those companies for which data are available. The government bond yield refers to the average during the first half of 2013. Investment income excludes unrealised gains and losses.

⁵ The analysis is based on a sample of 22 listed insurers and reinsurers with total combined assets of about €4.8 trillion in 2011, which represent around 63% of the gross premiums written in the euro area insurance sector. Quarterly data were only available for a sub-sample of these insurers.

Chart 3.36 Capital positions of large euro area insurers

(2004 – Q3 2013; percentage of total assets; 10th and 90th percentiles, interquartile distribution and median)



Sources: Bloomberg, individual institutions' financial reports and ECB calculations.

Note: Capital is the sum of borrowings, preferred equity, minority interests, policyholders' equity and total common equity.

Chart 3.37 Earnings per share of selected large euro area insurers and real GDP growth

(Q1 2002 – Q4 2014)

— actual earnings per share (EUR)
•••• real GDP growth (percentage change per annum)
■ earnings per share forecast for 2013 and 2014 (EUR)
● real GDP growth forecast for 2013 and 2014 (percentage change per annum)



Sources: European Commission, Thomson Reuters and ECB calculations.

Volatility in global debt markets through the summer had a stronger impact on reported capital positions than profitability of large euro area insurers. The recent rises in the long-term yields of highly rated euro area, UK and US government bonds decreased the capital positions of large, and particularly internationally active, euro area insurers in the second and third quarters of 2013 (see Chart 3.36). The dip demonstrates the vulnerability of some insurers to the risk of a sudden increase in yields through its impact on asset valuations and therefore reported solvency.⁶ Capital buffers, however, remained comfortable in historical terms.

INSURANCE SECTOR OUTLOOK

Market-based indicators suggest a relatively stable outlook for the euro area insurance sector over the next year. Volatility in market indicators in June, largely linked to global bond market turbulence, has given way to a gradual improvement in the market pricing of insurers (see Chart S.3.30). The decreasing trend in the dispersion of perceived credit risk across large insurers has also continued (see Chart S.3.28).

Analysts expect insurance earnings to remain at comfortable levels in 2013 and 2014 (see Chart 3.37). Although the low-yield environment continues to weigh on the profitability of the sector, the recent corrections are seen to enhance investment income prospects somewhat as reinvestments can be made at higher levels. Analysts also expect higher yields to improve both

Increase in yields of highly rated countries impacted capital buffers

Overall outlook stable

Analysts balance improved investment prospects against muted growth

⁶ Large, listed euro area insurers generally follow International Financial Reporting Standards (IFRSs), which provide for a uniform treatment of financial assets (depending on their respective accounting classification), but (currently) not for like treatment of insurance liabilities. In most European jurisdictions, liabilities are currently not marked to market.

the economic solvency of all insurers through higher discount rates on liabilities and the prudential ratios in those jurisdictions where the valuation of liabilities is based on market rates.⁷ Analysts also note that insurers have adjusted their business models and are now in a better position to face the current low-yield environment than during the past years.⁸

Improved expectations regarding investment income contrast with challenges for the insurance sector, in the form of muted economic growth and its impact on the ability of the sector to attract new business and retain existing clients. Weak economic growth currently translates into sluggish demand for primary insurance, and potentially increased credit risk in corporate bond markets. Low demand, together with ample capital in the sector, also gives rise to limited pricing opportunities. In the medium term, analysts are more positive about the growth prospects, and many even attach a positive outlook to the sector as a whole.

INVESTMENT RISK

Solvency risks for the insurance sector are closely tied to investment activity, which remains concentrated in government and corporate bond markets. Investments in structured credit, equity and commercial property, by contrast, have remained at low levels (see Chart S.3.25).

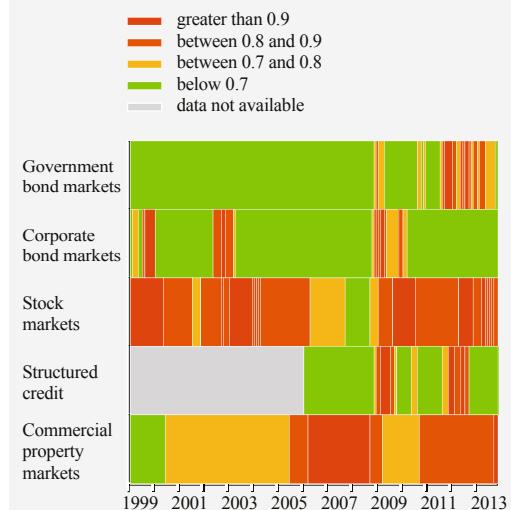
Despite the increase in yields of highly rated bonds...

A rise in the yields of **government bonds**, notably those of highly rated sovereigns, has contributed to the easing of the conditions shown in the investment uncertainty map (see Chart 3.38). On balance, the impact of an interest rate rise on the economic solvency of insurers is likely to be positive, owing to the effect of the higher discount rates on the liability side. Prudential solvency ratios of insurers, however, may be at risk from a sudden rise in yields in jurisdictions where liabilities are not treated in a market-consistent way.⁹ Comfortable capital buffers help in this respect, as do hedging and hold-to-maturity strategies.

As regards profitability, increasing yields may bring reinvestment opportunities and potentially ease the squeeze that some small and mid-sized life insurers in particular have experienced in presence of high, albeit declining, minimum guarantees to policyholders. Insurance companies typically

Chart 3.38 Investment uncertainty map for the euro area

(Jan. 1999 – Oct. 2013)



Sources: ECB, Bloomberg, JPMorgan Chase & Co., Moody's, Jones Lang LaSalle and ECB calculations.

Notes: Each indicator is compared with its "worst" level since January 1999. "Government bond markets" represent the ten-year government bond yield in the euro area and the option-implied volatility of German ten-year government bond yields; "Corporate bond markets" A-rated corporate bond spreads and speculative-grade corporate default rates; "Stock markets" the level and the price/earnings ratio of the Dow Jones EURO STOXX 50 index; "Structured credit" the spreads of residential and commercial mortgage-backed securities; and "Commercial property markets" commercial property values and value-to-rent ratios.

7 Economic solvency is used throughout the text to refer to a market-consistent treatment of both assets and liabilities, versus prudential solvency which is dependent on the accounting and prudential rules in use.

8 Such adjustments could include geographical and business line diversification, a switch in product design towards unit-linked policies in which the policyholder bears the risk, and asset-liability management techniques.

9 In contrast to the effect on solvency in economic terms, which always considers the market impact on both sides of the balance sheet, the impact of a rate hike on prudential solvency is negative if liabilities are not marked to market but assets are. The differences in the accounting treatment of liabilities across jurisdictions imply that the short-term prudential solvency risks differ from country to country. The investment profile of each institution, together with the extent of maturity mismatch, hedging strategies and product design, also play a decisive role.

hold most of their assets in the available-for-sale portfolio despite their intention to hold them to maturity. This policy enables the companies to take advantage of reinvestment opportunities that rising rates may offer, while keeping open the possibility to move assets to the held-to-maturity portfolio in case large valuation declines are anticipated.

Notwithstanding their rise over the course of the year, the yields on highly rated government bonds still remain at very low levels and are expected to keep investment income of euro area insurers moderate for some time to come. Such low yields also continue to constitute the key underlying medium-term solvency risk in economic terms through liability valuation. More and more analysts and investors are focusing on the economic impact of low yields on the solvency of insurance companies, also as it is seen to approximate the position of the insurer under the forthcoming Solvency II framework. Insurers in those jurisdictions where liabilities are not yet marked to market are thus not insulated from the negative impact of low yields on their perceived solvency, despite the fact that it is not visible in the prudential ratios.

In an environment characterised by a fragmented and in some cases low-yielding government bond market, the appeal to insurers of increasing **corporate bond** portfolios is clear. A closer look reveals that this development is mainly evident for insurers residing in countries where government

... low yields remain the key economic risk in the medium term

Chart 3.39 Investment mix for selected large euro area insurers

(H1 2012 – H1 2013; percentage of total investments; median)

- ◆ high-yield environment
- low-yield environment

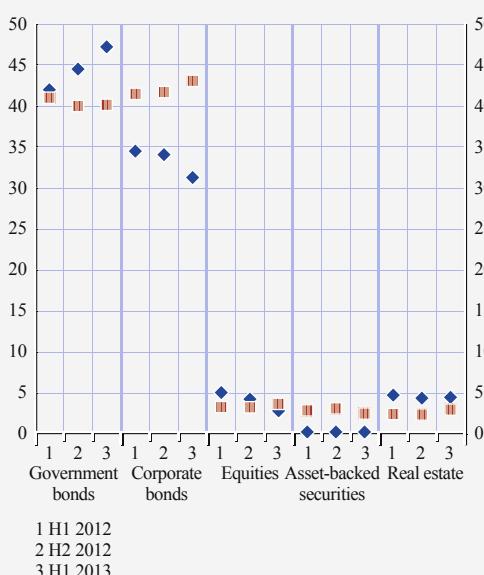
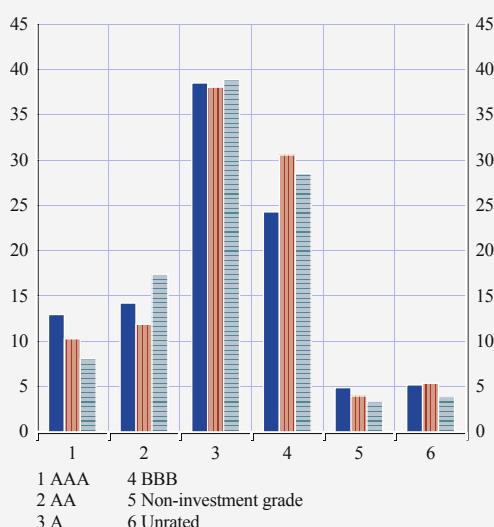


Chart 3.40 Corporate bond investments of selected large euro area insurers according to rating categories

(weighted average; percentage of total corporate bond investments)

- 2011
- 2012
- 2013



Sources: JPMorgan Cazenove, individual institutions' financial reports and ECB calculations.

Notes: Based on consolidated financial accounts data. The equity exposure data exclude investment in mutual funds. Insurers are divided into high- and low-yield categories on the basis of the country of residence.

Sources: Company reports, JPMorgan Cazenove and ECB calculations.

Notes: Based on 12 large euro area insurers for 2011 and 2012. For the first half of 2013, information was only available for ten insurers in the sample. For one insurer, the rating distribution for 2011 was used as a proxy for the year 2012, owing to a lack of data.

Corporate rating migration towards the mid-range

bond yields are low (see Chart 3.39). Investment in other asset classes such as equities and asset-backed securities has also increased for these insurers, albeit starting from a very low level.

At the same time, the average rating of the corporate bond portfolios of selected large euro area insurers has decreased somewhat (see Chart 3.40). Although part of the apparent migration towards BBB-rated bonds in particular may be attributable to recent downgrades, especially in the banking sector, it cannot be excluded that a part of the phenomenon is related to search-for-yield activities in the current low-yield environment. The recent movement towards A- and AA-rated securities may, however, also signal deliberate action to upgrade the investment portfolio and would as such argue against intentional risk-taking by the insurers in the sample.

Insurers adjust investment strategy

In summary, evidence points towards an ongoing adjustment of investment strategies by large euro area insurers in an environment of low and uncertain returns on investments. The developments in terms of asset allocation and rating migration may contribute to the apparent insensitivity of investment income to domestic government bond yields, as shown in Chart 3.35. On the one hand, this process is likely to translate into decent returns on equity also in the near future and to add further benefits that arise from diversification. On the other hand, the developments, together with the weak macroeconomic outlook, may imply an increased market and credit risk in the future and therefore merit close monitoring.

UNDERWRITING RISK

Underwriting risks are key for insurers. In the short term, the actual occurrence of natural catastrophes can have a significant impact, as losses can be substantial. Inadequate pricing of policies constitutes a major source of risk in the medium-to-long term, as premiums collected may not suffice to pay liabilities.

Insured catastrophe losses remained below average in the first half of 2013, the major single event having been the floods in central and eastern Europe, with an estimated impact of USD 4 billion (see Chart 3.41). Atlantic hurricane activity has so far remained low, despite the forecasts for an above-average season. As a consequence, insurance capital, and therefore capacity, has remained strong.

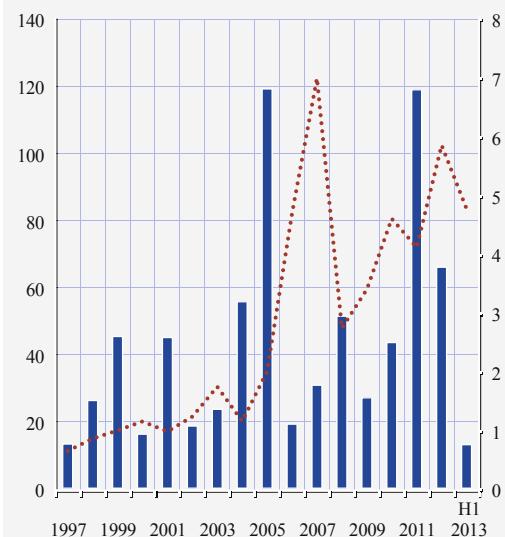
Strong capital impacts non-life pricing

The comfortable level of capitalisation, together with the few catastrophe losses over the last year, have contributed to the modest overall developments in the pricing of non-life insurance policies, and in particular to the decline in US catastrophe reinsurance. In addition, the inflow of capital into (and therefore the competition in) the reinsurance market has increased through the pick-up in the issuance of insurance-linked securities such as catastrophe bonds (see Chart 3.41 and the section on institutional investors below). The overall impact on the

Chart 3.41 Insured catastrophe losses and catastrophe bond issuance

(1997 – H1 2013; USD billions)

— insured losses (left-hand scale)
···· issuance of catastrophe bonds (right-hand scale)



Sources: EQECAT, Munich Re, Swiss Re, Guy Carpenter and ECB calculations.

Note: For catastrophe bond issuance, H1 2013 refers to the first seven months of the year.

European insurance sector, however, is expected to be subdued. First, large euro area (re)insurers are generally well diversified across business lines and their income is therefore not likely to be significantly affected by the decrease in US catastrophe insurance pricing. The pricing of motor insurance, for example, is continuing on its upward trend in many core European markets. Second, the risk-based Solvency II framework is likely to increase the demand for reinsurance in Europe in the medium term. Third, despite the surge in issuance of insurance-linked securities as complementary products that are particularly suitable for financial investors, traditional reinsurance has some distinctive benefits for insurers in terms of product design and is therefore likely to prevail.¹⁰

For life insurers, the increasing yields on highly rated government bonds and the ensuing impact on profitability and economic (and in some cases prudential) solvency could alleviate pressure for the necessary and ongoing adjustment of business models. Combined with competitive or even shrinking markets (see Chart S.3.22), they could in particular induce the granting of unsustainably high product guarantees on new life insurance policies. By contrast, the improved funding conditions of banks have reduced competition between banks and life insurers, and therefore also the risk of a liquidity squeeze and consequent forced asset sales. Liquidity risk could, however, re-emerge on account of renewed difficulties in attracting new business and retaining existing clients in the present economic situation. While not constituting a major current risk, the liquidity situation should be monitored as its pace of change can be significantly faster than that of other risks to the insurance sector.

Finally, exposures related to credit risk protection selling have remained modest, in line with the overall development of the market. Such non-traditional activities may, however, become an interesting source of income should the low-yield environment continue to prevail. As in the case of potential forced asset sales, non-traditional activities bear a significant liquidity risk in the form of margin calls. The proposed policy measures applicable to global systemically important insurers (G-SIIs) are targeted at containing this risk, among others.¹¹

INSURANCE COMPANIES, PENSION FUNDS AND BANK FUNDING

Insurance companies and pension funds, also referred to as institutional investors, are major buyers of bank bonds. Monitoring the investment behaviour of this broader class of investors to detect potential trends that could impact bank funding is therefore important for broader financial market stability.

Chart 3.42 shows that investment in bank bonds by insurers and pension funds has remained robust during the crisis. The low-yield environment is likely to continue to spur investment in bank bonds by institutional

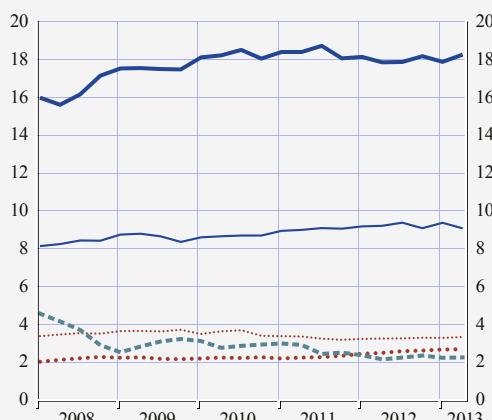
*Higher yields
may lower reform
pressure on life
insurers*

*Risks from credit risk
protection remain
small*

Chart 3.42 Financial assets of euro area insurance companies and pension funds

(Q1 2008 – Q2 2013; percentage of total financial assets)

- debt securities issued by governments
- debt securities issued by NFCs
- - - shares
- debt securities issued by MFIs
- debt securities issued by OFIs



Source: ECB.

Note: MFIs refer to monetary financial institutions, NFCs to non-financial corporations and OFIs to other financial intermediaries.

*Institutional
investors remain
important for bank
funding...*

10 For example, a reinsurance policy can be better tailored to cover specific risks and can have renewable features.

11 See Section 3.4 on regulatory developments.

investors. In this regard, it is notable that, while the landscape of pension funds is currently highly heterogeneous across the euro area, the overwhelming majority of the private pension funds in the euro area reside in low-yield countries. Interest of these funds in investment alternatives to government bonds is expected to continue to be high.

Bank bonds are, however, not the only available investment alternative to government bonds. Institutional investors have notably been major contributors to the recent surge in the catastrophe bond markets (see Chart 3.41). From the investor's point of view, catastrophe bonds bear relatively high returns, which are moreover not correlated with financial market cycles owing to the nature of the underlying risk. They may therefore offer some welcome diversification away from financial risks related to bank bonds, especially for those pension funds and life insurers that are not directly involved in underwriting natural catastrophe policies. The final impact of the various factors on bank funding by institutional investors remains an empirical question.

3.3 A QUANTITATIVE ASSESSMENT OF THE IMPACT OF SELECTED MACRO-FINANCIAL SCENARIOS ON FINANCIAL INSTITUTIONS

This section provides a quantitative assessment of four macro-financial scenarios that map the main systemic risks identified in the analysis presented in the previous sections of this Financial Stability Review (FSR) (see Table 3.1):

- (i) *economic and financial shocks that affect asset valuations and bank profitability, eroding confidence in the euro area financial sector* – materialising through negative shocks to aggregate supply and demand in a number of euro area countries;
- (ii) *the risk of renewed tensions in sovereign debt markets as a result of delayed national reforms, unforeseen bank recapitalisation needs or a rise in global bond yields* – materialising through an increase in long-term interest rates and declining stock prices;
- (iii) *the risk of global financial market turbulence, with asset mispricing and low market liquidity* – reflected by a sharp increase in investor risk aversion worldwide, leading to falling stock and corporate bond prices and to lower euro area external demand;

Table 3.1 Mapping main systemic risks into adverse macro-financial scenarios

Risk	Scenario	Key assumptions driving impact on GDP
Economic and financial shocks that affect asset valuations and bank profitability, eroding confidence in the euro area financial sector	Adverse economic growth scenario	Shocks to investment and consumption as well as user cost of capital and nominal wages
Renewed tensions in sovereign debt markets as a result of delayed national reforms, unforeseen bank recapitalisation needs or a rise in global bond yields	Sovereign debt crisis scenario	An aggravation of the sovereign debt crisis fuelling increases in interest rates and stock price declines
Global financial market turbulence, with asset mispricing and low market liquidity	Global risk aversion scenario	A shock to confidence and rise in risk aversion world-wide fuelling stock price declines, corporate bond yield increases and eventually affecting euro area external demand
Bank funding challenges in stressed countries that force banks to deleverage excessively	Funding stress scenario	Shocks to money market interest rates and credit costs for the private sector

Source: ECB.

- (iv) *bank funding challenges in stressed countries that force banks to deleverage excessively – reflected by reduced access to wholesale debt financing and deposit outflows in distressed countries, with detrimental effects on the supply of loans.*

The assessment is based on a macro-prudential simulation exercise involving top-down stress-testing tools. The results are not comparable with those of micro-prudential stress tests.¹²

MACRO-FINANCIAL SCENARIOS AND THEIR IMPACT ON GDP

The four adverse scenarios described below and summarised in Tables 3.1 and 3.2 display the key driving factors at play, as well as the overall impact on euro area GDP, with the latter giving an indication of the respective scenario's impact on the whole spectrum of macro-financial model variables that respond to the shocks set in each scenario. The impact of the adverse scenarios is assumed to be felt as from the third quarter of 2013.

Adverse euro area growth

A clear thread throughout this FSR is the detrimental impact of weak macroeconomic activity on both the macro-financial environment and financial institutions. In order to capture the risk of weaker than anticipated domestic economic activity in many euro area countries, this scenario involves country-specific negative shocks to aggregate supply, via increases in both the user cost of capital and nominal wages, and to aggregate demand, via a slowdown in both fixed investment and private consumption. The calibration of the country-specific shocks was based on a quantitative and qualitative ranking of the most pertinent risks at the country level.¹³ The effect on GDP is derived using “stress-test elasticities”.¹⁴

These assumptions result in an overall impact on euro area real GDP growth, expressed in deviations from baseline growth rates, of -1.1, -1.9, and -0.6 percentage points in 2013, 2014 and 2015 respectively. The simulations serve illustrative purposes, covering a generic three-year

... the results are not comparable with those of micro-prudential stress tests

The first scenario is based on a shock to aggregate supply and demand

Table 3.2 Overall impact on euro area GDP growth under the baseline and adverse scenarios

	2012	2013	2014	2015
Baseline (annual growth rates given in the European Commission's autumn forecast)	-0.7	-0.4	1.1	1.7
<i>Percentage point deviations from baseline growth</i>				
Adverse economic growth scenario		-1.1	-1.9	-0.6
Sovereign debt crisis scenario		-0.1	-0.5	-0.6
Global risk aversion scenario		-0.1	-0.8	-0.5
Funding stress scenario		0.0	-0.4	-0.7

Sources: European Commission, ECB and ECB calculations.

12 The tools employed are: (i) a forward-looking solvency analysis, similar to a top-down stress test, for euro area banks; and (ii) a forward-looking analysis of the assets and liabilities side of the euro area insurance sector. For a more detailed description of the tools, see J. Henry and C. Kok (eds.), “A macro stress testing framework for systemic risk analysis”, *Occasional Paper Series*, No 152, ECB, October 2013, as well as ECB, “A macro stress testing framework for bank solvency analysis”, *Monthly Bulletin*, August 2013. The results are based on publicly available data up to the second quarter of 2013 (or few quarters earlier) for individual banks and insurance companies, as well as bank exposure data disclosed in the 2011 EU-wide stress test and the 2011 EU capital exercise coordinated by the European Banking Authority (EBA).

13 The aggregate supply and demand shocks are calibrated on the basis of statistical criteria, where the probabilities of the shocks are measured in relation to the historical volatilities of the economic variables in each country.

14 Stress-test elasticities are a simulation tool that is based on impulse response functions (taken from ESCB central banks' models) of endogenous variables to predefined exogenous shocks. They incorporate intra-euro area trade spillovers.

Under the second scenario, euro area sovereign bond yields rise to abnormally high levels...

... accompanied by a sharp decline in stock prices, and by an increase in both short-term interest rates and sovereign CDS spreads

This implies losses in the trading book and an increase in banks' cost of funding and credit risk

Abrupt decrease in investor confidence, leading to a stock price-driven shock emanating from the United States...

horizon – hence the strong deviation from baseline also in the current year. The real economic impact varies considerably across euro area countries, with countries under sovereign stress affected most negatively.

Aggravation of the sovereign debt crisis

Sovereign stresses have been at the heart of the crisis. This scenario attempts to capture such stresses, envisaging a rise in euro area sovereign bond yields to elevated levels, while taking into account co-movements with other asset prices (in particular, stock prices). The shocks are assumed to emanate from euro area countries that are particularly vulnerable to possible further contagion from euro area EU/IMF programme countries.¹⁵

The design of this shock is predicated on the following assumptions. First, a permanent shock to long-term government bond yields on the cut-off date is assumed for all euro area countries except Greece and Cyprus, which are outliers in this regard, ranging from no impact to up to 344 basis points. Second, the slope of national yield curves on the cut-off date is used to transpose the simulated shock to other maturities. Third, the shock to bond yields has spillover effects on stock prices, ranging from 0% to -37% across the euro area countries, with the strongest negative impact observed in Spanish and Italian stock markets. The simulated shocks to bond yields and stock prices lead to an immediate and persistent increase in short-term market interest rates.¹⁶ Lastly, the calibrated shocks to ten-year government bond yields determine country-specific shocks to sovereign credit default swap (CDS) spreads.¹⁷

Depending on the country, these factors lead to varying increases in sovereign bond yields that result in marking-to-market valuation losses on euro area banks' sovereign exposures in the trading book,¹⁸ while the increase in sovereign credit spreads also raises the cost of euro area banks' funding. The country-specific shocks to interest rates and stock prices also have direct implications for the macroeconomic outlook, which in turn affects banks' credit risk. Ultimately, the impact on euro area real GDP – assuming an unchanged monetary policy stance – amounts to -0.1, -0.5, and -0.6 percentage point deviations in 2013, 2014 and 2015 respectively.¹⁹

Increased risk aversion

The third adverse scenario concerns the potential for a mispricing of risk across various market segments around the world and is modelled as an abrupt decrease in investor confidence and an increase in risk aversion worldwide. More specifically, a negative confidence and stock price-driven shock emanating from the United States is assumed. This would lead to a recession in the

¹⁵ The selection of countries that are potentially vulnerable to further contagion is based on a systematic shock simulation to identify the countries/markets that are most influential in the sense of causing the most widespread response when themselves affected by a shock. Smaller countries, e.g. Cyprus and Slovenia, have not been considered as countries from which shocks may emanate since their sovereign bonds outstanding are insufficient or their data quality is inadequate for carrying out a robust analysis. The calibration of the sovereign bond yield shock is based on the daily compounded changes in ten-year government bond yields and stock prices observed since January 2011. These observations are used to simulate a joint, multivariate forward distribution of yields and stock prices 60 days ahead. In the simulation, long-term interest rates and stock prices in countries that are currently perceived by market participants as being particularly vulnerable to possible further contagion are shock-originating markets, with the shocks assumed to occur with a 1% probability. The response for all other markets/countries is computed using a non-parametric model consistent with the shock probability assumption. The resulting shock sizes are dependent, in principle, on the selected sample period. However, sensitivity analyses show that the shocks do not change materially if, for instance, the sample size is reduced by using a cut-off date in mid-2011.

¹⁶ The same simulation procedure as that used for calibrating long-term bond yield shocks across euro area countries has been applied to the three-month EURIBOR.

¹⁷ They are based on estimated regressions of sovereign CDS spreads vis-à-vis long-term government bond yields.

¹⁸ By contrast, securities held in the available-for-sale portfolio and in the banking book are assumed not to be affected by the asset price shock, in line with the treatment in the EBA's 2011 EU-wide stress test. The valuation haircuts are calibrated to the new levels of government bond yields, using the sovereign debt haircut methodology applied in the EBA's 2011 stress-test exercise.

¹⁹ The impact of these shocks on euro area economic growth was derived on the basis of the stress-test elasticities.

United States and would have negative implications – via trade and confidence spillovers – for the global economic outlook, including euro area foreign demand. This also includes the impact of endogenously derived increases in oil and other commodity prices, as well as an appreciation of the euro's exchange rate against the US dollar. The impact on euro area foreign demand is derived with the National institute Global Economic Model (NiGEM). Lastly, the increase in risk aversion is assumed to cause corporate bond spreads to rise markedly from their current low levels.²⁰

On the basis of these assumptions, the US stock price shock amounts to 16% in the third quarter of 2013, with US stock prices assumed to gradually recover but to remain 8% below the baseline at the end of 2015. The resulting negative impact on euro area external demand, expressed in percentage changes from baseline levels, amounts to 2.4% at the end of 2013 and 2.9% at the end of 2014. The simulated shock to corporate bond prices corresponds, on average, to a haircut of around 4.5% on banks' corporate bond holdings.

The impact of the external demand shock on the euro area economies is derived using the stress-test elasticities. The overall impact on euro area real GDP, expressed in deviations from baseline growth rates, is -0.1, -0.8 and -0.5 percentage point in 2013, 2014 and 2015 respectively. The real economic impact differs considerably across the euro area countries, depending in particular on their export orientation and exchange rate sensitivity.

Renewed funding stress

A fourth key risk relates to the potential for banks experiencing pronounced funding difficulties in countries where the sovereign is under stress, which could seriously hamper credit intermediation, for example by inducing banks to cut back their lending. To account for the diverse stress factors that affect bank funding markets in some euro area countries, a number of shocks are considered. First, a shock to the three-month EURIBOR captures the risk of worsening funding conditions in money markets. It kicks in gradually, starting in the third quarter of 2013. The gradual increase mirrors the assumed increasing uncertainty about the quality of bank credit portfolios. Second, banks affected by funding constraints are assumed to increase the cost of extending credit to the private sector and to limit the supply thereof. To account for this effect, a set of country-specific shocks to the cost of corporate credit (via the user costs of capital) and to the interest margins on loans to households (via the financial wealth of households) is considered. The magnitude of the country-specific shocks is derived on the basis of markets' and experts' assessments of the severity of country-specific macroeconomic risks.

... with a negative impact on euro area external demand and, eventually, euro area GDP

Increased funding difficulties in some countries...

... with a shock to money market rates and credit costs for the private sector

Overall, the impact of the funding stress scenario on real GDP growth in the euro area remains muted in the second half of 2013. In 2014 and 2015, the deviations from baseline GDP growth rates amount to -0.4 and -0.7 percentage point respectively. Significant differences in responses can again be observed across countries.

SOLVENCY RESULTS FOR EURO AREA LARGE AND COMPLEX BANKING GROUPS

The impact on bank solvency is broken down into that on *individual* profit and loss results, on the one hand, and that stemming from cross-institutional *contagion*, on the other.

The impact of the four scenarios on euro area LCBGs' profit and loss accounts (and solvency positions) is obtained from a projection of the main variables determining banks' solvency, such as

Scenario-implied changes in credit risk and profits impact banks' solvency positions

²⁰ The corporate bond rate shock has been calibrated using the same simulation approach as that applied to government bond yields under the sovereign debt crisis scenario. An increase in risk aversion could also affect sovereign yields, but this is treated separately under "Aggravation of the sovereign debt crisis".

Table 3.3 Technical assumptions regarding the individual risk drivers of banks' solvency ratios

Credit risk	Changes to probabilities of default and loss-given-default estimated by exposure types (i.e. loans to non-financial corporations, retail and commercial real estate loans). ¹⁾ Projected changes at the country level applied to bank-specific loss rates to calculate the expected losses. ²⁾ For exposures to sovereigns and financial institutions, provisioning is based on rating-implied probabilities of default, similar to what was done in the EBA's exercise. ³⁾
Net interest income	Based on a loan-deposit margin multiplier approach to assess the impact of interest rate changes. ⁴⁾ Changes in short-term loan and deposit rates are then multiplied by the outstanding amounts of loans and deposits for each bank at the beginning of the horizon. To account for a marginal pricing of deposit rates, which have risen sharply in many euro area countries in recent years, changes in the short-term rate have been adjusted by adding the spread between the three-month money market rate and new business time deposit rates at country level as of end-March 2013.
Other operating income	Trading income developments correspond, for each bank, to its average trading income over the period 2007-12 under the baseline, and to the average of the three years of severe financial crisis (2008-10) under the adverse scenarios. Fee and commission income is assumed to remain constant in nominal terms.
Taxes and dividends	Tax and dividend assumptions are bank-specific, using the average ratio of positive tax payments to pre-tax profits over the period 2008-10 and the median dividend to net income ratio over the same period.
Risk-weighted assets	Risk-weighted assets are calculated at the bank level, using the Basel formulæ for banks following the "Internal Ratings Based Approach" and assuming fixed losses given default. ⁵⁾

Source: ECB.

1) For the forecasting methodology applied, see ECB, "2011 EU-wide EBA stress test: ECB staff forecasts for probability of default and loss rate benchmark", 4 April 2011.

2) More technically, the range from the starting levels of both the probabilities of default and the loss given default to the maximum of actual 2011 provisioning rates for the non-financial corporate, retail and commercial real estate sectors were calibrated conservatively.

3) See EBA, "2011 EU-wide Stress Test: Methodological Note – Additional Guidance", June 2011.

4) See Box 7 of the December 2010 FSR and Box 13 of the June 2009 FSR for further details.

5) Risk-weighted assets are defined according to the so-called Basel 2.5 (or CRD III) framework, including higher risk weights on re-securitisations in the banking book and certain market risk elements in the trading book.

the credit risk parameters, profits and risk-weighted assets.²¹⁾ Details of the technical assumptions for all relevant variables are contained in Table 3.3. Having computed the effects of the various shocks on the above-mentioned balance sheet components, the overall impact is expressed in terms of changes to banks' core Tier 1 capital ratios.

