EUROPEAN CENTRAL BANK

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FINANCIAL STABILITY REVIEW

DECEMBER 2010

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In 2010 all ECB publications feature a motif taken from the €500 banknote.

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PREFACE

Financial stability can be defined as a condition in which the financial system – which comprises financial intermediaries, markets and market infrastructures – is capable of withstanding shocks and the unravelling of financial imbalances. This mitigates the likelihood of disruptions in the financial intermediation process that are severe enough to significantly impair the allocation of savings to profitable investment opportunities. Understood this way, the safeguarding of financial stability requires identifying the main sources of risk and vulnerability. Such sources include inefficiencies in the allocation of financial resources from savers to investors and the mispricing or mismanagement of financial risks. The identification of risks and vulnerabilities is necessary because the monitoring of financial stability must be forward looking: inefficiencies in the allocation of capital or shortcomings in the pricing and management of risk can, if they lay the foundations for vulnerabilities, compromise future financial system stability and therefore economic stability. This Review assesses the stability of the euro area financial system both with regard to the role it plays in facilitating economic processes and with respect to its ability to prevent adverse shocks from having inordinately disruptive impacts.

The purpose of publishing this Review is to promote awareness in the financial industry and among the public at large of issues that are relevant for safeguarding the stability of the euro area financial system. By providing an overview of sources of risk and vulnerability for financial stability, the Review also seeks to play a role in preventing financial crises.

The analysis contained in this Review was prepared with the close involvement of, and contributions from, the Banking Supervision Committee (BSC). The BSC is a forum for cooperation among the national central banks and supervisory authorities of the European Union (EU) and the European Central Bank (ECB).

I OVERVIEW

OVERALL ASSESSMENT OF THE EURO AREA FINANCIAL STABILITY OUTLOOK

The overall economic and financial situation is still fraught with risks for financial stability. The main source of concern stems from the interplay between sovereign debt problems and vulnerabilities in segments of the euro area banking sector. Another important source of risk is the re-emergence of global imbalances and the possibility of their disorderly unwinding. These two vulnerabilities have the potential to generate negative surprises of potential systemic importance. This issue of the Financial Stability Review (FSR) assesses these risks and points to the appropriate actions to avoid or to mitigate their effects.

It is, however, important to underline that, should the current consensus baseline macroeconomic scenario for the euro area, which assumes moderate growth, materialise, the euro area financial sector is expected to further strengthen its resilience and profitability in the period ahead. This assessment is supported by several important developments: first, decisive actions taken at the EU level by Member States – including additional financial backstop mechanisms set up by governments – and by central banks to support financial stability; second, fiscal consolidation efforts by Member States; and third, increased transparency concerning financial institutions' asset exposures.

The main risks for the euro area financial system continue to include the concerns about the sustainability of public finances, with the potential for further adverse feedback between the public finances, macroeconomic growth and financial sector developments. Despite the fact that the interplay between vulnerabilities of economic growth, fiscal imbalances and bank funding conditions is prevalent in a limited number of euro area countries, which represent a relatively small share of total euro area GDP, risks of potential contagion to other euro area countries remain. However, the establishment of the European Financial Stabilisation Mechanism, the European Financial Stability Facility and the ECB's Securities Markets Programme should help to reduce the adverse impact on the euro area financial system in case such low-probability events materialised. Furthermore, also the countries not directly affected by the above-mentioned interplay may be experiencing growing risks of a renewed build-up of financial imbalances in the context of persistently low interest rates.

Other, albeit less material, risks identified outside the euro area financial system include the possibility of a resurgence of global imbalances, with the risk of their disorderly unwinding. The impact of such risks, should they crystallise, would likely be rather heterogenous across the different parts of the euro area financial system.

Although the risks to euro area household and non-financial corporate sectors have declined somewhat compared with the assessment in the June 2010 FSR in terms of their likelihood of materialising, the volume of related non-performing loans could still be significant, owing to the important roles of these sectors as sources and users of funds in the euro area financial system.

Within the euro area financial system, important risks include the possibility of a renewal of strains, because of heightened funding vulnerabilities and dampened profitability prospects. Furthermore, vulnerabilities of some financial institutions associated with concentrations of lending exposures to commercial property markets still exist.

Finally, there is also the possibility of heightened financial market volatility, particularly in the euro area government bond and stock markets, if the relatively favourable macroeconomic outcomes recently seen in the euro area as a whole were to turn out not to have heralded a more robust economic recovery. This market risk relates in particular to banks located in or exposed to countries with elevated sovereign risk.

In a broader sense, reflecting this link between macroeconomic outcomes and financial market volatility, a key concern in the period ahead is that many of the risks and vulnerabilities mentioned could be unearthed by a scenario involving weaker than expected economic growth.

These main risks for euro area financial stability are presented in the table below.

All in all, significant actions taken by euro area governments in the spring and summer of 2010 to bolster confidence in the financial sector were important to contain systemic risk in the euro area. This notwithstanding, given the potential for continued adverse feedback between weak public finances and financial sector vulnerabilities in many parts of the euro area, there is no room for complacency. Strong commitments by governments to rein in public sector imbalances and to implement measures that support the competitiveness of and confidence in the euro area economy are necessary to ensure financial sector soundness in the future. At the same time, banks should use opportunities available to bolster their capital buffers, including the transitional period to the Basel III rules, to further improve their resiliency towards possible shocks in the period ahead.

In an environment of divergent financial market developments across the euro area, the timing and phasing of exit from remaining public sector support measures pose particular challenges. Swift and decisive steps must be taken to address imbalances in those parts of the euro area financial system where they have been accumulating. In particular, the continuing dependence of a limited number of financial institutions on public support in some countries means that action is needed by the responsible authorities in the form of restructuring, de-risking and, where necessary, downsizing of the balance sheets of such firms. At the same time, in those parts of the euro area where long-term interest rates have declined to very low levels, partly reflecting safe-haven capital inflows, risk associated with a renewed search for yield could be developing. The relevant authorities need to remain particularly vigilant to prevent new imbalances from developing and further complicating the delicate balance that is facing policy-makers in the period ahead. The importance of getting the timing of exit from public support measures to the financial sector right should not be underestimated. Withdrawal of public support must proceed with caution and care, so as not to spark a setback to financial stability which would ultimately threaten the economic recovery.

Main risks for euro area financial stability

Outside the financial system, the main sources of risk for euro area financial stability include the possibility of:	Concerns about the sustainability of public finances, with the potential for further adverse feedback between public finances, macroeconomic growth and financial sector developments
	A resurgence of global imbalances and the risk of a disorderly unwinding of those imbalances
	Pockets of vulnerability being revealed in euro area non-financial corporations' balance sheets, because of high leverage, low profitability and difficult financing conditions
	Greater-than-expected euro area household sector credit losses if unemployment remains high for a prolonged period, or surprises to the upside
Within the euro area financial system, important risks include the possibility of:	A renewal of strains on financial systems, because of heightened funding vulnerabilities and dampened profitability prospects
	Vulnerabilities of some financial institutions associated with concentrations of lending exposures to commercial property markets being revealed
	Heightened financial market volatility if macroeconomic outcomes fail to live up to market expectations

The next part of this section reviews the main sources of risk and vulnerability that are present in the macro-financial environment. This is followed by an assessment of the main sources of risk and vulnerability that are specific to the euro area financial system. The section concludes with a reference to the latest regulatory developments.

SOURCES OF RISK AND VULNERABILITY OUTSIDE THE EURO AREA FINANCIAL SYSTEM

The main risk for the euro area financial system remains the concern about the sustainability of public finances in some euro area countries with a potential for further adverse feedback effects between public finances and the financial sector. For some countries, the consequence has been the creation of conditions for adverse feedback loops to open up between downside risks to economic growth, bank funding vulnerabilities and fiscal imbalances. This triangle of vulnerabilities has already led to further strains in a number of banking sectors, especially in funding markets, since the finalisation of the June FSR. Various propagation and contagion channels can be identified through which such country-specific disturbances could spread wider in the euro area financial system. As evidenced by the development of sovereign bond spreads since summer 2010, financial market participants seem to discount and frequently revise their assessment of such risks with particular emphasis on three euro area countries.

Market concerns about sovereign credit risk did ease somewhat in the second quarter, due to an improved general macroeconomic outlook and following a number of policy initiatives that were put in place from May 2010 onwards – including the ECB's Securities Markets Programme, the establishment of the European Financial Stabilisation Mechanism and the European Financial Stability Facility, as well as the publication of the EU-wide macro-stress-test results. Moreover, euro area countries announced their commitment to undertake or accelerate fiscal consolidation. In the third quarter and also more recently, however, perceptions of sovereign credit risk were driven by increasing fears that contingent or implicit government liabilities associated with state guarantees for the financial sector could actually trigger sizeable government expenditures in some countries.

The crisis has clearly demonstrated that limited progress with fiscal consolidation risks causing negative financial market reactions leading to significantly higher financing costs for sovereigns as the credit risk premium rises. This in turn increases the likelihood of an unsustainable debt spiral. At the same time, higher public sector financing needs will also increase bank funding costs through elevated competition for bond investors' funds.

Looking forward, it should be recognised that the beneficial growth effects of fiscal consolidation stemming from a decreased net present value of future taxes and a related reduction in uncertainty with respect to fiscal sustainability in general will be felt mostly in the medium term. As a consequence, short-term earnings prospects for banks could suffer. However, these concerns in no way call into question the fundamental need for strong and swift fiscal consolidation in several euro area countries.

While the necessary consolidation efforts will be proceeding in the coming years, any succession of significant bad news concerning individual banks, banking sectors or GDP growth in general could lead to a simultaneous, mutually reinforcing deterioration of bank and sovereign financing costs. This triangle of vulnerabilities is at work independent of the initial source of the imbalance, which is, with respect to the two euro area countries most concerned, the government sector in Greece and the banking sector in Ireland. In Greece the fiscal problem of the government sector triggered a reassessment among market participants of the creditworthiness of the Greek banking sector, seriously restricting Greek banks' access to market funding, which nevertheless has improved recently with some banks being able to increase their capital. In Ireland, a more traditional banking crisis due to impaired assets and excessive exposure to

property lending has led to a recapitalisation need of the banking system which, simply due to the size of the banking sector relative to the public sector, constitutes a challenge for the country. Correspondingly, Ireland applied for an EU/IMF financial support programme on 21 November, the terms of which were agreed on 28 November.

There are important side effects of the adverse fiscal-financial-growth feedback mechanism which is at work in the euro area countries with large public sector imbalances. In this respect, and with moderate price developments over the medium term in the euro area, and some non-standard monetary policy measures in place, a generally low interest rate level across the whole spectrum of the yield curve will prevail for those countries not, or much less, affected by concerns about domestic fiscal sustainability, due to safe-haven effects.

A further risk originating outside the euro area financial system is related to international capital flows and the risk of overheating emerging economies and related asset price bubbles in the short run, and the re-emergence of pre-crisis-style global imbalances in the medium run.

Net private capital inflows to emerging markets are expected to increase significantly in 2010 and 2011 compared with 2009. For euro area investors, there is a risk of a swift future correction of asset prices, should an emerging search-for-yield type of behaviour soon lead to large and possibly concentrated exposures to certain emerging markets. The risk of an emerging market asset price boom-bust scenario has not increased since the finalisation of the June FSR, however, as some emerging market economies have already enacted policy measures to contain capital inflows or, as in the case of China, booming housing markets.

What is more likely to become a potential risk in the medium run is the possibility of a resurgence of global imbalances, in which in particular emerging Asia finances a US savings deficit, leading to further growth of the net external liabilities of the United States. Such a situation entails the risk of significant exchange rate volatility should doubts about the sustainability of persistent US current deficits re-emerge. Behind this assessment is the observation that part of the past reduction of US trade and current account deficits appears to be cyclical and these deficits have already been widening again during 2010, while the mirror image has been observed in China. In order to support US economic growth and employment, the Federal Reserve announced on 3 November a new round of quantitative easing measures in the form of central bank bond purchases.

For the euro area, exchange rate volatility related to an abrupt correction of global imbalances would affect member countries differently, depending on the geographical structure of foreign trade, as non-euro area trade weights for individual countries vary significantly. This could potentially amplify divergent cyclical developments and add to the fiscal and financial sectors' difficulties in specific countries.

Although the overall outlook for euro area non-financial corporations has been improving, leverage is still relatively high. Some segments of the non-financial corporate sector continue to be confronted with difficult financing conditions, which makes these corporations' balance sheets vulnerable to shocks to their revenues or financing costs. But improving profits together with the relatively low prevailing cost of financing, which mitigates firms' interest rate burden, should support the ability of firms to service their debt and thus improve their creditworthiness in the period ahead. Strains persist however for some small and medium-sized enterprises (SMEs), on account of lower profitability levels and tighter credit standards. In addition, although the profitability of non-financial corporations should continue to be supported by the recovery in economic activity, even if this recovery takes place at a more modest pace, still subdued activity in some euro

area countries is likely to continue to weigh on profitability in some markets and sectors of the euro area. The overall assessment is thus rather one of a general improvement with respect to risks related to the euro area non-financial sector, but pockets of vulnerability remain. At the euro area level, the construction as well as wholesale and retail sectors seem to be the most vulnerable ones, due to their low profitability and relatively high debt levels.

Turning to commercial property markets, although most euro area countries have witnessed some improvements, prices are likely to remain below the highs seen in previous years for some time to come. This poses risks for many loan-financed property investors and commercial mortgage-backed securities (CMBSs) with loans due for refinancing in the coming months and years. It cannot be excluded, therefore, that additional losses could materialise for some banks in the period ahead as a result of their exposure to commercial property lending and investment.

Euro area household sector balance sheet conditions have broadly developed in line with what was anticipated in the June 2010 FSR. While the macroeconomic environment has continued to negatively affect household sector balance sheets, the overall assessment remains one of continued sustainability but with important differences across euro area countries. Vulnerabilities of household sector balance sheets stemming from still subdued household income prospects and residential property price developments therefore remain. Household income prospects are depressed due to unemployment rates predicted to remain elevated and even to further increase in several euro area countries. House prices in some euro area countries seem still to have potential for further downward adjustment.

SOURCES OF RISK AND VULNERABILITY WITHIN THE EURO AREA FINANCIAL SYSTEM

Since the publication of the June 2010 FSR euro area banks rolled over substantially less funds in the Eurosystem credit operations than they had borrowed in earlier operations. However, this decline in borrowing by banks from the Eurosystem did not lead to any disruption in the euro money market, despite some initial concerns by market participants. Towards the end of the period under review, the availability of funds also beyond the overnight maturity improved for a selected number of stronger banks, whereas the weaker banks seemed to find it difficult to access term funding and thus remained reliant on liquidity provided by the Eurosystem.

Notwithstanding the reduced recourse to Eurosystem operations, a number of indicators continued to point to lingering counterparty credit risk concerns in the euro money market. First, the difference between euro area unsecured and secured interbank lending rates remained high and especially so for longer maturities. Amid remaining tensions in the euro money market, on 2 December 2010 the ECB announced that it would maintain the current fixed rate full-allotment policy for main refinancing operations as long as necessary and at least until 12 April 2011. The three-month longer-term refinancing operations (LTROs) will likewise be conducted with a fixed rate tender procedure with full allotment up to the end of the first quarter of 2011. Second, the set of bidders in the Eurosystem operations remains segmented, with a small number of institutions which are excessively reliant on central bank liquidity accounting for a substantial share of the overall refinancing volumes. Concerns about the challenges that these banks may face when the ECB will proceed further with the phasing-out of the enhanced credit support measures remain acute. At the same time, there have been further signs of normalisation in the access to market-based financing by the majority of banks in the euro area.

In the euro area government bond markets, by the cut-off date for this issue of the FSR, the yields on the highest-rated long-term euro area government bonds declined further from the levels that prevailed in mid-May 2010. The overall decline in yields was characterised

by significant volatility which to a large extent reflected concerns among market participants about the outlook for global and euro area macroeconomic activity as well as renewed worries about the fiscal situation in some euro area countries. There were also occasional flight-to-safety flows which helped to depress the yields of high-grade euro area sovereign bonds in some cases to historical lows. At the other end of the rating spectrum, despite a spell of relief in July 2010 following several successful government bond auctions in peripheral euro area countries and overall positive EU-wide bank stress-test results, intra-euro area government bond yield spreads started widening again in late August 2010 on account of resurfaced fiscal sustainability concerns. Overall, liquidity in certain euro area government bond markets remained limited and the ECB's Securities Markets Programme was crucial in addressing the malfunctioning of these markets.

The euro area securitisation markets remain impaired, as reflected by the subdued issuance volumes in the euro area asset-backed security (ABS) market, which have fallen to the lowest level since 2003. Insufficient transparency about the composition of the asset pools has been identified as one of the key impediments to a sustainable recovery of securitisation markets. To partially address this issue, and since the Eurosystem is one of the most important lenders against ABSs, the final preparatory work initiated in April 2010 on the establishment of loan-level information requirements for ABSs in the Eurosystem collateral framework has advanced as planned so that the new requirements should become applicable for newly issued ABSs in due course. These new requirements will clearly increase transparency in this market, thereby contributing to more informed risk assessments and helping to restore confidence in the ABS markets.

In the euro area equity markets, indices somewhat recovered from the sharp correction in May 2010, but tended to fluctuate within relatively tight ranges. This was despite the fact that at the euro area level, economic news tended to come in more positive than what had been priced in by market analysts prior to the data releases. Rather, prices seem to have ebbed and flowed in line with changes in market sentiment regarding fiscal sustainability risk, the soundness of the banking sector and the macroeconomic outlook. Against this background, the performances of euro area national stock market indices appeared to be strongly influenced by changes in the perceived sovereign credit risk of the country. In these circumstances, should the future macroeconomic outcomes at the euro area level no longer continue to surprise on the upside, volatility in the equity markets may increase again.

The profitability of those euro area large and complex banking groups (LCBGs) which report quarterly earnings results continued recovering in the second and the third quarters of 2010, mainly driven by further buoyant net interest income, on average lower albeit in many cases still high loan loss provisions and a steady stream of fee and commission income. Net interest income (by far the most important revenue source for this group of banks) continued to be supported by still relatively steep yield curves and the continuing wide margins applied by banks on new lending. In addition, since the finalisation of the June 2010 FSR it has become increasingly apparent that growth in volumes of loans extended by banks in the euro area for house purchase could have passed a turning point. This development seems to have been driven mainly by the low interest rates and improved affordability following sharp drops in house prices in a number of euro area countries. That said, there are substantial differences in developments across individual Member States with lending for house purchase remaining anaemic in countries where public finance problems have pushed long-term interest rates to high levels and which face less favourable economic growth and employment prospects. At the same time, bank lending to non-financial corporations has recovered far more sluggishly in the euro area as a whole, reflecting low demand and, in some cases, continuing tight lending standards applied particularly on riskier borrower categories, such as SMEs. In the period ahead, a prospective recovery in volumes of

corporate lending could provide a further boost to banks' net interest income.

In contrast to the on average positive developments in the LCBGs' core maturity transformation business, there was a remarkable drop in the trading revenues of these institutions. This decline in trading income was a global phenomenon and seemed to have continued also in the third quarter, mainly related to lower trading volumes. All in all, the marked volatility in the two major income streams of LCBGs over the past years suggests that there is a risk that the recent recovery in LCBGs' earnings may not turn out to be sustainable.

The only gradual recovery in LCBGs' asset growth after a period of slowdown or an outright contraction in balance sheets in 2008-09 – which in some cases was substantial and for some institutions was partly related to required measures taken in response to government support received – in combination with efforts to raise new capital contributed to an improvement in LCBGs' capital ratios across the board. While this improvement seemed to have come to a halt in the first half of 2010, it should be noted that the earlier recovery in regulatory capital ratios among these institutions had been substantial, including for banks which had recorded the weakest ratios.

The positive developments in LCBGs' solvency ratios were also confirmed by the results of the stress-test exercise, coordinated by the Committee of European Banking Supervisors (CEBS) and developed in close cooperation with the European Central Bank and the European Commission, which was completed in July 2010. Altogether, 91 EU banks were covered in the exercise, representing around 65% of the assets of the EU banking sector. Apart from covering credit and market risks in the banks' portfolios, the exercise also addressed market concerns over EU banks' exposures to sovereign risk from EU countries, on account of which interbank market liquidity had fallen markedly in Europe, especially in the euro area, in early May. The publication of the results on 23 July 2010 increased transparency concerning the holdings of sovereign debt by EU banks and identified pockets of vulnerability. In this context, it is important to note that the severe problems faced by some euro area banks outside the set of LCBGs in the months following the publication of the stress-test results mainly related to acute vulnerabilities in their liquidity and funding positions which were not the focus of the stress-test exercise.

While the EU-wide bank stress tests provided useful information about the concentrations of credit risk in the banking system, the extent to which different LCBGs are exposed to interest rate risks is less well-known and more challenging to assess. In particular, the sharp divergence in long-term bond yields across individual euro area countries implies that the interest rate risks faced by banks operating in different parts of the euro area could be very different in nature. On the one hand, banks operating in countries where long-term interest rates have increased sharply may benefit from improved net interest income in the short term, whilst they are exposed to mark-to-market losses on their holdings of fixed income securities. Going forward, the persistently high long-term rates are likely to start having a more pronounced negative impact on these banks' earnings as volumes of new lending will be affected and the quality of new borrowers is expected to deteriorate. In contrast, LCBGs which operate predominantly in countries where long-term interest rates are at very low levels face the opposite type of risks, with the prospect of mark-to-market losses on unhedged fixed income exposures increasing as rates eventually go up. Against this backdrop, interest rate risk can be considered as the key unknown for the euro area LCBGs in the period ahead.

Financial performance of euro area insurance companies remained stable, on average, in the second and third quarters of 2010. This was in line with the expectations outlined in the June 2010 FSR, although there was a wide variation in results across institutions. The main risks faced

by insurers remain associated with the low level of yields on AAA-rated government bonds and the moderate recovery in economic activity. This notwithstanding, available information on the solvency positions of euro area insurers suggests that, on average, they have a reasonable amount of shock-absorption capacity to weather a materialisation of the risks they currently face.

REGULATORY DEVELOPMENTS

An important structural change that will have an impact on banks' regulatory capital requirements is the proposed revisions to strengthen global capital and liquidity regulations with the goal of promoting a more resilient banking sector (the so-called Basel III framework). Among the main items in terms of capital requirements, the new rules prescribe an increase in minimum requirements for common equity and Tier 1 capital, to be phased in gradually over a long implementation period. The new rules also include a non-risk-based Tier 1 leverage ratio that will serve as a backstop to the risk-based measures. As regards the new liquidity regulations, the main element is a 30-day liquidity coverage ratio, underpinned by a long-term structural liquidity ratio. The agreement on the new rules is an important step towards bolstering banks' future financial soundness.

Finally, on 1 January 2011 the new European supervisory framework will come into being, with the establishment of the European Systemic Risk Board (ESRB) and the creation of three European Supervisory Authorities (ESAs) covering, respectively, banks, securities markets, and insurance companies and pension funds. This signifies a substantial strengthening of the European supervisory structure both at the micro- and for the first time at the macro-prudential level, as the ESRB will have the mandate to identify systemic risks for the EU financial sector as a whole and to make policy recommendations to contain those risks.

II THE MACRO-FINANCIAL ENVIRONMENT

1 THE EXTERNAL ENVIRONMENT

Due to some deterioration in the global macroeconomic outlook since the finalisation of the June 2010 Financial Stability Review (FSR), several risks originating outside the euro area remain high or have even increased. Notwithstanding quantitative monetary easing, persistently large fiscal deficits and corresponding high levels of debt, in part due to economic stimulus packages, heightened the risk of an increase in US bond yields, which could, in turn, spill over to global bond yields and lead to increases in the cost of capital and losses on fixed income securities for banks around the world. At the same time, the emergence of risks stemming from weaknesses in household balance sheets has resulted in a further rise in delinquency rates and credit-related write-offs in mortgage lending-related sectors. In addition, the broad-based improvement in global money, equity and credit markets remains vulnerable to the possibility of further reversals in risk appetite and to negative news from the banking sector. The risks facing global financial institutions in relation to above-average write-offs on commercial property loans, more challenging funding conditions, and adverse macro-financial developments also remain high. While the outlook for emerging economies has improved, many have faced unexpectedly high capital inflows, although the risk of the re-emergence of asset price bubbles across the region has not increased further, thanks to the introduction of some macro-prudential measures. Finally, in the medium term, the risk of a re-emergence of global financial and current account imbalances remains, which could eventually lead to abrupt global capital movements.