Under the baseline scenario, the average core Tier 1 capital ratio is projected to decrease from 11.9% to 11.8% at the end of 2015

Under the **baseline scenario**, euro area LCBGs' core Tier 1 capitalisation is projected to decrease, on average, from 11.9% in the third quarter of 2013 to 11.8% by the end of 2015 (see Chart 3.43). The overall unchanged average solvency position under the baseline mainly reflects that the projected accumulation of pre-provision profits is offset by negative influences, predominantly from projected loan losses. The average development of euro area LCBGs' solvency positions, however, masks substantial variations across the individual institutions and euro area countries.

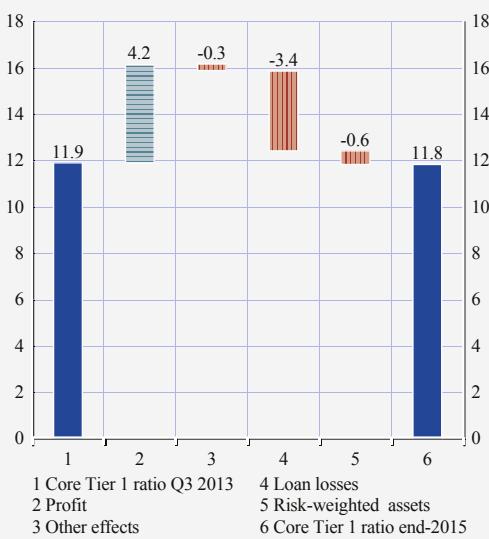
The adverse growth scenario leads to an average core Tier 1 capital ratio of 9.5% at the end of 2015

All four distinct **adverse scenarios** discussed above would have a notable adverse impact on euro area LCBGs' solvency, with average core Tier 1 capital ratios declining by 0.5 percentage point or more relative to the baseline scenario by the end of 2015 (see Chart 3.44). Under the sovereign debt crisis scenario and under the global risk aversion scenario, euro area LCBGs' core Tier 1 capital ratios would decline to 11.1% and 10.2% respectively by the end of 2015. A somewhat milder adverse impact is found under the funding stress scenario (11.3%). The adverse economic growth scenario would produce the most negative results: the euro area LCBGs' average core Tier 1 capital ratio would decline to 9.5% by the end of 2015.

21) The balance sheet and the profit and loss data are based on banks' published financial reports, while also taking into account the supervisory information that was disclosed in the context of the EBA's 2011 EU-wide stress test and the EBA's 2011 EU capital exercise (in particular, regarding the granular geographical breakdowns of exposures at default). To the extent possible, the data have been updated to cover the period up to the third quarter of 2013. The sample includes 17 euro area large and complex banking groups. Data consolidated at the banking group level are used. Bank balance sheets are assumed to remain unchanged over the simulated horizon, except when it is explicitly assumed otherwise, as in the funding stress scenario.

Chart 3.43 Average contribution of changes in profits, loan losses and risk-weighted assets to the core Tier 1 capital ratios of euro area LCBGs under the baseline scenario

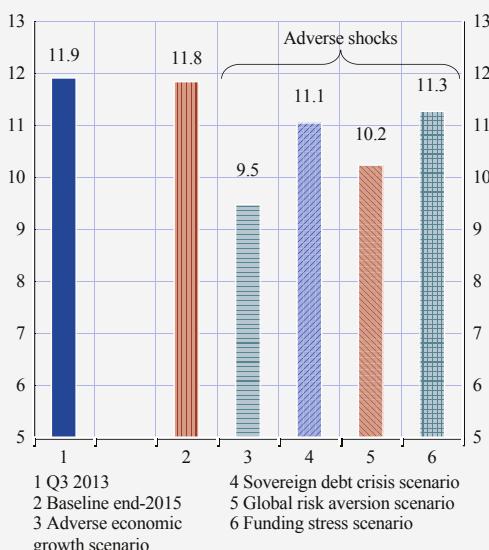
(percentage of the core Tier 1 capital ratio and percentage point contribution)



Sources: Individual institutions' financial reports, EBA, ECB and ECB calculations.

Chart 3.44 Average core Tier 1 capital ratios of euro area LCBGs under the baseline and adverse scenarios

(2013–2015; percentages; average of euro area LCBGs)



Sources: Individual institutions' financial reports, EBA, ECB and ECB calculations.

The main driving factors under all scenarios are the increase in loan losses and lower or negative retained earnings with respect to the baseline. Notably, under the sovereign debt crisis, the funding stress and the returning risk aversion scenarios, the decline in profits is relatively strong, owing to marking-to-market losses. Under the adverse economic growth scenario, the adverse impact largely originates from high loan losses.

The likelihood of capital shortfalls under the adverse scenarios is low by design, as it is based on low-probability events and scenarios.²² In this respect, it is useful to consider a **reverse stress test** whereby the size of the shock needed to drive the core Tier 1 capital ratio of, for example, one-third of the euro area banks in the sample down to a pre-specified threshold is derived for each of the scenarios.²³ Under mild scenarios, it is necessary to scale up the intensity of the scenario in the reverse stress test in order to lower the banks' core Tier 1 ratio below a reference threshold (e.g. 6% or 8%). Under more adverse scenarios, such scaling-up is not necessary as the core Tier 1 capital ratio already falls short of the 6% threshold for more than one-third of the banks.

Cross-checking results with a reverse stress test

Considering a threshold core Tier 1 capital ratio of 6%, the weak euro area growth scenario is found to be the most severe among the four scenarios as it would only need to be multiplied by a factor of around 2 to bring the ratio of more than one-third of the banks to below 6% (see Table 3.4). The global risk aversion scenario requires a reverse stress test multiplier of 6.3 before the core Tier 1

22 In order to rank the systemic risks considered in the various scenarios, it is not sufficient to focus solely on the solvency-implied results derived under each scenario. The probability of occurrence attached to each of the scenarios should also be considered in order to make the results fully comparable.

23 To derive the factor ("multiplier") that is needed for each scenario to reach a median core Tier 1 capital ratio equal to 6% by the end of 2015, the amplified macro model output is fed through the credit risk and profit satellite models, which in turn are linked to the balance sheets of individual institutions to derive the solvency positions of banks.

Table 3.4 Reverse stress test results

(multipliers)	Multiplier necessary to bring the core Tier 1 capital ratio of one-third of the banks to below 6%	Multiplier necessary to bring the core Tier 1 capital ratio of one-third of the banks to below 8%
Scenario		
Adverse economic growth scenario	2.1	1.5
Sovereign debt crisis scenario	9.5	7.3
Global risk aversion scenario	6.3	6.3
Funding stress scenario	10.4	7.4

Sources: ECB and ECB calculations.

capital ratio of one-third of the banks fall below 6%. The multipliers needed for the sovereign crisis and funding stress shocks are somewhat larger, standing at 9.5 and 10.4 respectively, thereby reflecting that the initial impacts of these shock scenarios are less severe than that the global risk aversion scenario.

POTENTIAL INTERBANK CONTAGION DUE TO BANK FAILURES

Adverse shocks to individual banks' solvency positions can lead to contagion effects via interbank liabilities

The deterioration in a given bank's solvency position under the adverse scenarios may spill over to other banks in the system. This can happen if, for example, the failure of a bank to comply with a threshold capital level would imply losses for interbank creditors – resulting in additional system-wide losses.

Interbank contagion effects could be amplified further if, in response to distressed interbank loans, banks were to sell their securities holdings to fill the gap in their balance sheets. This may give rise to fire-sale losses, which could adversely affect the marking-to-market valuation of their securities portfolios and further depress their capacity to fully honour interbank liabilities. If these actions are taken by many banks at the same time, they would magnify the implied impact on market prices of the assets being sold.

In the absence of detailed data on interbank exposures, publicly available information is used to generate prospective instances through dynamic network modelling where one (or more) financial entity can have contagious effects throughout the financial system.²⁴ The interbank contagion results, derived by applying such a methodology to the four adverse scenarios considered above, are illustrated in Chart 3.45. The results for the contagion effects incorporate the restrictions on large exposures that EU rules impose on banks.²⁵

For the simulated networks with the most severe effects, the system-wide core Tier 1 capital ratio falls by about 36 basis points in some countries (see Chart 3.45). Contagion effects are therefore confined mainly to less than 0.36 percentage point additional core Tier 1 capital ratio reductions.

²⁴ The exercise is based on a sample of 65 European banks that were also covered in the 2011 EU-wide stress-testing exercise conducted by the EBA. An interbank network is generated randomly on the basis of banks' interbank placements and deposits, taking into account the geographical breakdown of banks' activities. Once the distribution of interbank networks has been calibrated, the system can be subjected to a shock in order to assess how specific shocks are transmitted throughout the system and to gauge the implications for the overall resilience of the banking sector. The shock is typically a given bank's default on all its interbank payments. The model consists of three main building blocks: the interbank probability map, the random interbank network generator and the equilibrium interbank payments. For a more detailed description of the methodology, see G. Halaj and C. Kok, "Assessing interbank contagion using simulated networks", *Working Paper Series*, No 1506, ECB, 2013, and Computational Management Science (10.1007/s10287-013-0168-4).

²⁵ Two limitations on the maximum exposure that is allowed vis-à-vis an individual counterparty are embedded into the network simulators, following the prescriptions in Article 111 of Directive 2006/48/EC. First, an interbank exposure of each bank cannot exceed 25% of its regulatory capital. Second, the sum total of the interbank exposures of a bank, individually exceeding 10% of its capital, cannot be higher than 800% of its capital.

However, should the banks respond to capital pressure by shedding assets at fire-sale prices, the capital shortfalls would be larger.

ASSESSING THE RESILIENCE OF EURO AREA INSURERS

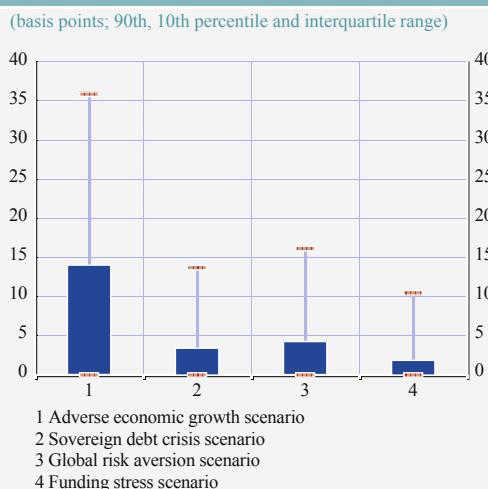
The assessment of the impact of the four main euro area financial stability risks on large euro area insurers is conducted using publicly available data for 13 major euro area insurance groups up to the fourth quarter of 2012. It relies on a market-consistent approach to the quantification of risks and ignores the heterogeneity of current institutional settings and accounting practices across jurisdictions. It is applied to both the *assets* and the *liabilities* side of insurance corporations' balance sheets. Rather than trying to gauge the impact in terms of prudential solvency ratios, given the strong heterogeneity of the individual reporting in this sector, the approach aims to spell out the main risks in economic terms.²⁶

The following market, credit and underwriting risks are assessed: (i) an increase in interest rates; (ii) a fall in equity and property prices; (iii) a deterioration of the creditworthiness of borrowers through a widening of credit spreads for marketable instruments; (iv) lapse rate²⁷ increases; and (v) an increase in loss rates on loan portfolios.

Using the same adverse scenarios as those for banks in the previous section, the risks for insurance companies are transmitted through three channels, namely: (i) valuation effects on financial securities and liabilities owing to changes in sovereign yields and swap rates; (ii) sales of assets due to unforeseen payments resulting from increased lapse rates; and (iii) changes in the credit quality of loan portfolios.

A number of simplifying assumptions had to be made for this exercise. First, decreases in the market value of insurance corporations' holdings of shares, bonds and property are assumed to occur instantaneously, before institutions have an opportunity to adjust their portfolios (see Table 3.5 for an overview across scenarios). This implies that no hedging or other risk-mitigation measures²⁸ were taken into account; consequently, losses may be overestimated. Second, available granular data (e.g. on investment in sovereign bonds, broken down by jurisdiction, on investment in corporate bonds and on loans, broken down by credit ratings, as well as on liabilities and debt assets, broken down by maturity) were used wherever possible, but broad aggregates of financial investments were used in some instances. The relative weights of various investments, broken down by instrument, are shown in Chart 3.36. Third, all income and expenses related to the underwriting

Chart 3.45 "Worst case" reduction in the core Tier I capital ratio of euro area banks due to interbank contagion: dispersion across simulations



Sources: Individual institutions' financial reports, EBA, ECB and ECB calculations.

Note: Interquartile range represents the 25th to 75th percentiles of the cross-country contagion effects under the most severe (upper 10th percentiles) of 20,000 simulated interbank networks.

Major risks are quantified using a market-consistent approach for the assets and liabilities side...

... under the macro-financial scenarios set out earlier

Simplifying assumptions necessary

26 The exercise is not related to the EU-wide stress test for the insurance sector coordinated by the European Insurance and Occupational Pensions Authority (EIOPA).

27 The lapse rate is defined as the fraction of contracts prematurely terminated by policyholders.

28 For example, interest rate risk hedging, asset-liability matching techniques and counter-cyclical premia (to dampen the effect of temporary adverse interest rate shocks through offsetting changes in the valuation of liabilities).

Table 3.5 Parameters for the assessment of euro area insurers

	Baseline	Adverse economic growth scenario	Sovereign debt crisis scenario	Risk aversion scenario	Funding stress scenario
Average euro area increase in long-term government bond yields (basis points)	0	0	182	0	0
Average add-on in credit yields of corporate bonds (basis points)	0	0	117	126	0
Shock to equity prices	0%	0%	-22%	-10%	0%
Shock to property prices	0%	-0.3%	-0.9%	0%	-1%
Cumulative loss rates over two years	0.4%	0.5%	0.8%	0.4%	0.4%
Average add-on in lapse rates	1%	1.7%	0.4%	0.4%	0.4%

Source: ECB calculations.

business are assumed to be fixed. For example, reduced demand for insurance products is not taken into account and each maturing contract is expected to be replaced, so that the underwriting income of each insurer remains constant. The underwriting component of income is stressed only in the form of increasing lapse rates. Details of the technical assumptions for all relevant variables are given in Table 3.6.

Table 3.6 Technical assumptions regarding the individual risk drivers of insurers' balance sheets

Credit risk	Credit risk assessment carried out using (i) breakdowns by rating or region, depending on data availability, and (ii) loss rate starting levels, which are stressed using the same methodology as applied for assessing the resilience of euro area banks.
Interest rate risk transmission	Sensitivities to interest rate changes computed for each interest-rate-sensitive asset and liability exposure. Relevant yield curves used to project asset and liability cash flow streams, to calculate internal rates of return and to discount the cash flows using yield curve shocks.
Haircut definition	Haircuts for debt securities derived from changes in the value of representative securities implied by the increase in interest rates under each scenario and uniformly applied across the sample of large euro area insurers. Valuation haircuts to government bond portfolios estimated on the basis of representative euro area sovereign bonds across maturities. Haircuts for corporate bonds derived from a widening of credit spreads.
Lapse risk	Lapse risk quantified by projecting insurers' cash flows over a two-year horizon, assuming a static composition of contracts and the reinvestment of maturing assets without a change in the asset allocation. Lapse rates linked to macroeconomic variables. ¹ Unexpected component of lapses ² leads to surrender payments ³ . In case of negative cash flows from surrender payments lead, insurer obliged to use cash reserves or sell assets to meet obligations. Lapse risk equals the cash or other assets needed to cover surrender payments.
Other assumptions specific to the sensitivity of investment income	Investment income earned from reinvested assets shocked on the basis of investment income earned at the beginning of the simulation horizon. All other assets assumed to earn the initial investment income throughout the simulation horizon. Maturing fixed income assets reinvested retaining the initial asset composition. Underwriting business component of operating profit assumed to remain constant throughout the simulation horizon. No distribution of dividends assumed.

Source: ECB calculations.

1) Sensitivities of lapse rates to GDP and unemployment were derived by taking the mean of a number of elasticity values, collected from the literature (see e.g. R. Honegger and C. Mathis, "Duration of life insurance liabilities and asset liability management", *Working Paper*, Actuarial Approach for Financial Risks (AFIR), 1993; C. Kim, "Report to the policyholder behaviour in the tail subgroups project", *Technical Report*, Society of Actuaries, 2005; and S. Smith, "Stopping short? Evidence on contributions to long-term savings from aggregate and micro data", *Discussion Paper*, Financial Markets Group, London School of Economics, 2004) and from ECB calculations.

2) The unexpected component of lapses is defined as the difference between the projected lapse rate and the average lapse rate reported by large European insurers.

3) It is assumed that 50% of the total amount represented by the extra lapse rates has to be paid (due to the existence of penalties in the contracts, which lower the insurers' risk).

The results confirm the importance of credit risk, although vulnerability to the materialisation of macro-financial risk is very heterogeneous across individual insurance groups (see Chart 3.46).

The sovereign debt crisis and risk aversion scenarios result in the most significant changes in assets for insurance companies – where losses amounting to, on average, 1.2% of their assets originate mainly from (primarily corporate) credit risk.²⁹

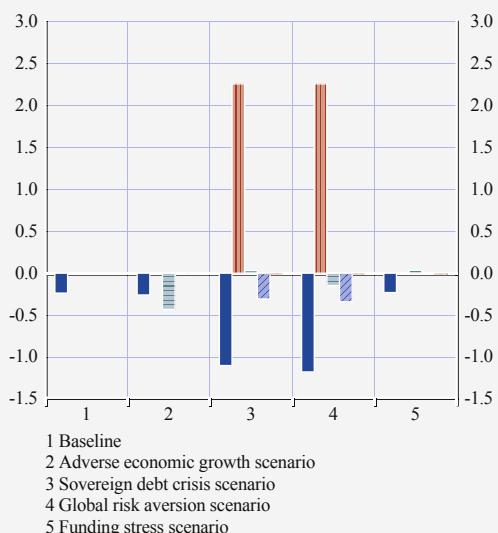
By contrast, the rising yields under the adverse scenarios do not have a negative impact on the economic solvency of the insurers in the sample. An increase of 2.3% in their net assets is explained by the longer duration of liabilities and, consequently, their greater sensitivity to the applied discount rate. Clearly, prudential solvency ratios would probably decrease on average, as most insurers in the sample belong to jurisdictions in which liabilities are not marked to market.³⁰ Variations in equity price losses are largely related to the heterogeneity in the volume of such investments. The impact of an adverse equity price shock on assets reaches 0.3%, on average.³¹ In addition, lapse risk-related losses, amounting to 0.4% of assets, would be higher in the case of the weak economic growth scenario, due to adverse macroeconomic developments.³² The materialisation of risks under the remaining scenarios has milder effects on insurers' balance sheets.

Another risk faced by insurers is a continuation of the current low-yield environment or a further weakening of their investment income. Chart 3.47 depicts the change in total investment income as a function of the shock to income earned from newly invested assets relative to the income earned by existing assets over a three-year horizon. If, for instance, the income earned on newly invested assets is halved, the total investment income would be lowered by, on average, 78 basis points.

Chart 3.46 Changes in asset values for large euro area insurers under different scenarios

(Q4 2012 – Q4 2015; percentage of total assets)

- credit risk
- interest rate risk
- lapse risk
- equity risk
- property risk



Sources: Individual institutions' financial reports and ECB calculations.

The joint sovereign debt crisis and economic growth scenario has a stronger impact

Rising yields have no adverse impact on insurers' solvency

Halving the income on newly invested assets leads to a reduction of 78 basis points in total investment income

29 Expressed as a percentage of net assets (assets minus liabilities), the effect would be equal to 16.4%.

30 Regarding interest rate risk, the forthcoming Solvency II regime is expected to replace current practices with a uniform approach in which the swap curve is used for the discount rate. To gauge the rough impact of such a regime, a projected swap curve, calculated on the basis of a model linking swap rates to sovereign yields, was used to discount liabilities. Under the euro area domestic shock scenario, the application of Solvency II valuation would lead to a lower increase of, on average, 0.5% in net assets, compared with the case whereby sovereign yield is used as the discount rate, as the adverse valuation effects in insurers' fixed income portfolio would not be offset to the same extent by respective movements on the liabilities side since the swap rate would remain decoupled from sovereign yields. It is important to note that the effect of any counter-cyclical instruments under Solvency II, which are currently under discussion, was not included in this exercise. Consequently, the negative impact in this exercise is likely to appear significantly more pronounced than it would be under a fully defined Solvency II regime.

31 Owing to data availability, gross equity exposures (gross of unit-linked exposures) were used and, consequently, the equity risk may be overestimated.

32 A sensitivity analysis of the impact of a property price shock is also conducted. An additional house price shock is calibrated with reference to a simulated forward distribution, using the same non-parametric simulation technique that is employed to calibrate financial market shocks. A shortfall measure conditional on a 1% percentile is computed on the basis of the resulting forward distribution. The calibrated shock amounts to an 8.6% decrease in property prices. The losses associated with such a shock are found, on average, to represent 0.2% of insurers' assets.

A comparison with the current average investment income of euro area insurers (see the previous section) suggests, however, that such a scenario in itself does not imply a key challenge for the solvency of the sector, especially given that no strategic responses of insurers have been taken into account in this exercise.³³

3.4 RESHAPING THE REGULATORY AND SUPERVISORY FRAMEWORK FOR FINANCIAL INSTITUTIONS, MARKETS AND INFRASTRUCTURES

The May 2013 issue of the FSR provided a concise overview of the implementation of certain key elements of the regulatory reform agenda in the European Union (EU). Since then, several important steps have been taken at international³⁴ and EU level to further revise the regulatory and supervisory framework for financial institutions, markets and infrastructures. This section elaborates on a number of initiatives that are considered to be of primary importance for enhancing financial stability in the EU.

The CRR/CRD IV aims to strengthen the resilience of the EU banking sector, restore market confidence and provide a level playing field for the banking industry

A major achievement at the European level has been the adoption of the **Capital Requirements Regulation and Directive** (CRR/CRD IV), which implements the Basel Committee's new global standards for capital and liquidity (Basel III) in the EU. The overarching goal of the CRR/CRD IV is to strengthen the resilience of the EU banking sector, restore market confidence and provide a level playing field for the banking industry, while ensuring that banks continue to finance economic activity and contribute to growth.

The CRR/CRD IV package was published on 27 June 2013. The Regulation (CRR), which sets out a "single rulebook" for credit institutions and investment firms, shall apply directly in all Member States from 1 January 2014 (with some limited exceptions). Different from the Regulation, Member States shall implement the rules set by the Directive (CRD IV) in their national legislation by end-2013. It should be noted, however, that certain elements of the CRR/CRD IV package are still subject to finalisation and recalibration, including (i) the leverage ratio, (ii) the liquidity coverage ratio (LCR) and (iii) the net stable funding ratio (NSFR). In order to ensure a harmonised application of the rules in all EU Member States, the European Banking Authority has been working on a number of regulatory and implementing technical standards to be published within the time frame set by the CRR/CRD IV.

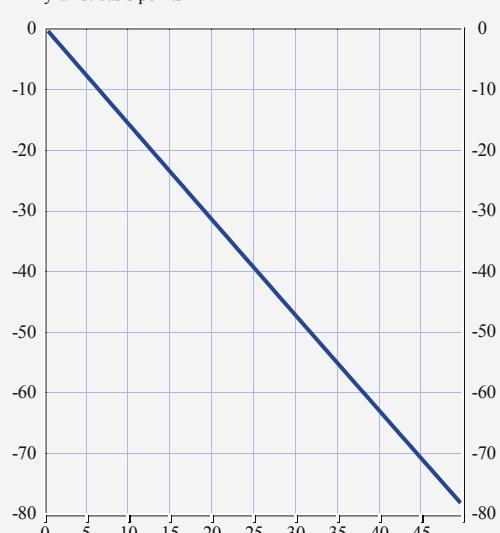
³³ The result is in line with earlier contributions concluding that insurance companies can cope with the low-yield scenario in the medium term (see e.g. A. Kablau and M. Wedow, "Gauging the impact of a low-interest rate environment on German life insurers", *Discussion Paper Series 2: Banking and Financial Studies*, No 02/2011, Deutsche Bundesbank, 2011). On the other hand, the impact of the low-yield environment on investment income would become more pronounced if a longer projection horizon is assumed.

³⁴ See *Overview of Progress in the Implementation of the G20 Recommendations for Strengthening Financial Stability*, Financial Stability Board, September 2013, and *Report to G20 Leaders on monitoring implementation of Basel III regulatory reforms*, Basel Committee on Banking Supervision, August 2013.

Chart 3.47 Sensitivity of large euro area insurers' total investment income to shocks to the yields on newly invested assets

(Q4 2012 – Q4 2015)

x-axis: size of the stock to income earned on re-invested assets, expressed as a percentage of initial total investment income
y-axis: basis points



Sources: Individual institutions' financial reports and ECB calculations.

Table 3.7 Selected legislative proposals in the EU for the banking sector

Initiative	Description	Current status
Single Supervisory Mechanism (SSM) Regulation	The Regulation establishes a single supervisory mechanism (SSM) with strong ECB powers (in cooperation with national competent authorities) for the supervision of all banks in participating Member States (euro area countries and non-euro area Member States which join the SSM).	The SSM Regulation was adopted by the European Council on 15 October.
Bank Recovery and Resolution Directive (BRRD)	The BRRD sets out a resolution framework for credit institutions and investment firms, with harmonised tools and powers relating to “prevention”, “early intervention” and “resolution”.	The European Commission’s proposal was published in June 2012. Currently, “trialogue” negotiations between the Commission, the Parliament and the Council are ongoing, with the aim to adopt the Directive by the end of 2013.
Deposit Guarantee Scheme (DGS) Directive	The DGS Directive deals mainly with the harmonisation and simplification of protected deposits, a faster payout and an improved financing of schemes.	The European Commission’s proposal was published in July 2010. Currently, triogue negotiations between the Commission, the Parliament and the Council are ongoing, with the aim to adopt the Directive in parallel with the BRRD by the end of 2013.
Single Resolution Mechanism (SRM) Regulation	The SRM Regulation establishes a single system, with a single resolution board and single bank resolution fund, for efficient and harmonised resolution of banks within the SSM.	The European Commission’s proposal was published in July 2013. The proposal is currently being discussed in the Council with the aim to reach a general approach.

With regard to ongoing regulatory initiatives, Tables 3.7-3.9 provide an update of the major strands of work in the EU, followed by a short overview of selected policy measures from the perspective of financial stability and macro-prudential policy.

Following up on the June 2012 report by European Council President Herman Van Rompuy on the envisaged **banking union**,³⁵ significant progress has been made in two areas identified as central elements of an integrated financial framework in Europe, namely the establishment of single banking supervision and a common resolution framework. The third element of the banking union, namely the setting-up of a common deposit guarantee fund in Europe, is considered as a medium-term objective.

As a first pillar of the banking union, a **single supervisory mechanism** (SSM) is being set up by a Regulation for participating Member States, including euro area countries and non-euro area Member States which enter into a close cooperation agreement with the ECB.³⁶ The Regulation confers specific micro- and macro-prudential tasks upon the ECB with strong systemic aspects in both areas.

From a micro-prudential (i.e. institution-specific) angle, the ECB will, in the initial stage, exercise direct supervisory power over “significant” credit institutions which, either because of their overall size or their importance for the economy of the EU or any participating Member State or their

*Significant
progress towards
a banking union*

*The first pillar
of the banking
union is the
establishment of a
single supervisory
mechanism*

³⁵ See “Towards a Genuine Economic and Monetary Union”, report prepared by the President of the European Council Herman Van Rompuy, in close cooperation with the Presidents of the Commission, the Eurogroup and the European Central Bank. Available at: http://ec.europa.eu/economy_finance/documents/131201_en.pdf

³⁶ See Council Regulation (EU) No 1024/2013 of 15 October 2013 conferring specific tasks on the European Central Bank concerning policies relating to the prudential supervision of credit institutions.

significance in cross-border activities, may pose risks to the financial system in the EU, either directly or through cross-border contagion channels.

At the same time, the ECB will also be entrusted with the power to implement certain macro-prudential measures that are applicable in a uniform way to all credit institutions, or to a subset of them, with the aim to address systemic risks of a structural or cyclical nature (see Box 8).

Box 8

MACRO-PRUDENTIAL ASPECTS OF THE SSM REGULATION

Macro-prudential policy is a relatively new and evolving concept, with the Financial Stability Board (FSB), the International Monetary Fund (IMF) and the European Systemic Risk Board (ESRB) playing a key role in developing its organising framework, defining its main objectives and policy tools at the international and European levels, respectively.

In the EU context, the ultimate objective of macro-prudential policy is defined by the ESRB as “contributing to the safeguard of the stability of the financial system as a whole, including by strengthening the resilience of the financial system and decreasing the build-up of systemic risks, thereby ensuring a sustainable contribution of the financial sector to economic growth”.¹ This general objective can then be translated into intermediate policy objectives which, in turn, are to be linked to concrete policy instruments that can be implemented either at the national or at the EU level. The ESRB identifies the following intermediate objectives of macro-prudential policy: (a) mitigating and preventing excessive credit growth and leverage; (b) mitigating and preventing excessive maturity mismatch and market illiquidity; (c) limiting direct and indirect exposure concentrations; (d) limiting the systemic impact of misaligned incentives with a view to reducing moral hazard; and (e) strengthening the resilience of financial infrastructures.²

According to the SSM Regulation, the power to initiate and implement macro-prudential measures will primarily remain with the national authorities, subject to a notification and coordination mechanism vis-à-vis the ECB.³ However, any national supervisory or macro-prudential authority may propose to the ECB to act in order to address the specific situation of the financial system and the economy in its Member State. An important additional feature of the SSM Regulation is that the ECB may, if deemed necessary, also apply higher macro-prudential measures, subject to the conditions and procedures specifically set out in the Capital Requirements Directive (CRD IV) and the Capital Requirements Regulation (CRR).

The CRR/CRD IV package incorporates several provisions that are of particular relevance for systemic risk management and macro-prudential policy-making. In particular, despite setting out a “single rulebook” for Europe, the Regulation provides national macro-prudential authorities with the right to apply, in certain areas, stricter prudential requirements on domestically

1 See Recommendation of the European Systemic Risk Board of 22 December 2011 on the macro-prudential mandate of national authorities (ESRB/2011/3).

2 See Recommendation of the European Systemic Risk Board of 4 April 2013 on intermediate objectives and instruments of macro-prudential policy (ESRB/2013/1).

3 See Article 5 of Council Regulation (EU) No 1024/2013.

authorised institutions in order to address risks to financial stability. The set of instruments that are available for macro-prudential authorities is, however, limited and subject to a strict notification and coordination mechanism.

Key macro-prudential instruments in the EU legal texts

Instrument	Description ¹⁾	Legal reference	Available from
CRD IV			
Counter-cyclical capital buffer	Builds up capital buffers in good times that can be drawn down in periods of stress. It strengthens the resilience of the banking system in periods of excessive credit growth.	Articles 130 and 135-140	2016*
Systemic risk buffer	Sets capital buffer requirements for financial institutions if the structural features of the financial system justify. It strengthens the resilience of the banking system.	Articles 133-134	2014**
Global systemically important institutions (G-SII) and other systemically important institutions (O-SII) capital buffer	Sets capital requirements for those financial institutions that might be more systemic. It enhances the resilience of SIIIs and discourages a further increase in their systemic importance.	Article 131	2016*
CRR			
Level of own funds (minimum capital requirements)	Sets higher minimum capital requirements for financial institutions if risks to the financial system justify. It strengthens the resilience of the banking system.	Article 458	2014
Large exposure requirements	Set limits on overall large exposures towards one or more counterparties or particular economic sectors. These limit the sensitivity of the financial institutions to common shocks and prevent an excessive concentration of risks.	Article 458	2014
Public disclosure requirements	Impose market discipline in addition to regulatory and supervisory requirements. These mitigate the underlying market failure of informational asymmetries to reduce the probability of bank runs and liquidity spirals.	Article 458	2014
Level of capital conservation buffer	Sets capital buffer requirements for financial institutions if risks to the financial system justify. It strengthens the resilience of the banking system.	Article 458	2016*
Liquidity requirements [liquidity coverage ratio (LCR) and net stable funding ratio (NSFR)]	The LCR sets minimum liquidity requirements to ensure that banks hold a sufficient amount of liquid assets to withstand a stress period of 30 days. It enhances short-term resilience of the liquidity risk profile of banks. The NSFR limits the gap between the maturity of banks' assets and liabilities. It improves resilience over a longer (one-year) time horizon.	Article 458	2015 (LCR) 2019 (NSFR)***
Risk weights in the residential and commercial property sectors****	Set higher risk weights vis-à-vis real estate exposures in order to target asset bubbles. These strengthen the resilience of the banking system and, at the same time, mitigate and prevent excessive credit growth and leverage.	Article 458	2014
Intra-financial sector exposures	Set higher risk weights vis-à-vis financial sector exposures. These strengthen the resilience of the banking system.	Article 458	2014

1) The description of the instruments is based on the Recommendation of the European Systemic Risk Board on intermediate objectives and instruments of macro-prudential policy (ESRB/2013/1). For a more detailed description, please refer to the Recommendation.

* The capital conservation buffer, the counter-cyclical capital buffer as well as the capital buffer for global and other systemically important institutions will be phased in gradually between 1 January 2016 and 31 December 2018. However, for the capital conservation buffer and the counter-cyclical capital buffer, Member States may impose a shorter transitional period. The recognition of the shorter transitional period would remain voluntary for the authorities of other Member States.

** The systemic risk buffer will only be available for the ECB if it is implemented in national legislation, which is only a possibility and not a mandatory requirement. Depending on its calibration (i.e. below 3%, between 3% and 5% and above 5%), different coordination mechanisms are prescribed.