1.1 RISKS AND FINANCIAL IMBALANCES IN THE EXTERNAL ENVIRONMENT

GLOBAL FINANCIAL IMBALANCES

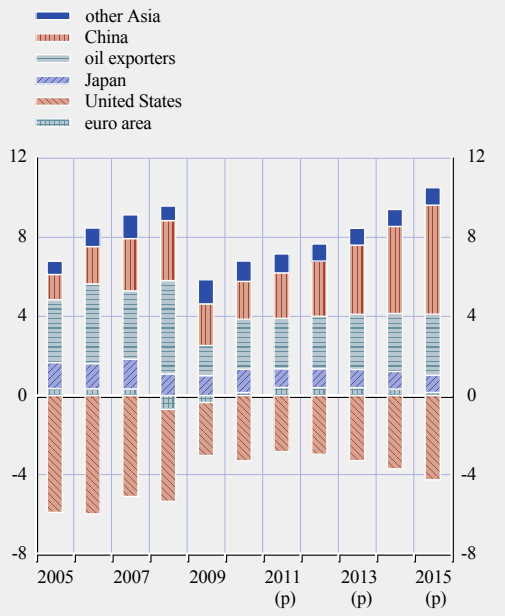
Since the finalisation of the June 2010 FSR the adjustment of global financial and current account imbalances has halted, as a reflection of the cyclical adjustment of global trade and the severe tensions in financial markets. As a result, US external imbalances increased, causing the trade deficit to widen from 2.9% of GDP in the last half of 2009 to 3.5% of GDP in the first half of 2010 and 3.8% of GDP in the third quarter of the year.

There are several factors that could – in the absence of a significant cooling of the economy – contribute to a further worsening of the US current account deficit in the period ahead (see Chart 1.1). A considerable increase in personal savings in the second half of 2009 and the first half of 2010 has been followed by a slight downward trend, on account of improving household net worth, despite still elevated unemployment rates. This trend was driven in part by strengthening private consumption, growing at an annualised quarterly rate of about 2.6% during the third quarter of the year.

In emerging Asia, most notably China, current account surpluses rose again after the publication of the last FSR. This mainly

Chart 1.1 Current account balances of selected economies

(2005 – 2015; percentage of US GDP)



Sources: IMF World Economic Outlook and ECB calculations.
Note: (p) denotes projection.

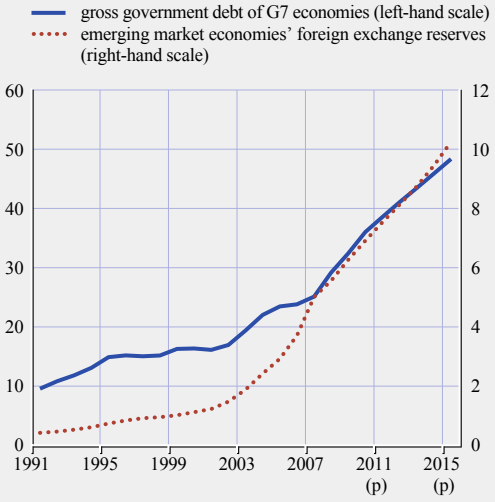
reflected a marked pick-up in exports due to stronger than expected foreign demand, as well as lower import growth on account of decreasing import prices and moderating domestic demand. In addition, the fading-out of fiscal stimulus measures and continued limited exchange rate flexibility in some surplus economies in emerging Asia could contribute to an increase in current account surpluses in the region. In oil-exporting economies, in contrast, external surpluses remained relatively stable on account of the stabilisation of oil prices over the past six months (see Chart 1.1).

Looking forward, the risks of a resurgence of global financial imbalances might recede somewhat over the short term to the extent that the global economic recovery is losing momentum. This reflects the cyclical nature of the adjustment of imbalances. At the same time, the structural factors behind large global financial and current account imbalances remain in place and could – together with the growing fiscal burden of advanced economies – cause a resurgence of imbalances over the medium term.

In this respect, the main mechanisms behind the build-up of large and persistent global imbalances could be exacerbated by two factors: the continuing symbiotic relationship between public sector deficits and the growing fiscal burden in major advanced economies, as well as public sector surpluses in the form of the excessive accumulation of foreign exchange reserves in major emerging economies (see Chart 1.2). Ultimately, this would undermine the credibility of any efforts to rebalance savings and investment in a sustainable way, both within and across the main imbalanced economies. As a consequence, the risk of potential funding pressures in large deficit economies might rise in the period ahead both in advanced economies and globally, as the focus of investors' concerns may increasingly shift to the sustainability of debt levels in the face of the uncertain resilience of the economic recovery.

Chart 1.2 Gross government debt in the G7 countries and EME holdings of foreign exchange reserves

(1991 – 2015; USD trillions)



Sources: IMF World Economic Outlook and ECB calculations.
Note: (p) denotes projection.

US SECTOR BALANCES

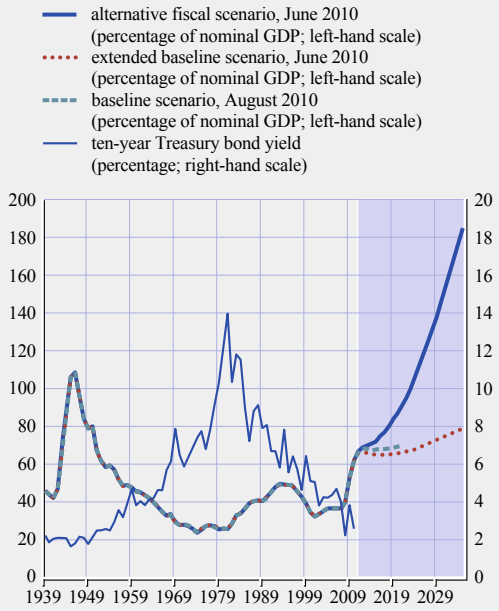
Public sector

The ongoing shortfall of federal revenues relative to spending, together with the extraordinary policy response to the financial crisis, have led to considerable fiscal imbalances in the United States. The budget outlook has deteriorated to some extent in comparison with the June 2010 FSR.

According to the November Monthly Budget Review published by the Congressional Budget Office (CBO), the federal fiscal deficit stood at 8.9% of GDP in the fiscal year 2010, only slightly below the deficit of 10.0% in 2009. Although the CBO expects a gradual further reduction of the federal budget deficit, fiscal imbalances are expected to persist over the next ten years, with the deficit, under current policies, estimated to stay in the range of 2.5% to 3.1% throughout 2013-20. As a result, federal debt held by the public is expected to increase from 53% of GDP in 2009 to almost 70% by 2020 and to rise further thereafter (see Chart 1.3).

Chart 1.3 US federal debt held by the public and the ten-year Treasury bond yield

(1939 – 2035; fiscal years)



Source: US Congressional Budget Office.
Notes: The baseline is based on "The budget and economic outlook – An update", August 2010, while the other two scenarios are taken from "Long-term budget outlook", June 2010. The extended baseline scenario adheres closely to current law. The alternative fiscal scenario incorporates changes to current law that are widely expected to occur or that would modify some provisions that might be difficult to sustain over a long period.

Federal debt would be higher if additional fiscal measures proposed in the 2011 President's budget (such as extensions to income tax cuts) as well as new stimulus proposals made in early September 2010 were to make it into law. Moreover, data on the federal debt held by the public do not include the debt of government-sponsored enterprises (GSEs) despite the fact that Fannie Mae and Freddie Mac have been under government conservatorship since September 2008 (see also Box 1). While part of this debt is likely to be recovered, it represents a potential additional implicit government liability.

According to an alternative fiscal scenario that incorporates several changes to current law that are widely expected to occur, the federal debt ratio could rise to as much as 185% of GDP by 2035 (see Chart 1.3).[1] There is a risk that the unfavourable long-term budget outlook could increase the probability of a US fiscal crisis.[2] In such a scenario, investors would become reluctant to finance all US government borrowing needs unless compensated with sufficiently high interest rates. Although remote, such a scenario could lead to a sudden and sharp rise in interest rates from their currently low level (see Chart 1.3). As a consequence, the CBO estimates that a four percentage point rise in interest rates could nearly double federal interest payments by 2015 relative to the baseline projection. Thus, the fiscal outlook would worsen further, as maturing long-term debt would need to be refinanced at higher rates. Aside from crowding out private investment, such a situation would severely constrain the room for further policy actions if these were required. A further concern is that a rise in interest rates would also reduce the market value of outstanding government bonds, thus causing losses for the holders of such bonds. This could affect both domestic and foreign investors and spill over into other global financial markets, thereby causing renewed financial turbulence.

The US government has a large number of options for improving the fiscal outlook and eliminating such risks. Proposals for consolidation will be spelled out by the Fiscal Commission at the end of 2010 and an early agreement on credible consolidation measures would help to dissipate uncertainty.

Corporate sector

Against the background of the ongoing modest economic recovery, the situation of the US non-financial corporate sector has continued to improve since the finalisation of the June 2010 FSR. On a quarterly basis, corporate profit growth turned positive in early 2009 and remained robust throughout the first half of 2010, though it slowed in the second quarter. The turnaround in profits, which initially had been supported mainly by profits of domestic

1 Fore more details, see CBO, "The long-term budget outlook", June 2010.
2 See CBO, "Federal debt and the risk of a fiscal crisis", *Economic and Budget Issues in Brief*, 27 July 2010.

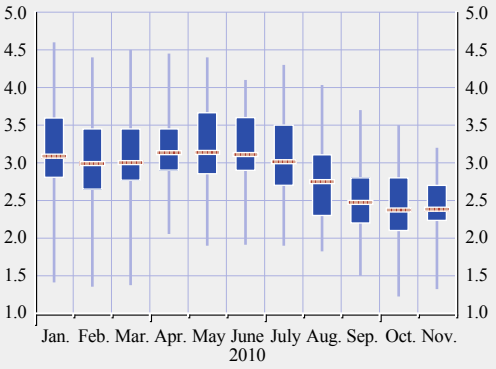
financial industries, increasingly spread to profits of domestic non-financial companies and to a lesser extent to the rest of the world (see Chart 1.4).

Reflecting this strong profitability, external financing needs of non-financial corporations remain limited as capital expenditure is broadly covered by gross savings. The outlook for corporate sector profitability is somewhat uncertain, however, as cost-cutting by firms via employment reduction has contributed significantly to profit recovery and thus puts a question mark over the future development of aggregate demand. At the same time, a recent reassessment by financial markets of the strength and sustainability of the US economic recovery suggests that there are downside risks to the outlook for profits (see Chart 1.5).

Regarding the asset quality in financial sector balance sheets, the quality of loans to non-financial corporations started to improve somewhat after the finalisation of the June 2010 FSR, despite a still elevated ratio of credit debt to net worth of non-financial companies in the second quarter of 2010. The improvement is reflected in a decline in delinquencies and charge-offs on commercial and industrial loans in the first half of 2010 (see Chart 1.6) and in lower speculative-grade corporate default rates (see Chart S3).

Chart 1.5 Distribution across forecasters for US real GDP growth in 2011

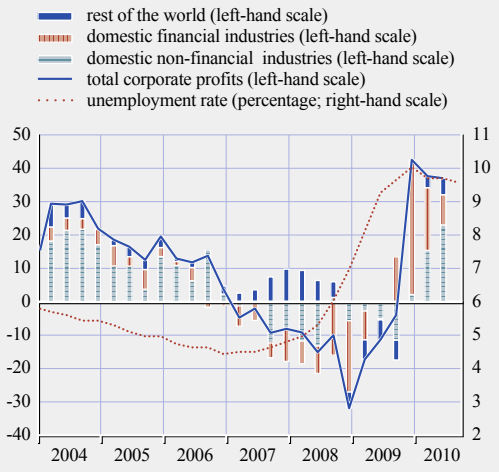
(Jan. 2010 – Nov. 2010; percentage change per annum; maximum, minimum, interquartile distribution and average)



Source: Consensus Economics.

Chart 1.4 US corporate sector profits

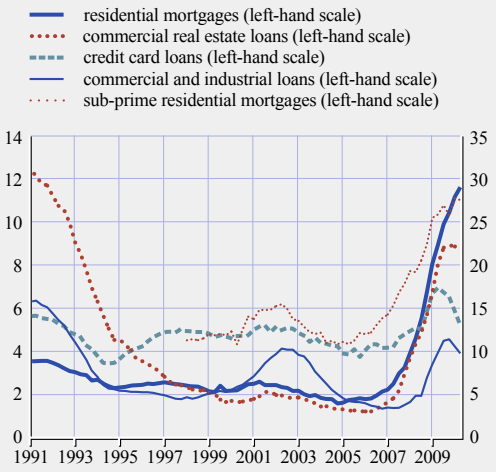
(Q1 2004 – Q3 2010; percentage point contribution to year-on-year growth; seasonally adjusted)



Sources: US Bureau of Economic Analysis and Consensus Economics.
Notes: Corporate profits include inventory valuation and capital consumption adjustments. Corporate profits data are only available up to Q2 2010.

Chart 1.6 US delinquency rates

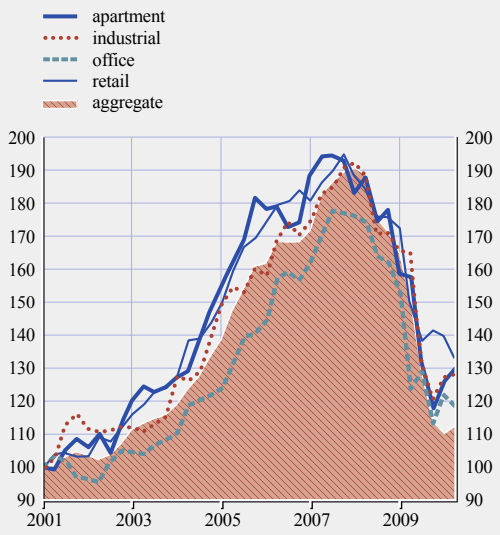
(Q1 1991 – Q2 2010; percentages)



Sources: Federal Reserve Board of Governors and Mortgage Bankers Association.

Chart 1.7 US commercial property prices by property type

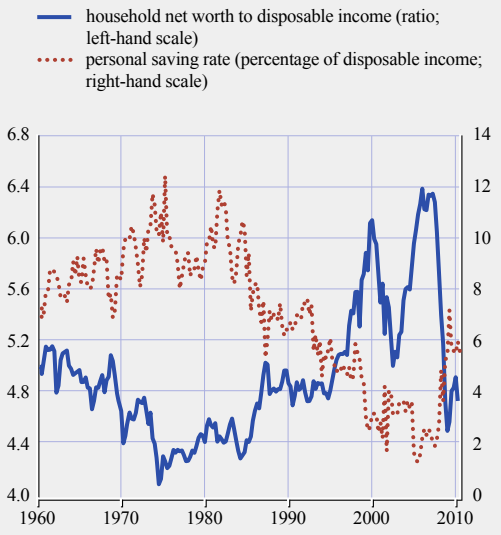
(Q1 2001 – Q2 2010; index: Q4 2000 = 100)



Sources: Moody's and MIT Center for Real Estate.
Notes: The dynamics of the aggregate national price index differ slightly from those of the main component indices as the indices are measured at different dates and historical data are not updated (explaining the larger fall from the peak in the aggregate than in the component indices). This "out-of-bounds" phenomenon is explained in more detail in "Moody's/REAL Commercial Property Price Indices, May 2010", Moody's Investors Service, special report.

Chart 1.8 US household net worth and personal saving rate

(Q1 1960 – Q3 2010)



Sources: Bureau of Economic Analysis and Federal Reserve Board.
Note: Net worth is only available up to the second quarter of 2010.

Even loan delinquencies in the commercial real estate sector – which remains one of the weakest areas of the non-financial corporate sector – appear to have shown signs of stabilisation since late 2009, in line with the slight increase in commercial property prices from their trough in the fourth quarter of 2009 (see Chart 1.7). This increase mainly reflects the prices of properties for industrial use, multi-family rental properties and to a lesser extent offices. Meanwhile, the prices of retail properties that are closely related to the residential housing market remain particularly weak and could continue falling if downside risks to the US residential property market materialise (see the household sector section).

Household sector

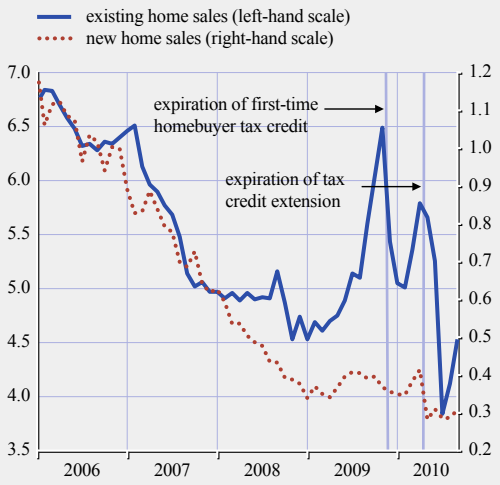
The balance sheets of US households have continued to improve modestly since the June 2010 FSR. Nevertheless, some financial stability risks stemming from the US household sector remain, largely as a result of increased downside risks attached to the US housing market and the general US economic outlook.

Net wealth as a percentage of disposable income recovered somewhat from its trough in early 2009, though this recovery was interrupted in the second quarter of 2010 as a result of a decline in financial assets (see Chart 1.8). Meanwhile, the ratio of household net worth to disposable income remains below its long-term average. Nevertheless, recent upward revisions to the personal saving rate imply that greater progress in the repair of household balance sheets has already been made than previously expected, which provides a more positive basis for the medium-term outlook for consumption.

As a result of lower interest rates and a further decline in the ratio of the stock of household debt to income, there have been further improvements in debt servicing and financial obligations ratios,

Chart 1.9 US home sales

(Q1 2006 – Q3 2010; millions at an annualised rate)



Sources: National Association of Realtors and US Census Bureau.

which have returned closer to their long-term averages (see Charts S5 and S6). In addition, delinquencies on consumer loans, most notably on credit cards, have also started to come down (see Chart 1.6).

However, two main risks can be identified for the US household sector. First, the improved situation of the corporate sector, stemming to a significant extent from cost-cutting measures, had negative repercussions on household sector employment. Indeed, the unemployment rate stood at 9.6% in October 2010, having come down only slightly from its recession peak of 10.1% last October. Second, the situation in the US housing market remains fragile and has deteriorated again, after the expiry of some temporary government support measures.

In particular, home sales have declined sharply following the expiration of the first-time homebuyer tax credit extension at the end of April 2010 and only rebounded slightly in more recent months (see Chart 1.9). This has brought the supply of homes on the market relative to the current sales rate back to rates well above long-term averages. Meanwhile, charge-offs, delinquencies (see Chart 1.6) and foreclosures on mortgages continued to rise in the second quarter of 2010, exerting downward pressure on house prices. According to the S&P/Case Shiller house price futures for the ten largest US cities, and following a modest recovery over the past few months, it is assumed that house prices will remain broadly flat over the next year. Overall, the risks posed to the housing market by elevated foreclosure rates, the still large imbalance between the supply of and demand for homes and the waning of policy stimulus thus remain on the downside (see also Box 1).

Box 1

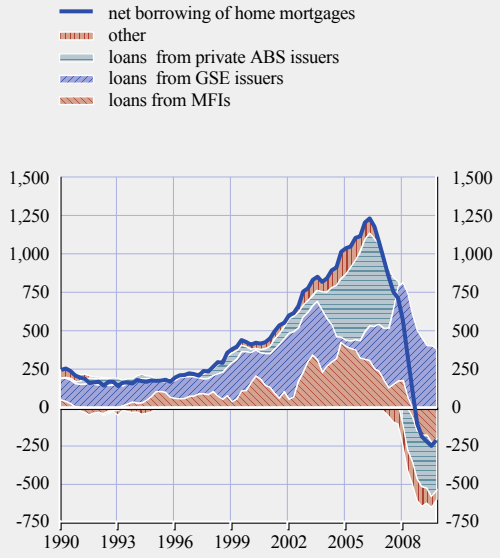
US GOVERNMENT-SPONSORED ENTERPRISES: OUTLOOK AND RISKS

The government-sponsored enterprises (GSEs) Fannie Mae and Freddie Mac, which have been major providers of credit to US mortgage borrowers, have become increasingly relevant to financial stability, in particular in the recent crisis.[1] First, in September 2008, due to the systemic risks attached to these entities, Fannie Mae and Freddie Mac were placed under temporary government control to avoid insolvency. Second, the Treasury entered into a Senior Preferred Stock Purchase Agreement providing limited guaranteed capital injections, which in

1 The Federal Home Loan Bank System (FHLB), the Federal Agricultural Mortgage Corporation (Farmer Mac) and the Farm Credit System are also government-sponsored enterprises, but given their size and their role in the mortgage market, this box mainly focuses on Fannie Mae and Freddie Mac.

Chart A Net borrowing of US home mortgages

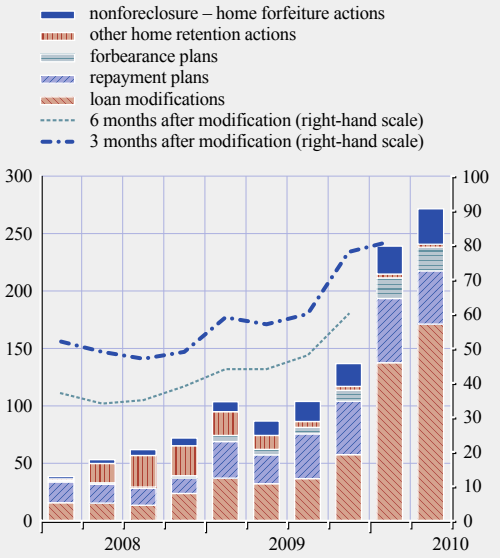
(Q1 1990 – Q2 2010; USD billions; four-quarter cumulative average flows)



Source: Board of Governors of the Federal Reserve.

Chart B Foreclosure prevention actions and current and performing loans

(Q1 2008 – Q2 2010; thousands of loans (left-hand scale); percentage (right-hand scale))



Source: Federal Housing Finance Agency.

December 2009 were extended to allow unlimited capital infusions over the next three years.[2] Against this background, this box examines the current role of the GSEs in the US housing market, their fiscal costs and the possible downside risks to the housing market and to financial stability more generally once the support is scaled back.

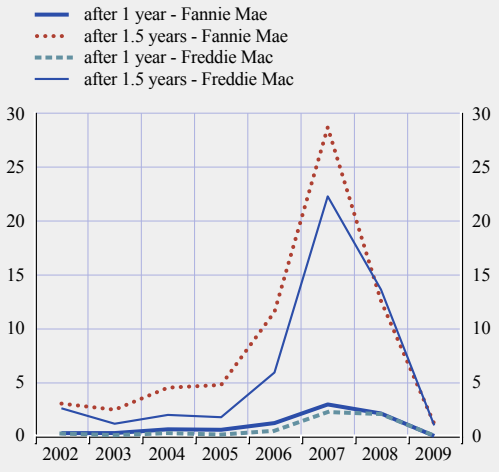
The government's involvement via the GSEs has become pivotal for the US housing market during the crisis. First, as credit from private asset-backed securities issuers dried up, the GSEs became the only source of net positive mortgage financing (see Chart A). As a result, in March 2010, the GSEs accounted for 53% of the total stock of home mortgages, compared with 40% in 2006. Second, the US Treasury and the Federal Reserve have purchased more than USD 1.4 trillion of mortgage-backed securities (MBSs) issued by GSEs, thereby contributing to historically low mortgage rates and enabling more affordable mortgage repayment refinancing. Furthermore, although the share of seriously delinquent loans remained elevated, GSEs contributed to a decrease in foreclosure rates and a decrease in excessive housing supply by foreclosure prevention actions and refinancing activity for current mortgage borrowers (see Chart B).[3]

Regarding credit risk, after the emergence of the crisis, GSEs faced significant losses on their credit portfolios, especially on mortgages which were originated in 2006 and 2007. As a result, since 2008 65% of their capital losses have been recapitalised by the Treasury to keep them solvent (see Chart C). Looking ahead, since the GSEs' underwriting standards were raised only after the government took control, there is a risk that losses from mortgages which were

2 Initially, the GSEs were allowed to draw up to USD 100 billion, which was later increased to USD 200 billion, in capital from the Treasury.
3 Two programs were introduced in this respect: the Making Home Affordable Program and the Home Affordable Refinancing Program.

Chart C Cumulative default rate by origination year for single-family conventional loans

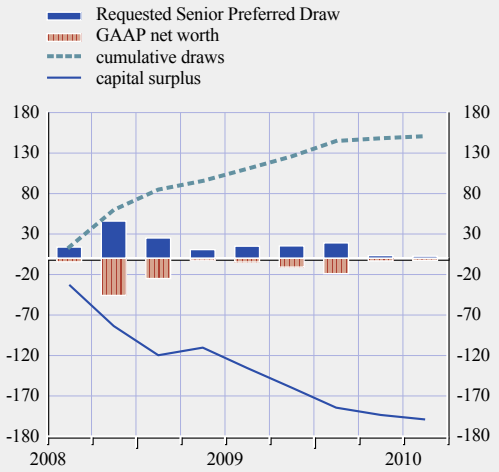
(2002-2009; basis points)



Source: Federal Housing Finance Agency.

Chart D Capital position of GSEs with Requested Senior Preferred Draw

(Sep. 2008 – June 2010; USD billions)



Source: Federal Housing Finance Agency.

originated in 2008 are yet to materialise in 2010, given the fact that cumulative default rates for mortgages issued in 2008 are higher than for those issued in 2006 (see Chart C).

As to the fiscal propagation channels, the GSEs' debt obligations have enjoyed an implicit guarantee by the federal government which, together with tax and regulatory exemptions, has resulted in sizeable federal subsidies. In January 2010 the Congressional Budget Office estimated that the subsidy costs would amount to 2.7% of 2009 GDP over the fiscal years 2009 to 2019, with the bulk of outlays occurring in 2009. Meanwhile, private sector estimates suggest even larger costs. Moreover, if the debt held by the two GSEs were to be accounted for as government debt (currently not the case), this would significantly raise current federal debt levels: the GSEs' total debt was around 10.7% of GDP at the end of 2009. Against the background of the already weak US fiscal situation, the support to the GSEs thus implies large contingent liabilities for the government, which add to the risks of further growing fiscal imbalances.

The dependence of the US mortgage market on the GSEs, as well as on other forms of government support, highlights the risks of a renewed collapse of the US housing market and a real activity drop in the event of a sudden government exit.[4] These risks could evolve into a negative feedback loop between the housing and financial sector, leading to a significant deterioration of the credit portfolio quality of small and medium-sized banks in particular. In such a scenario, there would be increased defaults on the part of several non-systemic institutions. At the same time, euro area financial institutions would also be affected: directly due to a sharp decrease in the value of their MBS holdings and indirectly due to spillover effects to equity and debt markets, tapped by the GSEs for funding purposes.

4 For more details on the impact of US housing support initiatives on recent housing market developments, see for example Box 1, ECB, *Monthly Bulletin*, September 2010.

Mounting fiscal costs and unsustainable dividend payments required from GSEs under the Senior Preferred Stock Purchase Agreement call for a reform of current GSE status.[5] Several options are being discussed and the likely outcome is that some form of government support for these entities will prevail, although the scope may be scaled back. The options include full privatisation, the transfer of key activities to the government and the re-establishment of the GSEs. From a financial stability perspective, however, several conditions must be met to avoid a renewed housing decline: the US housing market must stabilise and private mortgage origination must be revived. To achieve this, current financial sector reforms need to be implemented in such a way as to address dysfunctional aspects of securitisation markets: lack of transparency, complexity and inappropriate incentives in the originate-to-distribute model.

5 The reform is also driven by the need to target subsidies at specific groups determined by law-makers instead of providing a general subsidy.

REGION-SPECIFIC IMBALANCES

Non-euro area EU countries

Macroeconomic and financial conditions have strengthened further in the EU countries outside the euro area, but the key vulnerabilities remain broadly unchanged. There are, however, significant differences across countries in this regard.

In most non-euro area EU countries, the prospects for economic activity have improved further since the finalisation of the June 2010 FSR, although the recovery is likely to be muted and uneven. In the United Kingdom, the economic recovery has continued to be reflected in stronger than expected GDP growth in the third quarter, although the recovery still faces headwinds in the coming quarters. In many non-euro area EU countries, domestic drivers of growth remained depressed, while output growth continued to depend on foreign demand. Narrowing or stable credit default swap (CDS) as well as interest rate spreads, rising stock prices and appreciating currencies vis-à-vis the euro suggest that financial conditions have improved somewhat. In some countries with IMF/EU financial assistance programmes, however, financial conditions weakened on account of market concerns regarding the continuation of assistance. Credit growth has remained subdued or negative, reflecting both weak credit demand and tight lending conditions.

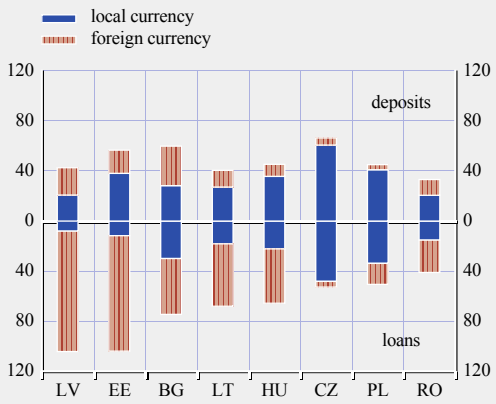
Although lending in foreign currency has virtually come to a halt, a key vulnerability remains the substantial currency mismatch on private sector balance sheets resulting from large shares of outstanding foreign currency loans. There is an ongoing concern that potential currency depreciations could significantly add to the debt burdens of households or companies that are exposed to this mismatch, in particular in view of some recent volatility in exchange rates in a number of countries. In addition, the outstanding total amount of domestic loans significantly exceeds that of deposits in several of these countries (see Chart 1.10). High loan-to-deposit ratios suggest that banks continue to depend strongly on foreign funding (mostly in the form of parent bank lending) and that there is a need to mobilise domestic deposits.

Another challenge facing banks exposed to non-euro area EU countries stems from the deterioration in credit quality, particularly in those countries where output contracted strongly and leverage was high. Household balance sheets, for example, are being stretched by higher unemployment, although in most countries unemployment seems to have reached a peak (see Chart 1.11). Nevertheless, history shows that non-performing loans tend to remain high for several years following a financial crisis.

The significant deterioration of fiscal positions during the past few years, which has contributed to

Chart 1.10 Outstanding deposits and loans in the non-financial private sector in selected non-euro area EU countries

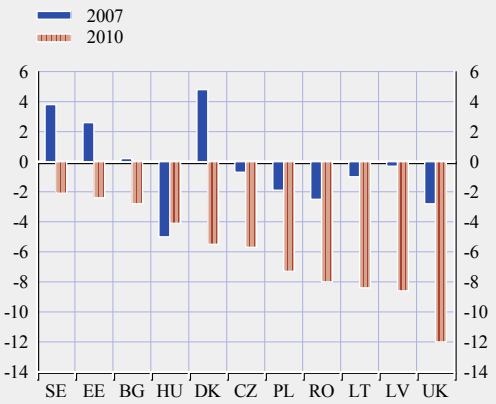
(Q2 2010; percentage of GDP)



Sources: National central banks and Eurostat.

Chart 1.12 General government balances in non-euro area EU countries

(percentage of GDP)



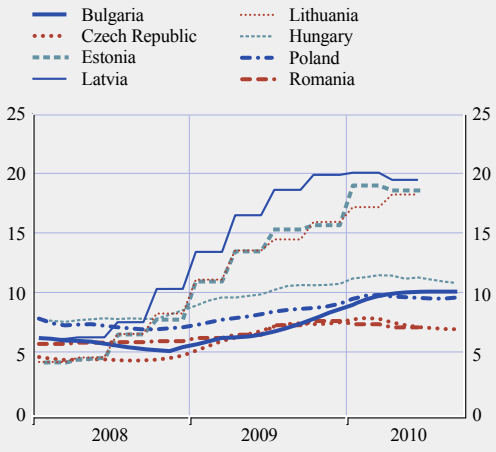
Source: European Commission.

still persistent fiscal deficits, albeit with significant differences across countries (see Chart 1.12), also constitutes a risk. These fiscal imbalances could undermine investor confidence and pose funding challenges for both sovereign issuers and the banking sector in these countries.

Looking ahead, the economic outlook in the non-euro area EU countries remains vulnerable to adverse disturbances, although macroeconomic and financial conditions have improved. Strains could reappear quickly if investor risk aversion were to rise as a result of uncertainties about economic policies or political tensions in some countries (particularly those with IMF/EU financial assistance programmes). In addition, risk aversion towards the countries could also increase as a result of spillovers from tensions in other EU countries or a reassessment of risk in general. Such disturbances could lead to disruptions in key funding markets, which would heighten the refinancing challenges facing banks and sovereigns. These risks are worsened by large currency mismatches in some countries.

Chart 1.11 Unemployment rates in selected non-euro area EU countries

(Jan. 2008 – Sep. 2010; percentage of the labour force)



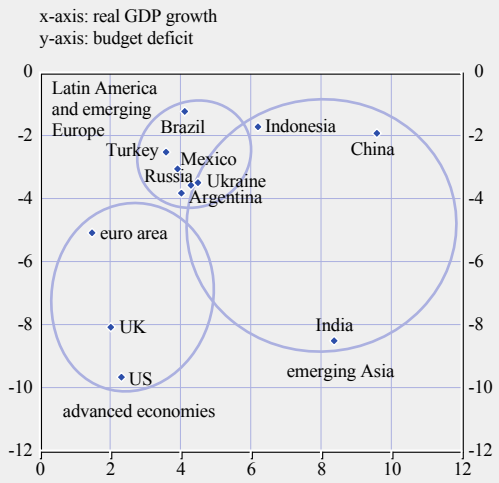
Source: Eurostat.

Emerging economies

Overall, economic recovery in emerging economies has continued since the finalisation of the June 2010 FSR. This has been particularly the case in the major economies, such as China, India and Indonesia in emerging Asia, and Brazil in Latin America, where both robust domestic demand and recovering global trade have supported economic growth. Despite the recovery in economic activity, inflationary pressures have remained contained in most cases. Moreover, the recovery in economic activity has also improved the fiscal situation in most emerging economies (see Chart 1.13).

Chart 1.13 Forecast of GDP growth and budget deficits in 2011 for selected emerging and advanced economies

(Oct. 2010; percentages)

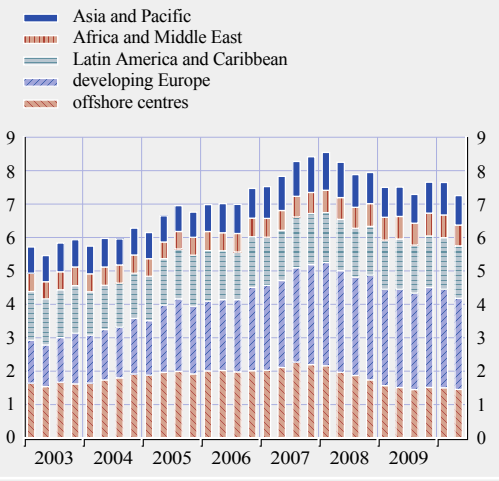


Source: IMF World Economic Outlook, October 2010.
Note: The largest three emerging markets of each region are shown.

Despite significant economic recovery, the macroeconomic risks for emerging economies have increased compared with the June 2010 FSR. This is because, alongside the slowdown in activity in advanced economies, particularly the United States, economic growth in emerging economies is expected to moderate in the quarters ahead.

Chart 1.14 Consolidated cross-border claims of euro area financial institutions on emerging economies

(Q1 2003 – Q2 2010; percentage of total assets)



Sources: BIS and ECB calculations.

In spite of some progress, without substantial structural change and moves to rebalance sources of growth, emerging economies will remain vulnerable to increased macroeconomic risks stemming from the slowdown of the global economy. Thus, the main macroeconomic risks for emerging economies are related to the extent of the slowdown in activity in advanced economies as well as to the robustness of domestic demand as fiscal and monetary policy support declines, as does the scope to provide such support.

Regarding financial risks, both domestic and international financing conditions for emerging economies have improved since the finalisation of the June 2010 FSR. At the same time, however, there has been an increase in financial vulnerabilities related to the widening of current account deficits, exposing countries to shifts in investor sentiment through their dependency on shorter-term volatile capital inflows (see Section 1.2).

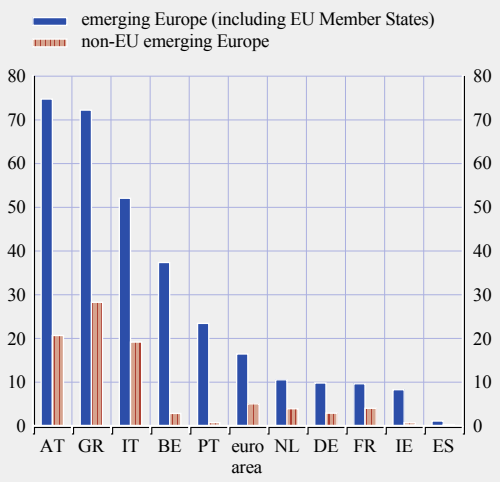
Regarding the risks related to cross-border lending, cross-border lending to emerging economies stabilised in the first quarter of 2010, as a percentage of total assets, and decreased in the second quarter of the year (see Chart 1.14), despite significant private capital flows into portfolio investments in emerging markets. Lending patterns diverged significantly across emerging economies but, most notably, the share of claims vis-à-vis emerging Europe and Asia decreased.

In non-EU emerging Europe, non-performing loans continued to rise during the first half of 2010 but the resulting losses were able to be absorbed by large capital and profit buffers in most countries. In Ukraine, however, bank recapitalisations of around 2.5% of GDP became necessary.

While the exposure of euro area banks to credit risk originating in non-EU emerging Europe is limited on average (around 5% of total cross-border claims of euro area banks), individual euro area countries hold up to 20-30% of their total cross-border claims in

Chart 1.15 Exposure of euro area banks to non-EU and EU emerging Europe

(Q1 2010; percentage of total extra-euro area claims)



Sources: BIS and ECB calculations.
Note: Non-EU emerging Europe includes south-east Europe and the CIS countries.

non-EU emerging Europe (which represents around 1% of their total assets), a figure which rises to 50-75% (1.5-2% of their total assets) if new EU Member States are included (see Chart 1.15).

Regional contagion effects could amplify a financial shock stemming from a sudden unravelling of imbalances in the region. In particular, EU Member States which might be perceived by investors as still sharing certain vulnerabilities with non-EU countries in emerging Europe could be negatively affected too. A deterioration of credit quality in the whole region could have negative repercussions on euro area banks with large exposures to the region. The negative spillovers would be exacerbated by the fact that euro area banks own local subsidiaries and branches in the region.

Looking ahead, the main risks to financial stability for emerging economies relate to the potential volatility in private capital inflows that could in extreme cases either lead to sudden stops of capital inflows or contribute to the formation of asset price bubbles. In addition, there are macroeconomic risks related to the extent of the slowdown in economic activity, whether through the decline in external demand or through the weakening of domestic demand in the light of the withdrawal of monetary and fiscal policy stimulus measures at home and abroad. Finally, in some countries, rising inflationary pressures could amplify the macroeconomic risks.

1.2 KEY DEVELOPMENTS IN INTERNATIONAL FINANCIAL MARKETS

US FINANCIAL MARKETS

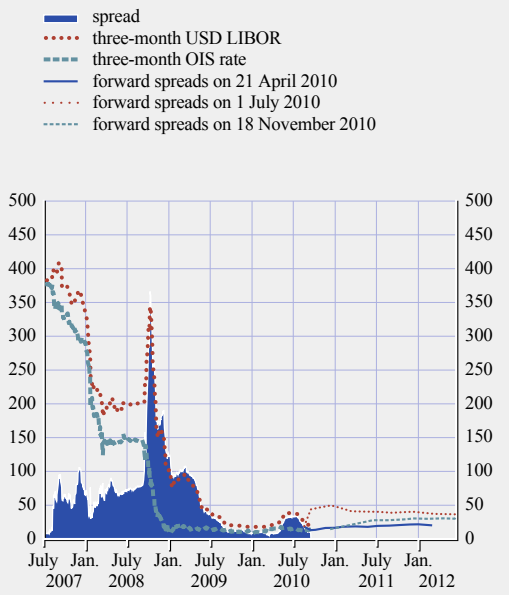
The money market

Conditions in the US money market have improved since the finalisation of the June 2010 FSR. After some tensions in the market in early May, related to the re-emergence of counterparty risk, and uncertainties related mostly to the impact of sovereign risk on banks' sovereign debt holdings, conditions in the US money market quickly normalised. The re-introduction of the swap lines between major central banks in May contributed to the stabilisation of and to an eventual downward trend in spreads between the three-month US dollar London interbank offered rate (LIBOR) and overnight index swap (OIS) rates. Moreover, three-month forward spreads, which increased more significantly in June, reverted to their pre-crisis levels (see Chart 1.16).

At the same time, OIS rates declined along the curve as expectations for the US economic outlook were revised further downwards and expectations of monetary policy tightening were significantly postponed. While some of the temporary liquidity facilities have already expired, the Federal Reserve decided to roll over the redemptions of the mortgage-backed securities (MBSs) and US Treasuries into new asset purchases of US Treasuries, in order to maintain the size of its outright holdings of securities. On 3 November the Federal Open Market Committee (FOMC) announced

Chart 1.16 Spreads between the USD LIBOR and the OIS rate

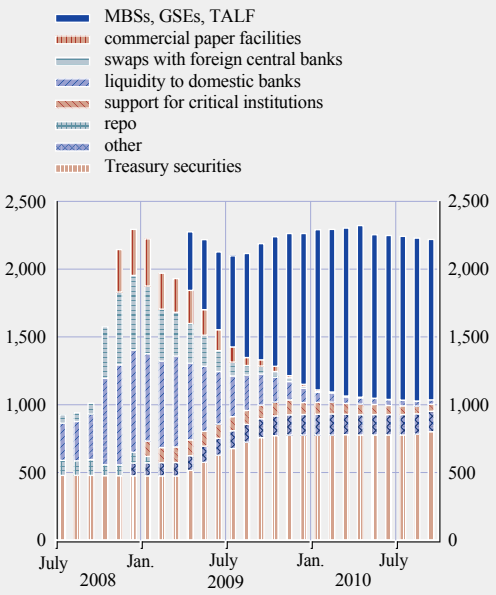
(July 2007 – June 2012, basis points)



Sources: Bloomberg and ECB calculations.

Chart 1.17 The Federal Reserve's balance sheet: liquidity support measures and asset purchase schemes

(July 2008 – Sep. 2010; USD billions)



Sources: Bloomberg and ECB calculations.
Note: "TALF" stands for Term Asset-backed Securities Loan Facility.

additional purchases of USD 600 billion of longer-term Treasury securities by the end of the second quarter of 2011 (see Chart 1.17).

The US dollar funding situation of European banks continued to be under scrutiny as the perceived counterparty risk for some European banks remained elevated in relation to their exposure to certain sovereign debt. However, unlike at the peak of the Lehman crisis, US dollar funding seemed to be a question of price rather than availability. US dollar rates implied by foreign exchange swaps have remained high but contained well below post-Lehman levels, partly thanks to the swap lines between the Fed and the ECB.

Looking ahead, the majority of market participants expect a further expansion in the balances of the Federal Reserve. Overall, however, the likelihood of a faster than expected unwinding of the Federal Reserve's balance sheet seems relatively remote at present (see section on government bond markets).

In addition to the possibility of a further rise in risk aversion towards European sovereign debt, US money markets continue to be vulnerable to the risk of disruptions arising from abrupt changes in market regulation, which implies more severe restrictions on the maturity profile of money market funds. Hence, while these funds significantly reduced the average maturity of their asset holdings, they were at the same time increasingly competing for risk-averse depositors. As a consequence, in an environment of low short-term interest rates, the profitability of money market funds diminished, which could lead to significant outflows of funds. In combination with possibly more restrictive regulation in upcoming banking reforms, these risks could further increase the funding costs for banks.

Government bond markets

US long-term government bond yields declined over the summer months and reached their lowest levels since the spring of 2009 (see Chart S24). Moreover, their decline was stronger at longer

maturities, and the US yield curve flattened significantly. The rebound observed in long-term Treasury yields since early October only partially corrected the low level of bond yields and the flattening of the US yield curve since the finalisation of the June 2010 FSR.

Two strongly related and mutually reinforcing changes in the economic environment since June 2010 seem to be behind those lower yields. First, there was a significant deterioration in the US (and global) economic outlook. Market concerns about a potential double-dip scenario in the United States increased after clearly disappointing data releases over the summer. These concerns in turn triggered temporary episodes of heightened risk aversion and flight-to-safety flows into US Treasuries, which reduced their yields (see Chart 1.18).

Second, monetary policy considerations also contributed to lower US Treasury yields. Expectations of policy rate hikes were pushed forward well into 2011, following the weaker growth and the Federal Reserve's announcement that policy rates could remain low for a protracted period of time. Moreover, the reinvestment of proceeds related to MBSs in further purchases of Treasuries by the Federal Reserve also contributed to lower bond yields.

Looking ahead, uncertainty about the level of long-term US bond yields has decreased since the publication of the last FSR but remains relatively high (see Chart 1.19). The macroeconomic outlook remains quite uncertain and this may trigger significant reallocations within bond portfolios of market participants. This in turn could cause an upward correction of long-term US government bond yields, mainly because US Treasury bonds embody a strong premium, which could lead to an upward correction in bond yields (see Chart 1.18). As a consequence, in an environment of increased issuance due to US Treasury financing needs, the start of tightening, coupled with an upward revision in inflation expectations, could make the long end of the US yield curve particularly vulnerable to further increases as the economic recovery accelerates. On the other hand, the early November

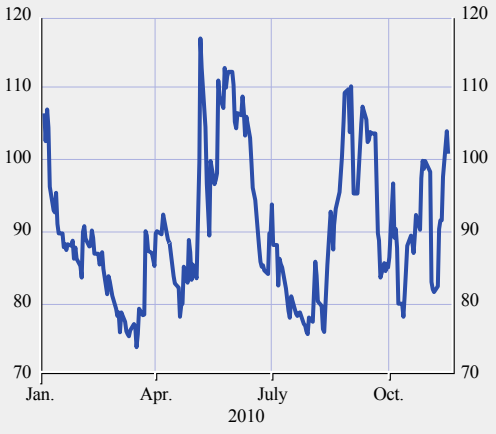
Chart 1.18 Long-term bond yields and nominal growth expectations in the United States

(Jan. 1990 – Nov. 2010; percentages)

Sources: Reuters, Consensus Economics and ECB calculations.
Notes: Ten-year Treasury bond yields. Nominal growth expectations are calculated as the sum of the weighted average of inflation and real GDP growth expectations over the next ten years.

Chart 1.19 MOVE index of volatility in the US government bond market

(Jan. 2010 – Nov. 2010; index: Jan. 2010 = 100)



Sources: Merrill Lynch and ECB calculations.
Note: MOVE is a weighted implied volatility index for one-month options for two, five, ten and thirty-year Treasuries.

announcement of the Federal Reserve to start a second phase of Treasury bond purchases amounting to USD 600 billion by the end of the second quarter of 2011 may well create a strong demand for Treasury bonds and counteract the upward pressure on bond yields.

Credit markets

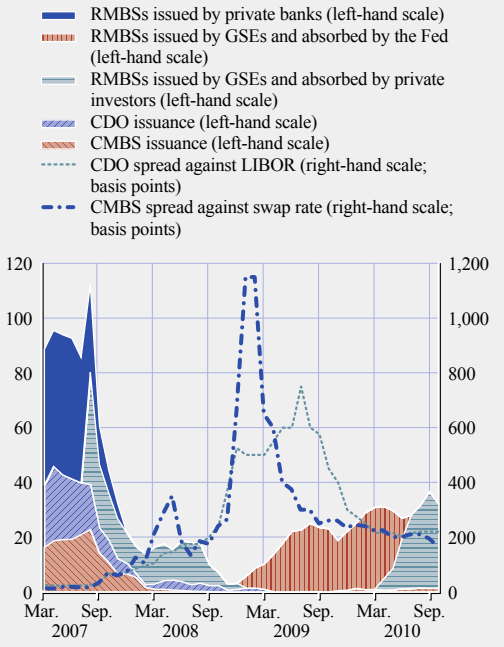
Despite the worsening outlook for the US economy, both performance and activity in the US credit sector have recovered after a subdued second quarter of 2010. The relatively high issuance activity was well absorbed and overall supply pressure remained contained, which was also related to the fact that a large part of what was issued was for refinancing purposes.

As regards the demand side of credit markets, the Federal Reserve's non-standard liquidity programmes no longer created additional demand on the secondary markets for MBSs and asset-backed securities (ABSs). That said, although the risk of a disorderly unwinding of the Federal Reserve's positions declined after the announcement that redeemed MBSs will be replaced by purchases of longer-term US Treasuries, the functioning of the mortgage markets could be severely impaired, since issuance of MBSs by government-sponsored enterprises (GSEs) critically depended on the absorption by the Federal Reserve (see Chart 1.20). Two other asset classes, commercial mortgage-backed securities (CMBSs) and collateralised debt obligations (CDOs), remained severely impaired compared with their pre-crisis levels, although spreads remained at relatively contained levels (see Chart 1.20).

The corporate bond markets have generally profited from the very low level of US Treasury yields as investors turned to an alternative asset class in the search for yield and as corporate profits had been better than expected, despite the deteriorating macroeconomic outlook. Despite an environment of relatively high risk aversion, the spread between average higher-rated bond yields and lower-rated bond yields narrowed in recent months (see Chart 1.21).