*** The expected implementation date of the NSFR is 2019, subject to a report and a legislative proposal by the Commission to the European Parliament and the Council by 31 December 2016.

**** As of 2014, competent authorities (i.e. micro-prudential supervisors) may also set a higher risk weight or stricter criteria for real estate exposures under Articles 124 and 164 of the CRR on the basis of financial stability considerations.

In its opinion on the CRR/CRD IV,⁴ the ECB highlighted that such a flexible arrangement is justified, *inter alia*, by the fact that economic and financial cycles are not completely harmonised across Member States, and Member States may face different types of systemic risk at a given point in time. Furthermore, there are also significant differences in the structural features of the financial sectors across Member States.

The ECB is of the view that the application of more stringent prudential measures at the level of specific Member States may enhance both financial stability and financial integration in the EU. Concretely, by mitigating systemic risks and protecting the Single Market from the build-up of excessive systemic risks in a coordinated way, macro-prudential authorities (including the ECB within the SSM) may effectively contribute to the smooth functioning of the financial system and promote the sustainable provision of financial services in the Single Market in the medium-to-long term.

The table below provides an overview of macro-prudential instruments that are covered by the CRR and the CRD IV. These instruments will be available for national authorities as well as the ECB when acting in its capacity as a macro-prudential authority within the SSM. The instruments not covered by EU law, such as loan-to-value (LTV), loan-to-income (LTI) or loan-to-deposit (LTD) ratios, will only be available for national authorities. In order to ensure their consistent application and avoid potential unintended cross-border effects, the coordination of policy actions among national authorities, the ECB and the ESRB is essential.

It should be noted that the instruments covered by the CRD IV will be available for the ECB only after the relevant provisions of the Directive have been implemented at the national level.

In addition to the application of the above-listed macro-prudential instruments, the ECB may, as a micro-prudential authority, use its supervisory powers to address systemic risks posed by a group of credit institutions collectively if such institutions are falling under its direct supervision. Concretely, if the ECB determines that institutions with similar risk profiles (such as similar business models or geographical location of exposures) are or might be exposed to similar risks or pose similar risks to the financial system, it may apply the supervisory review and evaluation process (SREP, or Pillar II in Basel III terminology) to those institutions in a similar or identical manner.⁵ The supervisory powers of the ECB under the SREP include, *inter alia*, requiring credit institutions to hold additional capital, restricting or prohibiting distributions, imposing specific liquidity requirements or requiring additional disclosures.⁶ Importantly, when the SREP is used by national supervisory authorities to address systemic risks in a specific Member State, close coordination with macro-prudential authorities has to be ensured.

⁴ See Opinion of the European Central Bank of 25 January 2012 on a proposal for a Directive on the access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms and a proposal for a Regulation on prudential requirements for credit institutions and investment firms (CON/2012/5).

⁵ See Article 103 of the CRD IV (on the application of supervisory measures to institutions with similar risk profiles).

⁶ See Article 104 of the CRD IV.

of three elements: (i) preparatory steps and plans to minimise the risks of potential problems; (ii) in the event of emerging problems, powers to halt a bank's deteriorating situation at an early stage in order to avoid a failure (early intervention); and (iii) if an institution is failing or likely to fail, clear means to resolve the bank in an orderly fashion while preserving its critical functions and limiting the impact on taxpayers. As stated in the ECB opinion on the proposed directive,³⁷ the ECB fully supports the development of a recovery and resolution framework and calls for its prompt adoption.

The Commission's proposal for a **Single Resolution Mechanism (SRM)** aims to set up a single system for resolution, with a Single Resolution Board and a Single Bank Resolution Fund, for the resolution of banks in SSM-participating Member States. As stated in the ECB opinion on the SRM proposal,³⁸ the ECB fully supports the establishment of an SRM, which will contribute to strengthening the architecture and stability of Economic and Monetary Union. Such a mechanism must therefore be established by the time the ECB assumes its supervisory responsibility in full. The proposed SRM regulation contains three essential elements for effective resolution, namely (a) a single system, (b) a single authority and (c) a single fund.

The SRM aims to set up a single system for resolution, with a Single Resolution Board and a Single Bank Resolution Fund

Both the SSM and the SRM are essential parts of the integrated financial framework of the banking union, which will help break the link between banks and sovereigns in the Member States concerned and reverse the current process of financial market fragmentation. Therefore, the ECB strongly supports the envisaged timeline for the SRM. According to this timeline, the SRM would enter into force by the middle of 2014 and would become fully operational by 1 January 2015. This timeline takes into account that the SRM is a key element of banking union.

As a related policy initiative, the European Commission issued in July 2013 its "Banking Communication", providing guidance on the application of state aid rules to support measures in favour of banks in the context of the financial crisis, applicable as of 1 August 2013. The overarching objective for the Commission when assessing state aid in this context is financial stability, while minimising distortions to competition. To maintain a level playing field across the Single Market, the minimum requirements for burden-sharing with the aid beneficiary, i.e. capital holders and investors, have been raised. Following the Banking Communication, all capital-generating measures, including the writing-down or conversion into equity of subordinated debt, should be exhausted before any kind of state aid can be granted to a bank, provided that fundamental rights are protected and it does not lead to disproportionate results or endanger financial stability.

The third pillar of the banking union is the establishment, in the medium term, of a common deposit guarantee fund in Europe

The third pillar of the banking union is the establishment, in the medium term, of a common deposit guarantee fund in Europe. As a first step in this direction, the **Deposit Guarantee Scheme (DGS) Directive** is currently being revised, with triologue negotiations ongoing in parallel with the BRRD. The overarching objectives of the revision are to maintain financial stability by strengthening depositor confidence and protecting their wealth in order to avoid bank runs in times of financial stress. The pursuit of these objectives is, in addition, driven by the need to further harmonise depositors' protection so as to enhance the internal market. The DGS Directive sets a uniform level of €100,000 for deposit protection in the EU. Both the DGS Directive and the BRRD are important to achieve clear and harmonised frameworks in the EU and to make further progress towards the banking union.

³⁷ Opinion of the European Central Bank of 29 November 2012 on a proposal for a directive establishing a framework for recovery and resolution of credit institutions and investment firms (CON/2012/99), http://www.ecb.int/ecb/legal/pdf/en_con_2012_99_f_sign.pdf

³⁸ Opinion of the European Central Bank of 6 November 2013 on a proposal for a Regulation of the European Parliament and of the Council establishing uniform rules and a uniform procedure for the resolution of credit institutions and certain investment firms in the framework of a Single Resolution Mechanism and a Single Bank Resolution Fund and amending Regulation (EU) No 1093/2010 of the European Parliament and of the Council (CON/2013/76), http://www.ecb.europa.eu/ecb/legal/pdf/en_con_2013_76_f_sign.pdf

In addition to initiatives in the area of banking regulation, several steps have been taken to also strengthen the resilience of **financial infrastructures**.

Concerning **recovery and resolution for financial market infrastructures** (FMIs), the European Commission launched in October 2012 a consultation on a possible recovery and resolution framework for financial institutions other than banks. Work at the global level has progressed and three consultations were published in August 2013. The Committee on Payment and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO) published a consultative report which provides guidance to FMIs on how to develop plans to enable them to recover from threats to their viability and financial strength. The CPSS-IOSCO report is consistent with the FSB's October 2011 "Key attributes of effective resolution regimes for financial institutions" ("Key Attributes"). The FSB also published a consultative document on the application of these Key Attributes to non-bank financial institutions in August 2013. In the same month it published a consultation on the assessment methodology for the Key Attributes, which also includes sector-specific guidance for FMIs.

On 3 June 2013 the Governing Council adopted the "**Principles for financial market infrastructures**" (PFMIs), introduced in April 2012 by the CPSS and IOSCO, for the conduct of Eurosystem oversight in relation to all types of financial market infrastructures. In practice, the PFMIs are implemented in the EU and/or euro area through various legal acts for the different financial market infrastructures. The provisions follow and are consistent with the PFMIs.

In the area of systemically important payment systems (SIPS), the ECB published in June 2013 a consultation on a draft **ECB regulation on oversight requirements for systemically important payment systems**. The draft regulation, which implements the CPSS-IOSCO principles in a legally binding way, covers both large-value and retail payment systems of systemic importance, whether operated by Eurosystem national central banks or private entities. It defines the criteria for qualifying a payment system as systemically important. The requirements defined in the draft regulation are aimed at ensuring efficient management of legal, credit, liquidity, operational, general business, custody, investment and other risks as well as sound governance arrangements, objective and open access and the efficiency and effectiveness of systemically important payment systems. These requirements are proportionate to the specific risks to which such systems are exposed. It is expected that the final ECB regulation will be adopted by early 2014. It is further envisaged to subject compliance with the oversight requirements to a transitional period of eighteen months after the entry into force of the regulation, allowing for the SIPS operators to familiarise themselves with and to implement the requirements.

The **European Market Infrastructure Regulation** (EMIR) aims to bring more safety and transparency to OTC derivatives markets and sets out rules, *inter alia*, for central counterparties (CCPs) and trade repositories (TRs). Implementation of EMIR is ongoing.

On 15 September 2013 the deadline by which CCPs in Europe had to apply for authorisation expired. Within six months after submitting a complete application, the national competent authorities will have to inform applicants whether the authorisation has been granted, after which the mandatory clearing obligation will be determined, or refused. Furthermore, it has to be decided which products will have to be cleared by CCPs. Hence, the clearing obligation may only take effect in the third quarter of 2014.

Table 3.8 Selected legislative proposals in the EU for financial markets

Initiative	Description	Current status
European Market Infrastructure Regulation (EMIR)	The Regulation aims to bring more safety and transparency to the over-the-counter (OTC) derivatives market.	The Regulation entered into force in August 2012. Implementation is ongoing.
Regulation on improving the safety and efficiency of securities settlement in the EU and on central securities depositories (CSDR)	The Regulation introduces an obligation of dematerialisation for most securities, harmonised settlement periods for most transactions in such securities, settlement discipline measures and common rules for central securities depositories.	The European Commission's proposal was published in March 2012. The CSDR entered into the triadogue negotiations among the Commission, the Parliament and the Council in autumn 2013.
Review of the Markets in Financial Instruments Directive and Regulation (MiFID II/MiFIR)	The proposals, consisting of a Directive and a Regulation, aim to make financial markets more efficient, resilient and transparent, and to strengthen the protection of investors.	The European Commission's proposals were published in October 2011. The proposals are currently being negotiated by the Council, the Commission and the Parliament.
Money Market Fund (MMF) Regulation	The proposal addresses the systemic risks posed by this type of investment entity by introducing new rules aimed at strengthening MMFs' liquidity profile and stability. It also sets out provisions that seek, inter alia, to enhance their management and transparency, as well as to standardise supervisory reporting obligations.	The European Commission's draft proposal was published in September 2013.

On 7 November 2013 the European Securities and Markets Authority, which is responsible for the authorisation of trade repositories, approved the registration of four TRs for the EU that cover all derivative asset classes. The reporting start date for new contracts in each asset class will be 12 February 2014, with different phase-in periods for contracts that were outstanding on or entered into on or after 16 August 2012.

In the area of **central securities depositories** (CSDs), the European Commission published a legislative proposal on improving the safety and efficiency of securities settlement in the EU and on central securities depositories (the CSD Regulation or CSDR) in March 2012. The CSD Regulation introduces, inter alia, an obligation of dematerialisation for most securities, harmonised settlement periods for most transactions in such securities, settlement discipline measures and common rules for CSDs. The CSDR will enhance the legal and operational conditions for cross-border settlement in the EU. The ECB therefore strongly recommended in its opinion that the proposed regulation and corresponding technical standards are adopted prior to the launch of TARGET2-Securities, planned for June 2015. In the interim period until the CSDR and technical standards have been finalised and enter into force, the Eurosystem will use the PFMIs as oversight standards. The CSDR entered into the "triadogue" negotiations among the Commission, Parliament and Council in autumn 2013.

In the field of **shadow banking**, the European Commission issued a communication along with a legislative proposal on money market funds (MMFs) on 4 September 2013.³⁹ The communication outlined several priority areas where other Commission initiatives are expected to follow. These include: (i) transparency of the shadow banking sector (to monitor risks more effectively); (ii) the provision of securities law (to better identify property rights); (iii) securities financing transactions

A proposal for a regulation on money market funds in the EU has been made

³⁹ "Shadow Banking – Addressing New Sources of Risk in the Financial Sector", Communication from the Commission to the Council and the European Parliament (available at http://ec.europa.eu/internal_market/finances/shadow-banking/index_en.htm#maincontentSec1).

(to tackle pro-cyclicality and leveraging risks); and (iv) the interactions of shadow banking entities with the rest of the financial system (to address interconnectedness and contagion risk).

The Commission's proposal for a **regulation on money market funds**⁴⁰ puts forward a range of requirements intended to improve the resilience of funds operating in the EU. Consistent with internationally promoted standards in this area, permissible investment policies and stricter liquidity rules are set with the aim to place MMFs in a better position to repay investors that withdraw funds at short notice. Those MMFs that advertise a constant net asset value share price (C-NAV) would be subject to additional prudential requirements in the form of a cash NAV buffer amounting to at least 3% of assets under management. Other provisions in the regulation relate to the enhancement of transparency and the standardisation of supervisory reporting requirements.

At the international level, the Financial Stability Board (FSB) issued revised recommendations to strengthen oversight and regulation of shadow banking on 29 August 2013,⁴¹ including two high-level policy frameworks dealing with financial stability risks posed by (i) shadow banking entities (other than MMFs) and (ii) securities financing transactions. The FSB aims to finalise its proposed recommendations in 2014.

Trialogue agreement on the Omnibus II Directive

The process of achieving a more harmonised **insurance regulation** in Europe continued in the second half of 2013. As expected, the European Insurance and Occupational Pensions Authority (EIOPA) published in June the results of its impact assessment of various measures which aim to reduce excessive volatility in the balance sheets of insurers under Solvency II. This "long-term guarantee assessment" forms the basis for the discussions of the triogue parties on the Omnibus II Directive, which enables the Solvency II framework to become operational. In November, the triogue reached a provisional political agreement on the Omnibus II Directive, which still needs to be endorsed by EU Member States before being finalised. In order to avoid legal uncertainty, the Commission has proposed to put back the transposition date of Solvency II from 30 June 2013 to 31 March 2015 and the application date from 1 January 2014 to 1 January 2016.

G-SIIs have been identified

In July the FSB published the International Association of Insurance Supervisors' methodology for identifying **global systemically important insurers (G-SIIs)**, an initial list of nine G-SIIs and a set of policy measures that will apply to them.⁴² Further work will focus on the development of higher loss absorption capacity requirements for non-traditional and non-insurance activities of G-SIIs, built upon straightforward, backstop capital requirements for all group activities.

A proposal for implementing a financial transaction tax is under negotiation

In addition to the legislative proposals listed in the above tables, further regulatory initiatives are being considered by policy-makers in the EU. In this regard, on 14 February 2013 the European Commission published a proposal for implementing a **financial transaction tax (FTT)** in eleven euro area Member States⁴³ via enhanced cooperation. The European Parliament adopted its legislative resolution on the proposal on 3 July in which it supports the Commission's approach but calls for several amendments. In the Council the negotiations among Member States are meanwhile continuing. So far, no clear tendencies have emerged as regards the tax design preferred by the participating Member States.

40 Proposal for a Regulation of the European Parliament and of the Council on Money Market Funds (available at http://ec.europa.eu/internal_market/investment/money-market-funds/index_en.htm).

41 The full documentation is available at http://www.financialstabilityboard.org/press/pr_130829a.pdf

42 The full documentation is available at http://www.financialstabilityboard.org/publications/r_130718.pdf

43 Austria, Belgium, Estonia, France, Germany, Greece, Italy, Portugal, Slovakia, Slovenia and Spain.

Table 3.9 Selected legislative proposals in the EU for the insurance sector

Initiative	Description	Current status
Solvency II Directive/Omnibus II Directive	The Solvency II Directive is the framework directive that aims to harmonise the different regulatory regimes for insurance corporations in the European Economic Area. Solvency II includes capital requirements, supervision principles and disclosure requirements. The Omnibus II Directive aligns the Solvency II Directive with the legislative working methods introduced by the Lisbon Treaty, incorporates new supervision measures given to EIOPA and makes technical modifications.	The Solvency II Directive was adopted in November 2009. The Commission put forward a draft directive postponing the application date of the Solvency II Directive from 1 January 2014 to 1 January 2016. A provisional political agreement on the Omnibus II Directive was reached by the triilogue in mid-November.

While legislative proposals on tax policies do not fall within the scope of ECB activities, the ECB is closely observing the developments concerning the FTT. The ECB shares some of the objectives of the FTT proposal, but it also considers that, with the parameters which were published in February 2013, the proposal may have negative implications for the implementation of monetary policy, for the functioning of securities settlement systems and for financial stability.

In the field of **banking structures**, the High-level Expert Group (HLEG) on reforming the structure of the EU banking sector, chaired by Erkki Liikanen, presented its report to the European Commission on 2 October 2012. After a public consultation in May 2013, the European Commission will make an impact assessment including legislative proposals in 2013 with the focus on the proposals for mandatory separation set out in the Liikanen Report.

Legislative proposal on reforming the structure of the EU banking sector is expected in 2013

In its position published in January 2013,⁴⁴ the Eurosystem welcomed the recommendations of the HLEG, which are considered to be important directional steps towards strengthening the resilience of the financial system and enhancing the resolvability of financial institutions in Europe. The implementation of consistent rules on banking structures is all the more important given that some Member States are already moving unilaterally ahead with national legislative proposals which may lead to regulatory arbitrage and to the fragmentation of the single market for financial services.

⁴⁴ *Bank structural reform – Position of the Eurosystem on the Commission’s consultation document*, available at: http://www.ecb.europa.eu/pub/pdf/other/120128_eurosystem_contributionen.pdf

Box 9

RECENT EVIDENCE ON TAXING FINANCIAL TRANSACTIONS

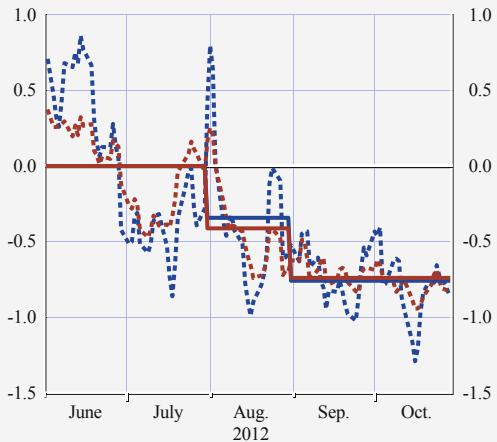
With the financial crisis, there has been renewed political interest in financial transaction taxes (FTTs) – a notion with origins dating back to a proposal by James Tobin some 35 years ago.¹ Indeed, within the European Union, 11 countries have expressed a commitment to introducing such a tax in some form. Notwithstanding any prospective benefits, notably for government revenues, the imposition of such taxes also entails costs. In particular, FTTs might have

¹ See Tobin, J., “A Proposal for International Monetary Reform”, *Eastern Economic Journal* (Eastern Economic Association), 1978.

Chart A Bid-ask spreads for comparable French and Dutch stocks

(basis points)

French stocks
control group
French stocks
control group

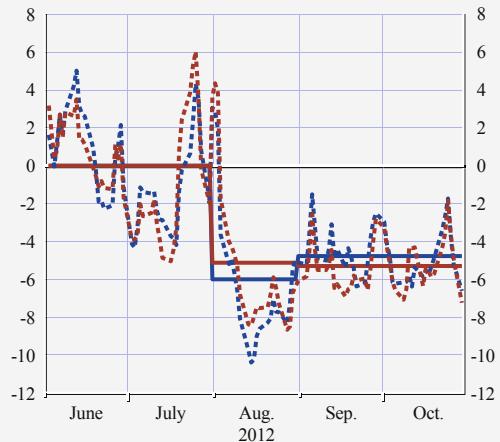


Sources: Thomson Reuters and ECB calculations.
Notes: The charts plot the cross-sectional averages (dashed lines) for the treated group (in blue) and the control group (in red) minus their respective pre-event averages over time. Three-day moving averages. The bold lines indicate the sub-period averages for June/July, August and September/October.

Chart B Intraday volatility for comparable French and Dutch stocks

(percentages; annualised volatility)

French stocks
control group
French stocks
control group



Sources: Thomson Reuters and ECB calculations.
Notes: The charts plot the cross-sectional averages (dashed lines) for the treated group (in blue) and the control group (in red) minus their respective pre-event averages over time. Three-day moving averages. The bold lines indicate the sub-period averages for June/July, August and September/October.

implications for the activity and functioning of affected financial market segments. Whilst in principle the existing literature could shed some light on the potential costs and benefits of such taxes, in practice most empirical evidence is more than a decade old, or relates to rather illiquid emerging markets, thereby limiting its applicability to the current European setting.

Recent evidence is available from an FTT introduced for French equities on 1 August 2012. The French FTT consists of a levy of 20 basis points on the purchase of shares of French companies with a market capitalisation of €1 billion or more. Importantly, the tax only applies to outright transfers of ownership (implicitly exempting intraday trading activity) and includes exemptions for trading related to market-making. While both the scope and the implementation of this FTT are quite different from draft proposals for a European-level equivalent, this specific example can nonetheless provide illustrative insights into prospective impacts.

Comparing outcomes for the group of affected French stocks with those for similar Dutch stocks that are traded on the same market but not subject to the FTT yields some interesting insights.² Evidence suggests that the FTT had no significant permanent impact on either intraday return volatility or the bid-ask spread, given that both lines do not diverge notably after the 1 August implementation (see Charts A and B).³ The absence of any decrease in market liquidity is most likely a consequence of the exemption of market-making activities.

² For a more detailed exposition of methodology, see Colliard, J-E. and Hoffmann, P., "Sand in the chips? Evidence on taxing transactions in modern markets", *ECB Working Paper Series*, forthcoming.

³ Due to seasonality in trading activity in August, the permanent impact is judged as the difference between September/October and June/July.

Chart C On-exchange trading volumes for comparable French and Dutch stocks

(as a percentage of the average for June-July 2012)

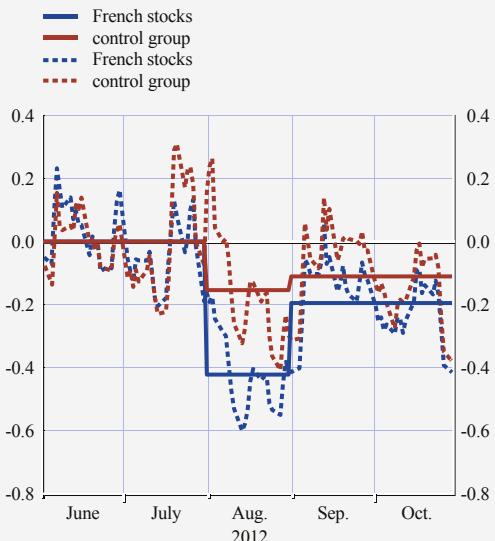
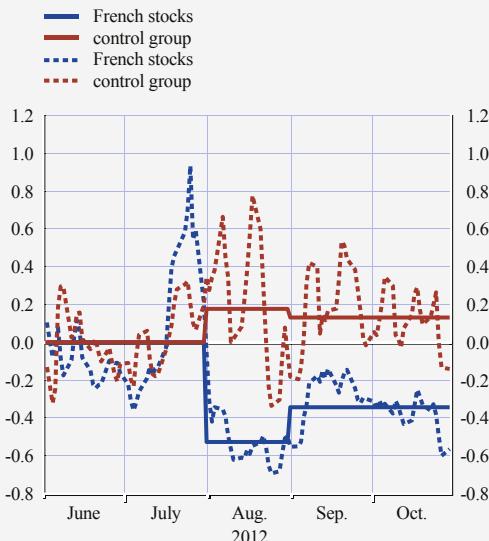


Chart D Over-the-counter trading volumes for comparable French and Dutch stocks

(as a percentage of the average for June-July 2012)



Sources: Thomson Reuters and ECB calculations.

Notes: The charts plot the cross-sectional averages (dashed lines) for the treated group (in blue) and the control group (in red) as percentage of their respective pre-event averages over time. Three-day moving averages. The bold lines indicate the sub-period averages for June/July, August and September/October.

Sources: Thomson Reuters and ECB calculations.

Notes: The charts plot the cross-sectional averages (dashed lines) for the treated group (in blue) and the control group (in red) as percentage of their respective pre-event averages over time. Three-day moving averages. The bold lines indicate the sub-period averages for June/July, August and September/October.

The FTT's impact on trading volume nonetheless differed considerably across different market segments (see Charts C and D, where the causal impact of the FTT is given by the difference between French stocks and the control group). While the volume on Euronext, the main listing exchange for the stocks considered, displayed a slight decline of about 10%, off-exchange trading – including over-the-counter (OTC) trades and volume executed in dark pools, which account for a significant proportion of the overall reported trading volume – dropped by around 40%. Interestingly, much of this decline was driven by a decrease in very large transactions.

This striking difference across market segments suggests that the adopted liquidity safeguards were significantly less effective in protecting off-exchange activity. While also being subject to the market-making exemption, the less formal nature of liquidity provision in the OTC market implies that an occasional liquidity provider may have been crowded out by the tax.

Overall, these findings highlight how such taxes might have differing liquidity and market functioning impacts across market segments. The evidence suggests that an FTT introduced in France last year led to a significant decline in transactions in the OTC market, with a concomitant reduction in liquidity provision in this market segment. Clearly, such taxes entail the prospect of budgetary benefits.⁴ At the same time, impacts of a more widespread application of such taxes on market activity in the absence of adequate safeguards for liquidity provision might embed prospective financial stability risks.

⁴ European Commission estimates suggest that budgetary benefits of €4.5-6.5 billion in revenues could accrue from taxing all transactions in EU27 equities without any exemptions (see http://ec.europa.eu/taxation_customs/taxation/other_taxes/financial_sector/).



SPECIAL FEATURES

A PREPARATORY WORK FOR BANKING SUPERVISION AT THE ECB¹

This special feature briefly outlines the work currently being undertaken at the European Central Bank, in close cooperation with the national competent authorities of the participating Member States, for the assumption of supervisory responsibilities in November 2014. Following a short introduction, which summarises some of the features of the single supervisory mechanism, the preparatory developments are outlined, around five main themes, which reflect the organisation of the preparatory structures.

INTRODUCTION

The European Central Bank (ECB) is currently preparing to take on new banking supervision tasks as part of the single supervisory mechanism (SSM). The main aims of the SSM are to ensure the safety and soundness of the European banking system and to increase financial stability in Europe. The SSM will create a new system of financial supervision, whereby the ECB will be responsible for the effective and consistent functioning of the SSM, cooperating within the SSM with the national competent authorities (NCAs) of participating EU Member States.² Specific tasks relating to the prudential supervision of credit institutions have been conferred on the ECB under Article 127 (6) of the Treaty on the Functioning of the European Union.³

The ECB is currently preparing to take on new banking supervision tasks

Council Regulation (EU) No 1024/2013 of 15 October 2013, conferring specific tasks on the ECB concerning policies relating to the prudential supervision of credit institutions, was published on 29 October 2013 and entered into force on 3 November 2013.⁴ The ECB shall assume the tasks conferred on it by this SSM regulation (henceforth “SSMR”) on 4 November 2014.

The ECB will directly supervise around 130 “significant” banks

Under the new system of supervision, the ECB will directly supervise “significant” credit institutions. It will work closely with the NCAs to supervise all other credit institutions under the overall oversight of the ECB. Around 130 banks will be directly supervised, representing almost 85% of total banking assets in the euro area. These credit institutions will be identified according to criteria, outlined in the SSMR, to determine their significance. In each participating country, at least the three most significant credit institutions will be subject to direct supervision by the ECB. All other credit institutions in the participating countries will continue to be supervised by the NCAs. According to Article 6 (5) of the SSMR, the ECB can decide at any time to exercise direct supervision of any one of these credit institutions in order to ensure consistent application of high supervisory standards.

At the centre of the SSM governance structure, a Supervisory Board will be established to plan and carry out the ECB’s supervisory tasks, undertake preparatory work, and propose complete draft decisions for adoption by the ECB’s Governing Council. It will be composed of a Chair, a Vice-Chair (to be chosen from among the members of the ECB’s Executive Board), four ECB representatives and one representative of the NCA of each participating country.

1 Prepared by Andreas Beyer, Giacomo Caviglia, Julian Ebner, Stephane Kerjean and Edward O’Brien.

2 To date, this includes all euro area countries plus Latvia. Member States whose currency is not the euro will have the possibility to participate in the SSM under the procedure of close cooperation.

3 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:083:0047:0200:en:PDF>

4 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:287:0063:0089:EN:PDF>

Preparations remain under the guidance of the transitory structures...

... overseen by a High-Level Group on Supervision...

... and supported by a Task Force on Supervision organised into five work streams

Work stream I has mapped the euro area banking system

PREPARATORY WORK

The Supervisory Board is expected to be in place in early 2014, and until that time, preparations will remain under the guidance of the transitory structures, comprising senior supervisors and technical experts from the NCAs and the ECB and established in order to make the preparations and provisions for the commencement of the SSM. Below, some of the key tasks and considerations of five preparatory work streams that have been established are outlined, which reflect the work that has been undertaken over the last year of preparations and/or which remains to be completed before November 2014.

Temporary governance structures

The early preparation for the SSM has been overseen, since the summer of 2012, by a High-Level Group on Supervision, chaired by the President of the ECB and composed of ECB Executive Board members and the heads, at Board level, of the national authorities in charge of supervision in the Member States belonging to the euro area (at the moment of writing, the 17 euro area Member States plus Latvia, which will join the euro area in 2014). When distinct from the supervisory authorities, the central banks are also represented in the High-Level Group by representatives with a comparable level of seniority.

Reporting to the aforementioned Group, a Task Force on Supervision was established to coordinate the technical preparation, chaired by the Director General Financial Stability of the ECB and composed of the heads, at staff level, of the supervisory functions in the same authorities represented in the High-Level Group. In turn, the Task Force established five work streams, each dedicated to a specific area and composed of experts from the ECB and the national authorities. The activities of these work streams are described in the following sections.

Mapping the euro area banking system

A fundamental task in the preparations for the establishment of the SSM has been the mapping of the euro area banking system. To this end, a catalogue comprising all supervised entities falling within the scope of the SSM, as well as systematic disclosure on the structure and composition of all euro area banking groups has been created. Data collections have been carried out for these purposes which have also benefited broader policy discussions.

The data collections and analyses have been focused on those entities falling within the scope of the SSM according to the SSMR. They are defined in the latter as “credit institutions, financial holding companies or mixed financial holding companies, or branches, which are established in participating Member States, of credit institutions established in non-participating Member States”.⁵

Apart from mapping the entire system, a clear focus of this work has been on the approach to identifying significant institutions, which the ECB will directly supervise. The criteria for significance derive from Article 6 (4) of the SSMR. It stipulates that an institution shall be considered significant if it meets any of three criteria, on a consolidated basis and at the highest level of consolidation within the participating Member States: i) the total value of its assets exceeds €30 billion; ii) the ratio of its total assets to the GDP of the participating Member State of establishment exceeds 20%, unless the total value of its assets is below €5 billion; or iii) it is among

⁵ The approach to gathering data on those entities was developed to allow for an assessment of their significance according to the criteria provided in Article 6 (4) of the SSMR. This required examinations and assessments of national idiosyncrasies concerning supervisory definitions and data availability, to achieve a maximum degree of consistency across jurisdictions, while duly taking into account the specific features of national banking systems.

the three most significant credit institutions in a participating Member State. Institutions for which public financial assistance has been requested or received directly from the European Financial Stability Facility or the European Stability Mechanism shall be considered significant and the ECB may also consider an institution to be of significant relevance where it has established banking subsidiaries in more than one participating Member States and its cross-border assets or liabilities represent a significant part of its total assets or liabilities.⁶

Supervisory legal issues

Assuming the tasks conferred on the ECB by the SSMR will require the adoption of a number of ECB legal acts in advance of November 2014, in view of the implementation of the SSMR and of the establishment of the SSM. A dedicated work stream has been established to facilitate these legal preparations and to provide legal advice concerning the other preparatory work.

*Work stream 2
has prepared legal
acts and provided
legal advice*

Among these various legal acts, the ECB must adopt, in consultation with the NCAs and on the basis of a proposal from the Supervisory Board, the framework which will set out the practical arrangements for the implementation of Article 6 of the SSMR (concerning the cooperation between the ECB and the NCAs within the SSM). This so-called Framework Regulation will take the form of an ECB regulation, a draft of which will be subject to public consultation in early 2014.

This draft Framework Regulation covers the aspects expressly referred to in Article 6 (7) of the SSMR. This includes the criteria for determining whether a credit institution is significant, as mentioned above, and the arrangements for determining how the ECB or an NCA, respectively, will supervise a credit institution that has been assessed as significant or less significant, not only at the outset of the SSM but also later. The Framework Regulation will include the procedures governing the cooperation between the ECB and the NCAs along with detailed operational arrangements for the implementation of the tasks conferred on the ECB, as required by Article 33 (2) of the SSMR.⁷

*Work stream 3
has developed
proposals for a
supervisory model*

Supervisory model

A core element of the preparations for the SSM centre on the proposal and elaboration of a supervisory model. This includes, *inter alia*, the role for joint supervisory teams (JSTs), which will be composed of staff from both the ECB and NCAs, and the supervisory review and evaluation process (SREP), including the risk assessment system (RAS), based on the principles outlined in the SSMR.

The JST concept is a core element of the SSM supervisory model. Without prejudice to the role of the Supervisory Board, JSTs will be responsible for the entire annual supervisory programme of each institution supervised directly by the ECB and will conduct the supervisory work. In addition to RAS and SREP activities, JSTs may undertake a range of ongoing supervisory activities to support the fulfilment of the supervisory programmes. JSTs will also play an important role in crisis management and will be responsible for ensuring that credit institutions have in place effective preventive measures to deal with potential crisis situations, for proposing appropriate early intervention tools and for handling crisis situations.

On the basis of Article 4 (g) of the SSMR, the ECB is exclusively competent to carry out the supervisory review of significant credit institutions and, as such, is required to develop its own

⁶ A precise and consistent assessment of whether an institution meets the criteria cited above requires a number of further technical and procedural specifications beyond the basic formulations in Article 6 (4) of the SSMR. As foreseen in the latter, those details will be provided in a dedicated section of the SSM Framework Regulation.

⁷ Matters of direct concern to credit institutions, such as the regime for taking supervisory decisions, the language regime and the rules of cooperation with participating Member States, are also contained within the Framework Regulation.

SREP. This will quantify capital and liquidity needs based on the RAS, the review of institutions' internal capital/liquidity adequacy assessment processes, the Pillar 1 minimum capital requirement, the risk-bearing capacity assessment and other available supervisory information. The definition of a supervisory toolkit, which is available as an adequate supervisory response to identified deficiencies from these assessments, is also under consideration. The RAS preparations cover the scope of the risk assessment and key definitions, the key principles to take into account when performing the risk assessment and the methodology for assessing risks. The methodology is rooted in a combination of quantitative indicators and qualitative inputs. Work on these topics has resulted in the development of an integrated SREP approach. The RAS and capital and liquidity buffer quantification will be conducted both at the risk level and also at the overall level.

In addition to the focus on directly supervised banks, consideration has also been given to the approach for dealing with less significant institutions (LSIs). While NCAs retain responsibility for supervising LSIs, the ECB has an oversight function, to ensure harmonised, high-quality supervision across the system. The ECB may also assume supervisory responsibility for an LSI at any time. NCA supervision of LSIs will be undertaken in accordance with SSM harmonised standards and processes, with a view to supervisory practices for LSIs converging over time. The first building block of this oversight and convergence is the definition of regular reporting requirements and the central analysis of the reports received from the NCAs. The aim of this analysis will be to identify fragile or high-risk LSIs and possible weaknesses in supervision.

This work stream has also considered the development of processes and procedures for supervision, the development of the on-site inspection approach and the preparation of an appropriate information technology architecture for the SSM.

Supervisory data reporting

Another key area of preparation has been focused on the supervisory reporting framework. The design of that framework is primarily driven by the requirements of the centralised RAS. An important element of the framework is flexibility: reporting data have been categorised according to different bank risk profiles, given that advances in the methodologies for assessing risk profiles will continue to inform the reporting framework.

A number of data modules have been defined within the framework. The core supervisory data module, essentially based on the European Banking Authority's common reporting and financial reporting templates, will provide standardised information on solvency measures, as well as financial information on banks and banking groups. The statistical data module relies on monetary financial institution (MFI) statistics as a complement to supervisory information. Data collected from each euro area MFI, in accordance with Eurosystem statistical requirements, provide a detailed source of highly harmonised data. This data is produced at a higher frequency (monthly) and in a more timely manner (just a few days after the reference period) than supervisory data. These data provide important information on the assets and funding structures of MFIs.⁸ The framework also includes other modules, for example: granular credit data, as an essential component to be used for supervisory analyses, and which constitute a powerful planning device to inform supervisory activity; ad hoc data collections, to facilitate, for example, stress testing; national data requirements, to inform national-specific reporting, which remains to be harmonised; and data required for public disclosure.

⁸ The key difference between MFI data and supervisory consolidated data relates to the reporting population and the geographical consolidation scope. For MFI data, the reporting population consists of MFIs resident in each Member State – no consolidation is performed for cross-border subsidiaries or non-bank subsidiaries.

The preparation of the supervisory data reporting framework and the associated infrastructures has been, and will continue to be, informed by a series of data collection exercises.

Comprehensive assessment

The fifth technical work stream is focused on planning and preparing for the comprehensive assessment, which will be conducted by the ECB and the participating NCAs, in line with the provisions of the SSMR.⁹ The comprehensive assessment will be carried out prior to the ECB assuming its new supervisory tasks in November 2014, pursuant to Article 33 (4) of the SSMR, and is seen as an essential element of the preparations, providing the necessary clarity and transparency on the banks that will be subject to the ECB's direct supervision.

*Work stream 5
has planned and
prepared for the
comprehensive
assessment*

The comprehensive assessment has been defined to comprise three complementary pillars. The first is the supervisory risk assessment, analysing key risks and vulnerabilities on banks' balance sheets, including liquidity, leverage and funding. Second is the asset quality review (AQR), examining the asset side of banks' balance sheets as of 31 December 2013. This assessment will be broad and inclusive, covering credit and market exposures, on and off-balance-sheet positions, domestic and non-domestic exposures, non-performing loans, forborne loans, and corporate, retail, institutional and sovereign exposures. The AQR will be conducted with reference to harmonised definitions. The third pillar is the stress test, building on and complementing the AQR by providing a forward-looking view of banks' shock-absorption capacity under stress. The ECB and the European Banking Authority have agreed to perform the stress test in close cooperation.

A focus of the preparations to date has been the AQR, which will be risk-based and will concentrate on the most risky and non-transparent elements of individual banks' balance sheets. To ensure that a significant portion of banks' balance sheets are assessed, however, strict minimum coverage criteria, at both country and bank level, will be observed. The AQR has been planned as a three-phase exercise, consisting of portfolio selection, execution and reporting. In order to foster transparency, consistency and sound communication throughout the exercise, the NCAs will involve staff from the ECB and from other Member States' NCAs to assess and review the implementation of the comprehensive assessment at the national level. The AQR will have a strong central governance structure, responsible for establishing the methodologies and for project organisation, overseeing the execution phases and ensuring the quality of the results. It will be supported by an independent expert firm of management consultants.

CONCLUDING REMARKS

Preparations continue apace at the ECB to take on new banking supervision tasks as part of a single supervisory mechanism. This preparatory work has been ongoing since the summer of 2012 in close cooperation with the NCAs of the participating Member States, overseen by the High-level Group on Supervision. As part of this work, significant progress has been made in five key areas: i) mapping the euro area banking system; ii) preparation of legal acts and provision of legal advice; iii) development of a supervisory model, iv) preparations for a supervisory reporting framework; and v) planning and preparing for the comprehensive assessment. The preparations at the ECB, as well as among national authorities, will continue in the coming months to allow the ECB to assume the tasks conferred on it by the SSMR on 4 November 2014.

⁹ Recent communication on the comprehensive assessment can be found at: <http://www.ecb.europa.eu/pub/pdf/other/notecomprehensiveassessment201310en.pdf?065ff8953213aaef23e385c1119dd541a>

B PREDICTING FINANCIAL VULNERABILITIES TO GUIDE THE SET-UP OF COUNTER-CYCICAL CAPITAL BUFFERS¹

The systemic dimension of the financial crisis has underscored the need for an expanded set of policies to contain systemic risk throughout the financial cycle. Counter-cyclical capital buffers (CCBs) form an integral part of the expanded European macro-prudential toolkit in this respect, with a “time series” focus in that they increase the resilience of the banking sector to shocks arising from financial and economic stress over the cycle and thereby provide a means to attenuate pro-cyclicality inherent in the financial system. To guide the setting of CCBs, the Basel Committee on Banking Supervision (BCBS) has proposed a focus on, inter alia, the deviation of the domestic credit-to-GDP ratio from its backward-looking trend (also known as the domestic credit-to-GDP gap), given its track record of signalling financial stress well in advance. The Capital Requirements Directive (CRD) IV specifies that other variables should also be taken into consideration in addition to the credit gap. This special feature assesses the usefulness of private sector credit and other macro-financial and banking sector indicators in guiding the setting of CCBs in a multivariate early warning model framework. The analysis shows that in addition to credit variables, other domestic and global financial factors such as equity and house prices, as well as aggregate banking sector balance sheet indicators, help to predict historical periods of financial vulnerabilities in EU Member States. Consequently, policy-makers deciding on CCB measures could benefit from considering a wide range of indicators.

INTRODUCTION

The CCB aims to increase the resilience of the banking system in case of a financial crisis

Faced with the longest and most severe financial crisis in decades, policy-makers around the globe have actively searched for policy tools which could help to prevent, or at least reduce the intensity of, future financial crises. A tool that is an integral part of the Basel III regulations and which has been implemented in the EU's Capital Requirements Directive (CRD) IV is the counter-cyclical capital buffer (CCB).

The CCB aims to increase the resilience of the banking system in case of a financial crisis by ensuring that banks set aside capital in times of “aggregate growth in credit [...] associated with a build-up of systemic risk”, which can be “drawn down during stressed periods”.² In order to promote international consistency in setting CCB rates, the Basel Committee on Banking Supervision (BCBS) has suggested a methodology giving prominence to the ratio of aggregate private sector credit to GDP.³ The CRD IV, while acknowledging the importance of credit growth and the credit-to-GDP ratio, specifies that buffer rates could also take into account other variables that can indicate the existence of risks to financial stability.⁴ This provides the motivation for this special feature, namely to assess the usefulness of credit and other macro-financial variables for predicting banking sector vulnerabilities in a multivariate framework, thereby enabling a more informed decision on the setting of CCB rates.

- 1 Prepared by Tuomas Peltonen and Willem Schudel. This special feature is based on Behn, M., Detken, C., Peltonen, T. and Schudel, W., “Setting countercyclical capital buffers based on early warning models: would it work?”, *Working Paper Series*, No 1604, ECB, 2013.
- 2 See Capital Requirements Directive IV (preamble 80), available online at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:176:0338:0436:EN:PDF>
- 3 See Basel Committee on Banking Supervision, “Guidance for national authorities operating the countercyclical capital buffer”, December 2010. The BCBS guidelines are based on Drehmann, M., Borio, C., Gambacorta, L., Jiménez, G. and Trucharte, C., “Countercyclical capital buffers: exploring options”, *BIS Working Papers*, No 317, BIS, July 2010, as well as on Drehmann, M., Borio, C. and Tsatsaronis, K., “Anchoring countercyclical capital buffers: the role of credit aggregates”, *International Journal of Central Banking*, 7(4), 2011.
- 4 In particular, the CRD IV specifies that the deviation of the credit-to-GDP ratio from its long-term trend should serve as “a common starting point for decisions on buffer rates by the relevant national authorities, but should not give rise to an automatic buffer setting or bind the designated authority. The buffer shall reflect, in a meaningful way, the credit cycle and the risks due to excess credit growth in the Member State and shall duly take into account specificities of the national economy”.

The BCBS guidelines are based on an analysis that uses a sample of 26 countries from all over the world, for which the credit-to-GDP gap (defined as the deviation of the credit-to-GDP ratio from its backward-looking long-term trend) represents the best single indicator in terms of signalling a coming financial crisis. However, the evidence presented by the BCBS⁵ does not account for the 12-month implementation period needed to raise the capital buffers specified in the CRD IV regulation.⁶ In other words, the credit gap may be an early warning indicator that is not *early enough* for policy implementation purposes. Moreover, the guidelines do not directly compare the predictive power of the credit-to-GDP gap with that of other potentially relevant variables related to risks to financial stability (as stated in the CRD IV) in a *multivariate* framework. Furthermore, only seven EU countries were part of the BCBS study. Acknowledging the potentially very large implications that this policy has for the European banking sector, this special feature aims to address these non-trivial issues.

In line with the spirit of the forthcoming legislation for the CCB, the models used in this special feature are calibrated so that they predict a vulnerable state of the economy (or banking sector), i.e. a build-up of system-wide risk that, with a suitable trigger, could turn into a banking crisis. This would, hopefully, allow for a timely build-up of the CCB to increase the resilience of the banking sector.

IDENTIFYING SYSTEMIC BANKING CRISES

An important element of an early warning model for banking crises is the definition of a *vulnerable state* of the economy from which a banking crisis could emerge, given a suitable trigger. Vulnerable states are defined as the period between twelve and seven quarters before the onset of a banking crisis. This time horizon accounts for the announcement period of twelve months specified in the CRD IV as well as for a time lag required to implement the necessary policies.

*Identifying systemic
banking crises
in the EU*

The banking crises data is based on a dataset developed by the ESCB Heads of Research Group.⁷ This database consists of quarterly data on systemic banking crises in the EU countries between the first quarter of 1970 and the fourth quarter of 2010.⁸ The crisis occurrence index takes a value of 1 when a banking crisis occurred in a given quarter, and a value of 0 when no crisis occurred. The database aggregates information about banking crisis occurrences from the academic literature, which is subsequently cross-checked with the ESCB Heads of Research Group before inclusion in the database.

Figure B.1 shows the banking crisis dates for the sample of countries considered in this special feature. The composed dependent variable, a vulnerable state, is equal to 1 between twelve and seven quarters (inclusive) prior to a banking crisis as identified by the banking crises database and 0 for all other quarters in the data.⁹

5 In the BIS working paper forming the background to the BCBS guidelines (Drehmann, M., Borio, C., Gambacorta, L., Jiménez, G. and Trucharte, C., op. cit.), the authors judge a signal of 1 (0) to be correct if a crisis (no crisis) occurs at any time within a three-year horizon.

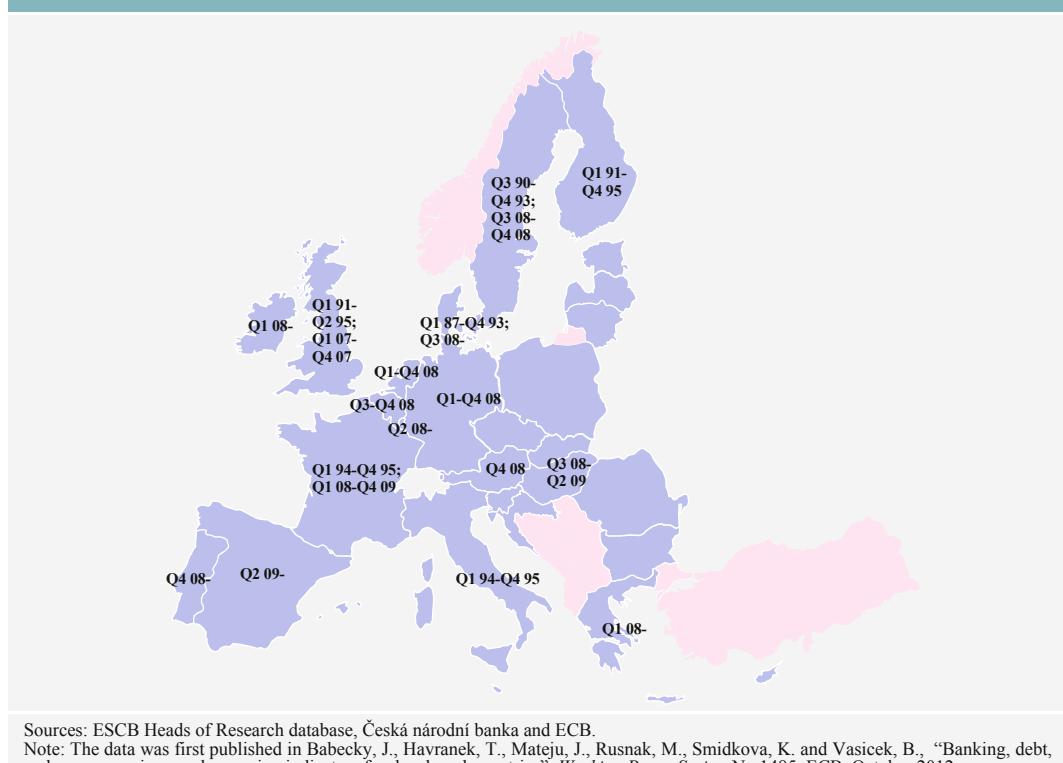
6 See Article 126(6) of the CRD IV.

7 The data was collected by a team at Česká národní banka and was published in Babecky, J., Havranek, T., Mateju, J., Rusnak, M., Smidkova, K. and Vasicek, B., "Banking, debt, and currency crises: early warning indicators for developed countries", *Working Paper Series*, No 1485, ECB, October 2012.

8 Croatia, which joined the EU on 1 July 2013, has not yet been included in the database.

9 In order to overcome crisis and post-crisis bias, all country quarter observations which are in, or within six quarters of, a banking crisis are omitted from the analysis. See, for example, Bussiere, M. and Fratzscher, M., "Towards a new early warning system of financial crises", *Journal of International Money and Finance*, 25(6), 2006.

Figure B.1 Banking crisis dates for the sample countries



MACRO-FINANCIAL AND BANKING SECTOR INDICATORS

Country-specific indicators: credit variables...

The panel dataset used in the analysis contains quarterly macro-financial and banking sector data from the second quarter of 1982 onwards, for 23 EU Member States. The data is sourced through Haver Analytics and originally comes from the Bank for International Settlements (BIS), the ECB, Eurostat, the International Monetary Fund (IMF) and the Organisation for Economic Cooperation and Development (OECD).¹⁰

Given the importance of credit in the BCBS proposal and the CRD IV, several measures of credit to the private sector are taken into account. The source of the credit data is the BIS, whose credit series appears to be based on the broadest definition of credit provision to the private sector, while having been adjusted for data gaps and structural breaks.¹¹ The model framework includes four different measurements of credit, accounting for credit growth and leverage at the domestic and at the global level. *Credit growth* is entered as a percentage (annual growth), while leverage is

¹⁰ In particular, the individual series stem from the following original sources: data on total credit to the private non-financial sector are obtained from the BIS and from Eurostat for those countries where BIS data are not available; information on nominal GDP growth and inflation rates comes from the IMF's International Financial Statistics; data on stock prices are obtained from the OECD, while data on house prices are provided by the BIS; and interest rate and banking sector variables are obtained from the OECD.

¹¹ The BIS' long series on total credit and domestic bank credit to the private non-financial sector includes “[c]redit [that] is provided by domestic banks, all other sectors of the economy and non-residents”. The “private non-financial sector” includes non-financial corporations (both privately owned and publicly owned), households and non-profit institutions serving households. In terms of financial instruments, credit covers loans and debt securities. A description of the database can be found in Dembiermont, C., Drehmann, M. and Muksakunratana, S., “How much does the private sector really borrow? A new database for total credit to the private non-financial sector”, *Bank for International Settlements*, 2013.

measured by the deviation of the *credit-to-GDP ratio* (using nominal GDP data) from its long-term backward-looking trend as proposed in the BCBS 2010 Consultative Document.¹²

In an increasingly integrated global economy, vulnerabilities that develop in one country or at a global level can potentially rapidly transmit to other countries around the world. In fact, earlier studies have stressed the importance of global variables and their interactions with domestic variables in predicting domestic banking and financial crises.¹³ Moreover, the CRD IV regulation stipulates that the institution-specific CCB rates are to be calculated using a weighted average of the CCB rates in countries to which the respective institution is exposed. Therefore, it is important to analyse developments of credit (and other variables) beyond national boundaries.

Global credit variables have been computed using a GDP-weighted average of the variable in question for several countries, including the United States, Japan, Canada, and all European countries which are part of this study. In addition, four sets of *interaction terms* are included, namely the product of the domestic variables (to account, for example, for circumstances in which fast domestic credit growth is combined with a high level of leverage of the domestic economy), the product of the global variables (to account, for example, for fast global credit growth combined with a high level of global leverage) and the product of domestic and global credit variables (to account, for example, for fast domestic credit growth coinciding with fast global credit growth).

In order to test the importance of credit variables in a comparative fashion as well as to analyse the potential importance of other factors, a number of additional variables are also added to the models. These are selected based on the existing literature and on data availability and include *nominal GDP growth* (domestic and global), *consumer price inflation rates*, *equity prices*, *residential house prices* (domestic and global), *bank capitalisation* (calculated as the ratio of total banking sector equity over total banking sector assets) and *aggregate banking sector profitability* (defined as net income before tax as a percentage of total assets).

MACRO DEVELOPMENTS IN THE RUN-UP TO BANKING CRISES

Chart B.1 presents the average developments of the six main explanatory variables of interest over time before and after the onset of a banking crisis. For the purpose of predicting banking crises based on simple descriptive statistics, one would hope to find an indicator variable that displays a typical pattern in the run-up to a crisis so that it can be used as a signal. In the current case of predicting vulnerable states of the economy that precede future banking crises, variables that signal a crisis way ahead of time (i.e. two to three years before the crisis) would be of interest, so that policy-makers can use this time to increase the resilience of banks.

On average, the credit gap increases slowly prior to a banking crisis and starts falling about one year into the crisis. The BCBS concedes that the credit-to-GDP gap may not capture turning points well.¹⁴ Consequently, the ratio will not fall unless credit falls faster than GDP, something which is not at all certain during a banking crisis. Still, it shows that from a purely descriptive perspective, any signal to be derived from the credit gap will come from the level of this variable breaching a threshold value, not from turning points in its development.

... macro-financial
and banking sector
indicators

Indicator
developments before
and after a crisis

12 See Basel Committee on Banking Supervision, "Guidance for national authorities operating the countercyclical capital buffer", *Bank for International Settlements*, 2010. The backward-looking trend is calculated using a Hodrick-Prescott filter with a smoothing parameter λ of 400,000.

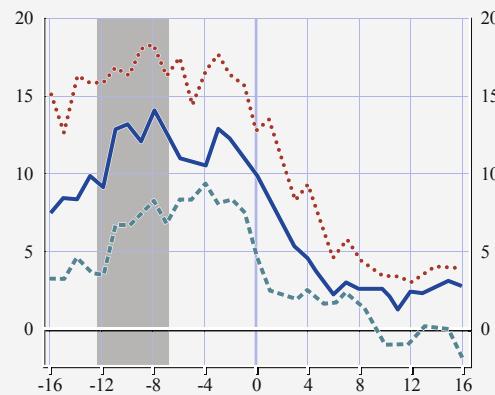
13 See, for example, Lo Duca, M. and Peltonen, T., "Assessing systemic risks and predicting systemic events", *Journal of Banking & Finance*, 37(7), 2013.

14 See Basel Committee on Banking Supervision, op. cit.

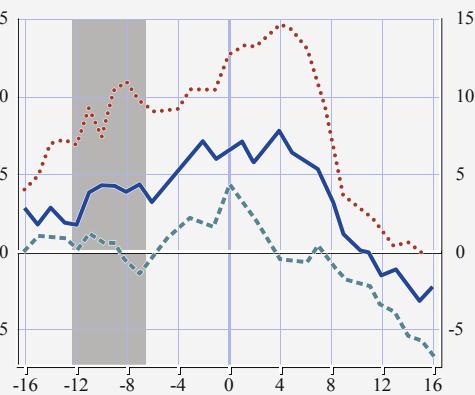
Chart B.1 Properties of macro variables before and during banking crises

(x axis: quarters around the crisis; y axis: percentages)

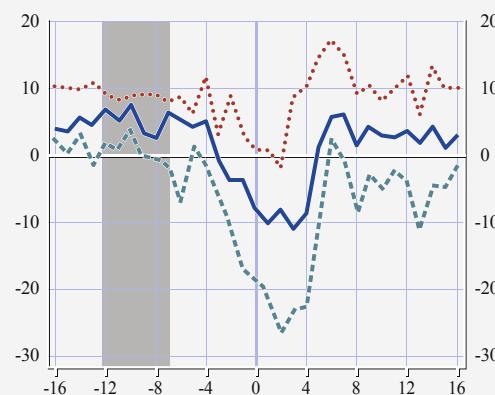
a) Private credit growth (year on year)



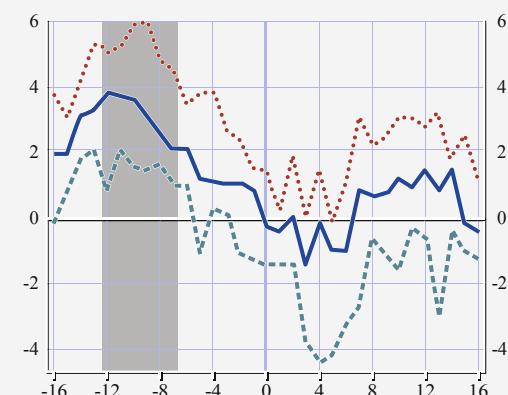
b) Private credit to GDP gap (recursive HP trend)



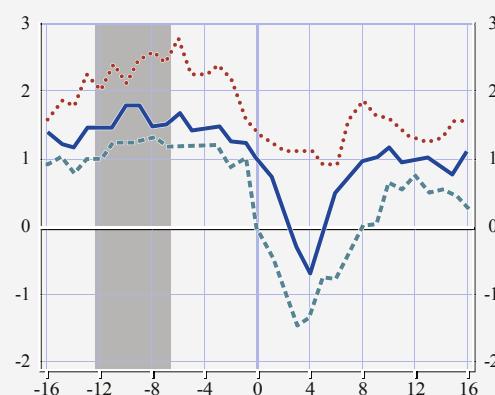
c) Stock price growth



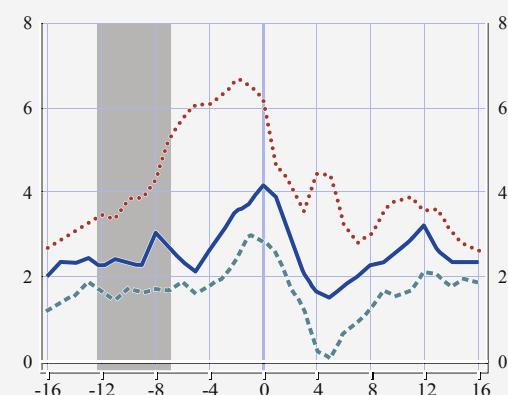
d) House price growth



e) Nominal GDP growth



f) Inflation



Sources: BIS, Eurostat, IMF, OECD and ECB calculations.

Notes: The figure depicts the development of key variables around banking crises (16 quarters before and after the start of a crisis) within the sample. The first crisis quarter is indicated by the vertical line, while the vulnerability state of twelve to seven quarters preceding a banking crisis is depicted by the grey window. The solid curve shows the development in the median country and the dashed lines represent the countries at the 25th and 75th percentile, respectively.

Unlike the credit gap, credit growth (as depicted in annual percentage changes) does appear to hit a peak about two years before the onset of banking crises, even though its fall only becomes clear during the last pre-crisis year. A similar development can be observed for nominal GDP growth and equity price growth figures. These variables do (on average) peak before the start of a crisis.

In the sample, the growth rate of residential house prices tends to peak on average about three years before a crisis happens, starting a clear descent (although prices are still rising) that lasts into the crisis, when house price growth stalls. To sum up, several macro-financial variables seem to possess potentially useful pre-crisis properties which may guide decisions on the set-up of CCBs. Yet, an early warning system analysis can provide a more formal framework to assess the usefulness of variables.

EVALUATING EARLY WARNING SIGNALS

Banking crises are quite rare events and over the past two decades most EU countries have encountered no more than one, if any at all. Still, when banking crises occur, they tend to be very costly for societies, both in a direct sense (bailouts and fiscal interventions) and indirectly, owing to the associated loss of economic output and welfare following these crises.¹⁵ Thus, policy-makers have a clear incentive to be able to detect potential signs of vulnerabilities that might precede banking crises early enough in order to take measures to prevent the further build-up of imbalances and to strengthen the resilience of the banking sector. Yet, at the same time, policy-makers do not want to signal crises which then do not in fact materialise. Doing so may: (a) reduce the credibility of their warnings, weaken decision-making and damage their reputation; and (b) needlessly incur costs on the part of the banking sector, endangering credit supply to the private sector. As a consequence, policy-makers also have an incentive to avoid false alarms, i.e. they do not want to issue warnings when a crisis is not imminent. As suggested by some studies,¹⁶ an evaluation framework for an early warning model needs to take into account policy-makers' relative aversion with respect to type I errors (not issuing a signal when a crisis is imminent) and type II errors (issuing a signal when no crisis is imminent).

*Evaluating
the predictive
performance
of individual
indicators...*

As the CRD IV regulation emphasises the role of credit variables in setting the CCB rate – in particular the role of credit growth and the credit-to-GDP gap – the usefulness of these variables for the identification of vulnerable states (recall that vulnerable states are defined as the period between twelve and seven quarters before the onset of a systemic banking crisis) within the EU banking sector is assessed first. The analysis is conducted as much as possible in a *real-time* fashion, meaning that only information that is available at a particular point in time is used. As such, all de-trended variables have been calculated using backward trends, thereby only using information available up to that point.

Table B.1 reports the signalling performance of several credit variable indicators, assuming a strong preference for the detection of crises by the policy-maker.¹⁷ The table also shows the percentage of type I and type II errors, as well as the absolute and the relative usefulness, the adjusted noise-to-signal

15 It is acknowledged that these losses may seem larger when crises are preceded by a credit boom which inflates GDP growth figures. Moreover, there is increasing evidence that so-called “credit-less recoveries” which occur after a credit bust can be as fast as credit-fuelled recoveries. For a recent discussion, see Takáts, E. and Uppen, C., “Credit and growth after financial crises”, *BIS Working Papers*, No 416, July 2013.

16 See, for example, Alessi, L. and Detken, C., “Quasi real time early warning indicators for costly asset price boom/bust cycles: a role for global liquidity”, *European Journal of Political Economy*, 27(3), 2011. For technical details on the evaluation method followed in this special feature, see Sarlin, P., “On policymakers’ loss functions and the evaluation of early warning systems”, *Economics Letters*, 119(1), 2013.

17 For a detailed discussion of the various evaluation metrics, see Behn, M., Detken, C., Peltonen, T. and Schudel, W., op. cit.

Table B.1 Evaluation of individual credit variables

	T1	T2	Absolute usefulness	Relative usefulness	aNtS ratio	% predicted	Cond prob	Diff prob
Domestic credit to GDP gap	0.187	0.552	0.023	0.256	0.678	0.813	0.168	0.047
Domestic credit growth (yoY)	0.309	0.443	0.022	0.240	0.641	0.691	0.176	0.056
Domestic credit to GDP ratio	0.585	0.118	0.019	0.211	0.452	0.415	0.232	0.112
Domestic credit gap	0.154	0.640	0.018	0.201	0.757	0.846	0.153	0.033
Domestic credit growth (4q ma)	0.244	0.555	0.017	0.194	0.734	0.756	0.157	0.037
Domestic credit growth (6q ma)	0.415	0.404	0.015	0.170	0.690	0.585	0.165	0.045
Domestic credit growth (qoq)	0.252	0.588	0.014	0.153	0.786	0.748	0.148	0.028
Domestic credit growth – GDP growth	0.431	0.454	0.009	0.103	0.798	0.569	0.146	0.026
Domestic credit growth (8q ma)	0.537	0.349	0.009	0.100	0.752	0.463	0.154	0.034
Global credit to GDP gap	0.081	0.474	0.040	0.443	0.516	0.919	0.209	0.089
Global credit growth (yoY)	0.187	0.396	0.037	0.412	0.487	0.813	0.219	0.099
Global credit to GDP ratio	0.179	0.405	0.037	0.411	0.493	0.821	0.217	0.097
Global credit gap	0.114	0.497	0.035	0.386	0.561	0.886	0.196	0.076
Global credit growth (4q ma)	0.106	0.518	0.033	0.373	0.580	0.894	0.191	0.071
Global credit growth (6q ma)	0.114	0.565	0.029	0.318	0.637	0.886	0.176	0.056
Global credit growth (qoq)	0.642	0.111	0.021	0.229	0.310	0.358	0.306	0.185
Global credit growth – GDP growth	0.146	0.634	0.019	0.216	0.742	0.854	0.155	0.035
Global credit growth (8q ma)	0.626	0.179	0.016	0.178	0.478	0.374	0.222	0.102

Sources: BIS, Eurostat and ECB calculations.

Note: “yoY” stands for “year on year”; “ma” stands for “moving average”; “qoq” stands for “quarter on quarter”.

ratio (aNtS),¹⁸ the percentage of vulnerable states correctly predicted by the indicator (% predicted), the probability of a vulnerable state conditional on a signal being issued (cond prob) and the difference between the conditional and the unconditional probability of a vulnerable state (diff prob).

Among the domestic indicators, indeed, the credit-to-GDP gap performs best in the sense that it generates the highest relative usefulness. This indicator correctly calls 81.3% of the vulnerable states and displays an adjusted noise-to-signal ratio of 0.678. Conditional on a signal being issued, the probability of a vulnerable state is 16.8%, which is 4.7% higher than the unconditional probability of a vulnerable state in the sample used. Other variables that perform relatively well are annual credit growth, the credit-to-GDP ratio and the credit gap.

Interestingly, global variables seem to outperform domestic variables in terms of usefulness. These indicators usually exert a higher relative usefulness, a lower adjusted noise-to-signal ratio, and are able to predict a larger share of the vulnerable states in the sample. This suggests that focusing on the development of domestic credit variables alone might not be sufficient. In an increasingly integrated global economy, vulnerabilities that develop at a global level potentially transmit to countries around the world. Therefore, policy-makers would benefit from taking these developments into account when deciding on CCB rates.