Chart 1.20 Issuance of RMBSs by private banks and GSEs, Federal Reserve holdings of RMBSs, and CMBS and CDO issuance

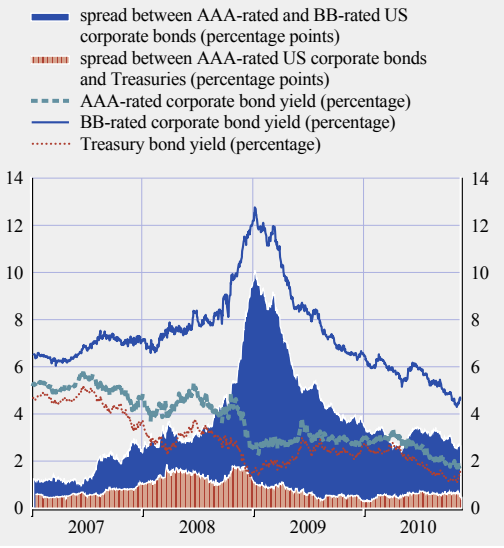
(Mar. 2007 – Oct. 2010; USD billions; three-month moving sums)



Sources: Dealogic, JP Morgan and ECB calculations.
Note: "RMBS" stands for residential mortgage-backed security.

Chart 1.21 US investment-grade and speculative-grade corporate bond yields, as well as Treasury bond yields and spreads

(Jan. 2007 – Nov. 2010)



Sources: Bloomberg and ECB calculations.

Looking ahead, the main risk for the US credit market is a significant cooling-down of the economy, while the risk of a tightening of liquidity conditions by central banks has lessened considerably. In this respect, the challenges of the gradual maturing of the Federal Reserve's MBS portfolio should not put any significant strain on credit segments outside this sector.

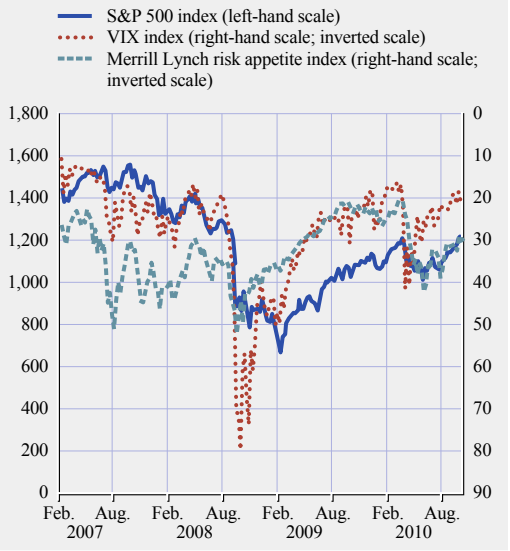
Equity markets

Despite relatively positive news on corporate earnings and their outlook and the rebound after the sell-off in May 2010, US stock prices recorded only moderate increases since the last FSR. The main reasons behind this were increased concerns about the US macroeconomic outlook and further swings in investors' risk appetite (see Chart S18, Chart S26 and Chart 1.22).

Turning to risks in the equity markets, investors' uncertainty – as measured by VIX futures – declined after the turbulence in May, but rebounded somewhat towards the end of the summer, and remained significantly higher than prior to the Lehman Brothers collapse.

Chart 1.22 S&P 500 equity index, S&P equity volatility and risk appetite index

(Jan. 2007 – Nov. 2010)



Sources: Merrill Lynch, Bloomberg and ECB calculations.

The volatility of financial stock prices was higher than that of non-financial stocks due to investors' concerns about the conditions in the financial system and the macroeconomic outlook and also due to uncertainties surrounding the proposals for changes in financial regulation. Over November 2010 risk aversion rebounded again following additional concerns about a sovereign debt crisis in some European countries.

Looking ahead, some risks of further volatility and a stock market correction remain over the short term. As for the bond market, macroeconomic uncertainty is high and its resolution in either direction may trigger significant reactions in stock prices. Financial stocks in particular appear to be vulnerable as financial sector price/earnings (P/E) ratios (based on near-term earnings) remain somewhat above historical averages. That said, a further worsening of the economic outlook may lead to a downward revision of earnings expectations and price corrections. Notwithstanding these risks, stock prices seemed to be more in line with long-term average earnings (see Chart S29), which somewhat downplays overvaluation concerns.

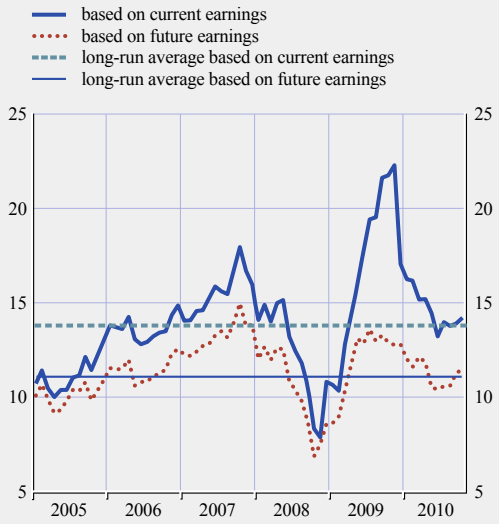
EMERGING FINANCIAL MARKETS

Since the finalisation of the June 2010 FSR, emerging market assets have continued to attract demand from both domestic and international investors. The factors influencing this were a revival of risk appetite, better economic growth prospects and sounder fiscal positions compared with advanced economies. Consequently, emerging market yield spreads on sovereign bonds in foreign and domestic currency have narrowed (see Charts S37 and S38) and equity prices have increased (see Chart S39).

Macro-prudential policies in key emerging economies intended to moderate excessive credit growth, stemming either from domestic demand pressures or from capital inflows, seem to have been successful in stabilising the rapid

Chart 1.23 Price/earnings ratios for equity markets in emerging economies

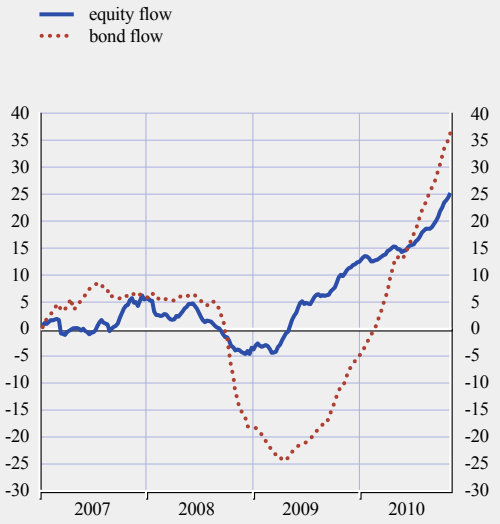
(Jan. 2005 – Oct. 2010; ratio)



Sources: MSCI, Bloomberg and ECB calculations.

Chart 1.24 Portfolio inflows into emerging economies

(Jan. 2007 – Nov. 2010; ratio)



Sources: EPFR and ECB calculations.
Note: Weekly cumulative flows as a share of assets under management.

asset price increases recorded earlier. Thus, the short-term financial stability risks related to the potential formation of asset price bubbles have been contained, but they could re-emerge in the medium term, e.g. as a consequence of capital inflows. As a result, valuation levels have stabilised across a variety of emerging market assets. In equity markets, increases in earnings have offset the rise in equity prices. Thus, P/E ratios based on current and future earnings are currently slightly above the long-term averages (see Chart 1.23). Despite recent narrowing, emerging market bond spreads are still far above the historical lows recorded before the onset of the current turmoil in 2007. Finally, rapid price increases and property valuation levels in key economies that earlier seemed mostly to be overheated have also stabilised. However, in some cases, particularly in China, banking sector exposures to mortgage loans and the dependence of local government finances on housing market developments remain a concern.

As highlighted in Section 1.1, the main financial stability risks facing emerging economies stem from the volatility of private capital inflows (see Chart 1.24). Private capital inflows into emerging markets are highly sensitive to changes in risk aversion among international investors (see Box 2). Uncertainties related to the global macroeconomic outlook or concerns about public debt sustainability could therefore trigger levels of risk aversion which would lead to a sudden stop of capital inflows into emerging economies. Such a development would have direct effects on the availability and costs of liquidity in emerging markets, as well as negative feedback effects on the real economy. It could also lead to significant asset price declines, contagion and negative wealth effects for domestic and international investors.

Looking ahead, the continued increases in private capital inflows together with strong domestic demand might trigger an excessive

credit expansion, a rise in leverage and potentially unsustainable asset price increases. Furthermore, a surge in capital inflows could lead to a further acceleration of reserve accumulation by emerging economies which would bring us swiftly back to the pre-crisis constellation of global imbalances. Addressing the policy challenges posed by volatile capital inflows and the timing of exits from monetary and fiscal stimuli therefore remains a challenging task.

Further risks regarding emerging financial markets relate to public debt issuance. There are two types of risk. The first is contagion risk, in the sense that concerns about public debt sustainability in developed countries would spill over to those emerging markets which are fiscally weaker. The second is the risk that advanced economies' borrowing needs could lead to higher borrowing costs for emerging economies.

Box 2

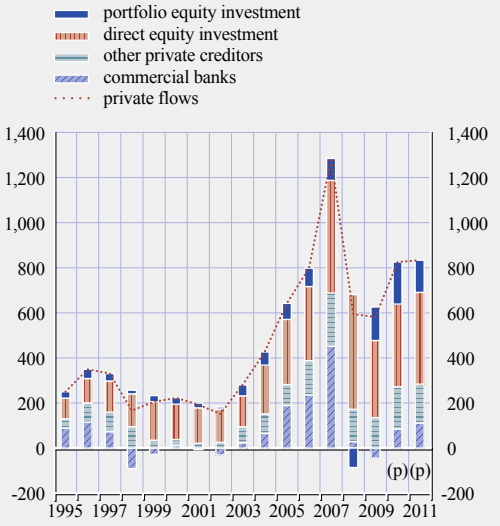
CAPITAL FLOWS TO EMERGING MARKETS

Private capital inflows into emerging economies have rebounded well from the trough experienced in 2009. The International Institute of Finance (IIF) estimates that the net private capital flows to emerging economies will total USD 825 billion in 2010 and USD 834 billion in 2011, significantly higher than the USD 581 billion recorded in 2009 (see Chart A). The most significant changes are expected in private creditors' (commercial banks and non-bank financial institutions) net inflows into emerging markets. Moreover, net portfolio investments in emerging markets are expected to continue to be sizeable in the medium term, totalling USD 187 billion in 2010 and USD 143 billion in 2011. In fact, using high-frequency data from a survey among fund managers (Emerging Portfolio Fund Research – EPFR) shows that portfolio inflows into emerging market assets, particularly into emerging market debt securities, started to rebound as early as the second quarter of 2009. In cumulative terms, inflows into emerging market equity markets exceeded the outflows recorded during the crisis by mid-2009, while bond markets have registered net inflows in cumulative terms since the second quarter of 2010.

Many fundamental factors, such as better economic growth prospects and sounder fiscal positions compared with advanced economies, as well as favourable conditions for carry trades, have contributed to the prompt recovery of private portfolio inflows into emerging markets. In addition, the revival of risk appetite among global investors has been an important driver (see Chart B) of private portfolio flows into emerging market assets. Strong capital inflows can have an impact on

Chart A Net private capital inflows into emerging economies

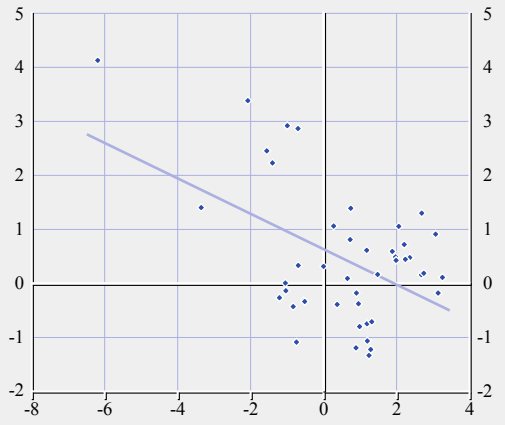
(1995 – 2011; USD billions)



Source: Institute of International Finance.
Note: (p) stands for projected.

Chart B Global risk aversion and capital inflows into emerging markets

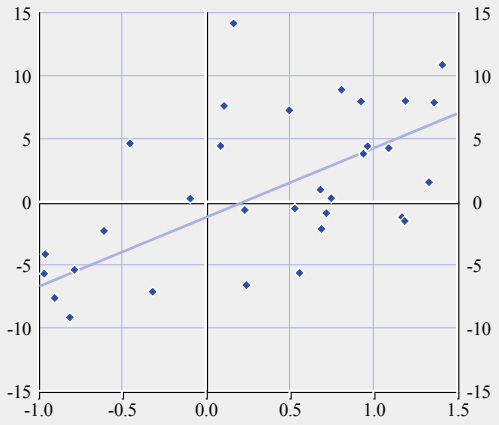
(Jan. 2007 – Sep. 2010; x-axis: total net portfolio flows; as a percentage of assets under management; y-axis: risk aversion; index)



Sources: EPFR, Bloomberg and ECB calculations.

Chart C Equity returns and capital inflows into emerging markets

(Jan. 2007 – Sep. 2010; x-axis: equity net portfolio flows; as a percentage of assets under management; y-axis: emerging market equity returns; percentage)



Sources: EPFR, Bloomberg and ECB calculations.

domestic financial and monetary conditions in emerging market economies. The link between net portfolio inflows and domestic asset prices is reflected in the strong correlation between net equity portfolio inflows and returns in the domestic equity market (see Chart C).

The fact that the risk appetite of global investors is an important driver of capital flows into emerging markets raises financial stability concerns. This is because swings in risk appetite can make capital inflows volatile and this can have severe implications for domestic capital markets and the real economy or indeed globally due to contagion and portfolio effects.

On the one hand, if there were to be a rise in risk aversion, sparked by a weakening macroeconomic outlook for example, this might contribute to a sudden stop of capital flows to emerging economies. This could have negative implications for asset price developments and increase the cost of funding or reduce its availability. In addition, there might be negative feedback loops between the financial sector and the real economy. On the other hand, if there were to be a rise in risk appetite, it might trigger significant capital inflows searching for higher yields. This could raise concerns about overheating, the potential build-up of asset price bubbles, increased asset price volatility and pressure on exchange rates.

At present, choosing the right policy mix to confront the potential destabilising impact of volatile capital inflows is a challenging task. The policy dilemma that many emerging economies face is that domestic conditions call for monetary policy tightening, whereas interest rate hikes can attract further capital inflows. The dilemma explains the increasing recourse to macro-prudential policies, especially in emerging Asia, and in some cases to capital controls. As regards macro-prudential tools, measures to control mortgage lending, such as requirements for downpayments or loan-to-value ratios, have been introduced in China, Hong Kong and Singapore to moderate property price increases. The recent moderation in the region points to a certain degree of success in the implementation of these measures, at least in the short term. Capital controls to curb portfolio inflows have also been adopted as another way of preventing macro-financial

risks. Limitations have been placed on short-term capital inflows in Brazil, Korea, Taiwan and Indonesia. The empirical evidence on the effectiveness of capital controls is inconclusive, however. There is therefore no clear outcome of a cost/benefit analysis between the benefits of a potential containment of an overheating economy and the costs of capital controls in terms of distortions in capital allocation and hindering the process of global financial integration.

1.3 CONDITIONS OF GLOBAL FINANCIAL INSTITUTIONS

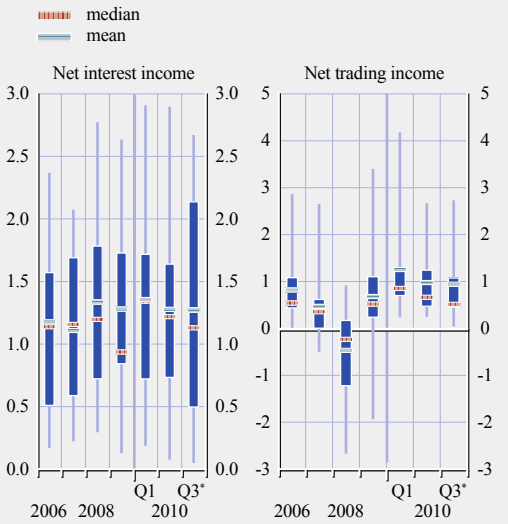
GLOBAL LARGE AND COMPLEX BANKING GROUPS [3]

Financial performance of global large and complex banking groups

In the second quarter of 2010, net incomes of most global large and complex banking groups (LCBGs) remained broadly stable; for the first time since 2007, no bank in this group reported a loss. Several banks' income declined slightly, due to poorer trading revenues, whereas others saw improvements in their net incomes as a result of decreasing loan loss provisioning. In the third quarter, however, most LCBGs reported a decline in net income, again owing to lower trading revenues.[4]

Chart 1.25 Net interest income and net trading income of global large and complex banking groups

(2006 – Q3 2010; percentage of total assets; maximum, minimum and interquartile distribution)



Sources: Bloomberg and ECB calculations.
Notes: Quarterly ratios are based on available data for a sub-sample of LCBGs. Quarterly results are annualised.

Net interest income, recently the most significant source of banks' income, decreased somewhat during the second and third quarters of the year (see Chart 1.25). As a percentage of total assets, median net income fell from 1.34% in the first quarter to 1.23% in the second and 1.13% in the third; the decline was largely driven by significant falls in income revenue across several institutions, although the impact was mitigated to some extent by the ongoing reduction in the size of banks' balance sheets. Whilst global LCBGs continued to profit from the still low levels of policy interest rates, the decrease in net interest incomes may also be explained by the expiry of longer-term fixed interest loans, while in general fewer loans were extended.

Net trading income – which improved significantly during the first quarter of 2010 as banks profited from increasing sales and trading revenues – decreased significantly in the second and third quarters, due to higher market volatility and a sharp decrease in trading volumes. In part, this decline relates to the typically strong first-quarter trading performance; nevertheless, in the third quarter all banks' suffered significant declines. The level of decline was also offset, however, by the base effect that resulted from balance sheet shrinkage. In contrast to the losses reported by banks between 2007 and 2009, all banks

3 For a discussion on how global LCBGs are identified, see Box 10 in ECB, *Financial Stability Review*, December 2007. The institutions included in the analysis presented here are Bank of America, Bank of New York Mellon, Barclays, Citigroup, Credit Suisse, Goldman Sachs, HSBC, JPMorgan Chase & Co., Lloyds Banking Group, Morgan Stanley, Royal Bank of Scotland, State Street and UBS. However, not all figures were available for all companies.

4 As indicated by the * in the charts in this section, the latest quarterly data sample is incomplete and includes only those LCBGs based in Switzerland and the United States; for LCBGs based in the United Kingdom, quarterly data for the first and second quarter of 2010 are imputed.

have thus far reported positive trading income in 2010 (see Chart 1.25). Finally, in terms of revenue streams, net fee and commission income remained broadly stable over the first three quarters of the year, thereby contributing to the overall stable net income of banks.

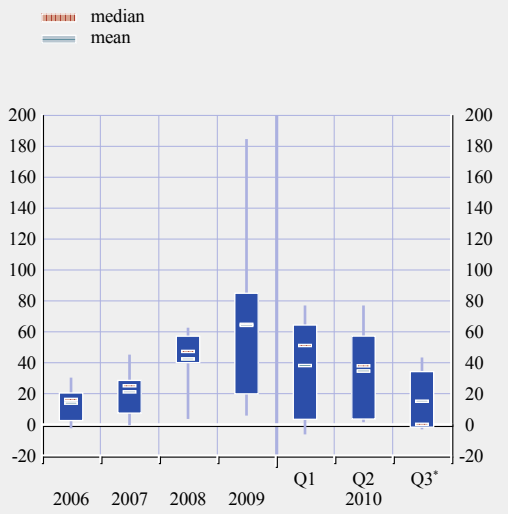
Incomes amongst global LCBGs were generally boosted by across-the-board reductions in loan loss provisioning, which were quite substantial in the first three quarters of 2010 (see Chart 1.26). The credit losses facing Swiss LCBGs declined in line with macroeconomic improvements in the third quarter of 2010, having risen somewhat in the second quarter. In the United Kingdom, improvements in the quality of banks' credit portfolios followed tentative signs of an economic recovery, after the 2009 peak in loan loss provisioning, which contributed to the high of that year for the global LCBGs. As a result, in the first half of 2010 provisioning rates declined substantially for UK LCBGs. Lower provisioning also improved the overall earnings of US-based global LCBGs during the first three quarters of the year. Considering the economic outlook in the US, however, banks must provision appropriately and resist the temptation to under-provision to bolster income (see also Chapter 1.2).

All in all, overall profitability decreased in the second and third quarters of the year, by comparison with the first. The average return on equity (ROE) declined from 10.1% in the first quarter of 2010 to 8.4% in the second and 5.6% in the third, for the sample of banks for which quarterly data were available (see Chart 1.27). However, in considering the full sample of global LCBGs, the average ROE increased significantly to 9.1% in the first half of 2010 from 3.4% in 2009 and -5.12% in 2008. The narrower range and the interquartile distribution of ROE results amongst global LCBGs for that period also suggest a general convergence in profitability, following several years of heterogenous outcomes.

Also, the average return on assets (ROA) decreased slightly from 0.7% in the first quarter of 2010 to 0.6% in the second and to 0.4% in the third, for those banks for which quarterly data were available (see Chart 1.27).

Chart 1.26 Loan loss provisioning ratios of global large and complex banking groups

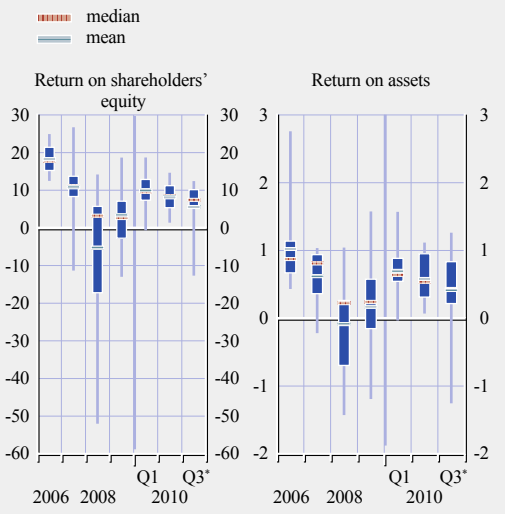
(2006 – Q3 2010; maximum, minimum and interquartile distribution)



Sources: Bloomberg and ECB calculations.
Note: Quarterly ratios are based on available data for a sub-sample of LCBGs.

Chart 1.27 Return on shareholders' equity and return on assets for global large and complex banking groups

(2006 – Q3 2010; percentages; maximum, minimum and interquartile distribution)



Sources: Bloomberg and ECB calculations.
Notes: Quarterly ratios are based on available data for a sub-sample of LCBGs. Quarterly results are annualised.

Solvency positions of global large and complex banking groups

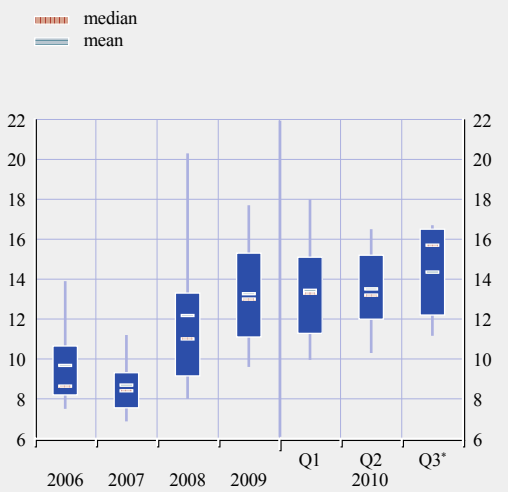
The leverage ratios of all global LCBGs, measured by shareholders' equity as a percentage of total assets, have remained stable since the publication of the last FSR in June 2010, after having decreased over the last two years. In the third quarter the ratio declined again, for those banks for which quarterly results were available. The banks' capital levels remain well above the current regulatory requirements, with a minimum Tier 1 ratio of 10.3% amongst this group in the first half of 2010 and 11.2% for the sub-sample of banks for which third quarter results were available (see Chart 1.28). At the upper end of the distribution, the maximum capital ratio amongst all global LCBGs decreased further from the high levels of 2008, falling to 16.5% in the first half of 2010; however, they are still significantly above their pre-crisis levels. On average, Tier 1 capital ratios rose to 13.5% in June 2010 from 13.3% in December 2009. Whether these levels of capitalisation will satisfy the new regulatory requirements of Basel III remains uncertain, however, given the changes required in the composition of capital. Risk-weighted assets, an important factor in determining a bank's capital ratio, will also increase under the new regime, as risk charges for bank trading books, securitisation and structured products rise. Some global LCBGs may therefore raise further capital over the coming years. In particular, Swiss LCBGs may have to raise significant amounts of capital to meet the special national requirements, which are higher than those of Basel III. The US and UK LCBGs will have to adjust their behaviour in the changed business environment following the newly implemented Basel III and macro-prudential regulatory frameworks.