The evaluation of the predictive abilities of global variables is subject to a caveat: as these variables do not vary across countries, and as most countries were subject to a crisis starting in 2008, the good performance of these variables can in part be explained by a clustering of crisis episodes within the same year, i.e. indicators based on global credit variables correctly predicted the current crisis in several of the sample countries. To a certain extent, this puts the higher usefulness of global variables relative to domestic variables in perspective. However, the current crisis is certainly one

¹⁸ The adjusted noise-to-signal ratio is the ratio of false signals measured as a proportion of quarters where false signals could have been issued to good signals as a proportion of quarters where good signals could have been issued. A lower adjusted noise-to-signal ratio indicates better predictive abilities of the model.

of the best examples of a non-domestic vulnerability spreading to banking systems around the world. Thus, if the aim of the CCB is to increase the resilience of the banking system, developments both at the domestic and at the global level can provide useful information to the policy-maker.

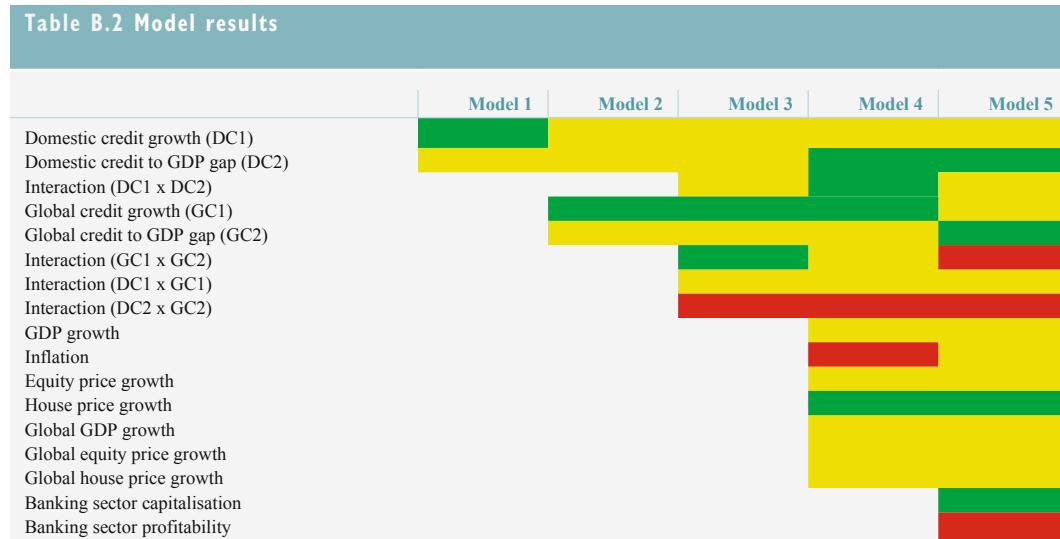
DEVELOPING AN EMPIRICAL MODEL TO PREDICT VULNERABILITIES

While the signalling approach presented above is a simple and useful way to assess the predictive abilities of individual indicators, a multivariate framework has the advantage of being able to assess the joint performance of several indicators. Therefore, as is common in the literature,¹⁹ a multivariate logistic regression model is used in order to assess the predictive abilities of a combination of credit, macro-financial and banking sector variables. In addition to the dependent variable and the independent variables mentioned earlier, the estimations also include a set of country dummy variables in order to account for unobserved time-invariant heterogeneity at the country level (country fixed effects). Robust standard errors clustered at the quarterly level are used in order to account for potential correlation in the error terms that might arise from the fact that global variables are identical across countries in a given quarter. Furthermore, all explanatory variables have been lagged by one quarter to account for lags in data availability.²⁰

*... and of
multivariate
logit models*

Table B.2 depicts the main results of the model estimations, while Table B.3 shows some model evaluation metrics. Starting by considering a model which takes into account the domestic credit gap and domestic credit growth (with the relative usefulness of Model 1 measuring 0.24), it is, surprisingly, found that the model performance is slightly weaker than the one of the domestic credit gap alone (with a relative usefulness of 0.26). Next, the global credit variables are included

Table B.2 Model results



Sources: BIS, Eurostat, IMF, OECD and ECB calculations.

Notes: The colour coding serves to get a quick overview of the main estimation results. A green colour corresponds to a significant (at the 5% level) positive effect on the probability of observing a future banking crisis (over a horizon of twelve to seven quarters), while a red colour implies a significant (at the 5% level) negative effect on the same probability. All effects (coefficients) which are not significant at the 5 % level of statistical significance are depicted in yellow.

19 See, for example, Davis, E. and Karim, D., "Comparing early warning systems for banking crises", *Journal of Financial Stability*, 4(2), 2008.

20 Lagging the explanatory variables also helps to account for endogeneity bias through simultaneity. This simple procedure cannot crowd out all endogeneity-related bias, but the fact that the dependent variable itself is an early warning variable could be considered to be a mitigating factor. Moreover, the time horizon for which this variable is equal to one has been chosen in the context of the exercise and has not been exogenously determined.

Table B.3 Evaluation of the models

	T1	T2	Absolute usefulness	Relative usefulness	aNtS ratio	% Predicted	Cond Prob	Diff Prob
Model 1	0.224	0.534	0.021	0.236	0.688	0.776	0.166	0.045
Model 2	0.088	0.573	0.030	0.336	0.628	0.912	0.178	0.058
Model 3	0.136	0.364	0.045	0.497	0.421	0.864	0.245	0.125
Model 4	0.052	0.342	0.054	0.603	0.361	0.948	0.285	0.159
Model 5	0.111	0.278	0.051	0.596	0.312	0.889	0.282	0.173

Sources: BIS, Eurostat, IMF, OECD and ECB calculations.

with the result that the predictive power of the model improves (the relative usefulness of Model 2 rises to 0.34). As also shown in Behn et al. (2013),²¹ the inclusion of domestic and global interaction terms further improves the model performance, with Model 3's relative usefulness measuring 0.50. Moreover, by including further variables that could potentially be useful in measuring the stability of the banking sector, the model performance increases further (the relative usefulness of Model 4 rises to 0.60) and the model issues a warning in 94.8% of the quarters in the sample where a banking crisis occurs, seven to twelve quarters ahead. Finally, the performance of Model 5, which includes banking sector variables, is similar to that of Model 4. However, Model 5 includes controls for banking sector profitability and level of capitalisation, which are important factors to take into account when setting CCBs.²²

In sum, it seems that credit variables are indeed among the most important predictors of vulnerable states of the economy. However, as stated above, both model fit and model performance increase significantly when other variables are included. For example, the positive coefficient for house price growth in Model 4 indicates that asset price booms promote the build-up of vulnerabilities in the financial sector. Moreover, Model 5 shows that banking sector variables exert a significant influence on the build-up of financial vulnerabilities: a country is more likely to be in a vulnerable state when the aggregate bank capitalisation within the country is relatively low. In addition, it seems that future banking crises are more likely when profits in the banking sector are relatively high. This could well be related to the fact that periods of high bank profitability are typically associated with increased risk-taking and the build-up of vulnerabilities, which could explain the positive coefficient for the profitability variable preceding banking crises. As such, the multivariate analysis confirms the pattern illustrated in Chart B.2, namely that several macro-financial variables contain useful information which can be used to predict or signal future banking crises.

Simulating the effects of the CCB while accounting for macro-financial feedback effects

Higher banking sector capitalisation is expected not only to strengthen the resilience of the banking sector, but also to a certain degree to dampen the financial cycle and reduce financial imbalances by slowing credit, GDP and asset price growth. The multivariate logistic regression model combined with a global vector auto regression (GVAR) model could be one of the tools to guide policy-makers in calibrating CCBs. The main advantage of this simple approach is that it makes it possible to analyse the potential effects of higher capital levels on financial vulnerabilities across countries, while controlling for macro-financial feedback effects.²³

21 See Behn, M., Detken, C., Peltonen, T. and Schudel, W., op. cit.

22 The availability of long time series of banking sector variables limits the use of Model 5 for the out-of-sample analysis.

23 See Behn, M., Groß, M., Peltonen, T. and Schudel, W., "Calibrating countercyclical capital buffers with an integrated early warning GVAR model", ECB, mimeo.

OUT-OF-SAMPLE PREDICTIONS

Assessing the out-of-sample predictive performance

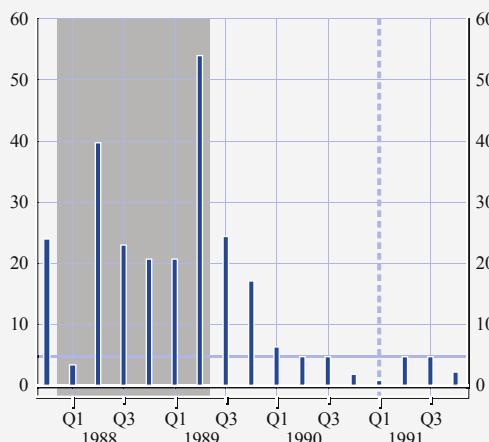
Given the objective of the early warning systems, any assessment of the indicators and models should focus on the out-of-sample performance. Moreover, successful in-sample predictions are much easier to achieve than successful out-of-sample predictions.²⁴ The out-of-sample usefulness of the model is assessed as follows. First, countries that had a banking crisis prior to 2007 are consecutively excluded from the estimation of the model. Then, the ability of the model based on the remaining countries to predict the crises in the excluded ones is assessed.²⁵

Two examples of this out-of-sample forecasting exercise are presented in Chart B.2 using Model 4 from Table B.2. As is visible from the chart, the model signals the banking crises in the Nordic countries well before their onset in the early 1990s. In both Finland and Sweden, the indicator consistently exceeds the threshold from the second quarter of 1988 onwards, which is 11 quarters ahead of the crisis for Finland and nine quarters ahead for Sweden. In both cases, banks would have had enough time to build up capital before the crisis if the CCB had been activated. In other words, the model seems to exhibit overall good out-of-sample properties, while information from the current crisis seems to be useful for the out-of-sample prediction of other systemic banking crises in the EU.

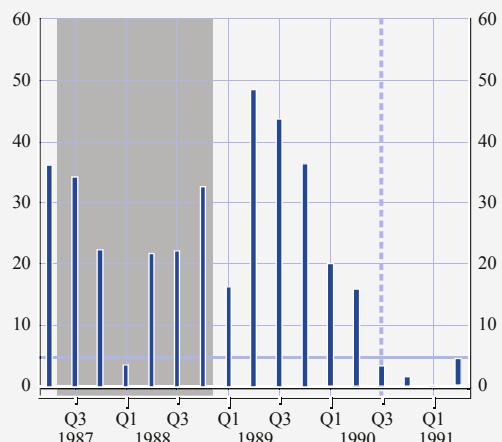
Chart B.2 Out-of-sample model performance for selected countries

(y-axis: percentage probability)

a) Finland



b) Sweden



Sources: BIS, Eurostat, IMF, OECD and ECB calculations.

Notes: The chart shows the model prediction for the respective country excluded from the estimation sample. The dashed vertical line corresponds to the first banking crisis quarter, while the vulnerability stage of twelve to seven quarters preceding a crisis (which the models try to predict) is depicted by the grey area.

²⁴ See Berg, A., Borensztein, E. and Patillo, C., "Assessing early warning systems: how have they worked in practice?", *IMF Staff Papers*, Vol. 53, No 3, 2005.

²⁵ Of course, one could try to fit a model to the observations prior to 2007 in order to see whether this model would be able to predict the current crisis. However, as most of the crisis episodes in the sample occur after 2007, and as it would be useful to learn something from these episodes, the approach described above has been chosen, i.e. using the information from the current crisis and checking whether it would have been useful for the prediction of past crises. Model 4 is used as the benchmark specification here.

CONCLUDING REMARKS

As a response to recent financial crises, the Basel III and CRD IV regulatory frameworks include the implementation of CCBs to increase the resilience of the banking sector and its ability to absorb shocks arising from financial and economic stress.

This special feature finds that, in addition to credit variables, other domestic and global financial factors such as equity and house prices, as well as banking sector variables, help to predict vulnerable states in EU Member States. Consequently, the main policy implication of this study is that in the context of setting up CCB measures, policy-makers could benefit from considering a wide range of macro-financial and banking sector indicators. Multivariate models, such as the one introduced here, are found to be more useful in this respect as they include the combined behaviour of several indicators.

C GAUGING THE EFFECTIVENESS OF CROSS-SECTIONAL MACRO-PRUDENTIAL TOOLS THROUGH THE LENS OF INTERBANK NETWORKS¹

This special feature examines various macro-prudential tools through the lens of recent advances in the study of interbank contagion. The specific set of tools analysed are those designed to contain the “cross-sectional” dimension of systemic risk – that is, those designed to limit the systemic risk stemming from factors such as correlations and common exposures across financial institutions. These include tools such as large exposure limits and other regulatory requirements designed to limit the spread of systemic risk between banks. The analysis rests on the basic notion that interbank network structures, and hence the risk of contagion across the banking system in response to shocks, are influenced by banks’ optimising behaviour subject to regulatory (and other) constraints.

Changes in macro-prudential policy parameters, such as large exposure limits, capital charges on counterparty exposures and capital and liquidity requirements more generally, will affect the contagion risk because of their impact on banks’ asset allocation and interbank funding decisions. This in turn implies that well-tailored macro-prudential policy can help reduce interbank contagion risk by making network structures more resilient.

The analysis shows that to capture the full extent of potential interbank contagion, all of the different layers of bank interaction should be taken into account. Hence, if the regulator only focuses on one segment of interbank relationships (e.g. direct bilateral exposures), the true contagion risks are likely to be grossly underestimated. This finding has clear policy implications and flags the importance of micro- and macro-prudential regulators having access to sufficiently detailed data so as to be able to map the many interactions between banks.

INTRODUCTION

A key lesson to have emerged from the recent financial crisis is that shocks hitting specific financial institutions have the potential to spread quickly across the entire financial system, with potentially disastrous consequences. Such experiences have led to a wealth of studies on financial contagion, many of which apply network theory, to better understand the risk built in to the financial system as a result of the interconnectedness of financial institutions. A key finding in the literature is that an important determining factor of contagion risks is, for instance, the interbank market is the structure of the networks through which banks are connected to each other. In other words, the scope for contagious losses following an idiosyncratic or system-wide shock depends on the number of connections and the centrality of the affected institutions within the network.

Shocks to individual financial institutions may spread across the market depending on the network structure of the system

However, so far, little is known about how financial networks are formed and about their sensitivity to changes in key bank parameters (for example, common exogenous shocks or regulatory initiatives) and how the many different layers of bank networks affect each other. A more comprehensive knowledge of these elements is, however, important so as to be able to better calibrate macro-prudential policies that will contribute to making interbank networks more resilient.

The financial network formation process is not well understood

Against this background, and drawing on recent ECB research, this special feature presents two analytical network tools that capture behavioural patterns of interbank relationships and the dynamic implications of multi-layered network structures.² Both approaches rely on “agent-based”

Two recently developed ECB network tools are presented...

1 Prepared by Grzegorz Halaj, Christoffer Kok and Mattia Montagna.

2 For a general description of network modelling for financial stability purposes, see ECB, “Evaluating interconnectedness in the financial system on the basis of actual and simulated networks”, *Financial Stability Review*, June 2012.

modelling, which imposes certain behavioural assumptions on the banks in the system subject to pre-specified budget (and regulatory) constraints.

The article first presents the methodology and macro-prudential implications of a modelling framework that focuses on how interbank networks are formed and in particular how they can be affected by certain macro-prudential policy actions. Second, the methodology and macro-prudential implications of a multi-layered interbank network model are presented. This framework illustrates the importance from a macro-prudential perspective of taking full account of all the different layers of banks' interactions. The final section concludes.

THE EMERGENCE OF INTERBANK NETWORKS³

This model is related to research on network formation, which has only recently become a topic of study within the field of finance. Understanding how interbank networks emerge can be critical to controlling and mitigating the related risks. Endogenous networks (and their dynamics) are a difficult problem since the behaviour of the agents (banks in particular) is very complex. The emergent literature on network formation therefore considers game theory and portfolio optimisation.⁴ The network formation model presented here adds to this strand of the literature by feeding a firm-level data set of European banks into a model based on portfolio-optimising banks.

Model description

The interbank network formation model looks at the banking system from the perspective of investment portfolio theory. The emerging linkages are the outcome of a sequential game played by banks trying to invest in the interbank market and borrow interbank funding. Banks optimise their interbank assets taking into account risk and regulatory constraints as well as the demand for interbank funding and propose their preferred portfolio allocation among the interbank counterparties.⁵ As regards the funding side, banks define their most acceptable structure of funding sources with the objective of limiting refinancing risk. Banks meet in a bargaining game in which the supply and demand for interbank lending is matched.

In order to account for the complexity of interbank markets, a sequential optimisation process encompassing four distinct rounds is assumed (see Figure C.1).

In the *first* round, banks specify the preferred allocation of interbank assets by maximising the risk-adjusted return from the interbank portfolio. In this optimisation process, each bank first draws a sample of banks according to a predefined probability that a bank is related to another bank.⁶ On this basis, banks make offers of interbank placements at a current market rate corrected

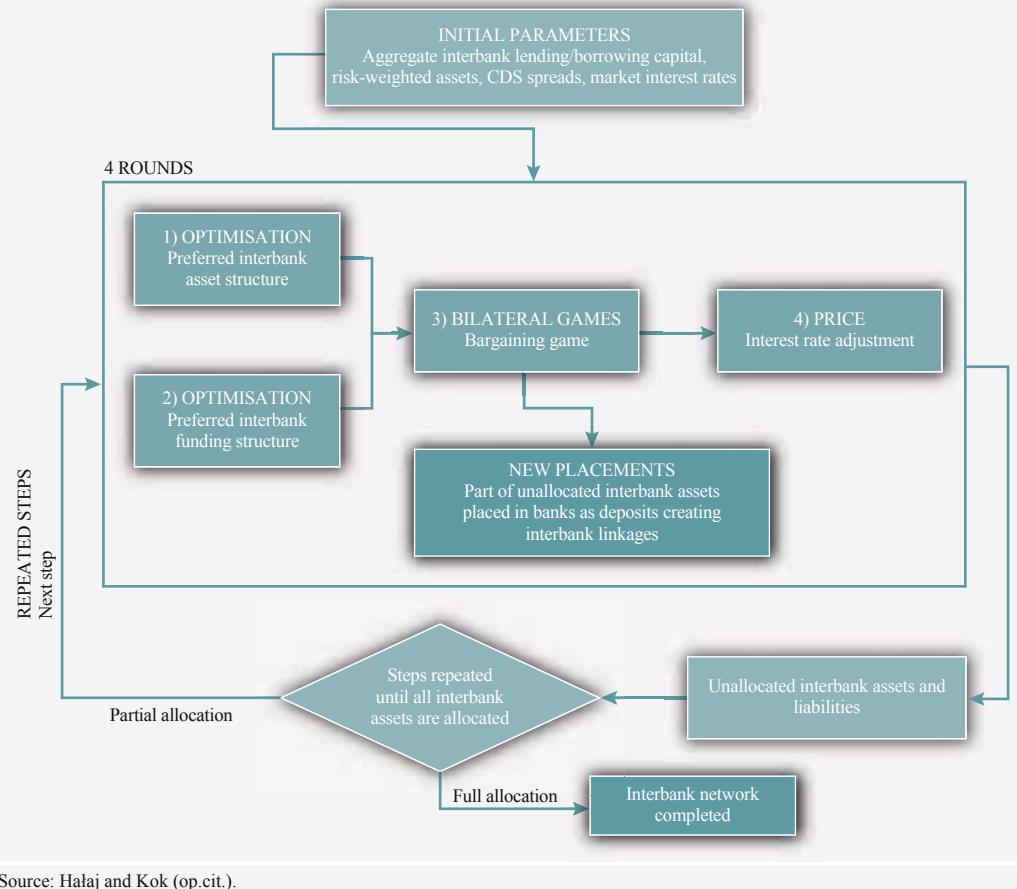
3 This sub-section is based on Halaj, G. and Kok, C., "Modelling the emergence of interbank networks", *Working Paper Series*, ECB, forthcoming.

4 For a few recent studies, see Acemoglu, D., Dahleh, M.A., Lobel, I. and Ozdaglar, A., "Bayesian learning in social networks", *Review of Economic Studies*, Vol. 78, pp. 1201-1236, 2011; Cohen-Cole, E., Petacchini, E. and Zenou, Y., "Systemic risk and network formation in the interbank market", *CEPR Discussion Papers*, No 8332, 2011; Bluhm, M., Faia, E. and Krahnen, J.P., "Endogenous banks' networks, cascades, and systemic risk", *SAFE Working Paper*, Goethe University, 2013; Georg, C.-P., "The effect of the interbank network structure on contagion and common shocks", *Journal of Banking and Finance*, Vol. 37(7), 2013.

5 The model abstracts from the presence of a central bank that can act as a lender of last resort for banks unable (or unwilling) to fund themselves in the interbank market. Hence, the interbank contagion effects derived from the model would reflect the impact without any central bank intervention. While not the focus of this article, the modelling framework could easily account for exogenous central bank liquidity injections.

6 The probability of interbank relationships is based on the "probability map" constructed by Halaj and Kok (2013), which is derived from information about banks' total interbank assets and liabilities, the geographical breakdowns of those assets and information about whether banks are internationally active or not; see Halaj, G. and Kok, C., "Assessing interbank contagion using simulated networks", *Working Paper Series*, No 1506, ECB, 2013.

Figure C.1 Sequential game: the four-round procedure behind the formation of the interbank network



Source: Hałaj and Kok (op.cit.).

for a premium based on the counterparty's default probability. They try to maximise the return adjusted by investment risk, taking into account the volume of total interbank lending, the expected interest income accounting for the counterparty risk, the volatility of the interbank lending rates and regulatory and other constraints.⁷

Obviously, the recipients of the interbank funding will have their own preferences regarding funding sources. Therefore, in the *second* round of the model, after the individual banks' optimisation of interbank assets, banks calculate their optimal funding structure among banks that have offered placements. They decide on the preferred structure based on the funding risk of the resulting interbank liabilities. The funding decision is based on the objective of minimising the rollover (refinancing) risk of interbank deposits.

*In the second round,
banks define their
optimal interbank
funding structure*

⁷ The regulatory constraints imposed on the banks include a "minimum risk-weighted capital ratio" of 8% and a "large exposure limit" on the maximum size of an exposure to a given counterparty relative to the capitalisation of the bank creditor. In addition to the regulatory constraints, capital is also assumed to be constrained by a "credit valuation adjustment (CVA) surcharge" reflecting the additional capital required in banks' internal economic capital models for changes in the riskiness of interbank exposures gauged by market-based default probabilities for banks. This CVA element is not to be mistaken for the CVA capital charge on changes in the credit spread of counterparties on over-the-counter derivatives transactions.

*In the third round,
banks try to match
optimally determined
interbank deposits in
a bargaining game...*

*... and in the fourth
round, banks that
still do not have
sufficient funding
adjust their offered
interest rate upwards*

*The rounds are
repeated until all
interbank assets
and liabilities are
matched*

*The sensitivity of the
interbank network
structure to large
exposure limits
is verified*

*By lowering the
large exposure
limits, interbank
connectivity
increases...*

The offers of interbank placements may diverge from the funding needs of the other side of the interbank market. In the *third* round, it is therefore assumed that pairs of banks negotiate the volume of interbank deposits. These negotiations are modelled by means of a bargaining game in which banks may be more or less willing to deviate from their preferred and optimisation-based structures of assets and liabilities.⁸

After the first three rounds, a full allocation of interbank assets may still not be achieved, with some banks remaining short of their desired interbank funding. To increase the chance of attracting the missing interbank funding, in the *fourth* round banks in need of additional funding are assumed to change the offered interest rate for new deposits. Intuitively, it follows that the bigger the funding gap with respect to the assumed interbank funding needs, the higher the increase in the offered interest rate.

The four consecutive rounds are repeated with a new drawing of banks to be included into subsamples of banks with which each bank prefers to trade. Consequently, each bank enlarges the group of banks considered to be their counterparties in the interbank market and proposes a new preferred structure of interbank assets and liabilities for the part unallocated in the previous step. In this way, interbank assets and liabilities are incrementally allocated among banks. All in all, the network formation algorithm ensures a swift convergence of network structures. After a handful of iterations, the algorithm yields an allocation of above 80% of total interbank assets. After 20 such steps, more than 95% of interbank assets are allocated.

The model calibration is based on publicly available aggregate data on banks' balance sheet structures, in particular total interbank lending and borrowing. The proposed algorithm that matches banks on the interbank market utilises risky returns from interbank investment related to the general level of interbank interest rates and bank-specific counterparty default risk, proxied by banks' CDS spreads. Asset diversification can be controlled by a set of regulatory rules related to large exposure limits and minimum capital requirements. The effectiveness of the rules can be assessed by comparing the magnitude of contagion initiated by defaults of groups of banks following adverse economic scenarios in the stress-testing context and transmitted across the networks emerging from the model for different measures of the regulatory rules.

Macro-prudential policy implications

On the basis of the network formation modelling approach, various policy questions can be addressed. For example, the approach can be employed to detect the impact of different macro-prudential policy measures on the formation of network structures and the related contagion risks.

An obvious avenue for using the model is to assess the effects of different regulatory instruments aimed at limiting banks' risk in terms of counterparty exposures, such as the large exposure limits already embedded in current regulatory frameworks⁹ as well as systemic risk capital surcharges and changes in risk weights on exposures to other financial institutions to be introduced in the context of the implementation of the Basel III framework in the EU.

First of all, more stringent large exposure limits (i.e. lowering the threshold below 25%) could trigger substantial changes to the structure of banks' network connections. Chart C.1 illustrates that,

- 8 The game portrays an agreement between banks about the volume of the interbank placement in a given step of the interbank matching algorithm. Banks' willingness to engage in negotiations with direct counterparties depends on the trade-off between their disutility of adapting somewhat their optimised asset-liability structure and the costs of having to find a completely new counterparty (if they do not want to accept the offers from their existing counterparties).
- 9 See Article 111 of Directive 2006/48/EC which states that the interbank exposure of each bank cannot exceed 25% of its regulatory capital and that the sum of the interbank exposures of a bank, individually exceeding 10% of its capital, cannot be higher than 800% of its capital.

on average, across the sample of banks, the number of network connections increases when large exposure thresholds are lowered. Such action also results in a lower degree of concentration of interbank connections (as measured by the “betweenness” measure). This is intuitive: as limits on large exposures become more binding, banks have to reduce the size of individual exposures and as a result spread their interbank business across a wider range of counterparties.

Going beyond this simple illustration, it is instructive to use the model by imposing an adverse shock on the banking sector and assessing the interbank contagion for different settings of the macro-prudential instruments. More specifically, the interbank network is first subjected to a common adverse macroeconomic scenario, which induces banks to re-optimize the structure of their asset allocation¹⁰ and leads to the emergence of a new interbank network of bilateral exposures. In the second step, the impact of the adverse shock on bank solvency resulting from interbank contagion is observed and the impact across different settings of macro-prudential parameters (i.e. large exposure limits) is compared.

Chart C.2 shows the results of such an analysis. The y-axis depicts the difference between networks formed under a 10%, 15% and 20% large exposure limit, respectively, and under the standard 25% large exposure limit, taking into account the capital loss following an adverse shock. A negative value implies that contagion losses decline when the large exposure limit is lowered. On the x-axis, the banks’ riskiness (as measured by individual bank CDS spreads) is plotted. Contagion losses under an adverse scenario are reduced when making large exposure limits more binding by lowering them from the current regulatory threshold of 25% to 20%, 15% and 10%. Interestingly,

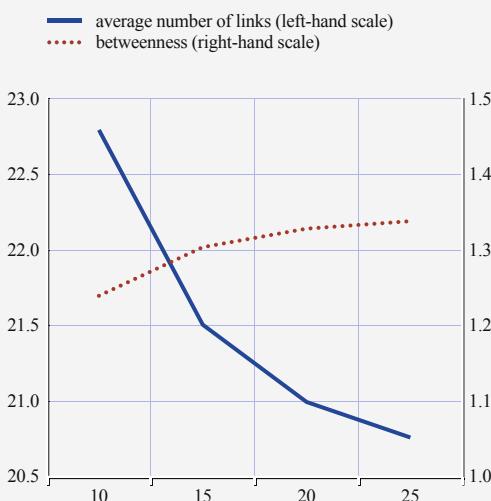
... but the implications for contagion risk under adverse market conditions are a priori ambiguous

The model suggests that contagion losses fall as the large exposure limit is lowered

The implications of more stringent large exposure limits are more pronounced for the soundest banks

Chart C.1 Topological measures of networks emerging under different large exposure thresholds

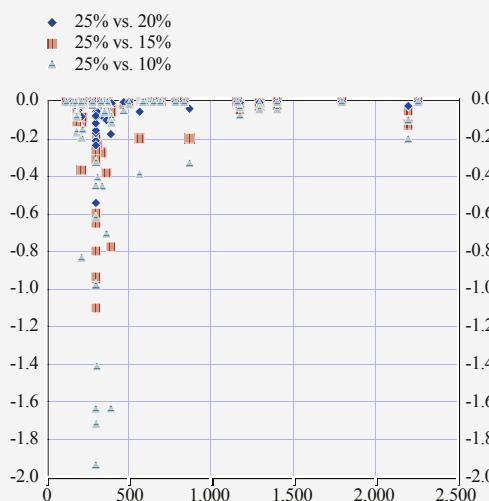
(percentages; x-axis: large exposure thresholds; y-axis: topological measures of networks)



Source: Halaj and Kok (op.cit.).
Note: Averages across all banks.

Chart C.2 Impact of large exposure limits on total capital ratio under an adverse macroeconomic scenario vs. bank credit quality

(x-axis: impact of large exposure limits on total capital ratio under an adverse macroeconomic scenario in basis points; y-axis: bank CDS spread in percentage points)



Source: Halaj and Kok (op.cit.).

10 The assumed asset allocation optimisation process follows Halaj, G., “Optimal asset structure of a bank – bank reactions to stressful market conditions”, *Working Paper Series*, No 1533, ECB, 2013.

this effect is especially pronounced for the group of banks perceived (by the markets) to be the soundest. In other words, the forced reduction of counterparty concentration risk seems to benefit in particular the safest part of the banking system, whereas the more vulnerable segments are found to be less affected by changes in the large exposure limits. This could suggest that, in this sample, the weaker banks have less scope for diversification, whereas stricter limits on interbank exposures could induce some of the stronger banks to diversify more, to the benefit of the system's overall resilience to contagion effects. This notwithstanding, caution is required in adopting measures that limit interbank funding and such actions should be weighed against potential unintended consequences on the overall liquidity and functioning of the money market.

While acknowledging that these results are contingent on the simulated networks, the relevance of the imposed asset and funding optimisation problem and the particular adverse scenarios considered, the results suggest that the tool can provide a useful benchmark for the calibration of the optimal configuration of such macro-prudential and regulatory instruments. An important way forward would be to extend the model set-up in order to be able to assess the effectiveness of macro-prudential instruments more explicitly in terms of their impact on the real economy (e.g. via the effect on banks' non-interbank assets).

A HOLISTIC APPROACH TO INTERBANK CONTAGION¹¹

Similar to the model presented in the previous section, this second approach is also based on a model of dynamic bank behaviour. In addition, a multi-layered network structure is modelled to account for the various layers of interbank relationships. This more holistic approach to studying interbank contagion is distinct from the traditional network-based contagion literature, which typically focuses on single segments of interbank relationships.¹²

Model description

Banks are connected via multiple channels that may amplify contagion

Financial entities are usually connected to each other through several kinds of financial products that link banks' balance sheets in several dimensions and may transfer idiosyncratic risks from one institution to its counterparties. While this mechanism is beneficial in normal times, enabling banks to pool their risks, in bad times the many different interbank connections can become channels of contagion that may amplify the overall effect.¹³

The proposed model of contagion includes three layers of connections: long-term, short-term and common exposures

To embody the different nature of the possible financial products connecting banks, it is useful to introduce a multi-layered framework, where each layer of the network represents a particular kind of link between banks. In order to account for the most common risks in banking activities, the model includes three layers: (i) long-term direct bilateral exposures, reflecting the lending-borrowing network, $L1$; (ii) short-term direct bilateral exposures, representing the liquidity network, $L2$; and (iii) common exposures to financial assets, representing the network of overlapping portfolios, $L3$. The networks on each of the three layers can have very different topological properties, such that each node (bank) may have different neighbouring nodes across different layers (see Figure C.2).

¹¹ This subsection is based on Montagna, M. and Kok, C., "Multi-layered interbank model for assessing systemic risk", *Working Paper Series*, ECB, forthcoming and *Kiel Working Papers*, No 1873, Kiel Institute for the World Economy, 2013.

¹² A couple of recent studies likewise highlight the importance of considering the various dimensions of interbank linkages (direct and indirect) for capturing the true contagion risk; see, for example, Gomez, S., Diaz-Guilera, A., Gomez-Gardeñes, J., Pérez-Vicente, C.J., Moreno, Y. and Arenas, A., "Diffusion dynamics on multiplex networks", arXiv: 1207.2788 [physics.soc-ph], 2013; Caccioli, F., Farmer, J.D., Foti, N. and Rockmore, D., "How interbank lending amplifies overlapping portfolio contagion: a case study of the Austrian banking network", arXiv: 1306.3704v1 [q-fin.GN].

¹³ See also Battiston, S., Delli Gatti, D., Gallegati, M., Greenwald, B. and Stiglitz, J.E., "Default cascades: when does risk diversification increase stability?", *Journal of Financial Stability*, Vol. 8, pp. 138-149, 2010; Fourel, V., Héam, J., Salakhova, D. and Tavolaro, S., "Domino effects when banks hoard liquidity: the French network", *Banque de France Working Paper Series*, No 432, 2013.

Importantly, the interbank network layers are assumed to interact in the sense that shocks are transmitted between layers via balance sheet adjustment mechanisms as banks respond to the shocks in a heterogeneous optimising manner.

In addition to the multi-layered network structure, an agent-based model is also imposed in this modelling approach to account for the fact that the structure of the network can change owing to banks' reactions to idiosyncratic or system-wide shocks. It is assumed that banks have to comply with minimum risk-weighted capital ratios and that they face liquidity constraints. If a certain shock results in banks' not fulfilling one or both of these predefined (regulatory) constraints, action is taken following a given pecking order.

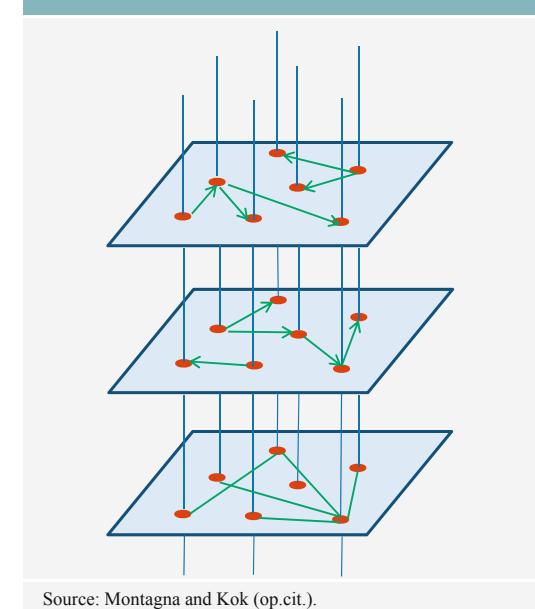
First, they can decide to withdraw liquidity from the short-term interbank market, thus triggering funding shocks for other banks in the system.

Second, banks can liquidate part of their securities portfolios, which in turn may give rise to "fire sale" losses, also affecting the solvency position of other banks holding similar securities.¹⁴ Banks which cannot fulfil the requirements following these actions are declared to be in default and are liquidated, potentially transmitting losses to their creditors.

The model is calibrated using bank balance sheet data for a sample of 50 large EU banks. Bank-level balance sheet information includes data on capital, short-term (maturity of less than three months) and longer-term (more than three months) interbank borrowing and lending, customer deposits, aggregate securities holdings and cash holdings. Information regarding individual banks' bilateral exposures is, however, not available.

In order to identify configurations of the system which are particularly prone to a systemic breakdown in case of an initial local shock, a large number of plausible interbank networks and portfolio structures are generated and the financial resilience of the system under different scenarios is assessed. Networks in layers $L1$ and $L2$ are generated according to a probability matrix P , whose entries represent the probability of a link between two nodes based on existing lending relationships (see Hałaj and Kok, 2013, op.cit.).¹⁵ The network in layer $L3$ is derived from a random generation of banks' securities portfolios, where each security belongs to a bank portfolio with a fixed probability p .

Figure C.2 An illustration of a triple-layered network structure



Source: Montagna and Kok (op.cit.).

Interactions between network layers are defined using an agent-based approach

Network structures prone to contagion risk are identified by randomly selecting various possible structures of the layers

¹⁴ Since the price of the securities is endogenously driven by the amount of securities sold by the banking system, withdrawing liquidity is the cheapest way for banks to improve their capital and liquidity ratios. This implies that, as long as a bank has some short-term interbank assets to liquidate, it will prefer to do this than sell securities.

¹⁵ Also in this case, a large exposure limit is imposed on the size of bilateral interbank exposures.

*Less contagion
is observed for
networks when
considered in
isolation*

*Simulations
performed on a
model of a real
banking system show
that an idiosyncratic
shock to a bank on
one layer can be
transmitted between
layers, increasing
the overall number
of defaults*

*Strong non-linear
effects emerge from
the interactions
between the layers*

Macro-prudential policy implications

An interesting feature of the model is the possibility to disentangle the effects stemming from the different layers. In other words, the model makes it possible to study how interbank counterparty risk, funding risk and liquidity risk materialise and interact with each other after an initial shock to the system. In this set-up, the idiosyncratic risk of single institutions is shared not only with its direct counterparties, which are likely to be aware of the risks taken, but also with other players not directly connected to the institution, which are unlikely to be fully aware of the potential risk transfers.

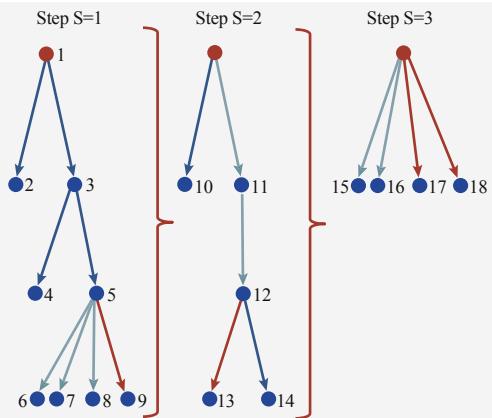
Figure C.3 provides an illustration of how the transmission of shocks across the different layers is likely to amplify the impact compared with a situation where only shocks within single network segments are considered. In the left-hand panel, an initial shock to bank 1 results in the default of four additional banks via their direct bilateral counterparty exposures. If only this segment of the multi-layered interbank relationships is analysed (as is typically the case in network-based contagion literature), the shock propagation would be assumed to stop at this point. However, in the example, it can be seen that the default of bank 5 results in further bank defaults owing to contagion via the short-term funding channel and via the common exposure channel. The joint defaults of the nine banks (reflected in the red “super-node” in the middle panel of Figure C.3) result in the default of five additional banks. This process continues until no further defaults are triggered. In this example, a total of 18 banks default (compared with five if only the direct bilateral exposures are considered).

The amplification of interbank contagion effects when considering the shock propagation across multiple layers of bank interrelations is further illustrated in Charts C.3 and C.4 which show the results of 1 million simulations of the multi-layered network model.

The key point to notice is the non-linear effects that emerge when dynamic interactions across different network layers are taken into account. Chart C.3 shows the contagion effects when one large bank defaults, comparing the situation when network layers are considered in isolation (red dotted line in the chart) and the situation when all three layers are considered simultaneously, allowing for interactions between them (blue columns). While in the majority of network configurations there are no substantial differences between the two dimensions, in the tails of the distributions the number of defaults triggered when all three layers are considered at the same time substantially exceed those triggered when the three network segments are considered in isolation.

Chart C.4 shows the dynamics of the contagion process for one specific network configuration of the multi-layered network (based on the default of the same bank as in Chart C.3). Again, the amplifying effects of having a multi-layered network structure is clearly visible given that the cumulated number of defaults when considering the full system of interbank layers largely exceeds the number of defaults resulting when only accounting for contagion effects in parts of the system.

Figure C.3 An illustration of the propagation mechanism across different network layers

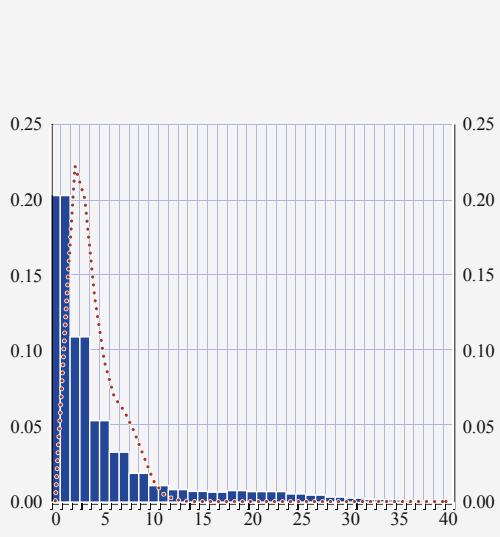


Source: Montagna and Kok (op.cit.).

Note: The blue arrows indicate layer L1, the light green arrows indicate layer L2 and the red arrows indicate layer L3.

Chart C.3 Number of defaults triggered by one bank defaulting – with and without multi-layered network interactions

(x-axis: number of bank defaults; y-axis: density)



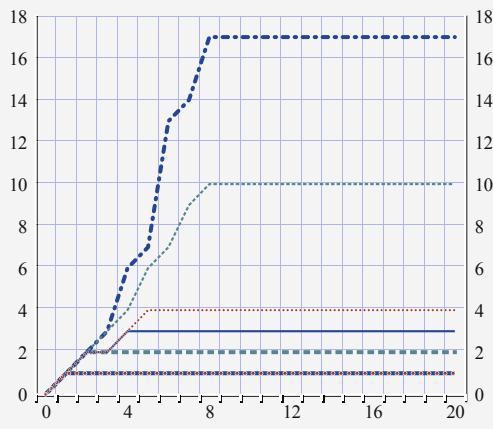
Source: Montagna and Kok (op.cit.).

Notes: Distribution of defaults across 1 million simulated network configurations. The blue bars represent the number of defaults when all three layers are considered simultaneously. The red dotted line reflects the sum of the number of defaults across the three layers when they are seen in isolation.

Chart C.4 The amplifying effects of multi-layered networks

(x-axis: time periods; y-axis: number of bank defaults)

Series	Symbol
fire sales	Solid blue line
ST	Dotted red line
ST + fire sales	Dashed blue line
LT	Solid black line
LT + fire sales	Dotted black line
LT + ST	Dashed black line
full system	Dash-dot black line



Source: Montagna and Kok (op.cit.).

Note: "LT" refers to long-term direct bilateral exposures (layer L1), "ST" refers to short-term bilateral exposures (layer L2) and "fire sales" refer to common securities exposures (layer L3).

CONCLUDING REMARKS

Identifying the critical links in interbank networks and reducing their strength using dedicated macro-prudential policy instruments should help make the financial system safer. The interbank network models presented in this special feature focus especially on this dimension of prospective macro-prudential policies. More specifically, the article shows that certain macro-prudential policy instruments, available to the ECB in the context of the single supervisory mechanism (SSM), could potentially be effective in pulling interbank network structures in a direction which makes the overall system more resilient.

The strengthening of capital and liquidity buffers should, all things being equal, make the risk of contagion less probable, as individual banks would be more resilient and less prone to transmitting shocks to their counterparties.

In addition, efforts should be made to avoid triggering contagion. This requires the mitigation of systemic risks before they reach tipping point, for example, by preventing the build-up of financial imbalances.

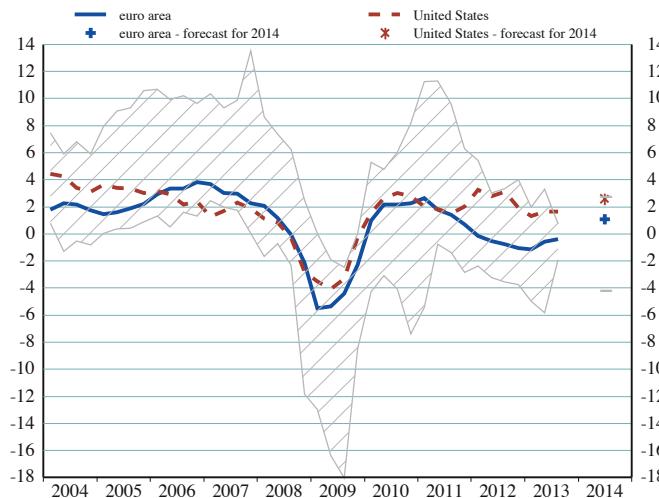
Looking forward, in order for the ECB's macro-prudential policy function, in cooperation with national macro-prudential authorities, to be able to tailor its policy actions along the lines highlighted in this article, it will be of crucial importance that the macro-prudential regulator has proper access to the relevant data so as to be able to map the most important elements of interbank relationships. In addition, further work is needed on the analytical tools for modelling interbank networks and on the impact of macro-prudential tools on complex financial systems.

STATISTICAL ANNEX

I. MACRO-FINANCIAL AND CREDIT ENVIRONMENT

S.I.1 Actual and forecast real GDP growth

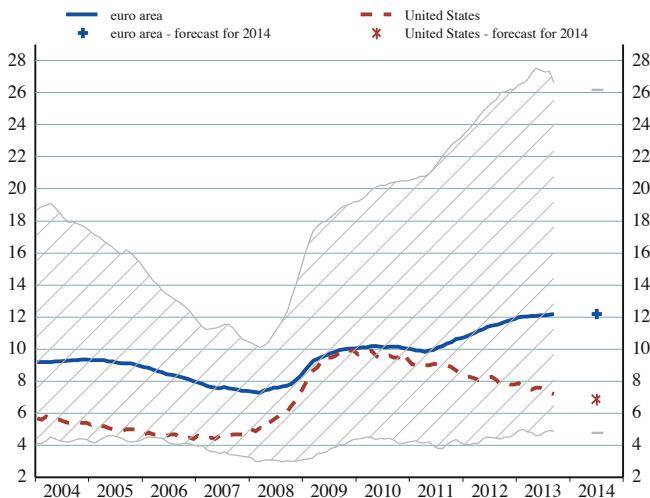
(Q1 2004 - Q3 2013; annual percentage changes)



Sources: Eurostat and European Commission (AMECO, autumn 2013 forecast).
Note: The hatched area indicates the minimum-maximum range across euro area countries.

S.I.2 Actual and forecast unemployment rates

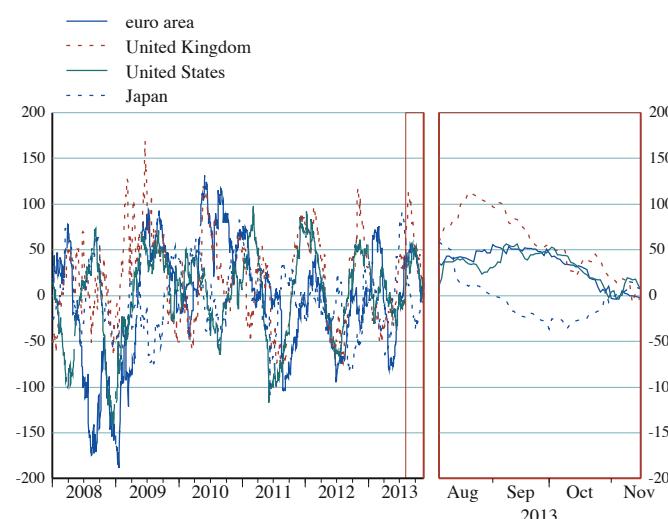
(Jan. 2004 - Sep. 2013; percentage of the labour force)



Sources: Eurostat and European Commission (AMECO, autumn 2013 forecast).
Note: The hatched area indicates the minimum-maximum range across euro area countries.

S.I.3 Citigroup Economic Surprise Index

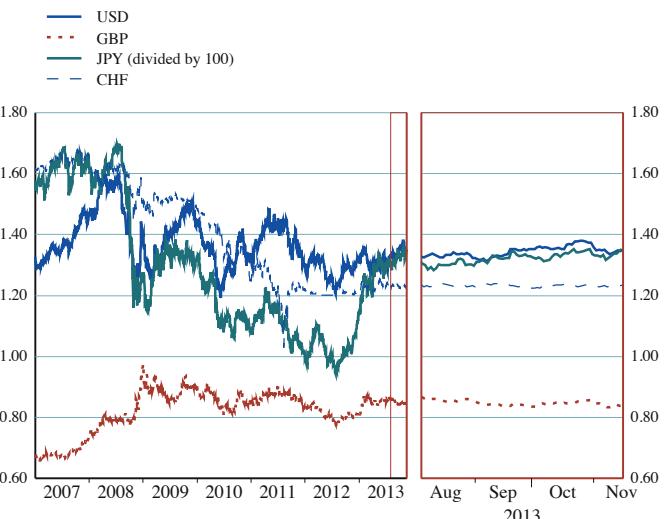
(1 Jan. 2008 - 15 Nov 2013)



Source: Bloomberg.
Note: A positive reading of the index suggests that economic releases have, on balance, been more positive than consensus expectations.

S.I.4 Exchange rates

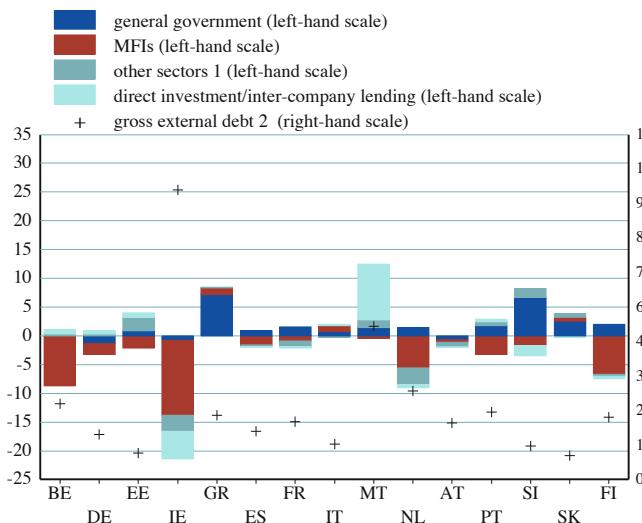
(1 Jan. 2007 - 15 Nov 2013; units of national currency per euro)



Sources: Bloomberg and ECB calculations.

S.1.5 Quarterly changes in gross external debt

(2013 Q2; percentage of GDP)



Source: ECB.

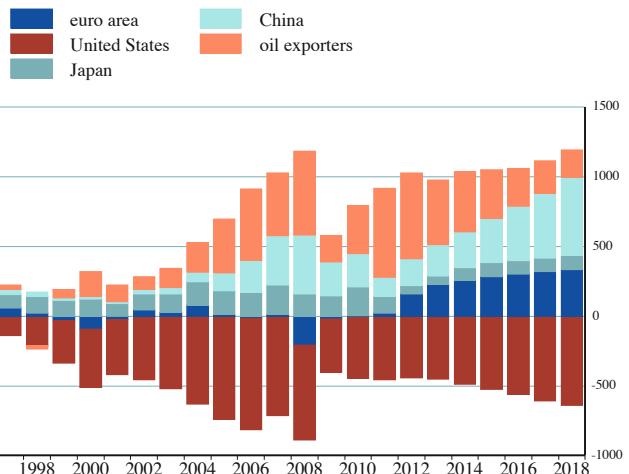
Notes: For Luxembourg, quarterly changes were -0.08% for general government, -28% for MFIs, 122% for other sectors and 18.63% for direct investment/inter-company lending. Gross external debt was 5,269% of GDP.

For Cyprus, quarterly changes were 14.05% for general government, -70.58% for MFIs, 17.8% for other sectors and 1.79 for direct investment/inter-company lending. Gross external debt was 357% of GDP.

- 1) Non-MFIs, non-financial corporations and households.
- 2) Gross external debt as a percentage of GDP.

S.1.6 Current account balances in selected external surplus and deficit economies

(1997 - 2018; USD billions)

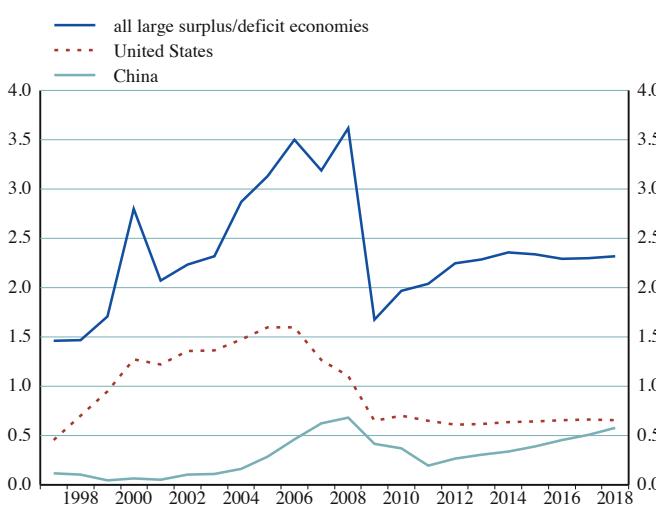


Source: IMF World Economic Outlook.

Notes: Oil exporters refers to the OPEC countries, Indonesia, Norway and Russia. Figures for 2013 to 2018 are forecasts.

S.1.7 Current account balances (in absolute amounts) in selected external surplus and deficit economies

(1997 - 2018; percentage of world GDP)

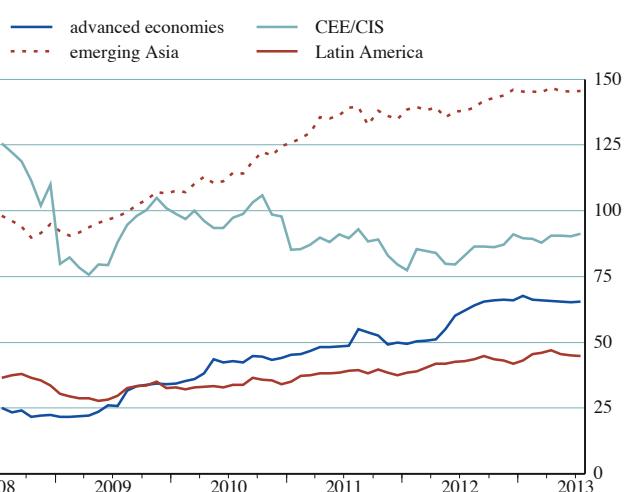


Source: IMF World Economic Outlook.

Notes: All large surplus/deficit economies refers to oil exporters, the EU countries, the United States, China and Japan. Figures for 2013 to 2018 are forecasts.

S.1.8 Foreign exchange reserve holdings

(Jul. 2008 - Jul. 2013; percentage of 2009 GDP)



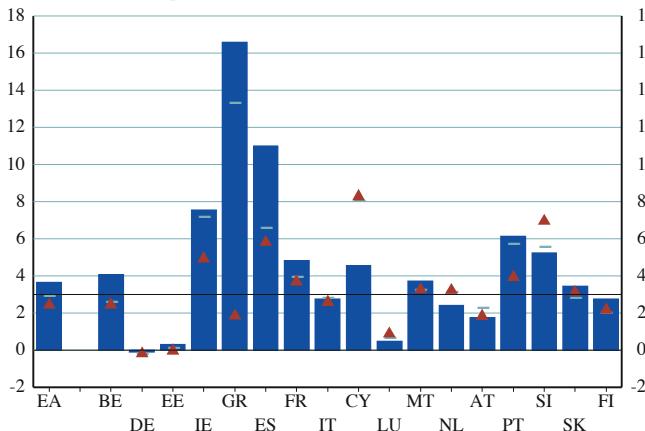
Sources: Bloomberg, IMF World Economic Outlook and IMF International Financial Statistics.

Note: CEE/CIS stands for central and eastern Europe and the Commonwealth of Independent States.

S.I.9 General government deficit/surplus (+/-)

(percentage of GDP)

- █ four-quarter moving sum in Q2 2013
- European Commission forecast for 2013
- ▲ European Commission forecast for 2014

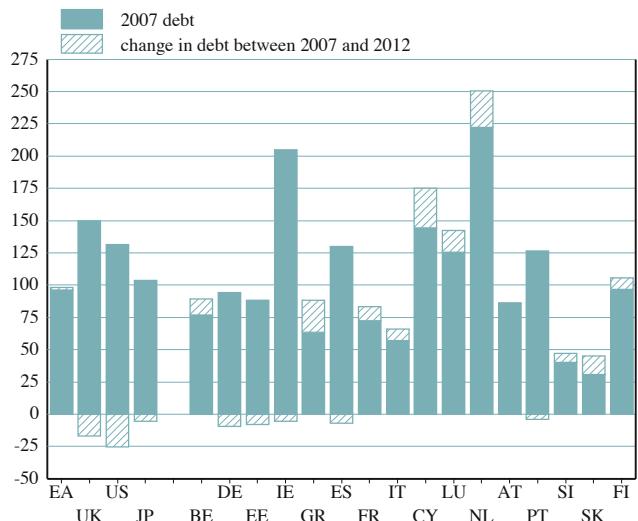


Sources: National data, European Commission (AMECO, Autumn 2013 forecast) and ECB calculations.

Notes: Data on four quarter moving sum refer to accumulated deficit/surplus in the relevant quarter and the three previous quarters expressed as a percentage of GDP. Deficit/surplus for Germany and France are Q4 2012 figures as data for Q1-Q2 2013 are not published due to confidentiality.

S.I.11 Household debt-to-gross disposable income ratio

(percentage of disposable income)



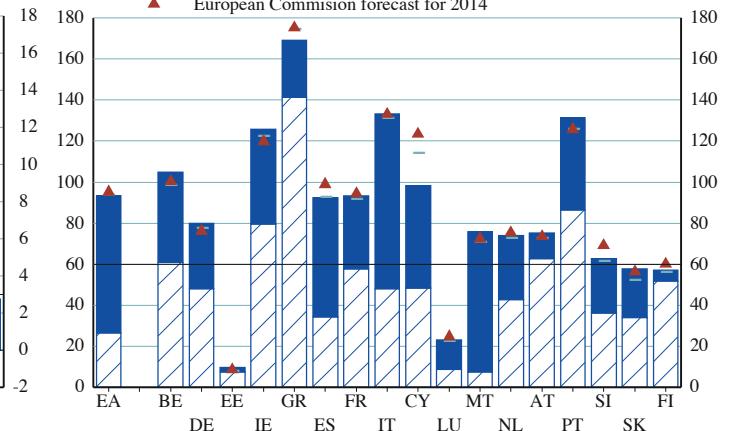
Sources: ECB, Eurostat, US Bureau of Economic Analysis and Bank of Japan.

Notes: Gross disposable income adjusted for the change in net equity of households in pension fund reserves. For Luxembourg initial debt data refer to 2008, change in debt refers to 2008 and 2011. Change in debt for Japan and Greece refers to 2007 and 2011. Data for Malta are not available.

S.I.10 General government gross debt

(percentage of GDP, end of period)

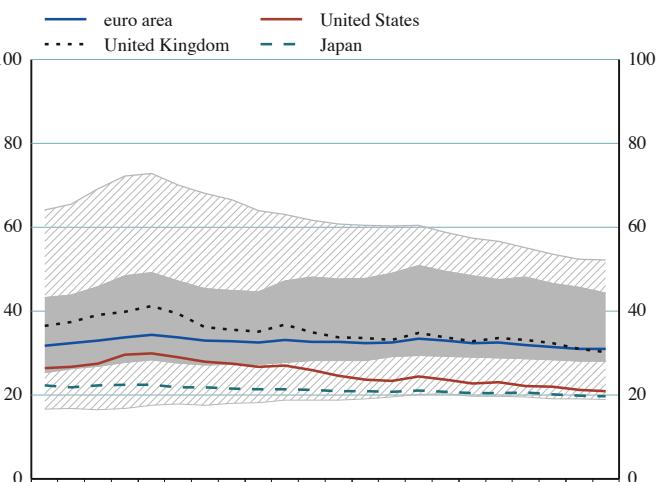
- █ gross debt at end-Q2 2013
- ▨ of which held by non-residents
- European Commission forecast for 2013
- ▲ European Commission forecast for 2014



Sources: National data, European Commission (AMECO, Autumn 2013 forecast) and ECB calculations.

S.I.12 Household debt-to-total financial assets ratio

(Q3 2007 - Q2 2013; percentages)

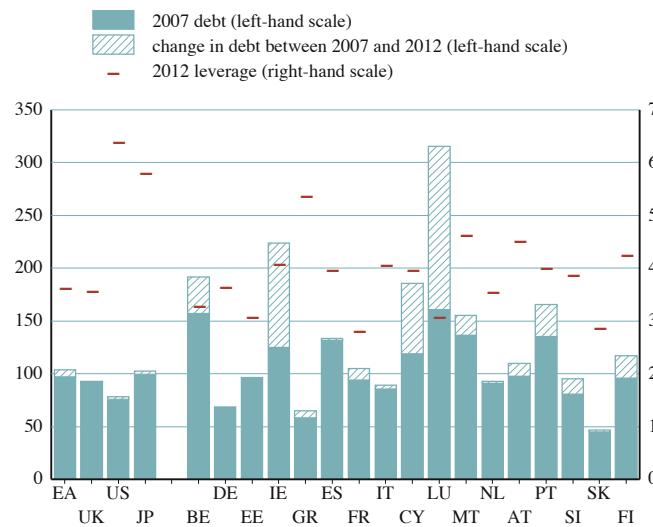


Sources: ECB and ECB calculations, Eurostat, US Bureau of Economic Analysis and Bank of Japan.

Note: The hatched/shaded areas indicate the minimum-maximum and interquartile ranges across euro area countries.

S.I.13 Corporate debt-to-GDP and leverage ratios

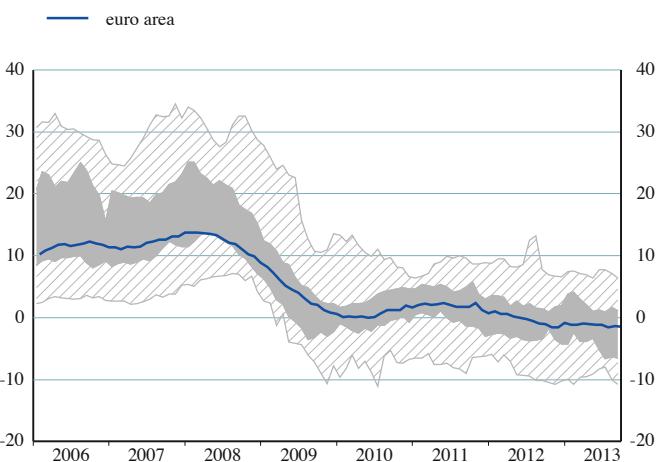
(percentages)



Sources: ECB, Eurostat, US Bureau of Economic Analysis and Bank of Japan.

S.I.14 Annual growth of MFI credit to the private sector in the euro area

(Jan. 2006 - Sep. 2013; percentage change per annum)

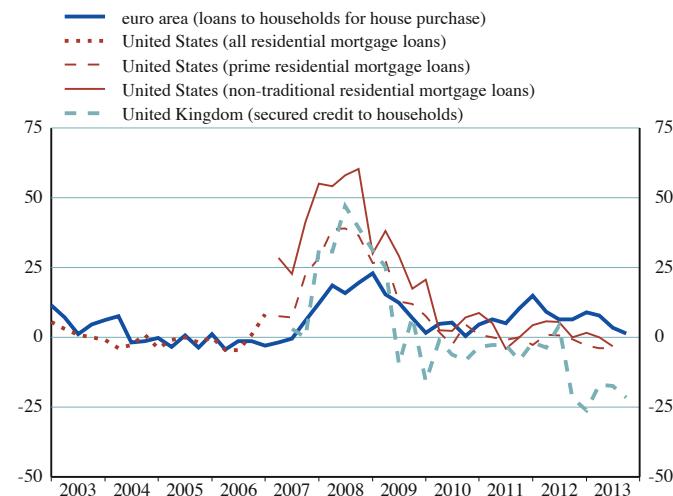


Sources: ECB and ECB calculations.

Notes: MFI sector excluding the Eurosystem. Credit to the private sector includes loans to, and holdings of securities other than shares of, non-MFI residents excluding general government; MFI holdings of shares, which are part of the definition of credit used for monetary analysis purposes, are excluded. The hatched/shaded areas indicate the minimum-maximum and interquartile ranges across euro area countries.

S.I.15 Changes in credit standards for residential mortgage loans

(Q1 2003 - Q4 2013; percentages)

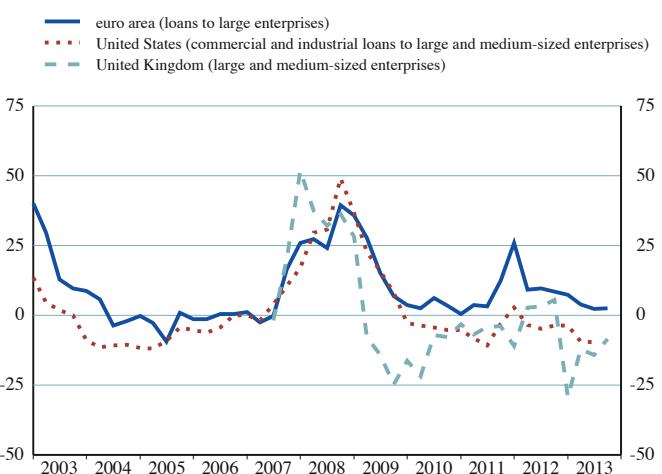


Sources: ECB, Federal Reserve System and Bank of England.

Notes: Weighted net percentage of banks contributing to the tightening of standards over the past three months. Data for the United Kingdom refer to the net percentage balances on secured credit availability to households and are weighted according to the market share of the participating lenders. Data are only available from the second quarter of 2007 and have been inverted for the purpose of this chart. For the United States, the data series for all residential mortgage loans was discontinued owing to a split into the prime, non-traditional and sub-prime market segments from the April 2007 survey onwards.