Outlook for global large and complex banking groups on the basis of market indicators

Despite some variability over recent months, by early November the average share price of the sample of global LCBGs stood at around the same levels seen at the time of the finalisation of the June 2010 FSR. Dispersion across banks widened significantly, however (see Chart 1.29 and Chart S12). As indicated in previous editions of the FSR, this dispersion, in line with the overall fortunes of global LCBGs, may be linked to the

Chart 1.28 Tier 1 capital ratios for global large and complex banking groups

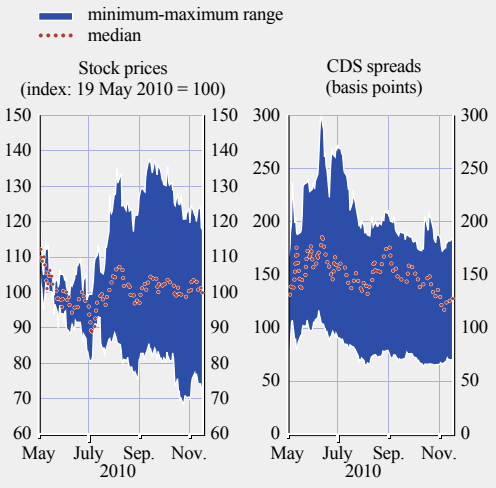
(2006 – Q3 2010; percentage of total assets; maximum, minimum and interquartile distribution)



Sources: Bloomberg and ECB calculations.
Notes: Quarterly ratios are based on available data for a sub-sample of LCBGs. Quarterly results are annualised.

Chart 1.29 Stock prices and CDS spreads for a sample of global large and complex banking groups

(May 2010 – Nov. 2010)



Sources: Bloomberg and ECB calculations.

levels of state support received over recent years and the nature of the banks' business model; the weakest-performing banks over recent months continue to be those that received significant government support and that can be characterised as universal banks. Overall, however, positive news on financial sector performance during the second quarter, as well as a general robustness of the financial markets and continued government support measures and stimulus, contributed to the stable stock price developments.

At the same time, global LCBGs' credit default swap spreads have decreased somewhat since May 2010, after concerns over sovereign risks declined due to the positive market impact of the large EU fiscal support measures announced in May 2010 (see Chart 1.29 and Chart S13). A slight widening of spreads could be seen at the end of August, as concerns about the fiscal sustainability of some European countries emerged amid fears of possible spillovers to the large and complex banks through various channels; these concerns included the viability of support programmes.

Outlook and risks for global large and complex banking groups

A sharp decline in trading revenues, continued moderate economic activity, as well as the uncertainty about the fiscal sustainability of some countries resulted in a challenging operating environment for the global large and complex banking groups in recent months. Although their performances improved substantially during the year, the macroeconomic outlook, combined with fears arising from the potential spillover of sovereign concerns, have contributed to continued uncertainty in the outlook for global LCBGs. In the near term, banks' income remains susceptible to the condition of the financial markets. In the longer term, uncertainty surrounding the future regulatory regime has been alleviated to some extent, which should provide a positive basis for LCBGs, although the spectre of increased competition from sovereigns in the debt market remains for those banks that may be required to raise further capital.

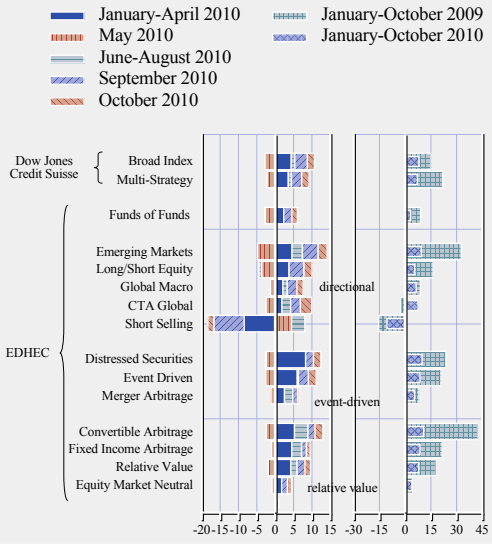
HEDGE FUNDS

Average single-manager hedge fund investment returns indicate that hedge funds did not manage to escape the negative effects of financial market turbulences in May and June 2010. Thereafter, the year-to-date investment results and the prospects for the whole of 2010 improved only with the strong investment performance in September and October 2010 (see Chart 1.30).

Nevertheless, analysis of the fund-level information in one commercially available hedge fund database continued to suggest that a substantial proportion of hedge funds remained below their high watermarks (i.e. previous investment performance peaks) as they had not yet recouped all of the losses they had suffered since the end of 2007 (see Chart 1.31). Furthermore, the hedge fund liquidation rate, although declining, remained above the pre-crisis levels.

Chart 1.30 Global hedge fund returns

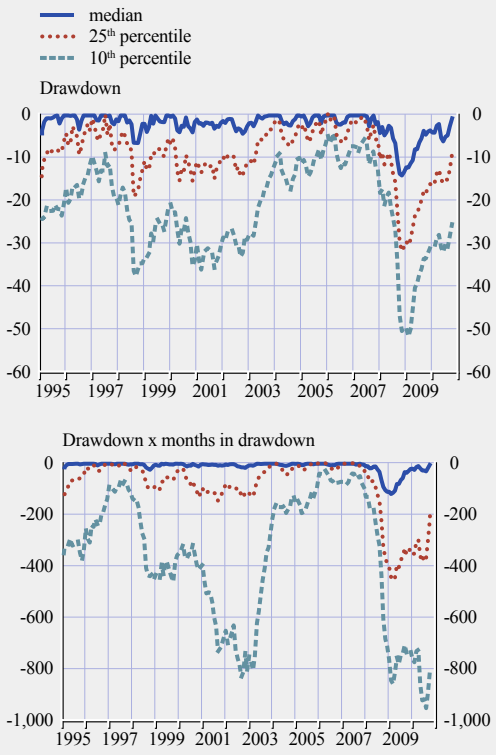
(Jan. 2009 – Oct. 2010; percentage returns, net of all fees, in USD)



Sources: Bloomberg, EDHEC Risk and Asset Management Research Centre and ECB calculations.
Note: EDHEC indices represent the first component of a principal component analysis of similar indices from major hedge fund return index families. "CTA Global" stands for "Commodity Trading Advisors Global"; this investment strategy is also often referred to as managed futures.

Chart 1.31 Distribution of single-manager hedge fund drawdowns globally

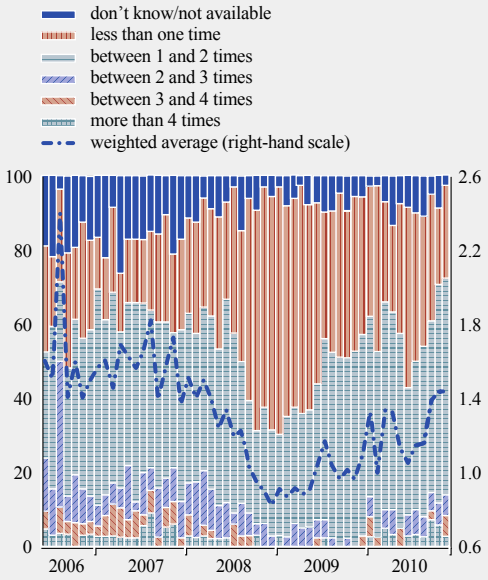
(Jan. 1995 – Oct. 2010; percentage cumulative monthly returns, net of all fees, in fund's reporting currency)



Sources: Lipper TASS database and ECB calculations.
Notes: The drawdown indicator refers to the cumulative percentage decline from the latest historical performance peak of a hedge fund as measured by net asset value per participation unit. The most recent data are subject to incomplete reporting.

Chart 1.32 Hedge fund leverage

(June 2006 – Nov. 2010; percentage of responses and weighted average leverage)



Source: Bank of America Merrill Lynch, "Global Fund Manager Survey".
Notes: Leverage is defined as the ratio of gross assets to capital. In 2009 and 2010, the number of responses varied from 30 to 43.

Insufficient investment returns may be especially problematic for smaller hedge funds for a number of reasons. First, such funds rely more on performance fees. Second, the bulk of recovered investor flows has fled to and may continue feeding into larger hedge funds. Third, funds of hedge funds, which could be more supportive of smaller single-manager hedge funds, have themselves faced large redemptions and their role as capital providers has diminished.

Although there might be incentives for some hedge funds to increase risk-taking, average leverage levels seemed to be still substantially below their pre-crisis peaks. These levels, however, have continued to drift along on their upward trend, not least because of the low nominal interest rates and higher counterparty credit risk tolerance by prime-broker banks (see Chart 1.32 and Section 4.2). According to the second hedge fund survey conducted by the UK's Financial Services Authority, leverage levels in April 2010 increased compared with October 2009 across all investment strategies, but more so for fixed income arbitrage hedge funds.[5]

In the period ahead, many smaller hedge funds will continue to have to fight for their survival. However, even under the plausible scenario of a continued high hedge fund liquidation rate, closures will probably be orderly and mainly for business reasons, thereby posing limited risks to financial markets or counterparties. At the same time, as investors prefer to invest in larger hedge funds, such funds are expected to

5 See Financial Services Authority, "Assessing possible sources of systemic risk from hedge funds", July 2010.

grow, as are the concomitant risks to financial stability. Furthermore, amid low nominal interest rates and higher counterparty credit risk tolerance by prime-broker banks, the limited data available on hedge funds' leverage pointed to a gradual releveraging of the hedge fund sector.

2 THE EURO AREA ENVIRONMENT

The overall macroeconomic environment in the euro area continued to improve further after the finalisation of the June 2010 Financial Stability Review (FSR), albeit with considerable differences across countries. Better macroeconomic prospects, as well as a tightening of the fiscal stance, contributed to a slight improvement in the fiscal outlook for the euro area as a whole. Nevertheless, the main risk for the euro area financial system remains the concern about the sustainability of public finances in some countries, with a potential for further adverse feedback effects between public finances and the financial sector. On a more positive note, despite prevailing uncertainty regarding future growth prospects and persisting vulnerabilities in the non-financial corporate sector, the overall macroeconomic improvement facilitated a slight decline in the risks to financial stability posed by the sector as a whole. The modest improvement in balance sheet conditions and profitability is however not broad-based across industries and not yet as widespread within the segment of small and medium-sized enterprises (SMEs). Risks stemming from the household sector are assessed to have remained contained, as negative labour market developments were in line with expectations, and the debt servicing burden has decreased slightly for the euro area as a whole. Heterogeneity in country-level developments is however substantial at this juncture.

2.1 ECONOMIC OUTLOOK AND RISKS

The euro area macroeconomic environment has improved further since the finalisation of the June 2010 FSR.

Following a marked rebound in the second quarter of the year, growth is expected to have moderated in the second half of the year, as the factors that boosted the recovery in the initial phase – in particular the fiscal stimuli, the inventory cycle and the rebound in trade – diminished in strength (see Chart S43). Looking ahead, activity is expected to pick up at a modest pace, led by the recovery of exports and by gradually rising domestic demand, reflecting the effects of past monetary stimulus and the significant efforts to restore the functioning of the financial system. The December 2010 Eurosystem staff macroeconomic projections for the euro area place annual real GDP growth between 1.6% and 1.8% in 2010, 0.7% and 2.1% in 2011 and 0.6% and 2.8% in 2012.[1]

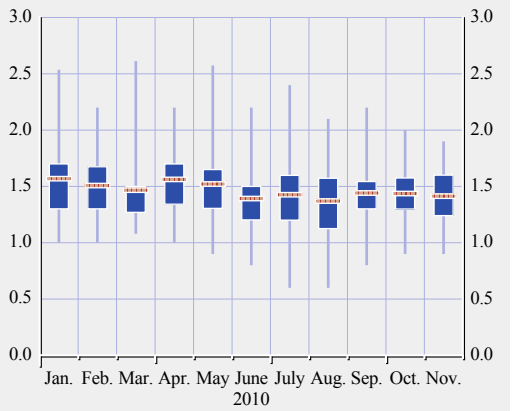
Uncertainty about the economic outlook remains elevated, with professional forecasters indicating a rather wide range of views about growth prospects for 2011 in the forecasts made throughout 2010 (see Charts 2.1 and S44). In particular, uncertainty relates to the ongoing process of balance sheet adjustment in the financial and non-financial sectors both inside and outside the euro area.

Moreover, at the country level within the euro area, there remains considerable heterogeneity in terms of the outlook. While some countries have seen a strong rebound in growth following the recession, prospects in several countries

1 The December 2010 Eurosystem staff macroeconomic projections were published on 2 December, after the cut-off date for this issue of the FSR.

Chart 2.1 Distribution across forecasters for euro area real GDP growth in 2011

(Jan. 2010 – Nov. 2010; percentage change per annum; maximum, minimum, interquartile distribution and average)



Source: Consensus Economics.

remain weak owing to the need for balance sheet repair in various sectors, while accumulated competitiveness losses are expected to dampen growth.

For the euro area as a whole, notwithstanding the somewhat improved outlook, the risks are tilted to the downside. On the one hand, global trade may continue to perform more strongly than expected, thereby supporting euro area exports. At the same time, it is to be noted that the level of business confidence in the euro area remains relatively high. On the other hand, downside risks relate to the tensions in some segments of the financial markets and their potential spillover to the euro area real economy. Further downside risks relate to renewed increases in oil and other commodity prices, protectionist pressures and the possibility of a disorderly correction of global imbalances.

Several risks to financial stability stemming from the macroeconomic environment remain, notably those due to the adverse macro-financial feedback loops. In particular, were the recovery to falter, renewed strains could be felt in the corporate and household sectors, possibly translating into higher default rates. With considerable heterogeneity amongst country prospects, the possibility of such a scenario in some regions of the euro area remains a concern. At the same time, downside risks to growth and persisting banking fragilities could further weaken fiscal positions, adding to sovereign stresses with a negative impact on banks' funding conditions and the outlook for economic activity.

2.2 BALANCE SHEET CONDITION OF NON-FINANCIAL CORPORATIONS

The profitability of euro area non-financial corporations has continued to improve, although the condition of parts of the SME sector remains fragile. Corporate sector indebtedness has stabilised, although debt remains at historically high levels. Firms' ability to service their debt has benefited from the decline in the interest rate burden and a significant pick-up in retained earnings, amid broadly improving economic conditions. These developments in the corporate sector during the past six months have broadly been in line with the expectations outlined in the June 2010 FSR.

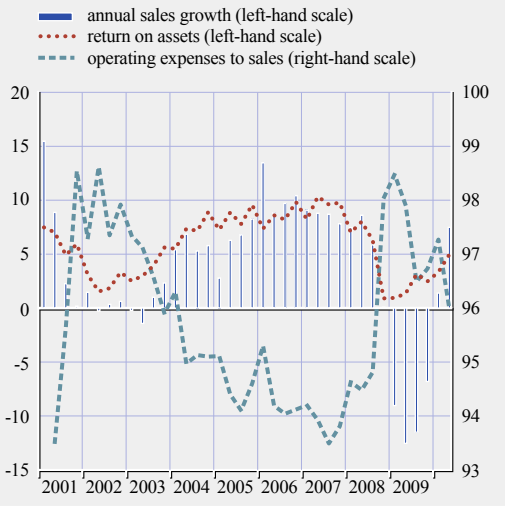
EARNINGS DEVELOPMENTS

The aggregate gross operating surplus of euro area non-financial corporations increased at the beginning of 2010 according to euro area accounts data. This change compared to trend may indicate a possible turning point in firms' profitability. However, improved profits did not lead to growth in investment or employee compensation, instead being mostly reflected in retained earnings.

This improvement was also visible in data on large and medium-sized listed corporations. The profitability of these firms continued to increase in the first half of 2010 owing to moderating expenses and improving sales (see Chart 2.2). While cost-cutting measures were especially pronounced throughout 2009, sales picked up in the first half of 2010, notably supported by the rebound in external trade. In spite of the general improvement, the profitability of listed medium-sized companies, gauged by the net income-to-net sales ratio, remained slightly negative in the second quarter

Chart 2.2 Sales growth, return on assets and cost/sales ratio of listed non-financial firms in the euro area

(Q1 2001 – Q2 2010; percentages; medians)



Sources: Thomson Reuters Datastream and ECB calculations.

of 2010. Profitability remains weakest in the construction sector as well as in the wholesale and retail sectors.

In contrast to large firms, the conditions for small firms remained weak, as demonstrated by the most recent SME survey, covering the period from March to September.[2] Profits of SMEs continued to deteriorate, although the situation improved in net percentage terms when compared with the previous survey. Also, the number of SMEs reporting decreasing or increasing turnover was almost equal.

Overall, the latest available information for euro area corporates shows that profitability is gradually improving, albeit with considerable heterogeneity across sectors and firm types. The recovery of large companies is somewhat more advanced than that of SMEs, especially since stronger exports have supported large firms' sales while SMEs have suffered more from relatively weak domestic demand.

LEVERAGE AND FUNDING

Several corporate sector debt ratios indicate a stabilisation in firms' leverage levels at the beginning of 2010 (see Charts 2.3 and S51). According to the latest SME survey, the moderation of leverage seems to stem mainly from SMEs' balance sheets since the leverage of large corporations appears to have remained broadly unchanged. Looking at the different sectors, median debt levels were highest in the construction, wholesale and retail sectors, as well as the transport and communication sectors, in the second quarter of 2010. In spite of stabilising indebtedness ratios, leverage continues to be at historically high levels.

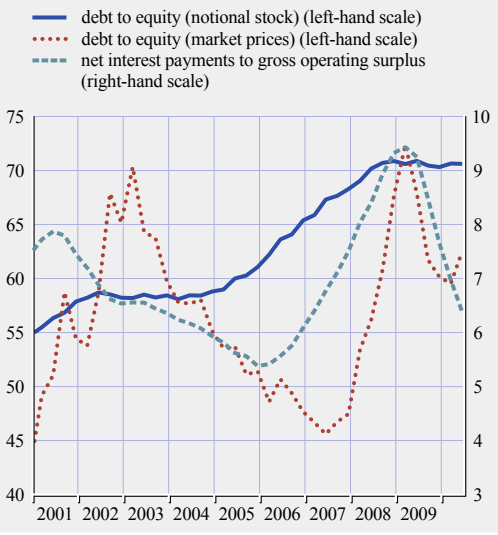
The ratio of net interest payments to gross operating surplus – a measure of companies' debt servicing ability – has dropped substantially since March 2009, standing at 6.4% in the second quarter of 2010. The decline in the interest burden indicates that firms are more likely to be able to sustain their debt levels. But this positive development stems primarily from the decline in interest rates recorded since the end of 2008 and much less from firms' declining leverage.

In addition to the risks stemming from high leverage, firms face funding risks as they eventually need to roll over some of their outstanding debt. So far, the growth of retained earnings, as well as subdued investment expenditures and M&A activities, have – to some extent – reduced companies' need for external financing. During the third quarter of 2010, financing conditions eased somewhat as the real cost of external financing for euro area non-financial corporations decreased owing to the diminishing cost of equity and the decreasing cost of market-based debt (see Chart S49). Nevertheless, while bank lending rates remain at low levels, lending standards are still tight. The October 2010 bank lending survey for the euro area pointed to a further net tightening of credit standards for non-financial corporations, albeit to a lesser extent than in the previous survey. This could have contributed to pressures on the SME sector, as suggested in Box 3.

2 See ECB, "ECB survey on the access to finance of small and medium-sized enterprises in the euro area", October 2010.

Chart 2.3 Total debt and interest burden of non-financial corporations in the euro area

(Q1 2001 – Q2 2010; percentages)



Sources: ECB and ECB calculations.

Unlike the conditions faced by SMEs, the availability of alternative market-based external funding is reducing large companies' funding risks. The annual growth rate of debt securities issued by firms continued to be robust in the third quarter of 2010. Especially in September 2010 debt issuance activity picked up for both non-investment-grade and investment-grade firms. The firms continued to scale back short-term debt issuance, while there was solid growth in longer-term (fixed rate) debt securities issuance (see Chart S48). Although the cost of market-based debt increased temporarily in May and June 2010, in the midst of tensions in euro area sovereign bond markets, all non-financial corporate bond yields decreased in the third quarter of 2010.

Box 3

HAVE EURO AREA BANKS BEEN MORE DISCRIMINATING AGAINST SMALLER FIRMS IN RECENT YEARS?

The combination of a general economic slowdown and the intensification of the financial crisis in late 2008 resulted in a marked reduction in lending to non-financial corporations in the euro area. Survey-based evidence suggests that the slowdown in credit to the euro area corporate sector reflects both lower borrower demand and more restrictive loan supply by banks faced with pressures on their balance sheets.[1] However, the economic impact on and hence potential feedback loops to the financial sector crucially hinge on the extent to which the borrowers facing a less abundant supply of bank credit are able to replace it with other sources of finance. Against this background, this box sheds some light on whether lending to smaller companies, which are typically more bank-dependent, has declined by more than credit to larger firms.[2]

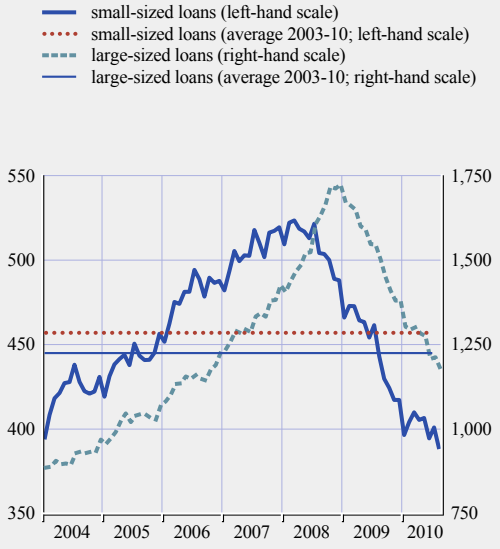
There are several reasons why banks, when faced with pressures to deleverage and greater uncertainty about the economic outlook, may decide to restrain lending to smaller companies by more than that to larger ones. First of all, smaller firms usually suffer more from problems related to a lack of information on creditworthiness (e.g. owing to less rigorous requirements for their accounting statements) and hence in general face higher external financing costs. Second, this information problem is reinforced by smaller firms' typically lower amount of collateral (e.g. fixed assets) and less stable cash flows. Furthermore, smaller firms are generally in a weaker bargaining position vis-à-vis their banks, as they are less able (than larger firms) to tap debt markets and, due to their more information-intensive bank relationships, they face greater costs when trying to shift banks ("lock-in" costs). Overall, such problems are likely to be more pronounced during periods of heightened uncertainty about the value of collateral and banks' own situation.

Applying the ECB's MFI interest rate statistics, which contain information on MFI lending rates and new business volumes broken down by the size of loans to non-financial corporations, Chart A shows that since its peak in early 2008 the six-monthly flow of small-sized loans (i.e. below €1 million) started declining earlier and by more than for large-sized loans (i.e. above €1 million).[3] Moreover, by August 2010 the six-monthly flow of small-sized loans

1 See the Eurosystem's bank lending survey. See also ECB, "Monetary policy and loan supply in the euro area", *Monthly Bulletin*, October 2009.
2 SMEs are of high importance in the euro area corporate sector. They account for 99% of the number of firms in the euro area, around 60% of turnover and almost 70% of employment; see also European Commission, "2007 SME Observatory Report", and the ECB survey on the access to finance of SMEs in the euro area.
3 Obviously, this distinction provides information about the size of the loans taken out, but not about the actual size of the firms taking out the loans. Nonetheless, it may serve as a rough proxy for the granting of loans to smaller and large firms, respectively. In particular, the large-sized loan category is likely to be dominated by larger companies.

Chart A New business volumes of loans to euro area non-financial corporations broken down by size

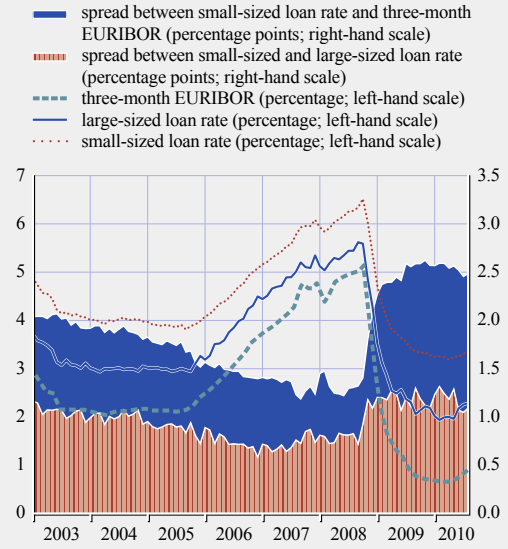
(Jan. 2004 – Aug. 2010; EUR billions; six-monthly flows)



Source: ECB.

Chart B Short-term MFI interest rates on new business loans to euro area non-financial corporations and the three-month EURIBOR

(Jan. 2003 – Aug. 2010)



Source: ECB.

reached its lowest point since the beginning of the statistics in January 2003. In addition, it currently stands 15% below its 2003-10 average. In comparison, by August 2010 the six-monthly flow of large-sized corporate loans was close to its historical average and, while having declined rapidly in recent months, had only fallen back to the level last observed in early 2007.