S.I.16 Changes in credit standards for loans to large enterprises

(Q1 2003 - Q4 2013; percentages)

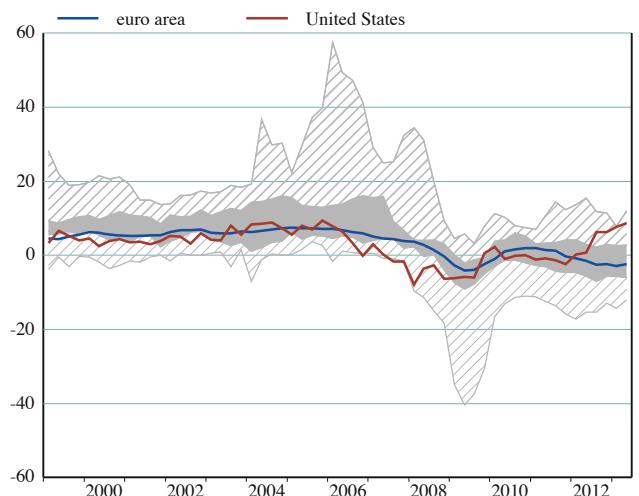


Sources: ECB, Federal Reserve System and Bank of England.

Notes: Weighted net percentage of banks contributing to the tightening of standards over the past three months. Data for the United Kingdom refer to the net percentage balances on corporate credit availability and are weighted according to the market share of the participating lenders. Data are only available from the second quarter of 2007 and have been inverted for the purpose of this chart.

S.I.17 Changes in residential property prices

(Q1 1999 - Q2 2013; annual percentage changes)

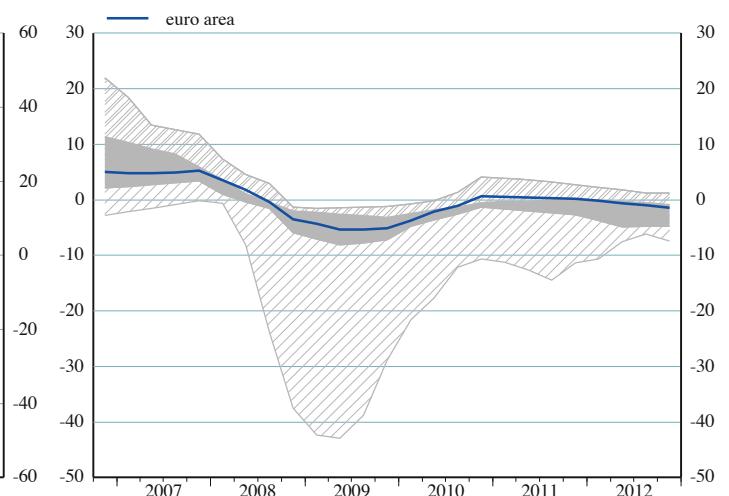


Sources: National data and ECB calculations.

Notes: The target definition for residential property prices is total dwellings (whole country), but there are national differences. The hatched/shaded areas indicate the minimum-maximum and interquartile ranges across euro area countries.

S.I.18 Changes in commercial property prices

(Q4 2006 - Q4 2012; capital value; annual percentage changes)



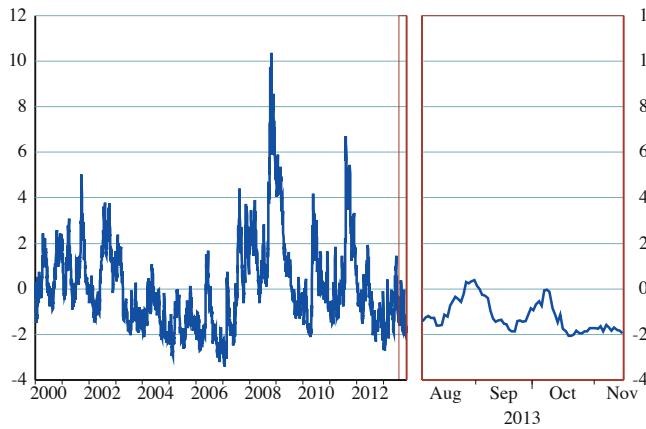
Sources: ECB experimental estimates based on Investment Property Databank data.

Note: The hatched/shaded areas indicate the minimum-maximum and interquartile ranges across euro area countries, excluding Estonia, Greece, Cyprus, Luxembourg, Malta, Slovenia, Slovakia and Finland.

2 FINANCIAL MARKETS

S.2.1 Global risk aversion indicator

(3 Jan. 2000 - 15 Nov 2013)

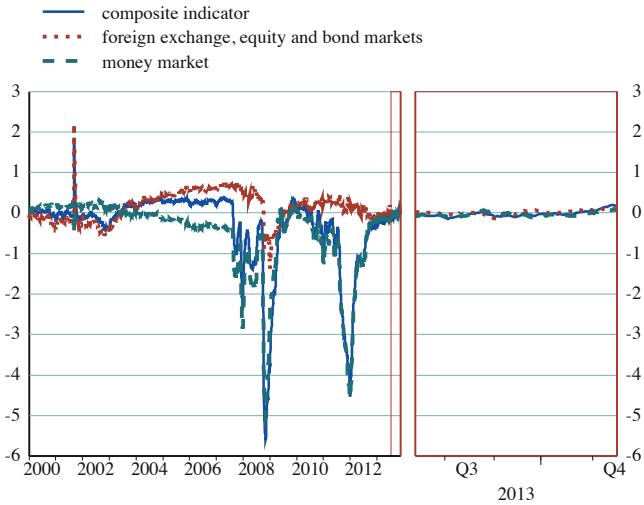


Sources: Bloomberg, Bank of America Merrill Lynch, UBS, Commerzbank and ECB calculations.

Notes: The indicator is constructed as the first principal component of five currently available risk aversion indicators. A rise in the indicator denotes an increase of risk aversion. For further details about the methodology used, see ECB, "Measuring investors' risk appetite", *Financial Stability Review*, June 2007.

S.2.2 Financial market liquidity indicator for the euro area and its components

(4 Jan. 1999 - 15 Nov 2013)

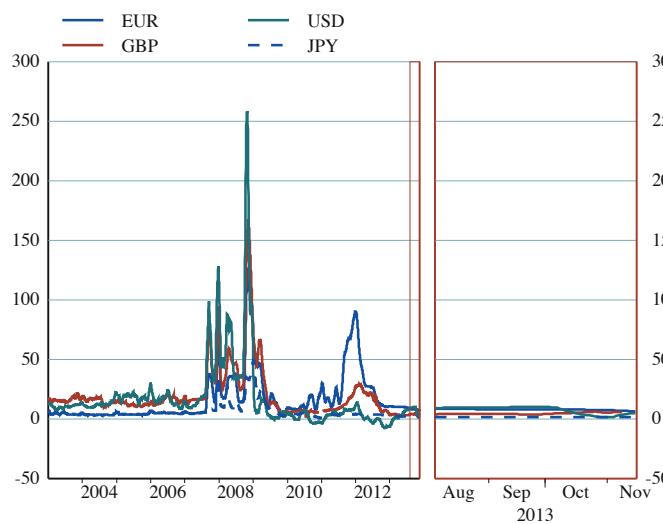


Sources: ECB, Bank of England, Bloomberg, JPMorgan Chase & Co., Moody's KMV and ECB calculations.

Notes: The composite indicator comprises unweighted averages of individual liquidity measures, normalised from 1999 to 2006 for non-money market components and over the period 2000 to 2006 for money market components. The data shown have been exponentially smoothed. For more details, see Box 9 in ECB, *Financial Stability Review*, June 2007.

S.2.3 Spreads between interbank rates and repo rates

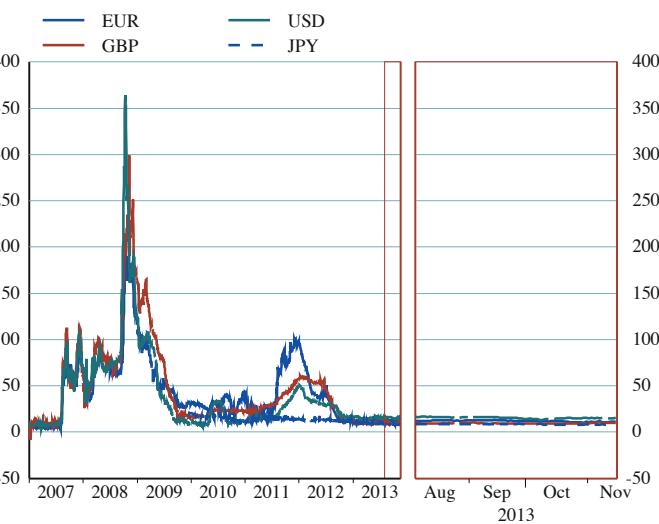
(3 Jan. 2003 - 15 Nov 2013; basis points; 1-month maturity; 20-day moving average)



Sources: Thomson Reuters, Bloomberg and ECB calculations.

S.2.4 Spreads between interbank rates and overnight indexed swap rates

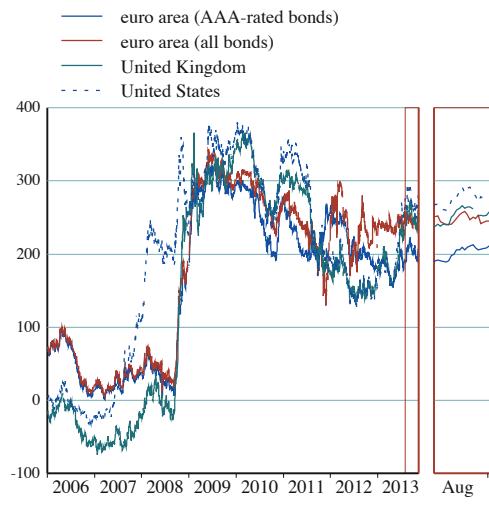
(1 Jan. 2007 - 15 Nov 2013; basis points; 3-month maturity)



Sources: Thomson Reuters, Bloomberg and ECB calculations.

S.2.5 Slope of government bond yield curves

(2 Jan. 2006 - 15 Nov 2013; basis points)

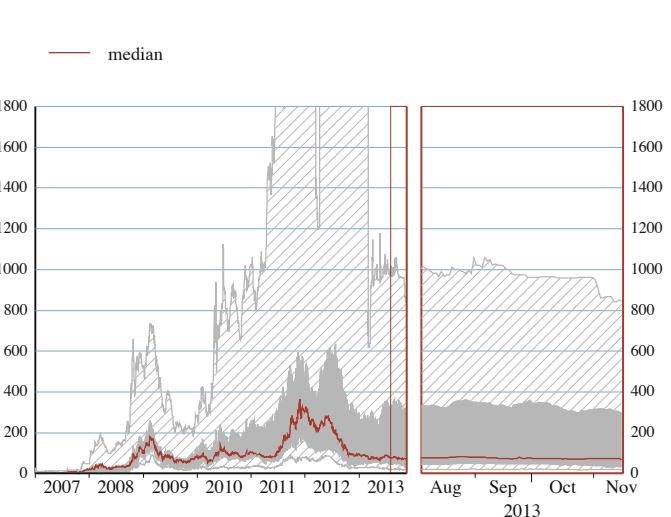


Sources: European Central Bank, Bank for International Settlements, Bank of England and Federal Reserve System.

Notes: The slope is defined as the difference between ten-year and one-year yields. For the euro area and the United States, yield curves are modelled using the Svensson model; a variable roughness penalty model is used to model the yield curve for the United Kingdom.

S.2.6 Sovereign credit default swap spreads for euro area countries

(1 Jan. 2007 - 15 Nov 2013; basis points; senior debt; five-year maturity)

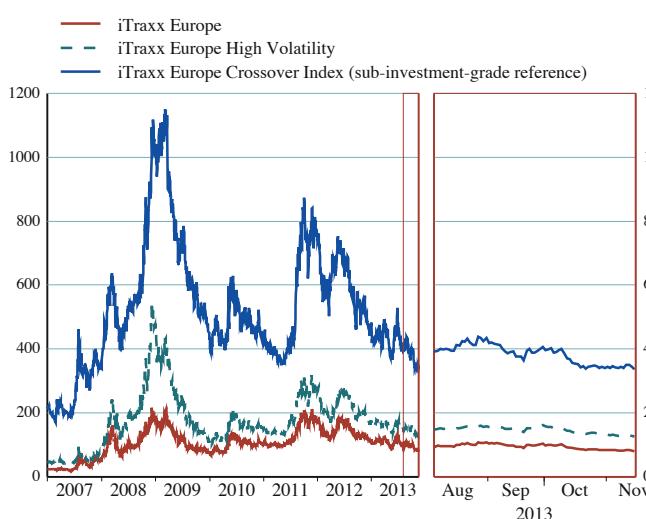


Sources: Thomson Reuters and ECB calculations.

Notes: The hatched/shaded areas indicate the minimum-maximum and interquartile ranges across national sovereign CDS spreads in the euro area. Following the decision by the International Swaps Derivatives Association that a credit event had occurred, Greek sovereign CDS were not traded between 9 March 2012 and 11 April 2012. Since 1st of March 2013 Greek sovereign CDS is not available due to lack of contributors. For presentational reasons, this chart has been truncated.

S.2.7 iTraxx Europe five-year credit default swap indices

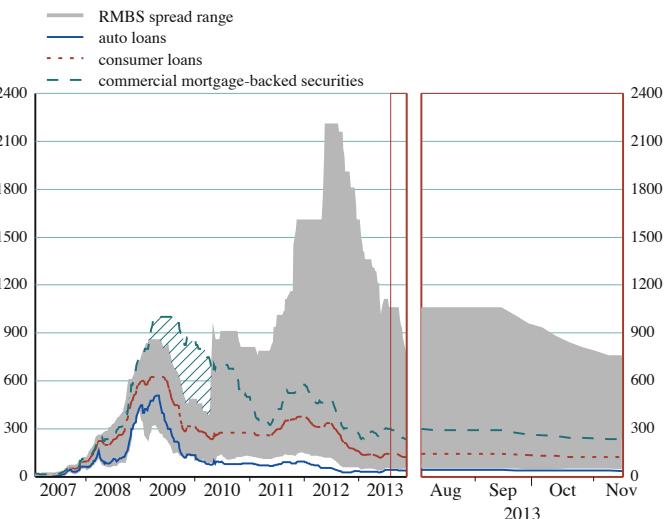
(1 Jan. 2007 - 15 Nov 2013; basis points)



Source: Bloomberg.

S.2.8 Spreads over LIBOR of selected European AAA-rated asset-backed securities

(26 Jan. 2007 - 15 Nov 2013; basis points)

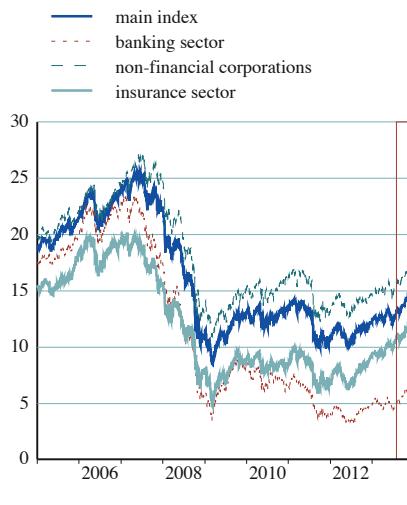


Source: JPMorgan Chase & Co.

Note: In the case of residential mortgage-backed securities (RMBSs), the spread range is the range of available individual country spreads in Greece, Ireland, Spain, Italy, the Netherlands, Portugal and the United Kingdom.

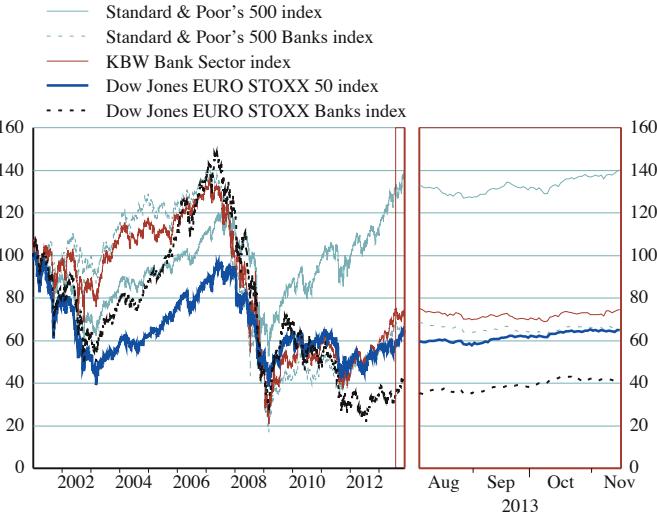
S.2.9 Price/earnings ratio for the euro area stock market

(3 Jan. 2005 - 15 Nov. 2013; ten-year trailing earnings)



S.2.10 Equity indices

(2 Jan. 2001 - 15 Nov. 2013; index: Jan. 2001 = 100)

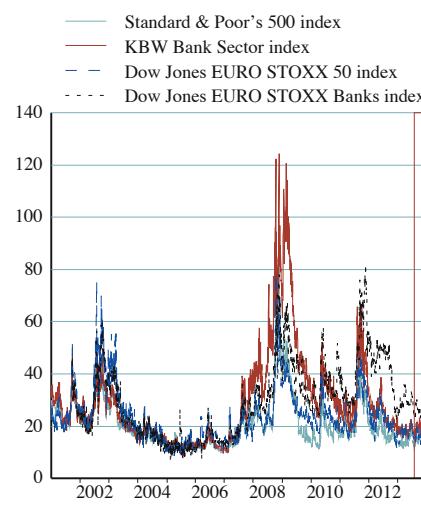


Sources: Thomson Reuters and ECB calculations.

Note: The price/earnings ratio is based on prevailing stock prices relative to an average of the previous ten years of earnings.

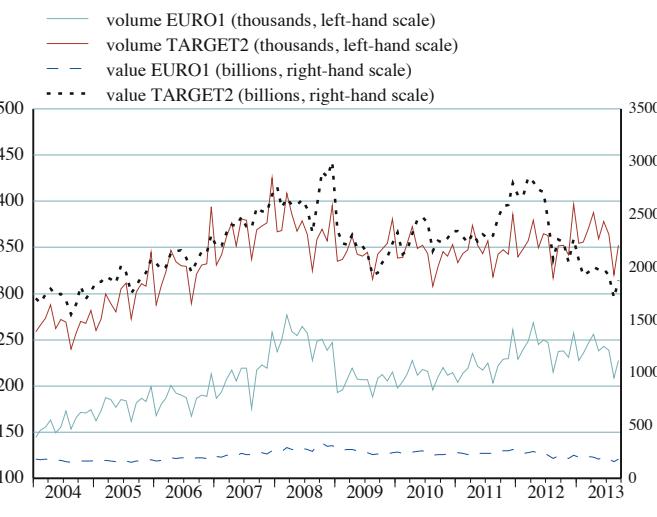
S.2.11 Implied volatilities

(2 Jan. 2001 - 15 Nov. 2013; percentages)



S.2.12 Payments settled by the large-value payment systems TARGET2 and EURO1

(Jan. 2004 - Sep. 2013; volumes and values)



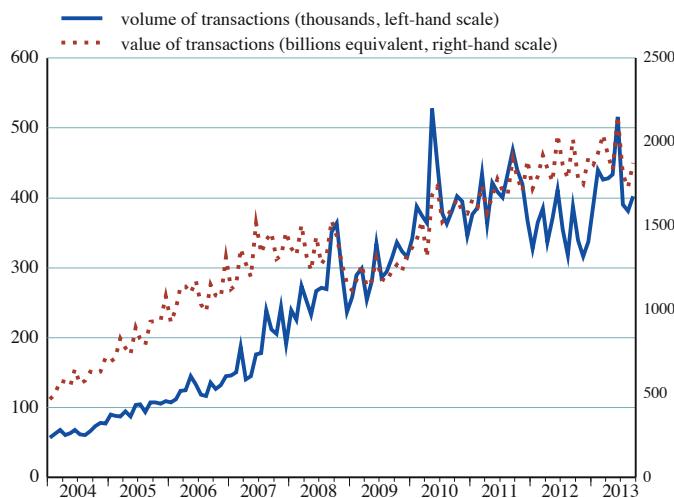
Source: Bloomberg.

Source: ECB.

Notes: TARGET2 is the real-time gross settlement system for the euro. TARGET2 is operated in central bank money by the Eurosystem. TARGET2 is the biggest large-value payment system (LVPS) operating in euro. The EBA CLEARING Company's EURO1 is a euro-denominated net settlement system owned by private banks, which settles the final positions of its participants via TARGET2 at the end of the day. EURO1 is the second-biggest LVPS operating in euro.

S.2.13 Volumes and values of foreign exchange trades settled via the Continuous Linked Settlement Bank

(Jan. 2004 - Sep. 2013; volumes and values)

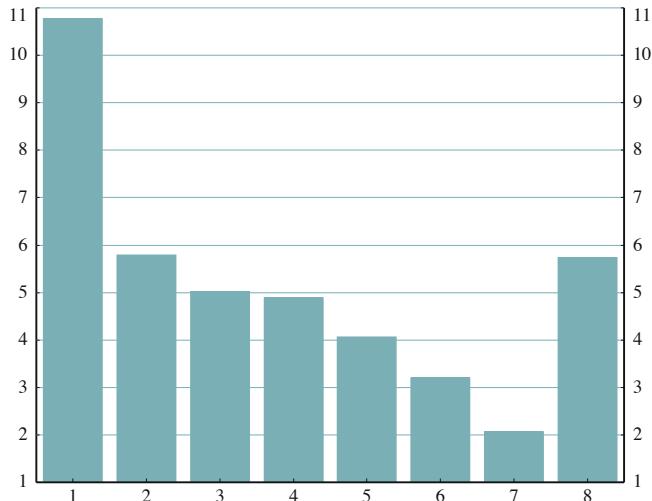


Source: ECB.

Notes: The Continuous Linked Settlement Bank (CLS) is a global financial market infrastructure which offers payment-versus-payment (PvP) settlement of foreign exchange (FX) transactions. Each PvP transaction consists in two legs. The figures above count only one leg per transaction. CLS transactions are estimated to cover about 60% of the global FX trading activity.

S.2.14 Value of securities held in custody by CSDs and ICSDs

(2012; EUR trillions; settlement in all currencies)

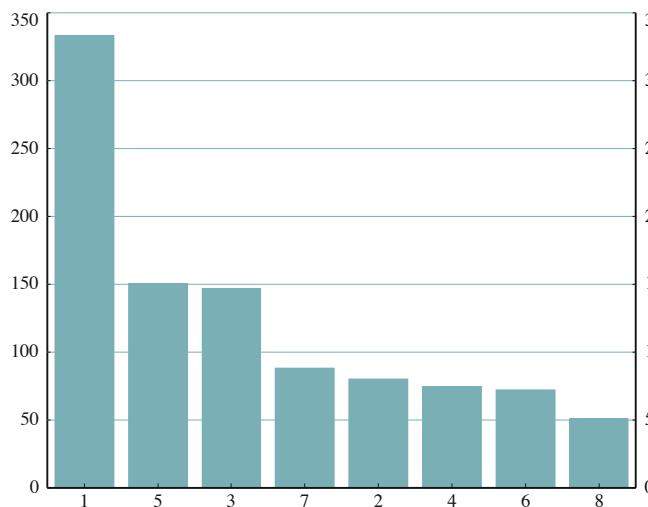


Source: ECB.

Notes: CSDs stands for central securities depositaries and ICSDs for international central securities depositaries. 1 - Euroclear Bank (BE); 2 - Clearstream Banking Frankfurt - CBF (DE); 3 - Euroclear France; 4 - Clearstream Banking Luxembourg - CBL; 5 - CRESTCo (UK); 6 - Monte Titoli (IT); 7 - Iberclear (ES); 8 - Remaining 31 CSDs in the EU.

S.2.15 Value of securities settled by CSDs and ICSDs

(2012; EUR trillions; settlement in all currencies)

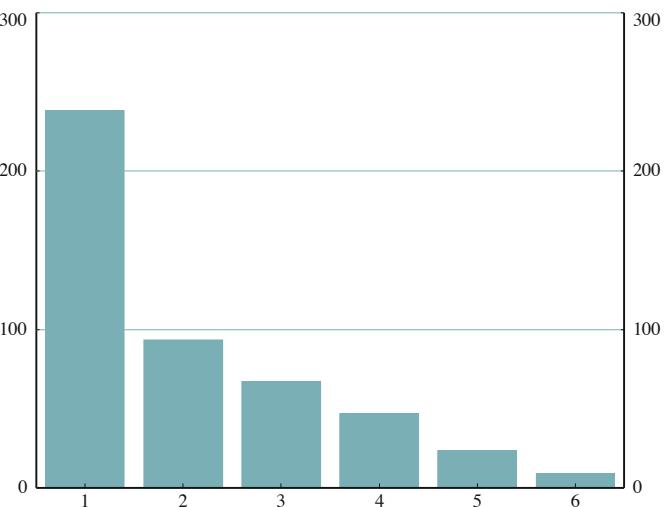


Source: ECB.

Note: See notes of Chart S.2.14.

S.2.16 Value of transactions cleared by central counterparties

(2012; EUR trillions)



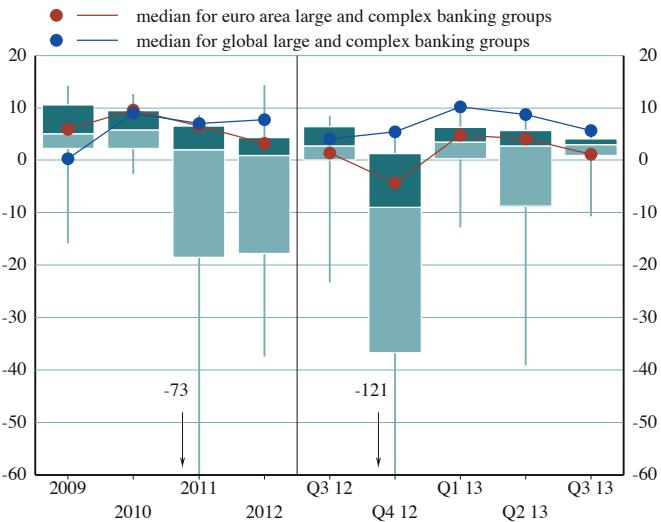
Source: ECB.

Notes: 1 - EUREX Clearing AG (DE); 2 - LCH.Clearnet Ltd; 3 - LCH Clearnet SA (FR); 4 - ICE Clear Europe (UK); 5 - CC&G (IT); 6 - Others. The chart includes outright and repo transactions, financial and commodity derivatives.

3 FINANCIAL INSTITUTIONS

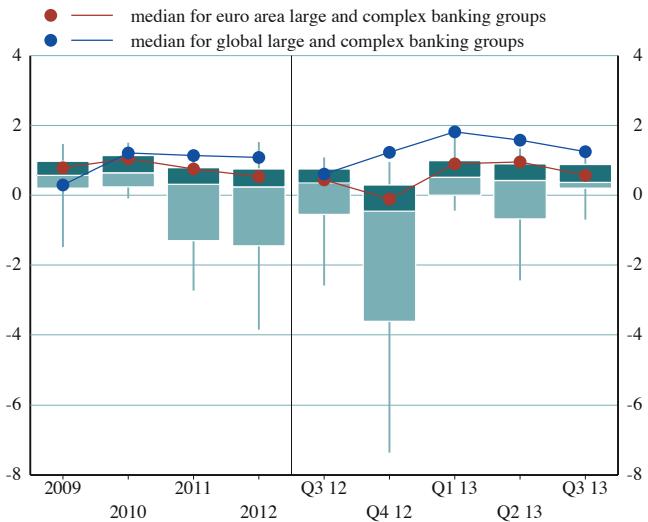
S.3.1 Return on shareholders' equity for euro area significant banking groups

(2009 - Q3 2013; percentages; 10th and 90th percentile and interquartile range distribution across significant banking groups)



S.3.2 Return on risk-weighted assets for euro area significant banking groups

(2009 - Q3 2013; percentages; 10th and 90th percentile and interquartile range distribution across significant banking groups)

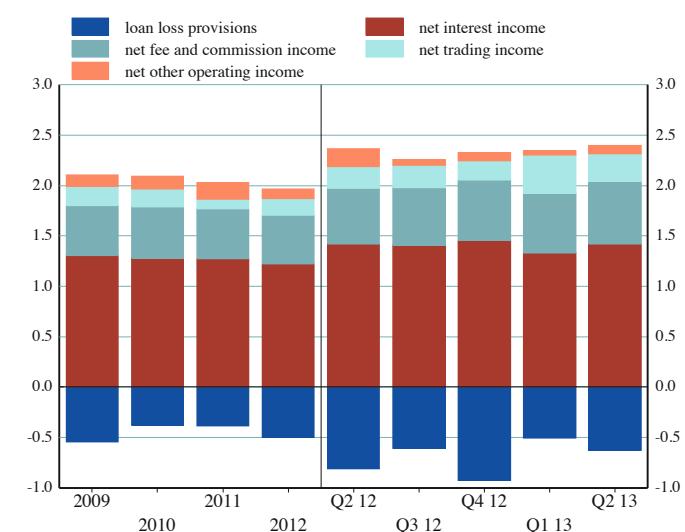


Sources: SNL Financial and ECB calculations.

Notes: Includes publicly available data for significant banking groups that report annual financial statements and a subset of those banks that report on a quarterly basis. Quarterly figures are annualised.

S.3.3 Breakdown of operating income for euro area significant banking groups

(2009 - Q2 2013; percentage of total assets; weighted average)



Sources: SNL Financial and ECB calculations.

Notes: Includes publicly available data for significant banking groups that report annual financial statements and a subset of those banks that report on a quarterly basis. Quarterly figures are annualised.

S.3.4 Diversification of operating income for euro area significant banking groups

(2009 - Q2 2013; individual institutions' standard deviation dispersion; 10th and 90th percentile and interquartile range distribution across significant banking groups)



Sources: SNL Financial and ECB calculations.

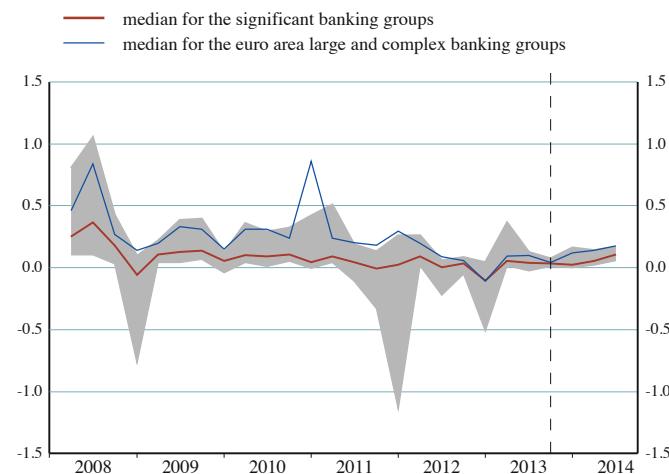
Notes: Includes publicly available data for significant banking groups that report annual financial statements and a subset of those banks that report on a quarterly basis. Quarterly results are annualised.

Sources: SNL Financial and ECB calculations.

Notes: Includes publicly available data for significant banking groups that report annual financial statements and a subset of those banks that report on a quarterly basis. A value of "0" means full diversification, while a value of "50" means concentration on one source only.

S.3.5 Actual and forecast earnings per share for euro area significant banking groups

(Q1 2008 - Q2 2014; EUR)



Sources: SNL Financial and ECB calculations.

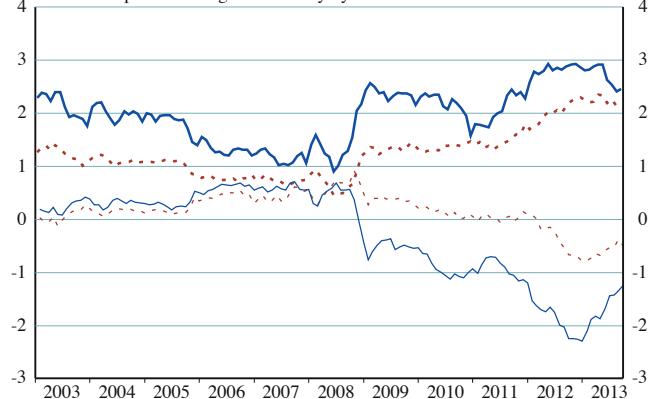
Note: The shaded area indicates the interquartile ranges across the diluted earnings per share of selected significant banking groups in the euro area.

S.3.6 Lending and deposit spreads of euro area MFIs

(Jan. 2003 - Sep. 2013; percentage points)

Legend:

- lending to households (solid blue line)
- lending to non-financial corporations (dashed red line)
- deposits with agreed maturity by non-financial corporations (dashed orange line)
- deposits with agreed maturity by households (solid blue line)

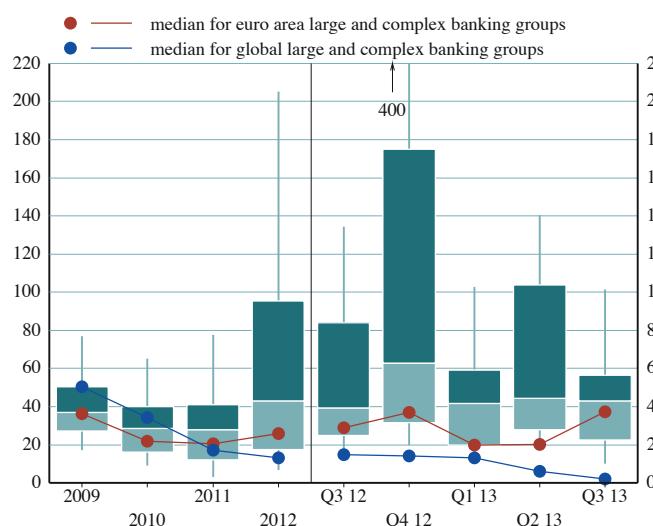


Sources: ECB, Thomson Reuters and ECB calculations.