A possible explanation for the stronger slowdown of small-sized lending might be that, in recent years, smaller firms have requested fewer loans from banks than larger firms did. However, it would normally be expected that such behaviour would put downward pressure on lending rates. But the opposite seems to have occurred since over the last two years, in parallel with the slowdown in lending, the rates on small-sized loans to non-financial corporations have failed to decline to the same degree as reference market rates (see Chart B). Notably, not only has the risk premium related to small-sized short-term corporate loan rates (i.e. the difference compared with the three-month EURIBOR) increased by more than 100 basis points since its low in mid-2008, but also their level compared with large-sized short-term corporate loan rates has increased and by mid-2010 reached its highest level since the inception of the statistics. This suggests that banks have become more discriminating in their pricing and granting of loans to smaller companies. This could contribute to the pressure such firms face amid weak profitability and significant financing needs, possibly aggravating the adverse economic feedback loop as small firms tend to be dependent on the banking sector to finance their investments and their ability to generate internal funding remains low (see Section 2.2).

EARNINGS AND RISK OUTLOOK

Looking forward, the recovery in firms' earnings is likely to continue in the course of 2011 as macroeconomic conditions continue to improve. The positive earnings outlook is also reflected in forecasts of financial analysts, who expect growth in earnings per share of non-financial companies included in the Dow Jones EURO STOXX index over a one-year horizon (see Chart S52).

The recovery of earnings is expected to continue and to be based on improving sales rather than on further cost-saving measures, as was the case at the end of 2009. The momentum in external trade is likely to be of benefit primarily to large listed companies, but as the economic recovery strengthens and domestic demand picks up, the improvements in earnings are expected to be more broad-based. SMEs' earnings are also expected to grow, albeit at a slower pace than those of large companies. After the sharp drop in dividends and strong earning retention during 2009, an increasing share of the earnings of listed companies may also be paid out as dividends.[3]

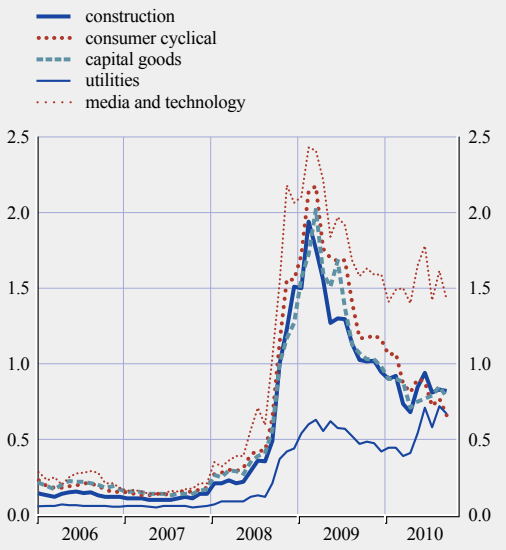
In the October 2010 bank lending survey, euro area banks expected corporate financing needs to increase somewhat, while credit standards on loans to enterprises were expected to remain stable in the fourth quarter of 2010. While survey results point to a slight increase in financing needs over the coming months, a subdued investment outlook, together with retained earnings, should limit the firms' demand for external financing. Nevertheless, banks' restrictive lending policy may be especially worrying from SMEs' perspective as they are more dependent on bank loans than large corporations.

As the number of insolvencies still tends to rise after economic recovery has begun, several euro area countries are expected to witness a record level of bankruptcies in 2010 before levels start falling in 2011.[4]

This is in line with expected default frequencies (EDFs) for euro area corporations, which remained at relatively high but broadly stable levels over the past six months, the only exception being the utilities sector.[5] The EDFs for the media and technology sector have levelled off since the beginning of 2009, but remained higher than those recorded for other sectors (see Chart 2.4). At the same time, default rates for speculative-grade corporations have continued to be high, although they have descended from their record levels.

Chart 2.4 Expected default frequencies for selected non-financial sectors in the euro area

(Jan. 2006 – Sep. 2010; percentage probability)



Sources: Moody's KMV and ECB calculations.
Notes: The EDF provides an estimate of the probability of default over the following year. Owing to measurement considerations, the EDF values are restricted by Moody's KMV to an interval between 0.1% and 35%. The "capital goods" sector covers the production of industrial machinery and equipment.

This declining trend is expected to continue in the following twelve months (see Chart S53).

OVERALL ASSESSMENT OF RISKS IN THE CORPORATE SECTOR

Improving profits, together with the low cost of financing, which eases firms' interest rate burden, should support companies' ability to service their debt and thus improve their creditworthiness in the period ahead. However, historically high leverage ratios, together with tight bank lending practices, indicate that vulnerabilities remain within the euro area corporate sector, which could be triggered once the cost of financing increases. Specific conditions in some euro area countries and

3 According to data on listed companies, the average ratio for dividends to common equity was approximately 4.8% between the second quarter of 2001 and the fourth quarter of 2008. In 2009, average dividends to common equity were 4.2%, reaching historical lows.
4 See Euler Hermes, "Insolvency Outlook", 1/2010.
5 Non-financial sector EDFs measure the probability of default of listed large and medium-sized firms over the year ahead.

weaker financial positions of SMEs, as well as of the construction, wholesale and retail sectors, across the euro area may constitute the most pressing sources of concern for the corporate sector's financial outlook.

The outlook for non-financial corporates is strongly dependent on general economic developments. If the economic recovery proves to be weaker than expected, there is a downside risk for the corporate sector's sales growth and profitability, while the potential for further cost-saving measures is relatively constrained.

2.3 COMMERCIAL PROPERTY MARKETS

DEVELOPMENTS IN COMMERCIAL PROPERTY MARKETS

Developments in commercial property markets during the past six months have been in line with the expectations outlined in the June 2010 FSR. The correction of commercial property prices seen in many euro area countries since 2007 appears to have come to an end, although conditions remain fragile in some countries. Capital values – i.e. commercial property prices adjusted downwards for capital expenditure, maintenance and depreciation – for prime property increased by 2.2% year on year in the second quarter of 2010 and 5.6% in the third quarter (see Chart 2.5). However, some countries still witnessed annual declines of 15-30%, although prices increased on a quarter-on-quarter basis for most countries.

Investment volumes remained rather stable in the second and third quarters at around €10 billion, although the volumes increased on a year-on-year basis,[6] which supported the annual price increases. Nevertheless, investment activity remained well below the levels seen in previous years as well as historical averages, and developments at a country level remained uneven.

RISKS FACING COMMERCIAL PROPERTY INVESTORS

The income risks for commercial property investors identified in the June 2010 FSR remain broadly unchanged. Capital values remain well below the levels seen in previous years in most countries. In addition, commercial property rents in the euro area continued to decline by about 1-2% year on year for both office and retail space in the second and third quarters of 2010. However, developments across countries were diverse and some countries witnessed continued large declines in rents.

Chart 2.5 Changes in the capital value of prime commercial property in euro area countries

(1997 – Q3 2010; percentage change per annum; maximum, minimum, interquartile distribution and weighted average)

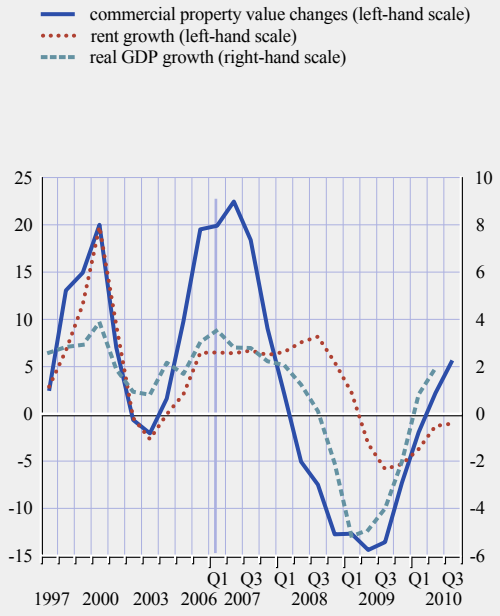
Source: Jones Lang LaSalle.
Note: Data for Cyprus, Malta, Slovakia and Slovenia are not available.

Loan-financed commercial property investors that purchased property during recent years, when prices were often significantly higher than current levels, continue to face refinancing risks and further losses. Many of the commercial property loans and commercial mortgage-backed securities (CMBSs) issued in recent years that are due to be refinanced in the near term were often granted with high loan-to-value ratios (often 75-85%). The low levels of commercial property prices, compared with the levels seen some years ago, can depress collateral values and pose challenges to property investors needing to refinance debt. This might force them to raise capital, for example by selling property, with a view to increasing the equity share in investments. It has also caused problems for some German open-ended property

6 According to data from DTZ Research.

Chart 2.6 Changes in the capital value of euro area prime commercial property, commercial property rent growth and euro area real GDP growth

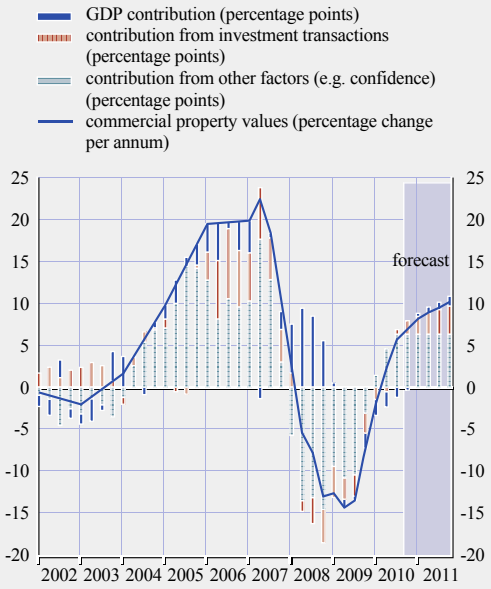
(1997 – Q3 2010; percentage change per annum)



Sources: ECB and Jones Lang LaSalle.
Note: Commercial property data for Cyprus, Malta, Slovakia and Slovenia are not available.

Chart 2.7 Forecast for the capital value of prime commercial property in the euro area

(Q1 2002 – Q4 2011)



Sources: ECB, Jones Lang LaSalle, DTZ and ECB calculations.
Notes: The forecast and the decomposition are obtained by using a structural VAR model with GDP growth, commercial property investment transactions and property values. The European Commission's spring 2010 forecast for euro area GDP was used in the projection.

funds. Some of these funds froze redemptions around two years ago due to liquidity shortages caused by large investor outflows. German law allows the funds to freeze redemptions for only two years and the funds that closed in 2008 and 2009 will be forced to either reopen with a sustainable business model or liquidate and return what cash remains to investors. Some funds have already announced that they will close and have started to sell properties.

The outlook for commercial property prices and rents largely depends on the future path of economic activity in the euro area, as developments in commercial property markets follow the business cycle rather closely (see Chart 2.6).

Commercial property prices in the euro area are projected to recover gradually during 2011, but there is high uncertainty surrounding this forecast, since it is heavily reliant on the macroeconomic outlook (see Chart 2.7) and is affected by considerable heterogeneity among country prospects.

OVERALL ASSESSMENT OF RISKS IN COMMERCIAL PROPERTY MARKETS

Although most euro area countries have witnessed some improvement in commercial property markets, prices remain well below the highs seen in previous years and conditions in some countries remain very challenging. This poses risks for many loan-financed property investors and CMBS deals with loans due for refinancing in the near term, as they may face collateral values that are considerably depressed with respect to the pre-crisis levels at which financing was secured. Continued losses for some banks are therefore likely in

the period ahead as a result of their exposure to commercial property lending and investment (see Section 4).

2.4 BALANCE SHEET CONDITION OF THE HOUSEHOLD SECTOR

The balance sheet condition of the euro area household sector has broadly developed in line with what was anticipated in the June 2010 FSR. While the macroeconomic environment has continued to negatively affect household sector balance sheets, the overall assessment remains one of continued sustainability.

Household indebtedness has edged up, while the debt servicing burden has decreased slightly. Looking forward, a relative improvement in the general economic outlook for the euro area could suggest that the negative effects of the macroeconomic environment on the euro area household sector balance sheet may become more moderate, but vulnerabilities of household sector balance sheets stemming from still subdued household income prospects and residential property price developments remain.

HOUSEHOLD SECTOR LEVERAGE

The annual growth rate of total loans granted to households (most of which are granted by monetary financial institutions – MFIs) was unchanged at 2.3% in the second quarter of 2010. However, the more readily available information on the loans to households extended by the MFI sector suggests a further slight pick-up in the growth of total loans. The annual growth rate of loans extended by MFIs stood at 2.8% in the third quarter of 2010, up from 2.7% in the second quarter of 2010. Combining this information with data on securitisation activity gives an indication that also the annual growth rate of total loans to households might have increased to 2.8% in the third quarter of 2010. The resuming growth of MFI loans to households was supported by an ongoing recovery in borrowing for house purchase (the annual growth rate increased to 3.4% in the third quarter from 3.0% in the second quarter of 2010), while the annual growth rate of consumer credit remained negative (see also Chart S61).

Overall, recent developments in the growth of loans to households appear to be consistent with longer-term regularities, with household borrowing tending to improve early in the economic cycle. Nevertheless, the prevailing considerable uncertainty that surrounds the outlook for housing markets and household income developments, coupled with the relatively high level of household indebtedness, has led to only a moderate recovery of household borrowing.

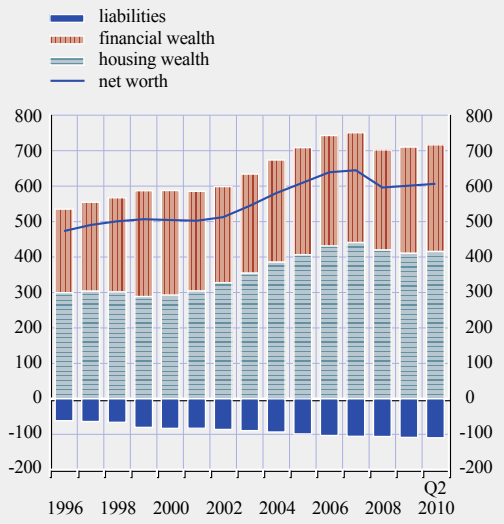
Looking forward, according to the results of the October 2010 bank lending survey for the euro area, banks expect household demand for housing loans to be somewhat stronger in the fourth quarter of 2010 relative to the third. The net demand for consumer credit and other lending to households is expected to turn positive.

The modest pick-up in household borrowing, while income growth remains subdued, is reflected in a slight increase in the debt-to-disposable income ratio to 98% in the second quarter of 2010. At the same time, households' debt-to-GDP ratio has also edged up slightly, to 66% in the second quarter of 2010 (see Charts S62 and S63).

Turning to the assets' side, the value of households' total assets, at an aggregate level, is estimated to have increased slightly in 2009, despite a decline in housing wealth. Hence, the overall net worth of the household sector remained broadly stable, even if household indebtedness increased somewhat (see Chart 2.8). The potential ability of households to meet debt obligations, as measured by the ratio of debt to liquid financial assets, does not appear to have worsened in the first half of 2010 (see Chart S64). However, should the accumulation of debt accelerate while housing wealth declines, household net worth could decrease, which could potentially weaken households' ability to renegotiate or repay debt.

Chart 2.8 Household sector net worth in the euro area

(1996 – Q2 2010; percentage of gross disposable income)



Sources: ECB and ECB calculations.
Notes: Data for housing wealth are based on ECB estimates. Data for the second quarter of 2010 are estimates based on information available for the first half of the year.

RISKS FACED BY THE HOUSEHOLD SECTOR

Developments in interest rates and income are the two main sources of risk which can affect the ability of households to service their debt. As in the previous issue of the FSR, household income prospects remain the prime source of risk for household debt sustainability. Risks stemming from developments in lending interest rates, on the other hand, have declined slightly in recent months.

Interest rate risks of households

Key ECB interest rates have remained at historically low levels since the finalisation of the June 2010 FSR. An ongoing pass-through from official rates to market rates brought about a continued decline in interest rates on loans to households in the course of 2009 and in the first half of 2010. Combined with a moderate recovery of household borrowing, the decline in lending interest rates has resulted in a further slight decline in households' debt servicing burden in the first half of 2010, as was anticipated in the June 2010 FSR. The interest payments stood at about 2.2% of disposable income in the second quarter of 2010, slightly down from 2.3% in the first quarter of 2010 and 2.5% in the fourth quarter of 2009 (see ChartS65). However, there are some indications that the decline in lending rates charged to households might be levelling off as some lending rates (mainly for short-term loans) picked up slightly since June 2010.

Overall, the interest rate risk faced by households has declined slightly since the finalisation of the June 2010 FSR. Looking forward, while it appears that earlier reductions in interest rates on loans to households might be levelling off, their relatively low level should keep the interest rate risks for the euro area household sector subdued.

Risks to household income

The evolution of household income, which is linked both to the general economic outlook and to developments in the labour market, is one of the most important predictors of households' ability to meet their debt servicing obligations.

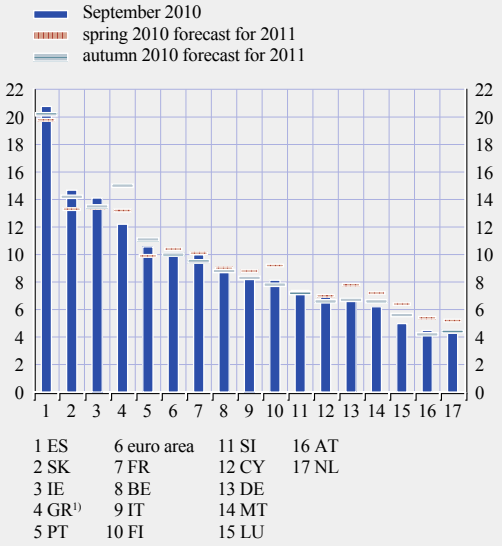
While the economic outlook has improved since the finalisation of the June 2010 FSR, albeit with the risks slightly tilted to the downside, the euro area unemployment rate stabilised at 10% between March and September 2010 (see Chart S45). The developments in household disposable income have therefore, on average, been rather muted and income-related risks for households' debt servicing are still present.

The relative stabilisation in the labour market conditions has, however, not been broadly based across euro area countries. For example, renewed increases in the unemployment rate have been recorded in some countries between March and September 2010. Looking ahead, unemployment rates are not expected to have yet reached their peaks in some countries (see Chart 2.9). A slight increase is still expected for the euro area as a whole in 2011.

The combination of negative labour market developments and relatively high levels of indebtedness may lead to higher income-related risks in some euro area countries compared

Chart 2.9 Unemployment rates and forecast in the euro area countries

(percentages)

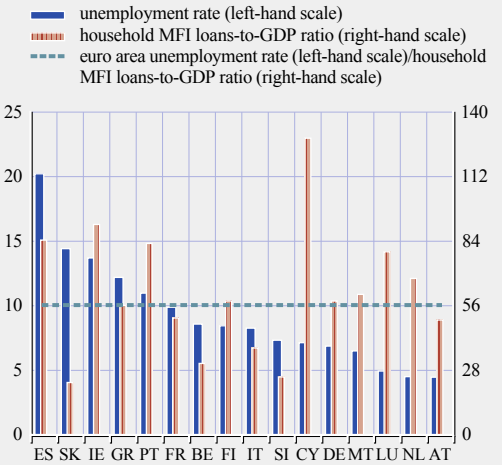


Sources: Eurostat, European Commission and national sources.
Note: The data for 2011 are European Commission forecasts.
1) Data for Greece are for August 2010.

with the euro area as a whole (see Chart 2.10). However, the assessment of such macroeconomic risks also has to take into account specific

Chart 2.10 Unemployment rates and household indebtedness in the euro area countries

(Q2 2010; percentages)



Sources: ECB, Eurostat and ECB calculations.
Note: Data on MFI loans to households do not include loans that have been derecognised from MFI balance sheets.

structural characteristics of different countries, such as the share of mortgage lending in total household lending, and country-specific features of the mortgage market.

Looking forward, as the recovery in euro area economic activity is expected to proceed at a modest pace, developments in labour markets and in household real income are likely to remain subdued. At the same time, an uneven recovery in labour market conditions, and differences in household sector indebtedness across euro area countries, suggest an uneven distribution of risks among euro area countries.

Risks to residential property prices

After the fall in euro area residential property prices observed in 2009, the pace of decline abated for most countries for which official data are available in the first and second quarters of 2010. The first half of 2010 tended to confirm the tentative signs of stabilisation broadly observed across countries, suggesting that the turning point in house price growth has been reached. In particular, house price changes turned positive in France, whereas the pace of house price declines moderated somewhat in Spain and the Netherlands. Nonetheless, discrepancies across countries remain, with several countries continuing to record year-on-year falls in house prices. Generally, the countries experiencing the most pronounced corrections were those that exhibited the strongest house price increases in the period prior to the onset of financial turmoil.

The improvement in the housing outlook may, in part, have reflected an improvement in borrowing conditions, with nominal interest rates on loans to households for house purchase at low levels. At the same time, the marked correction in the housing supply which had been observed during 2009 appears to have moderated somewhat in the first half of 2010. Nonetheless, relative to metrics of underlying fundamentals, house prices in the euro area as a whole remain overvalued. Despite increases in the ratio of household income to house prices since 2007, the ratio remains below

the levels seen at the beginning of the 2000s (see Chart S66). In addition, the euro area house price-to-rent ratio remains elevated (see Chart S68). Both measures would indicate the potential for further correction in euro area house prices in the near term. In that respect, a key downside risk underpinning the outlook for the housing market relates to the possibility for renewed weakness in economic fundamentals, most notably the labour market.

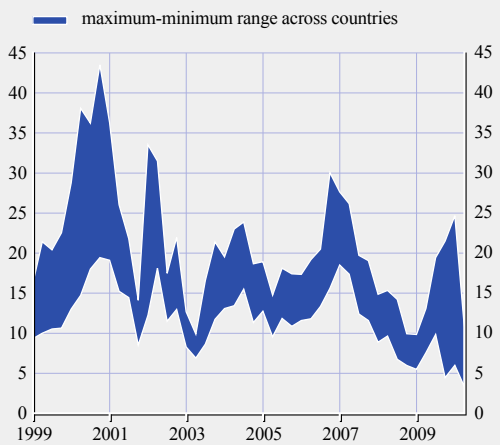
OVERALL ASSESSMENT OF RISKS IN THE HOUSEHOLD SECTOR

Overall, risks to the euro area financial sector originating from the household sector remain contained, despite considerable divergence at the country level. This is confirmed by developments in the distance to distress indicator (see Chart 2.11), which provides an approximation of changing patterns in the credit risk posed by the euro area household sector in the first half of 2010.[7]

Nevertheless, vulnerabilities of the household sector balance sheet stemming from subdued household income prospects and residential property price developments remain. These may moderate in the coming months but, most likely, at varying paces across euro area countries. Looking forward, the credit quality of the household sector could be negatively affected should macroeconomic developments turn out to be more moderate than currently foreseen, and unemployment rates remain high for longer than expected.

Chart 2.11 Euro area household sector's distance to distress

(Q1 1999 – Q2 2010; number of standard deviations)



Sources: ECB, Bloomberg and ECB calculations.
Note: A lower reading of distance to distress indicates higher credit risk.

2.5 ECONOMIC SITUATION OF THE GOVERNMENT SECTOR

The financial and economic crisis has entailed a generalised and severe worsening of fiscal positions in all euro area countries. Following the sharp deterioration in 2009 (see Table 2.1),[8] the government budget deficit ratio in the euro area as a whole is expected to remain broadly unchanged at 6.3% of GDP in 2010, before declining to 4.6% of GDP in 2011. On the one hand, the deficit in 2010 is affected by still unfavourable cyclical factors, the continued impact of fiscal stimulus measures, capital injections in the banking sector and the pick-up in interest payments. On the other hand, tax increases and spending restraint are contributing to a better fiscal position. Fiscal prospects for the euro area have improved compared with the June 2010 FSR, owing to a better macroeconomic outlook and the consolidation strategies adopted by many countries. The euro area government debt-to-GDP ratio is nevertheless projected to continue to increase significantly during 2010 and 2011 up to 86.5%. The outlook for 2012 confirms a rising debt ratio in spite of a further reduction of the deficit ratio.

Concerns about some governments' ability to restore sustainable public finances over the medium term have again fed tensions in government bond markets in the past months, leading to a tightening of refinancing conditions for some countries in particular (see Section 3.2). Their high budget deficits and high and rising government debt ratios remain a risk to financial stability.

7 The methodology supporting the construction of this indicator was described in detail in Box 7 in ECB, *Financial Stability Review*, December 2009.

8 The European Commission autumn 2010 forecasts displayed in Table 2.1 were published on 29 November, after the cut-off date for this issue of the FSR.

Table 2.1 General government budget balance and gross debt

(2007-12; percentage of GDP)

	General government budget balance						General government gross debt					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
Belgium	-0.3	-1.3	-6.0	-4.8	-4.6	-4.7	84.2	89.6	96.2	98.6	100.5	102.1
Germany	0.3	0.1	-3.0	-3.7	-2.7	-1.8	64.9	66.3	73.4	75.7	75.9	75.2
Ireland	0.0	-7.3	-14.4	-32.3	10.3	-9.1	25.0	44.3	65.5	97.4	107.0	114.3
Greece	-6.4	-9.4	-15.4	-9.6	-7.4	-7.6	105.0	110.3	126.8	140.2	150.2	156.0
Spain	1.9	-4.2	-11.1	-9.3	-6.4	-5.5	36.1	39.8	53.2	64.4	69.7	73.0
France	-2.7	-3.3	-7.5	-7.7	-6.3	-5.8	63.8	67.5	78.1	83.0	86.8	89.8
Italy	-1.5	-2.7	-5.3	-5.0	-4.3	-3.5	103.6	106.3	116.0	118.9	120.2	119.9
Cyprus	3.4	0.9	-6.0	-5.9	-5.7	-5.7	58.3	48.3	58.0	62.2	65.2	68.4
Luxembourg	3.7	3.0	-0.7	-1.8	-1.3	-1.2	6.7	13.6	14.5	18.2	19.6	20.9
Malta	-2.3	-4.8	-3.8	-4.2	-3.0	-3.3	61.7	63.1	68.6	70.4	70.8	70.9
Netherlands	0.2	0.6	-5.4	-5.8	-3.9	-2.8	45.3	58.2	60.8	64.8	66.6	67.3
Austria	-0.4	-0.5	-3.5	-4.3	-3.6	-3.3	59.3	62.5	67.5	70.4	72.0	73.3
Portugal	-2.8	-2.9	-9.3	-7.3	-4.9	-5.1	62.7	65.3	76.1	82.8	88.8	92.4
Slovenia	0.0	-1.8	-5.8	-5.8	-5.3	-4.7	23.4	22.5	35.4	40.7	44.8	47.6
Slovakia	-1.8	-2.1	-7.9	-8.2	-5.3	-5.0	29.6	27.8	35.4	42.1	45.1	47.4
Finland	5.2	4.2	-2.5	-3.1	-1.6	-1.2	35.2	34.1	43.8	49.0	51.1	53.0
Euro area	-0.6	-2.0	-6.3	-6.3	-4.6	-3.9	66.2	69.8	79.2	84.2	86.7	88.0

Source: European Commission autumn 2010 forecast.
Note: Euro area aggregate does not include Estonia.

FISCAL STANCE AND SUSTAINABILITY

As mentioned in the June 2010 FSR, three main factors contribute to explaining the unfavourable fiscal developments experienced over the past two years. Firstly, the financial and economic crisis brought about declining revenue-to-GDP and rising expenditure-to-GDP ratios through the operation of automatic stabilisers, revenue shortfalls and persistent growth in structural spending. Secondly, following the European Economic Recovery Plan which was agreed in December 2008, most euro area governments adopted significant fiscal stimulus measures with notable effects on deficits and debt. Thirdly, several countries have taken measures to stabilise the financial sector, which had an immediate impact on the deficit and/or debt position, or constitute a risk of higher deficits and/or debt in the future.

The significant loosening of governments' fiscal policies, together with adverse cyclical developments in 2009-10, have generated the worst budget balance deterioration and the largest rise in government debt in euro area history. In 2008-09, fiscal stimulus measures and government support for the financial sector accounted for about one-third of the euro area debt increase. The fiscal stimulus in 2010 is expected to be around 1% of GDP, unchanged from 2009 and still of a partially temporary nature (see Table 2.2).[9]

9 The European Commission autumn 2010 forecasts displayed in Table 2.2 were published on 29 November, after the cut-off date for this issue of the FSR.

Table 2.2 Change in general government debt in the euro area

(percentage of GDP; percentage points)

		2008	2009	2010[1]
1	General government gross debt	69.8	79.2	84.2
2	Change in debt ratio (2=3+4+5)	3.6	9.4	5.0
	of which contribution of:			
3	Nominal GDP growth	-1.6	2.3	-1.7
4	General government deficit (+)/ surplus (-)	2.0	6.3	6.3
4a	Automatic stabilisers	-0.6	1.8	1.4
4b	Fiscal stimulus measures	-	1.1	1.1
4c	Other	2.6	3.4	3.8
5	Deficit-debt adjustment	3.2	0.9	0.5
5a	Financial sector support	2.0	0.6	-
5b	Other deficit-debt adjustment	1.2	0.3	-
6	Change in contingent liabilities on account of the financial sector support	5.5	3.1	-

Sources: ECB, Eurostat 2010 notification and European Commission for the breakdown of general government deficit, financial sector support and contingent liabilities.
Note: The fiscal stimulus is partly of a temporary nature and partly includes permanent measures that have a detrimental effect on the structural budgetary component.
1) European Commission autumn 2010 forecast.

Further information on the fiscal situation is conveyed by the indicator of government net debt (financial assets held by the government subtracted from its liabilities, both recorded at market value). Government financial assets, some of which cannot easily be mobilised, mainly include currency and deposits, loans granted by government, securities other than shares, shares and other equity, and other accounts receivable. At the end of 2009, the average amount of consolidated financial assets held by euro area governments stood at around 32.4% of GDP. The market value of consolidated government liabilities at that time was 86.3% of GDP. Accordingly, the euro area government net debt ratio reached 53.9% of GDP in 2009, after having hovered between 40% and 50% of GDP over the previous ten years.

High deficit and debt levels weakened confidence in fiscal sustainability and triggered sharp increases in sovereign bond yields and spreads for many euro area countries in the course of the past two years. This has not only added to the overall interest rate risk in the financial system, but also imposed higher borrowing costs on public budgets for the countries concerned, thus exacerbating the fiscal problems. The vulnerability of governments in fiscal distress was also manifested by high short-term refinancing needs, also related to capital injections into the banking system. This has in turn implied higher funding costs and tighter financing conditions for the private sector. This experience shows that sound and sustainable public finances constitute a prerequisite for a stable financial and economic environment.

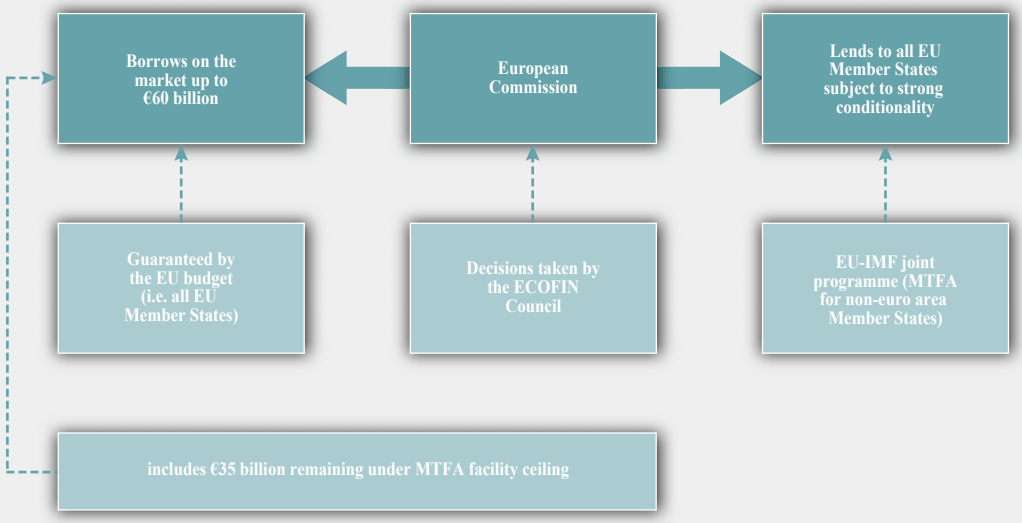
The market response to risks related to sovereign credit and the sustainability of public finances somewhat eased in the second quarter of 2010, supported by the establishment of the European Financial Stability Facility (EFSF) with a view to providing loans to cover the financing needs of euro area countries in difficulty, subject to strong policy conditionality (see Box 4). Furthermore, the situation also improved on account of fiscal consolidation measures and structural reforms introduced by some countries, as well as the publication of the results of banks' stress tests by the Committee of European Banking Supervisors (CEBS). However, in the third quarter, the uncertain outlook for public finances in some euro area countries again became a source of instability. Market perceptions of sovereign credit risk are driven not only by the outstanding level of gross and net government debt and the expected budget balance, but also by the risks entailed by contingent or implicit government liabilities associated with state guarantees to stabilise the financial sector. Such risks materialised in the case of Ireland and entailed substantially higher deficits and government debt.

Box 4

GOVERNMENT MEASURES TO SAFEGUARD FINANCIAL STABILITY IN THE EURO AREA

From early 2010 fiscal imbalances in certain euro area countries have been causing tensions in sovereign debt markets. Euro area countries responded by affirming their willingness to take determined and coordinated action, if necessary, to safeguard financial stability in the euro area as a whole. In this context, on 2 May 2010 euro area countries agreed to activate, together with the IMF, a three-year financial support programme for Greece. On 6-7 May 2010, tensions escalated abruptly in financial markets. In line with their earlier commitment, European governments took urgent and unprecedented action to safeguard financial stability. On 9 May 2010, the Member States agreed to establish a comprehensive package of measures, consisting of three elements.

Chart A European Financial Stabilisation Mechanism (EFSM)



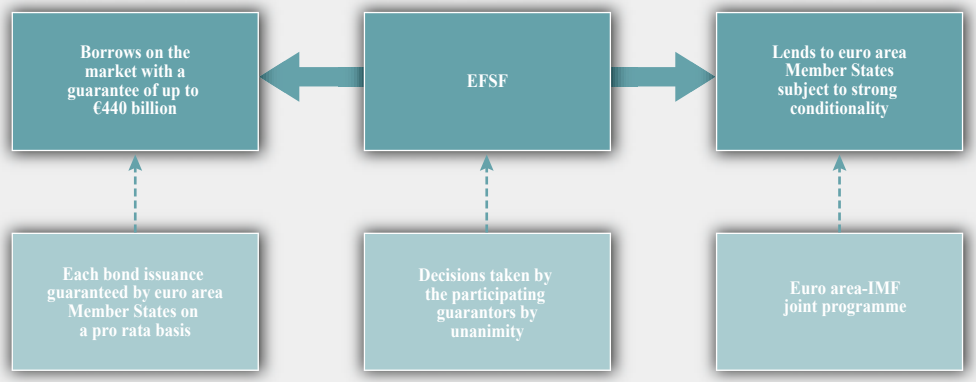
Note: MTFA denotes medium-term financial assistance.

Firstly, in line with the overall pledge to accelerate fiscal consolidation where warranted, countries experiencing strong market pressures committed to implement significant additional fiscal consolidation in 2010 and 2011 and take structural reform measures aimed at enhancing growth performance. Spain and Portugal announced additional measures on 12 May 2010 and 13 May 2010, respectively. An acceleration of fiscal consolidation plans has also been set in motion for most EU countries in the course of the year.

Secondly, the ECOFIN Council adopted a Regulation (No 407/2010) setting up the European Financial Stabilisation Mechanism (EFSM) (see Chart A). The Regulation allows the Commission to raise up to €60 billion on behalf of the EU for lending to EU Member States experiencing or being threatened with severe economic or financial disturbances. EFSM financial assistance will be subject to strong policy conditionality and take place in the context of joint EU-IMF programmes, on terms and conditions similar to those of IMF lending. The extension of the Regulation has to be reviewed every six months.

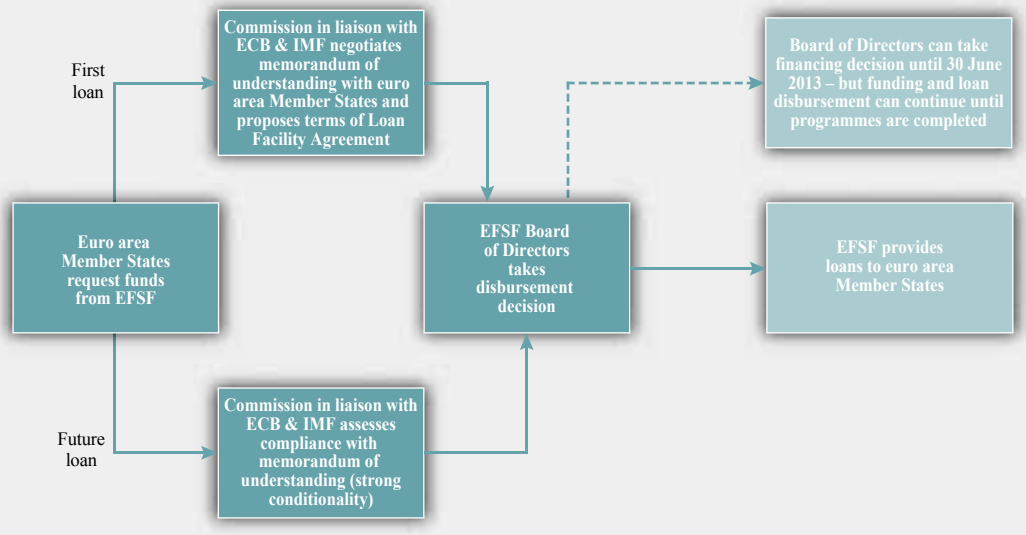
Thirdly, euro area Member States, on an intergovernmental basis, established the European Financial Stability Facility (EFSF) as a limited liability company under Luxembourg law (see Charts B and C). Its purpose is to provide loans to cover the financing needs of euro area Member States in difficulty, subject to strong policy conditionality in the context of joint euro area-IMF programmes. These loans will be financed through the issuance of debt securities, guaranteed up to a total of €440 billion by euro area Member States on a pro rata basis. On 15 June, the EFSF agreement entered into force and on 4 August Member States representing 90% of shareholding had completed national procedures regarding their guarantee obligations, thus triggering the activation of the EFSF. The EFSF can enter into loan facility agreements with euro area countries until 30 June 2013, with programmes continuing until completion. The IMF is expected to provide financing amounting to at least half as much as the euro area contribution to each programme, on terms and conditions in line with recent European programmes.

Chart B European Financial Stability Facility (EFSF)



Notwithstanding the determination demonstrated by European governments in May 2010 to safeguard financial stability in the euro area, the crisis demonstrated the clear need to strengthen economic governance in the EU and euro area. To this end, the European Council in March 2010 established a Task Force on Economic Governance under the chairmanship of its President, Herman Van Rompuy. The Task Force focused mainly on three areas: (i) strengthening fiscal surveillance, (ii) enhancing macroeconomic surveillance and (iii) establishing a crisis management framework. The ECB actively contributed to the work of this Task Force and in June 2010 submitted detailed proposals to strengthen governance and enforcement structures in the economic policy framework of the euro area. The Task Force submitted its final report to the European Council in October 2010. Subsequently, Mr Van Rompuy was invited to start

Chart C EFSF lending



Note: Loans will be extended on terms "comparable to Greece".

consultations on the establishment of a permanent crisis mechanism, including on a limited Treaty change required to that effect. The Commission is carrying out preparatory work on the general features of this new mechanism.

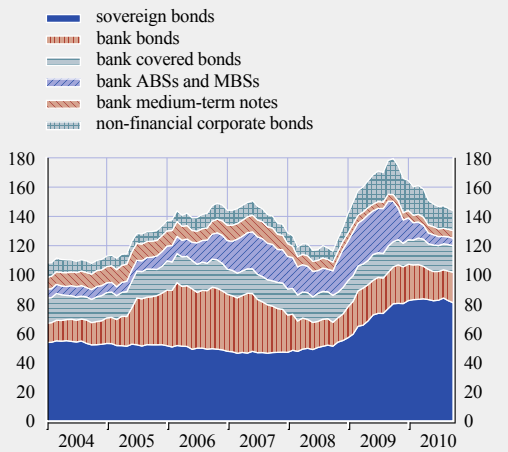
On 29 September 2010, the Commission came forward with six legislative proposals to strengthen surveillance which are being discussed by the Council and the European Parliament. Agreement on the legislative proposals is expected by June 2011.

GOVERNMENT DEBT MANAGEMENT

Government borrowing needs in the financial markets represent the most extensive direct interaction between fiscal policies and the financial system, mainly because high government debt issuance might crowd out financial and non-financial corporate debt financing and thus investment. Sovereign bond issuance in the euro area increased significantly after late 2008 (see Chart 2.12). In 2010 euro area governments' borrowing needs (related to maturing debt and deficits) are estimated to amount to almost 26% of euro area GDP, which represents a sharp increase with respect to a requirement of around 14% of GDP in 2007.

Chart 2.12 Euro area bank, sovereign and corporate debt issuance

(Jan. 2004 – Oct. 2010; EUR billions; 12-month moving average)



Sources: Dealogic and ECB calculations.

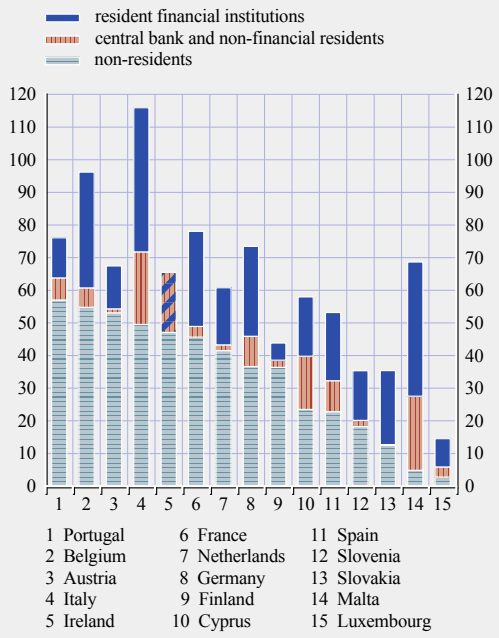
A high level of public debt tends to increase investors' concerns about holding government securities, as demonstrated by the recent surge in sovereign bond spreads and risk premia on interest rates in countries experiencing a severe deterioration of their fiscal situation.

Furthermore, a country's financial vulnerability to a significant deterioration in its fiscal positions may be higher, the larger the share of public debt held by foreign investors (see Chart 2.13). In 2009, the share of euro area total government debt held by non-residents (including those of other euro area countries) stood at about 54% (up from 33% in 1999). The share of public debt held by non-residents varies greatly across countries, roughly from 10% to 80%.

The residual maturity of public debt is an important factor affecting government refinancing conditions, especially in periods of market tensions. A sizeable share of debt with a short residual maturity implies that this part must be renewed within a relatively short period, and this can be more costly in times of weak market sentiment. In the euro area, in the period from January 2008 to October 2010, the share of securities with a residual maturity of up to one year increased from 19.5% to 21.7%. However (and of greater relevance to governments' refinancing risk), as at the end of October 2010, about 32.9% of outstanding euro area government debt securities would cumulatively mature within two years. In absolute amounts, not only securities with shorter residual maturities, but also securities

Chart 2.13 Government debt in euro area countries by holder

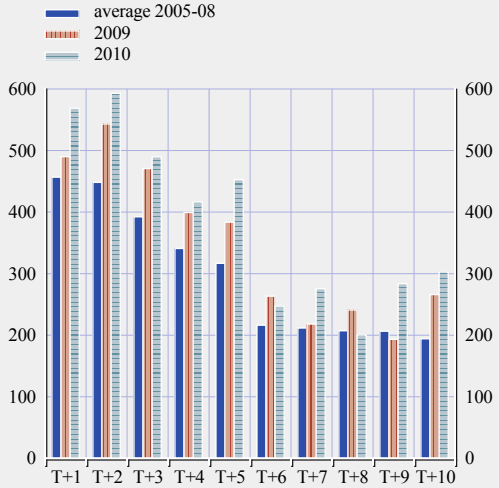
(2009; percentage of GDP)



Sources: ESCB and Eurostat.
Notes: In the case of Greece, data were not available at the cut-off date of this FSR. In the case of Ireland, only the breakdown of the debt by resident and non-resident was available.

Chart 2.14 Euro area sovereign debt maturity profile

(EUR billions)



Sources: Dealogic and ECB calculations.
Note: Data as at mid-November each year for the following calendar years.

with residual maturities of nine to ten years have increased sizeably compared with the average of 2005 to 2008 (see Chart 2.14).

OVERALL ASSESSMENT OF RISKS IN THE GOVERNMENT SECTOR

The fiscal situation remains challenging in the euro area. Nonetheless, after the finalisation of the previous FSR, the fiscal outlook for the euro area as a whole has improved thanks to better macroeconomic prospects and a tightening of the fiscal stance. However, fiscal positions continue to differ substantially across countries and concerns regarding the ability of some governments to restore sustainable public finances over the medium term are likely to persist. This uncertainty could in turn continue to cast doubts over the resilience of the euro area banks that are most reliant on government support. At the same time, the high refinancing needs facing euro area governments over the next couple of years exacerbate the risk of an adverse feedback loop between the public and financial sectors, as the public finance needs might crowd out bank issuance.

A timely execution of the fiscal consolidation strategies adopted by euro area countries is a crucial factor to enhance confidence in the sustainability of their public finances. Consolidation strategies should be in line with the recommendations under the Stability and Growth Pact or with more ambitious plans as adopted by individual countries.

While fiscal consolidation may, to some extent, entail costs in terms of lower economic growth in the short run, it will be beneficial in the medium term. Any delay in meeting country-specific adjustment targets agreed at the European level, in particular as regards the correction of excessive deficits, could instead trigger further adverse financial market reactions and undermine macroeconomic and financial stability in the euro area. At the same time, and despite not being an imminent risk for advanced economies, policy authorities should remain aware of the importance of stability-oriented fiscal policy for the conduct of monetary policy and the stability of inflation expectations.

Box 5

COMPARISON OF THE US, UK AND EU MACRO-PRUDENTIAL FRAMEWORKS

In the EU, the United Kingdom and the United States, new macro-prudential frameworks have been established, including the creation of new official bodies to improve systemic oversight and coordinate macro-prudential interventions. This box briefly describes the structure and responsibilities of these bodies and outlines the main differences.

In the EU, a European Systemic Risk Board (ESRB) is to be established, comprising a General Board, a Steering Committee, a Secretariat, an Advisory Technical Committee (ATC) and an Advisory Scientific Committee (ASC). In the first five years, the ESRB will be chaired by the President of the ECB. For the subsequent terms, the Chair of the ESRB shall be designated in accordance with the modalities determined on the basis of the review of the legislation to be conducted by the Council and the Parliament, after having received an opinion from the ECB and the European Supervisory Authorities (ESAs). The ECB shall ensure a Secretariat, and thereby provide analytical, statistical, logistical and administrative support to the ESRB.

In the United Kingdom, a Financial Policy Committee (FPC) will be created within the Bank of England, and chaired by the Governor. A new Prudential Regulation Authority (PRA) is to be formed as a subsidiary of the Bank of England.

In the United States, a Financial Stability Oversight Council (FSOC) has been formed as a result of the Dodd-Frank Act, comprising all US financial regulators and chaired by the Secretary of the Treasury.

A preliminary analysis shows some key differences. First, the central banks play prominent roles in all of these frameworks, but in the United Kingdom and the United States the involvement of the central bank in micro-prudential supervision has been strengthened (although in the United Kingdom through a separate body). In the EU framework, the ECB has a key role in particular as provider of analytical and statistical support to the ESRB. However, macro-prudential oversight is not integrated with micro-prudential supervision in the EU-wide framework insofar as supervision will continue to be carried out primarily by national supervisory authorities, with the European Supervisory Authorities having a mainly coordinating role.

Second, in both the United Kingdom and the United States, the focus of the powers of the macro-prudential body is on regulatory and supervisory policies, including the extent of the regulatory perimeter. Although this is not clarified explicitly in the ESRB legislative framework, it is expected that the ESRB will also play a similar role.

Third, the role of central banks in crisis management and resolution differs across the frameworks. The Federal Reserve and the Bank of England, in their capacity as central banks and prudential supervisors, can in principle respond to an emerging crisis using both traditional liquidity support and regulatory tools. The Bank of England will also be lead resolution authority. It can be expected that both the FSOC in the United States and the FPC in the United Kingdom will be involved in decisions to deploy regulatory tools for crisis management purposes. The ESRB does not have explicit tasks and powers on crisis management, apart from the power to advise the Council on the existence of an emergency situation.