Notes: Lending spreads are calculated as the average of the spreads for the relevant breakdowns of new business loans, using volumes as weights. The individual spreads are the difference between the MFI interest rate for new business loans and the swap rate with a maturity corresponding to the loan category's initial period of rate fixation. For deposits with agreed maturity, spreads are calculated as the average of the spreads for the relevant break-downs by maturity, using new business volumes as weights. The individual spreads are the difference between the swap rate and the MFI interest rate on new deposits, where both have corresponding maturities.

S.3.7 Net loan impairment charges for euro area significant banking groups

(2009 - Q3 2013; percentage of net interest income; 10th and 90th percentile and interquartile range distribution across significant banking groups)



Sources: SNL Financial and ECB calculations.

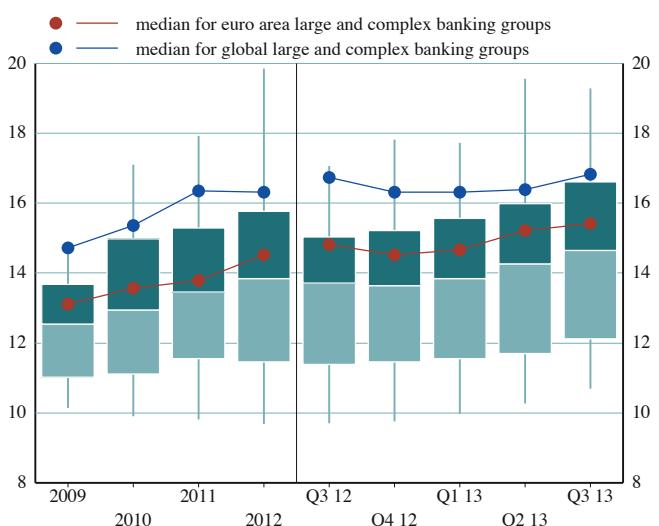
Note: Includes publicly available data for significant banking groups that report annual financial statements and a subset of those banks that report on a quarterly basis.

S.3.8 Total capital ratios for euro area significant banking groups

(2009 - Q3 2013; percentages; 10th and 90th percentile and interquartile range distribution across significant banking groups)

Legend:

- median for euro area large and complex banking groups (red line)
- median for global large and complex banking groups (blue line)

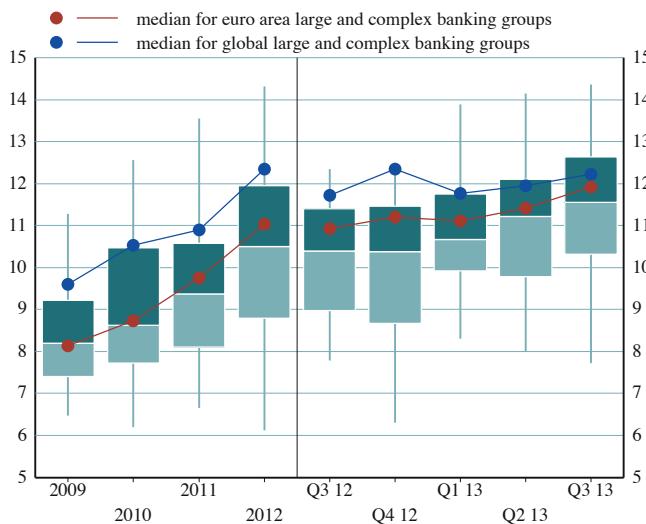


Sources: SNL Financial and ECB calculations.

Note: Includes publicly available data for significant banking groups that report annual financial statements and a subset of those banks that report on a quarterly basis.

S.3.9 Core Tier I capital ratios for euro area significant banking groups

(2009 - Q3 2013; percentages; 10th and 90th percentile and interquartile range distribution across significant banking groups)

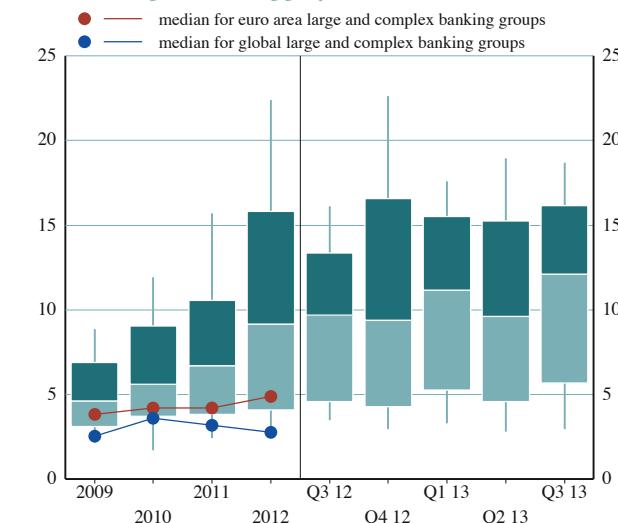


Sources: SNL Financial and ECB calculations.

Note: Includes publicly available data for significant banking groups that report annual financial statements and a subset of those banks that report on a quarterly basis.

S.3.11 Non-performing loan ratios for euro area significant banking groups

(2009 - Q3 2013; percentages; 10th and 90th percentile and interquartile range distribution across significant banking groups)

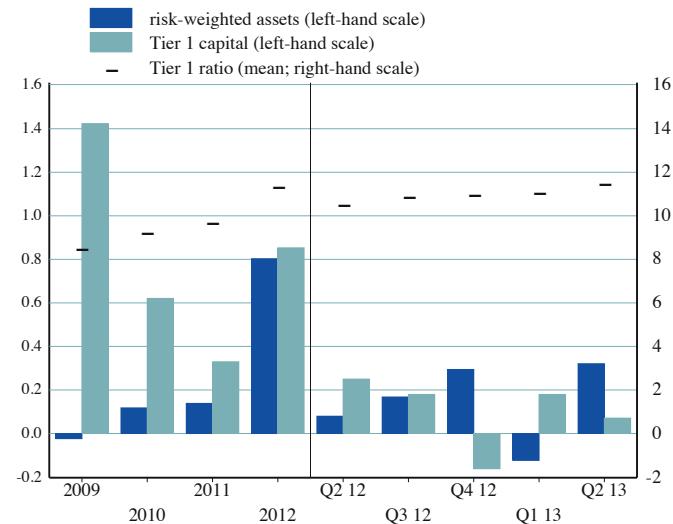


Sources: SNL Financial and ECB calculations.

Notes: Includes publicly available data for significant banking groups that report annual financial statements and a subset of those banks that report on a quarterly basis. The non-performing loan ratio is defined as the ratio of impaired customer loans to total customer loans. Quarterly data for the medians for euro area and global large and complex banking groups are not included on account of the inadequate availability of interim results on the date of publication.

S.3.10 Contribution of components of the core Tier I capital ratios to changes for euro area significant banking groups

(2009 - Q2 2013; percentages)

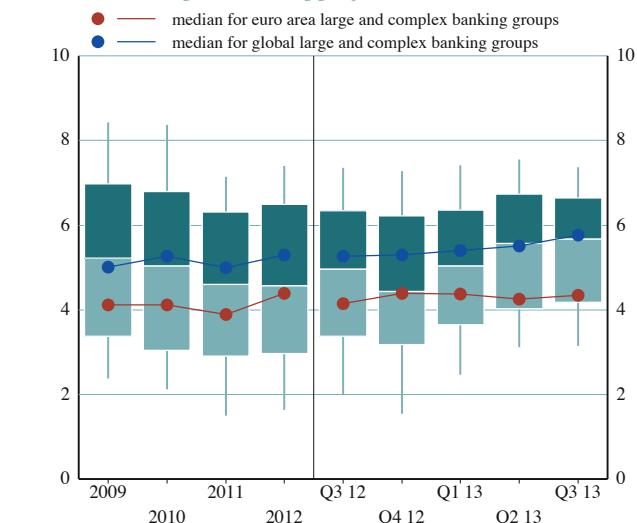


Sources: SNL Financial and ECB calculations.

Note: Includes publicly available data for significant banking groups that report annual financial statements and a subset of those banks that report on a quarterly basis.

S.3.12 Leverage ratios for euro area significant banking groups

(2009 - Q3 2013; percentages; 10th and 90th percentile and interquartile range distribution across significant banking groups)

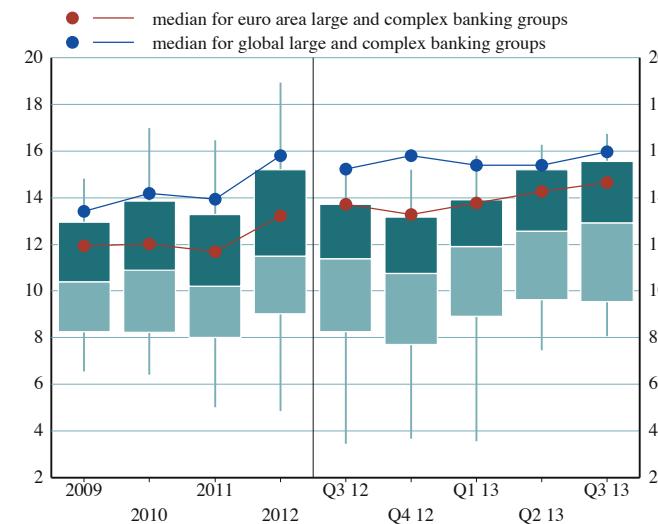


Sources: SNL Financial and ECB calculations.

Notes: Includes publicly available data for significant banking groups that report annual financial statements and a subset of those banks that report on a quarterly basis. Leverage is defined as the ratio of shareholder equity to total assets.

S.3.13 Risk-adjusted leverage ratios for euro area significant banking groups

(2009 - Q3 2013; percentages; 10th and 90th percentile and interquartile range distribution across significant banking groups)

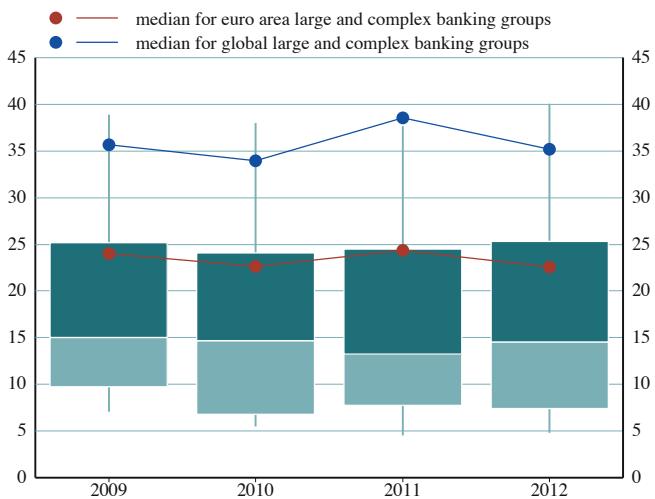


Sources: SNL Financial and ECB calculations.

Notes: Includes publicly available data for significant banking groups that report annual financial statements and a subset of those banks that report on a quarterly basis.
Risk-adjusted leverage is defined as the ratio of shareholder equity to risk-weighted assets.

S.3.14 Liquid assets ratios for euro area significant banking groups

(2009 - 2012; percentage of total assets; 10th and 90th percentile and interquartile range distribution across significant banking groups)

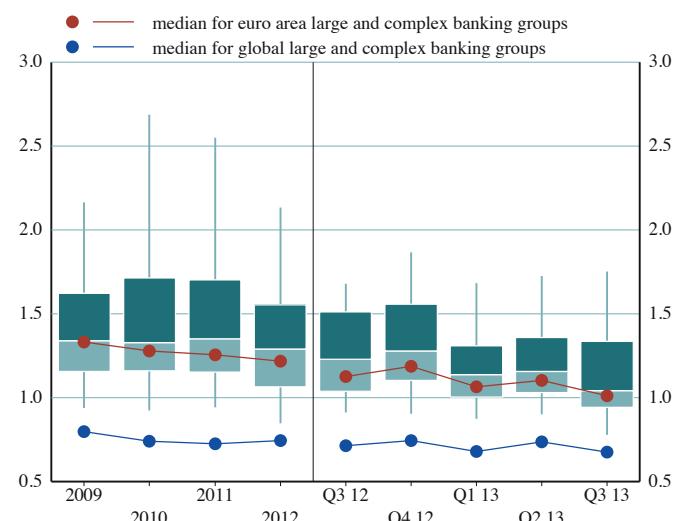


Sources: SNL Financial and ECB calculations.

Notes: Includes publicly available data for significant banking groups that report annual financial statements. Liquid assets comprise cash and cash equivalents as well as trading securities.
Quarterly data are not included on account of the inadequate availability of interim results on the date of publication.

S.3.15 Customer loan-to-deposit ratios for euro area significant banking groups

(2009 - Q3 2013; multiple; 10th and 90th percentile and interquartile range distribution across significant banking groups)

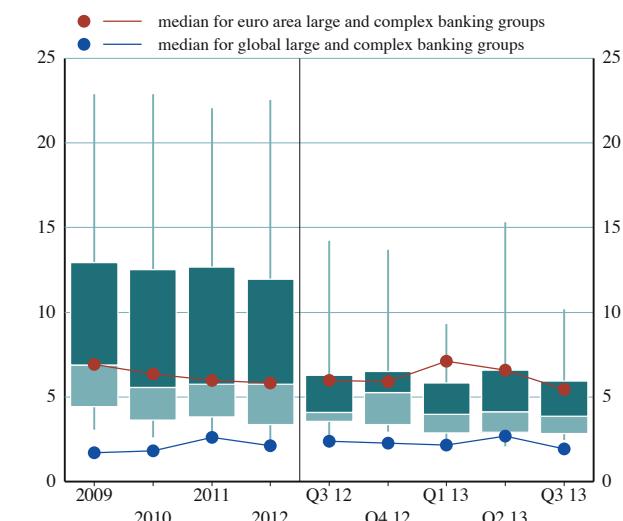


Sources: SNL Financial and ECB calculations.

Note: Includes publicly available data for significant banking groups that report annual financial statements and a subset of those banks that report on a quarterly basis.

S.3.16 Interbank borrowing ratio for euro area significant banking groups

(2009 - Q3 2013; percentage of total assets; 10th and 90th percentile and interquartile range distribution across significant banking groups)



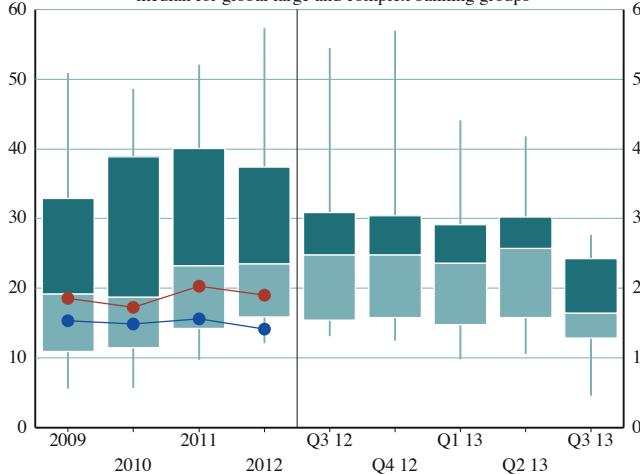
Sources: SNL Financial and ECB calculations.

Note: Includes publicly available data for significant banking groups that report annual financial statements and a subset of those banks that report on a quarterly basis.

S.3.17 Ratios of short-term funding to loans for euro area significant banking groups

(2009 - Q3 2013; percentages; 10th and 90th percentile and interquartile range distribution across significant banking groups)

- — median for euro area large and complex banking groups
- — median for global large and complex banking groups



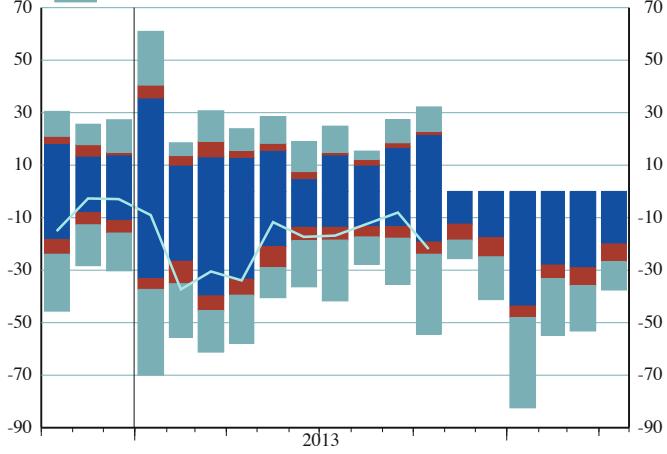
Sources: SNL Financial and ECB calculations.

Notes: Includes publicly available data for significant banking groups that report annual financial statements and a subset of those banks that report on a quarterly basis. Interbank funding is used as the measure of short-term funding. Quarterly data for the medians for euro area and global large and complex banking groups are not included on the account of the inadequate availability of interim results on the date of publication.

S.3.18 Issuance profile of long-term debt securities by euro area significant banking groups

(Oct. 2012 - Apr. 2014; EUR billions)

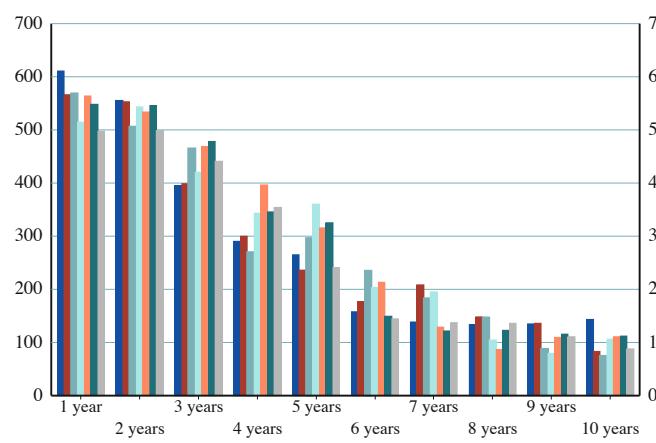
- corporate bonds
- asset-backed instruments
- medium-term notes
- net issuance



S.3.19 Maturity profile of long-term debt securities for euro area significant banking groups

(2005 - Oct. 2013; EUR billions)

- | | | |
|-------------------|--------|--------|
| ■ average 2005-07 | ■ 2008 | ■ 2009 |
| ■ 2010 | ■ 2011 | ■ 2012 |
| ■ Oct. 2013 | | |



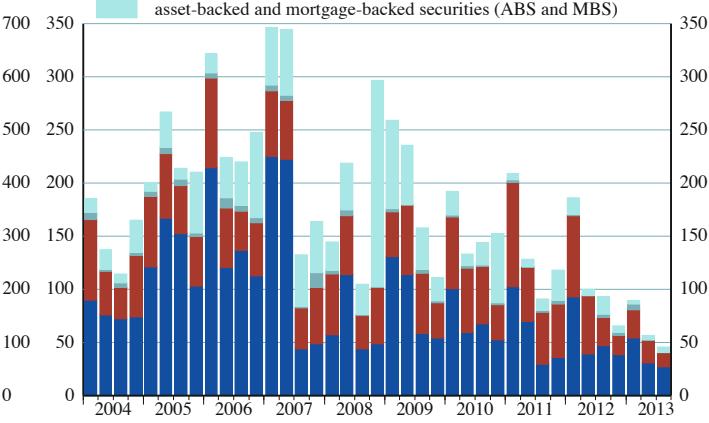
Sources: Dealogic DCM Analytics and ECB calculations.

Notes: Data refer to all amounts outstanding at the end of the corresponding year/month. Long-term debt securities include corporate bonds, medium-term notes, covered bonds, asset-backed securities and mortgage-backed securities with a minimum maturity of 12 months.

S.3.20 Issuance of syndicated loans and bonds by euro area banks

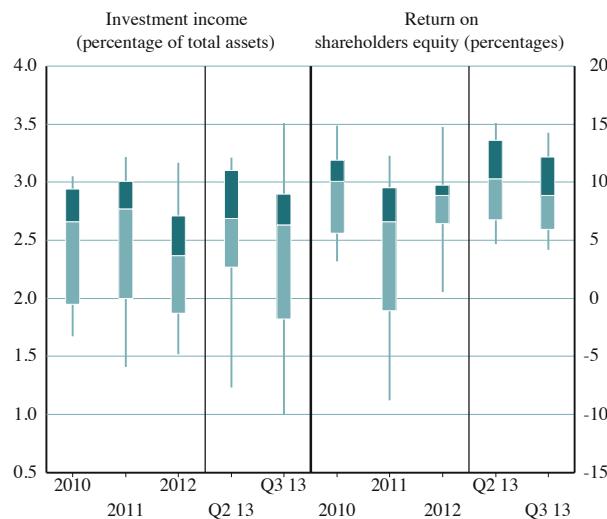
(Q1 2004 - Q3 2013; EUR billions)

- bonds (excluding covered bonds, ABS and MBS)
- covered bonds
- syndicated loans granted to banks
- asset-backed and mortgage-backed securities (ABS and MBS)



S.3.21 Investment income and return on equity for a sample of large euro area insurers

(2010 - Q3 2013; percentages; 10th and 90th percentile and interquartile range distribution)

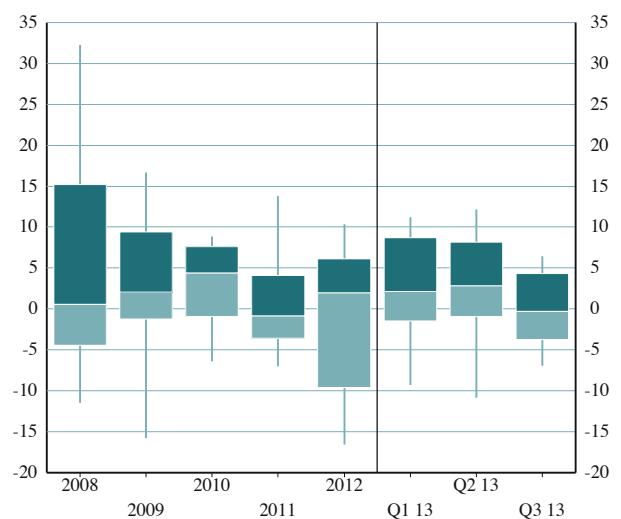


Sources: Bloomberg, individual institutions' reports and ECB calculations.

Notes: Based on available figures for 21 euro area insurers and reinsurers.

S.3.22 Gross-premium-written growth for a sample of large euro area insurers

(2008 - Q3 2013; percentage change per annum; 10th and 90th percentile and interquartile range distribution)

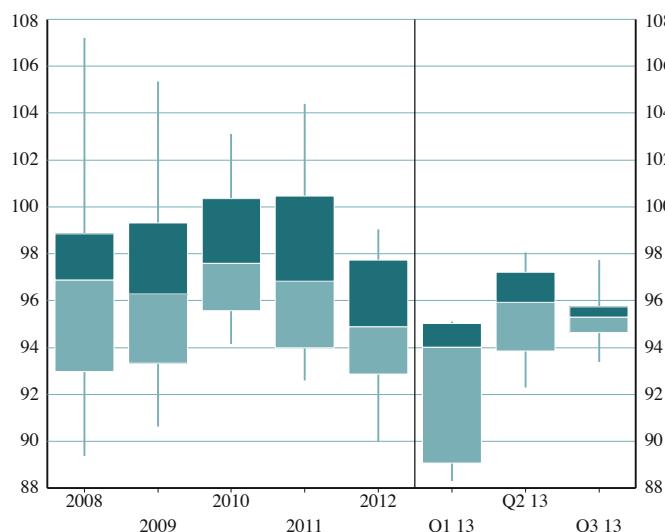


Sources: Bloomberg, individual institutions' reports, and ECB calculations.

Notes: Based on available figures for 21 euro area insurers and reinsurers.

S.3.23 Distribution of combined ratios for a sample of large euro area insurers

(2008 - Q3 2013; percentages; 10th and 90th percentile and interquartile range distribution)

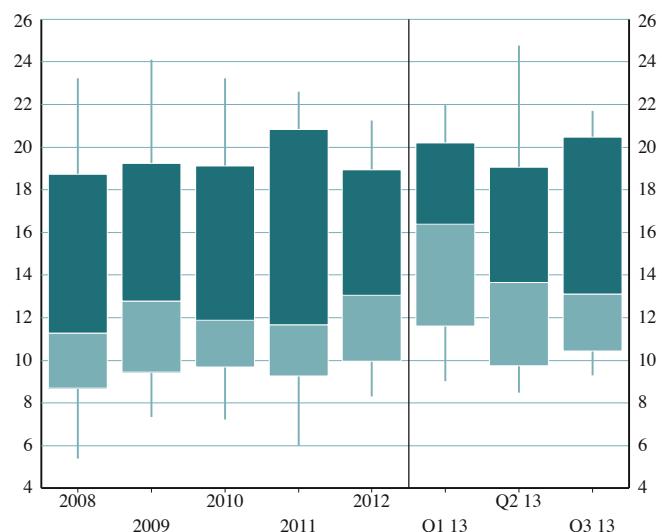


Sources: Bloomberg, individual institutions' reports and ECB calculations.

Notes: Based on available figures for 21 euro area insurers and reinsurers.

S.3.24 Capital distribution for a sample of large euro area insurers

(2008 - Q3 2013; percentage of total assets; 10th and 90th percentile and interquartile range distribution)

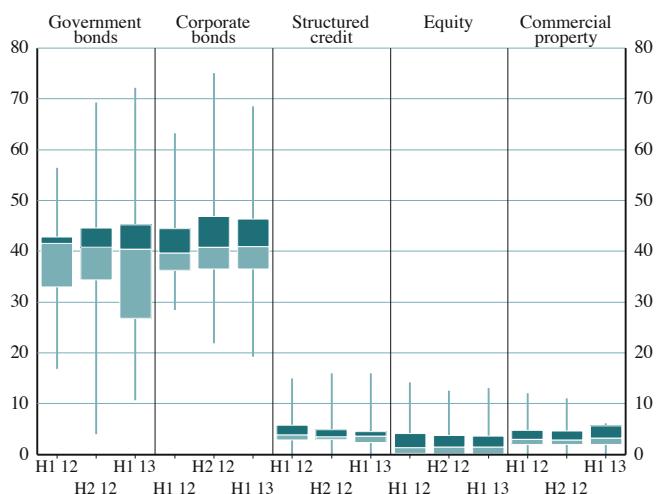


Sources: Bloomberg, individual institutions' reports and ECB calculations.

Notes: Capital is the sum of borrowings, preferred equity, minority interests, policyholders' equity and total common equity. Data are based on available figures for 21 euro area insurers and reinsurers.

S.3.25 Investment distribution for a sample of large euro area insurers

H1 2012 - H1 2013; percentage of total investments; minimum, maximum and interquartile distribution)

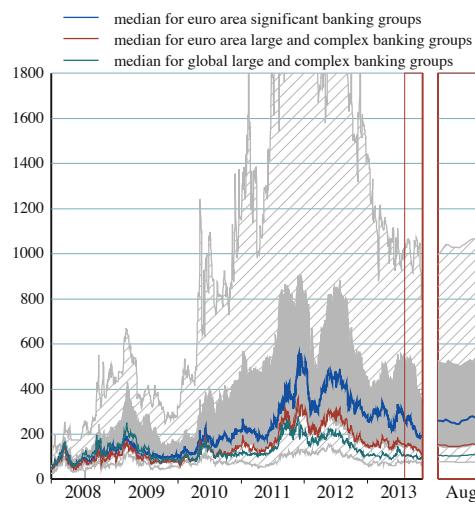


Sources: Individual institutions' financial reports and ECB calculations.

Notes: Equity exposure data exclude investments in mutual funds. Data are based on available figures for 14 euro area insurers and reinsurers.

S.3.27 Credit default swap spreads for euro area significant banking groups

(1 Jan. 2008 - 15 Nov 2013; basis points; senior debt; five-year maturity)

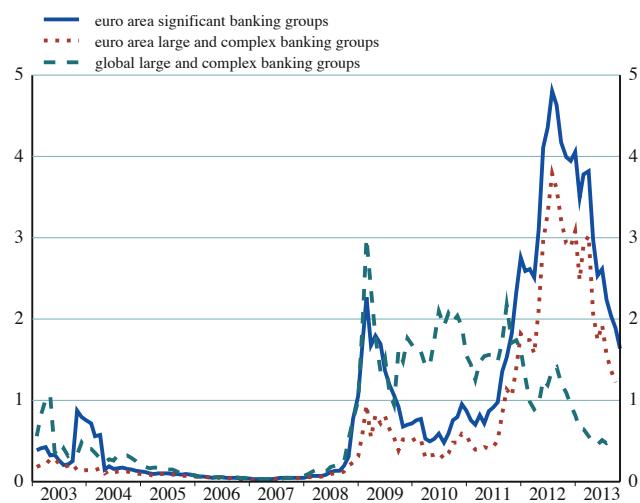


Sources: Thomson Reuters, Bloomberg and ECB calculations.

Note: The hatched/shaded areas indicate the minimum-maximum and interquartile ranges across the CDS spreads of selected large banks. For presentational reasons, this chart has been truncated.

S.3.26 Expected default frequency for banking groups

(Jan. 2003 - Oct. 2013; percentages; weighted average)

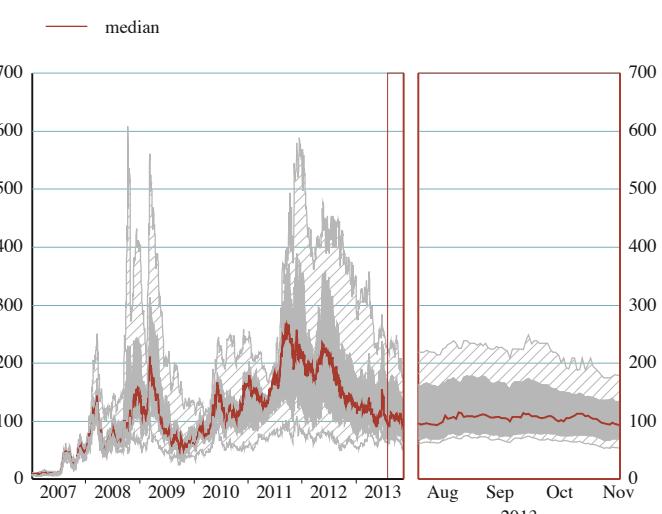


Sources: Moody's KMV and ECB calculations.

Note: The weighted average is based on the amounts of non-equity liabilities.

S.3.28 Credit default swap spreads for a sample of large euro area insurers

(3 Jan. 2007 - 15 Nov 2013; basis points; senior debt; five-year maturity)

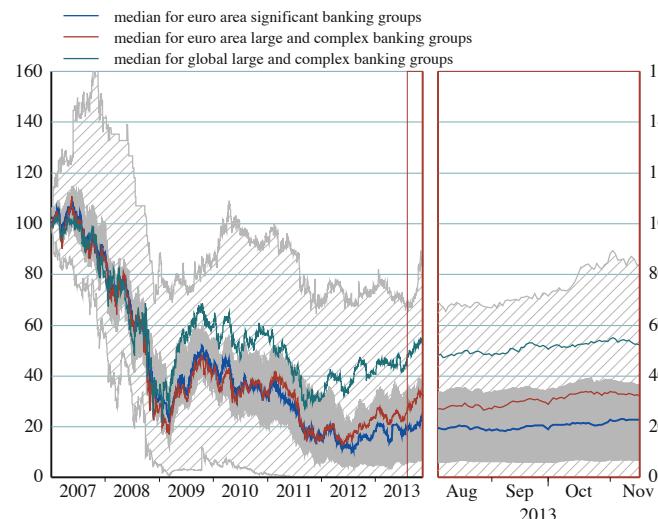


Sources: Thomson Reuters, Bloomberg and ECB calculations.

Note: The hatched/shaded areas indicate the minimum-maximum and interquartile ranges across the CDS spreads of selected large insurers.

S.3.29 Stock performance of the euro area significant banking groups

(3 Jan. 2007 - 15 Nov 2013 ; index: 2 Jan. 2007 = 100)

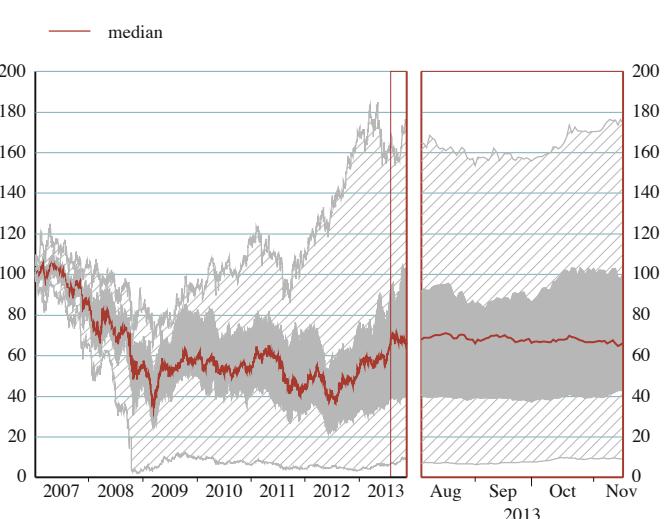


Sources: Thomson Reuters , Bloomberg and ECB calculations.

Note: The hatched/shaded areas indicate the minimum-maximum and interquartile ranges across equities of selected large insurers.

S.3.30 Stock performance of a sample of large euro area insurers

(3 Jan. 2007 - 15 Nov 2013 ; index: 2 Jan. 2007 = 100)



Sources: Thomson Reuters , Bloomberg and ECB calculations.

Note: The hatched/shaded areas indicate the minimum-maximum and interquartile ranges across equities of selected large insurers.