Comparison of UK, US and EU macro-prudential oversight frameworks

	UK	US	EU
Overarching body	*Financial Policy Committee (FPC)*	*Financial Stability Oversight Council (FSOC)*	*European Systemic Risk Board (ESRB)*
Scope	UK financial system	US financial system	EU-wide financial system
Overall objective	Protect financial stability by ► identifying and addressing aggregate risks and vulnerabilities across the financial system ► enhancing macroeconomic stability by addressing imbalances, e.g. dampening the credit cycle	► Identify risks to financial stability ► Promote market discipline ► Respond to emerging threats to the stability of the financial markets	► Contribute to the prevention or mitigation of risks to financial stability in the EU that arise from developments within the financial system and taking into account macroeconomic developments, so as to avoid periods of widespread financial distress ► Contribute to a smooth functioning of the internal market
Role of central banks	► The Bank of England has a key role as chairing and having majority on FPC ► Can direct prudential interventions and supervision by PRA via FPC ► PRA is a subsidiary of the Bank of England ► The Bank of England oversees CCPs, settlement systems and payment systems ► The Bank of England is lead resolution authority	► The Federal Reserve Board has significant role as macro- and micro-prudential regulator of systemic firms, including authority to require reports and conduct examinations of certain non-bank financial companies and bank holding companies ► However, the Federal Reserve Board does not chair the FSOC. The Treasury has the coordinating role	**Role of the ECB** ► The ECB President has a key role as chairing both the General Board and the Steering Committee (at least first five years) ► The ECB shall ensure a Secretariat, and thereby provide analytical, statistical, logistical and administrative support to the ESRB **Role of NCBs** ► All 27 NCB Governors are voting members on the General Board ► Four NCB Governors are on the Steering Committee ► NCBs provide staff to support the Secretariat of the ESRB ► NCBs bring macro-prudential competence and provide understanding of effects of interventions in all EU countries
Crisis management	► The FPC will be involved in decisions to deploy regulatory tools for crisis management purposes ► The Bank of England in its role as central bank, prudential regulator and resolution authority will be responsible for designing and executing the response to an emerging financial crisis ► HM Treasury will control any decisions involving the use of public funds	► The FSOC will be involved in decisions to deploy regulatory tools for crisis management purposes ► The Federal Reserve in its role as central bank, prudential regulator and resolution authority will be responsible for designing and executing the response to an emerging financial crisis ► The Treasury will control any decisions involving the use of public funds ► The FDIC will act as Orderly Liquidation Authority	► The ESRB does not have explicit tasks and powers on crisis management, apart from the power to advise the Council on the existence of an emergency situation

III THE EURO AREA FINANCIAL SYSTEM

3 EURO AREA FINANCIAL MARKETS

After the finalisation of the June 2010 Financial Stability Review (FSR), the declining excess liquidity in the euro money market spurred more interbank activity, but improvements in the redistribution of liquidity continued to be hampered by closely intertwined bank and sovereign credit risk concerns.

In the euro area capital markets, asset prices showed heterogenous developments across countries. In countries with weaker fiscal positions, long-term bond yields increased or remained at high levels and, in some cases, share prices also declined, while the opposite was typically the case in countries with stronger fiscal positions. In the period ahead, financial asset prices in the fiscally troubled countries are likely to remain vulnerable to changes in concerns about sovereign credit risk, the soundness of the banking sector and an uncertain macroeconomic outlook. In those countries where long-term bond yields have declined, in some cases to all-time low levels, their eventual increase may trigger higher interest rate volatility and would expose financial institutions and investors to significant interest rate risk.

3.1 KEY DEVELOPMENTS IN THE MONEY MARKET

Since late May 2010, the euro money market has continued to be dependent on the Eurosystem's liquidity support, the phasing-out of which was negatively affected by the adverse developments, driven by intense sovereign credit risk concerns, in euro area financial markets in early May 2010.

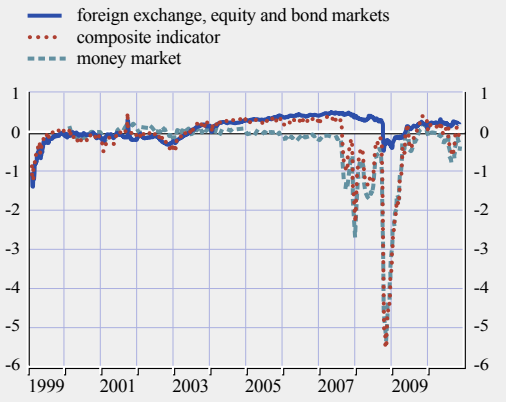
Owing to the substantially less than complete rollover of refinancing, excess liquidity in the euro area money market had declined markedly after the maturity of the first one-year longer-term refinancing operation (LTRO) on 1 July 2010 and the second one-year LTRO on 30 September 2010. This, however, did not lead to any disruption in the euro money market, despite some initial concerns by market participants. Nevertheless, against this backdrop, the value of the money market component of the ECB's financial market liquidity indicator suggested that liquidity conditions in the euro area money market had deteriorated somewhat after the finalisation of the June 2010 FSR (see Chart 3.1 and Chart S69).

While lower excess liquidity inevitably led to higher unsecured interbank rates, it also contributed to higher unsecured interbank activity, especially in the overnight segment. The EONIA volume increased from around €20-30 billion in late May 2010 to around €40 billion in mid-November 2010 (see Chart 3.2).

Activity in term fund segments, however, was rather limited, also not least because of outflows from money market funds. More recently, there has nonetheless reportedly been an improvement in the availability of both secured and unsecured term funds that was also supported by the additional transparency provided by the publication of bank stress-test results, although with some notable cross-country differences. The availability of

Chart 3.1 Financial market liquidity indicator for the euro area and its components

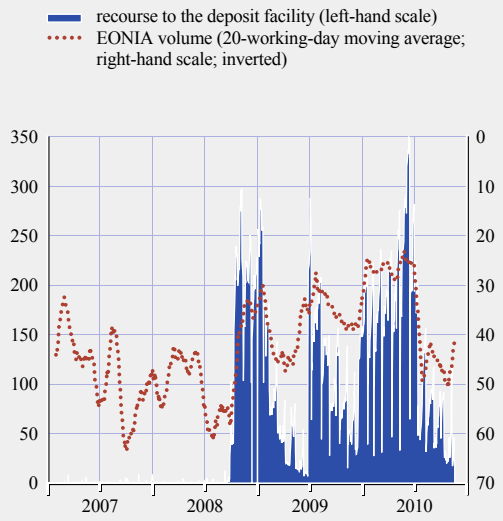
(Jan. 1999 – Nov. 2010)



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 over the period 1999-2006 for non-money market components and 2000-06 for money market components. The data shown have been exponentially smoothed. For more details, see Box 9 in ECB, *Financial Stability Review*, June 2007.

Chart 3.2 EONIA volume and recourse to the ECB's deposit facility

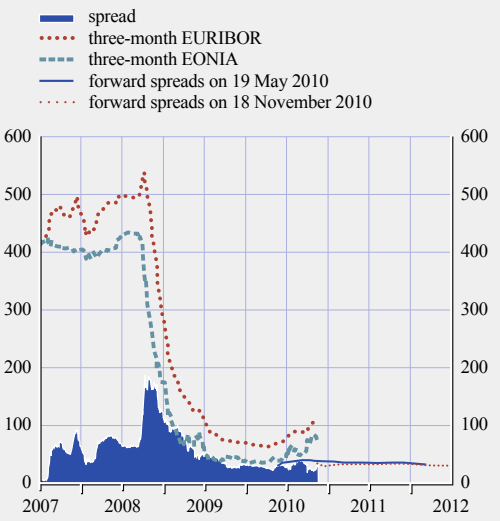
(Jan. 2007 – Nov. 2010; EUR billions)



Source: ECB.

Chart 3.3 Contemporaneous and forward spreads between the EURIBOR and EONIA swap rate

(July 2007 – June 2012; basis points)



Source: Bloomberg.

term funds improved for a selected number of stronger banks, whereas the weaker banks reportedly still found it difficult to access term funding, and thus remained reliant on liquidity provided by the Eurosystem.

It is also noteworthy that the volume of repo transactions involving Spanish government bonds increased substantially after it had become possible for more Spanish banks to settle repos with foreign banks through an international central clearing counterparty.

In addition, after the finalisation of the June 2010 FSR, the standard deviation of unsecured interbank interest rates contributed by banks in the EURIBOR panel decreased, albeit with significant volatility, thereby suggesting a lower dispersion of individual bank contributions, and thus possibly pointing to a lower tiering in the interbank market.

Positive developments notwithstanding, a number of indicators continued to point to still lingering counterparty credit risk concerns (see also Box 6). The difference between unsecured and secured interbank lending rates in the euro area remained high and especially so for longer maturities (see Chart S70). In addition, the continued extensive use of the ECB's deposit facility is the clearest sign of persistent counterparty credit risk concerns and a still impaired redistribution of interbank liquidity (see Chart 3.2).

Since late May 2010, the three-month EURIBOR/EONIA overnight index swap (OIS) spread has fluctuated within a narrow range and remained broadly unchanged by mid-November 2010 (see Chart 3.3). Forward spreads did not signal any expectation of significant changes either, although spreads were expected to remain above pre-crisis levels.

The volume of euro commercial paper outstanding declined further. It is also noteworthy that money market funds, which are regular buyers of euro commercial paper and important liquidity providers in the money market more generally, continued to suffer from investor outflows, most probably due to low nominal short-term yields.

Amid remaining tensions in the euro money market, the ECB announced on 2 September 2010 that it would maintain the current fixed rate full-allotment policy for main refinancing operations as long as necessary and at least until 18 January 2011. The three-month LTROs would likewise be conducted with a fixed rate tender procedure with full allotment up to December 2010.

While the announcement was generally welcomed by market participants, the measures were also perceived to illustrate the high reliance of some banks on the liquidity provided by the ECB and the challenges that these banks might face both when the ECB proceeds further with the phasing-out of its enhanced credit support measures and when banks need to compete with other banks to obtain funding from the ECB and the interbank market.

In the period ahead, the declining excess liquidity in the euro money market should spur more interbank activity, but any recovery will remain vulnerable to changes in closely intertwined bank and sovereign credit risk concerns.

Box 6

MAIN FINDINGS OF THE EURO MONEY MARKET SURVEY 2010

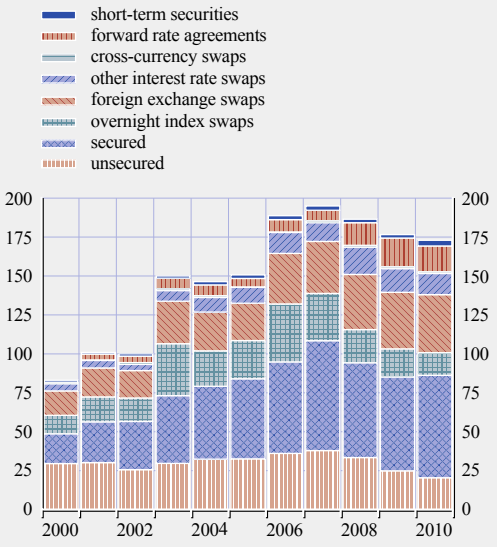
On 23 September 2010, the ECB published the results of the Euro Money Market Survey 2010, which were based on data collected from banks in 27 European countries and covered developments in various segments of the euro money market in the second quarter of 2010. This box reports on the survey's main findings.

The survey revealed that major changes triggered by the demise of Lehman Brothers and the introduction by the ECB of enhanced credit support measures in October 2008 continued to impact the functioning of the euro money market.

The overall turnover of the euro money market decreased for the third consecutive year, falling by 3% in the second quarter of 2010, as compared with the second quarter of the previous year (see Chart A). This decline could partly be attributed to the intensification of the financial crisis during the reporting period, and the surplus liquidity environment that prevailed in the euro interbank market as a result of the high allotment volumes in the ECB's liquidity-providing operations. The most notable decrease in activity took place in the segment of overnight index swaps (OISs), where turnover declined by 19%, and in the unsecured market segment, where turnover contracted by 18%.

Chart A Aggregated average daily turnover in the euro money market

(Q2 figures in the period from 2000 to 2010; index: aggregated average daily turnover volume in 2002 = 100)



Source: ECB.
Note: The panel comprised 85 credit institutions in 2000 and 2001, and 105 credit institutions thereafter.

Unsecured market turnover contracted across all maturities, although the most marked declines were at longer maturities. The contraction in unsecured activity could partly be explained by the shift to secured funding as a result of a greater aversion to counterparty credit risk and by the decline in demand for liquidity on account of the environment of surplus liquidity following the high participation and high allotment volume in the ECB's one-year longer-term refinancing operation (LTRO) of June 2009. In addition, an increasing reliance on the issuance of short-term debt securities (such as certificates of deposit) by banks, at the expense of the attraction of interbank deposits, may also to some extent explain the decline in unsecured turnover. This substitution could have been supported by the Eurosystem's temporary acceptance of some categories of banks' certificates of deposit as eligible collateral, thereby increasing the attractiveness of these assets for investors. Finally, in some jurisdictions changes in liquidity regulations may also have prompted banks to hold larger very short-term (overnight) liquidity buffers in the form of riskless deposits with the Eurosystem, rather than to lend these funds in the interbank market on an unsecured basis. New liquidity regulations may also have provided incentives for banks to lengthen the maturity of their liabilities, and thus reduced their demand for unsecured short-term cash.

The secured market remained the largest segment of the euro money market and continued to grow, expanding by 8% in the second quarter of 2010, broadly in line with the findings of the International Capital Market Association's European repo market survey.1 The increase in turnover was driven by higher activity in maturities of up to one month, which continued to account for the largest part of the secured market and grew by 14%. By contrast, turnover in other maturity brackets, except for the maturity bracket from one to three months, decreased. Activity in the secured market cleared through central counterparties (CCPs) increased further and accounted for 45% of total secured market turnover (as compared with 41% in 2009). In addition to lower counterparty credit risk, the increase was also due to more European banks joining repo platforms developed by CCPs. Tri-party repo market activity also showed growth in turnover, increasing by 26% over the previous year.

Activity in the derivatives market continued to contract this year, recording a decline of 7%, largely on account of OIS transactions. Given the low volatility of the EONIA after the allotment of the June 2009 one-year LTRO by the ECB, the need for hedging short-term interest rate risk was reduced, and thus contributed to lower activity in OISs, particularly for maturities of up to one month. Foreign exchange swaps were the only derivatives segment that expanded (+3%) as such swaps remain an important cash funding tool for European banks and are relatively secure financial instruments – in particular since foreign exchange swaps are cleared mainly via CLS Bank, which eliminates currency settlement risk.

Turnover in the short-term debt securities markets surged by 67% in the second quarter of 2010, as compared with the second quarter of 2009, and this may partly be explained by the increased use of short-term debt securities as eligible collateral for the Eurosystem's operations.

In terms of concentration among market participants, the market share of the top 20 banks showed a tendency to increase in the unsecured market and in most of the derivatives segments. For the secured market, the concentration was broadly unchanged. The unsecured market

1 International Capital Market Association, "European repo market survey", September 2010.

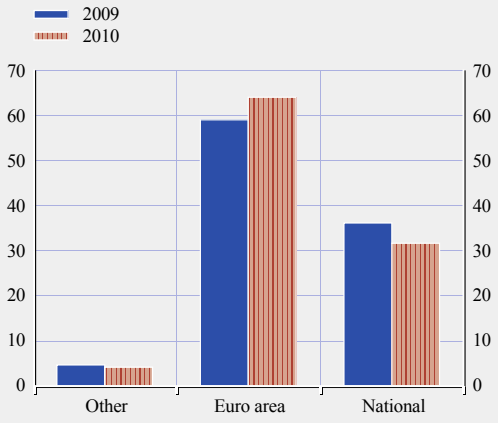
remained the least concentrated segment, followed by the foreign exchange swap and the secured market segments.

The decline in unsecured market turnover and the continuous expansion of the secured segment, in particular for transactions settled through CCPs, indicate that heightened counterparty risk remains a feature of the euro money market.

Concerns about sovereign risk have also affected the euro repo market. Indeed, data on the geographical breakdown of the collateral used in bilateral repos show that the share of collateral issued in the same country of origin as the counterparty providing the collateral declined from 36% in 2009 to 32% in 2010 (see Chart B). At the same time, the share of collateral issued in the euro area, but outside the country of origin of the counterparty providing the collateral, increased from 59% to 64%. This could partly be due to the increased reluctance of banks to trade repos against collateral made up of government bonds from the same country as the counterparty providing the collateral in countries where concerns about sovereign credit risk were particularly elevated in May and June 2010.

Chart B Geographical breakdown of collateral in bilateral repos in 2009 and 2010

(Q2 2009 and Q2 2010; percentages)



Source: ECB.
Note: The panel comprised 172 credit institutions.

3.2 KEY DEVELOPMENTS IN CAPITAL MARKETS

After the publication of the June 2010 FSR, asset prices in euro area capital markets waxed and waned amid recurrent concerns about the fiscal sustainability risk, the soundness of the banking sector and an uncertain macroeconomic outlook. Furthermore, all this took place against the backdrop of a substantial reallocation of investors' net flows into investment funds. On a net basis, investors withdrew money from money market and equity funds, and increased their investments in bond funds. In the case of equity funds, however, net inflows into emerging market equity funds were dwarfed by net outflows from developed market equity funds. If high inflows into bond funds continue in the period ahead, this may reduce the risk of a crowding-out of private sector issuance by large sovereign funding needs.

GOVERNMENT BOND MARKETS

By mid-November 2010, the yields on AAA-rated long-term euro area government bonds had declined from the levels that prevailed in late May 2010 (see Chart S73), but with significant volatility. Concerns about the outlook for global and euro area macroeconomic activity, as well as renewed worries about the fiscal situation in some euro area countries, triggered recurrent flight-to-safety flows, thereby bringing down the yields on high-grade euro area sovereign bonds to historical lows in the summer of 2010. The euro area yield curve flattened, as the declines in yields were larger for government bonds with longer maturities.

Despite a spell of relief in July 2010, after several successful peripheral euro area government bond auctions and the overall positive EU-wide bank stress-test results, euro area government

bond yield spreads over the OIS rate widened in late August 2010 and then again from mid-October 2010 on account of intensified concerns about fiscal sustainability (see Chart 3.4).

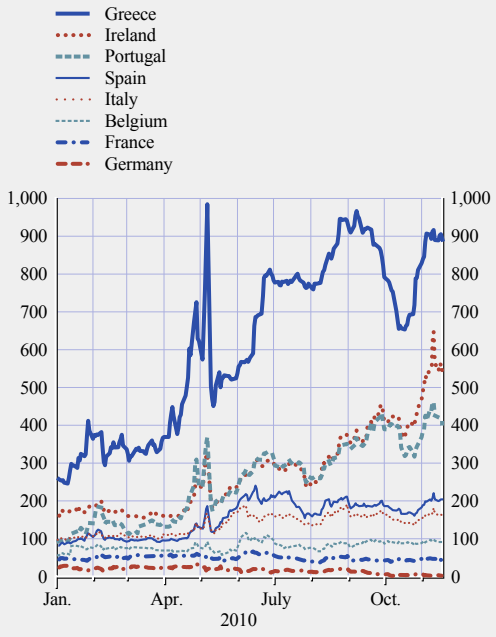
It is also noteworthy that increases in spreads led to higher nominal yields in only some cases, but the latter changes resulted in non-negligible marking-to-market losses for affected investors. For example, since the finalisation of the last FSR, the prices of ten-year Greek and Irish bonds both declined by around 22%, thereby prompting sales by investors whose internal stop-loss and value-at-risk limits had been breached.

Buying activity and liquidity in certain peripheral euro area government bond markets remained limited and the ECB's Securities Markets Programme was crucial in addressing the malfunctioning of these markets. Most market-makers continued to have a limited ability to hold peripheral euro area government bond debt on their balance sheets, and major one-way flows from their customers tended to lead to relatively large price movements. Because inventories could not be large and because price swings could be high, market-makers charged a higher price for their liquidity-providing services in the form of much wider bid-offer spreads.

Tensions in euro area bond markets, as well as high macroeconomic uncertainty, also led to a rebound in the implied bond market volatility extracted from options prices (see Chart S74). Moreover, the euro area composite implied volatility indices across various maturities suggested that in mid-November 2010 uncertainty about changes in euro area bond yields remained at levels not too distant from those observed in May 2010 (see Chart 3.5).

Chart 3.4 Difference between long-term euro area sovereign bond yields and the overnight index swap rate

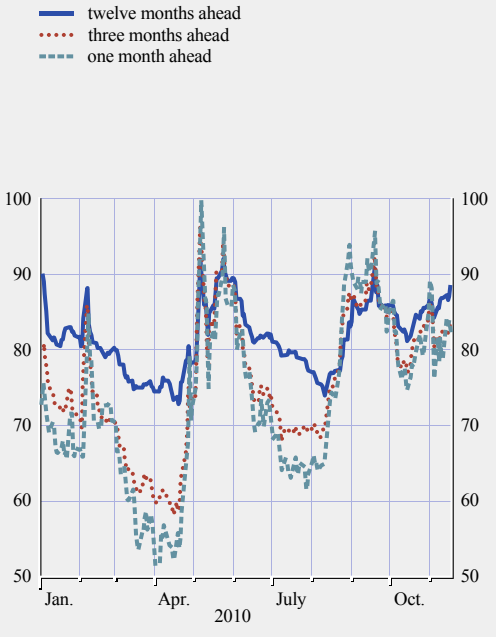
(Jan. 2010 – Nov. 2010; ten-year bond yields and ten-year overnight index swap rate; basis points)



Sources: Bloomberg and ECB calculations.
Note: The euro overnight index swap rate rather than German government bond yields was used in order to account for the impact of flight-to-safety flows into German government bonds.

Chart 3.5 Implied euro bond market volatility at different horizons

(Jan. 2010 – Nov. 2010; MOVE composite indices in percentages)



Source: Bank of America Merrill Lynch.
Note: The Merrill Option Volatility Estimate (MOVE) composite index is a weighted implied volatility index for options on two, five, ten and thirty-year euro swap rates.

Net issuance of euro area government debt moderated, and its annual growth rate declined from the historical high of 14% at the end of 2009 to less than 7% in September 2010. While the annual growth rate of net issuance of longer-term debt was positive, that of net issuance of short-term debt was negative. In addition, investor discrimination among euro area sovereign issuers manifested itself at the different levels of primary market demand and, in some cases, led to non-negligible price concessions at the time of issuance.

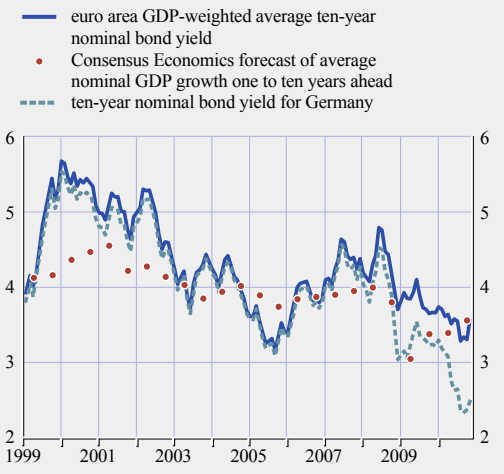
In the near future and over the next few years, overall euro area sovereign funding needs, and those of some euro area countries in particular, will remain significant and there is a risk of increasing competition for funding (see Chart 2.14 in Section 2). Moreover, any additional requests to provide support to ailing banks may further exacerbate the risk of adverse feedback between the financial sector and public finances.

In order to stabilise the government debt-to-GDP ratio, the effective interest rate on the existing stock of government debt should not exceed the nominal GDP growth rate, provided that the primary fiscal balance before interest payments remains zero. By mid-November 2010, the GDP-weighted euro area average of ten-year government bond yields remained close to the level suggested by nominal GDP growth expectations, largely on account of the yields on ten-year bonds issued by euro area governments with the largest fiscal imbalances (see Chart 3.6). Nonetheless, the effective interest rate cost of existing government debt may still be substantially lower than the latest ten-year government bond yields.

Looking ahead, there are a number of factors that may contribute to higher interest rate volatility in the future. First, the rapid decline and the latest low levels of high-grade long-term euro area government bond yields have raised the risk of a reversal of these changes. Second, the uncertainty about the macroeconomic outlook remains high. Third, the intensification of concerns about the fiscal sustainability of some euro area peripheral countries, especially after mid-October 2010, may take time to dissipate, and these concerns are thus likely to be associated with higher volatility in affected government bond markets. Nevertheless, at some point, most probably after the successful implementation of fiscal adjustment measures, the yields on peripheral euro area government bonds may start to decline, which could trigger short-covering and a restoration to benchmark levels of previously underweight exposures, thereby prompting even faster price increases. Fourth, financing needs will be significant in the coming years, and sovereign, bank and non-financial issuers will have to compete for available funding. Fifth, strong net inflows into bond investment funds and the low levels of nominal interest rates are reportedly prompting search-for-yield activity. Finally, on a risk-adjusted basis the attractiveness of carry trades, which involve funding long-term investments with short-term financing, and the concomitant risk of their abrupt unwinding remained high (see Chart 3.7).

Chart 3.6 Euro area long-term government bond yields and nominal GDP growth expectations

(Jan. 1999 – Nov. 2010; percentages)



Sources: Reuters, Consensus Economics and ECB calculations.

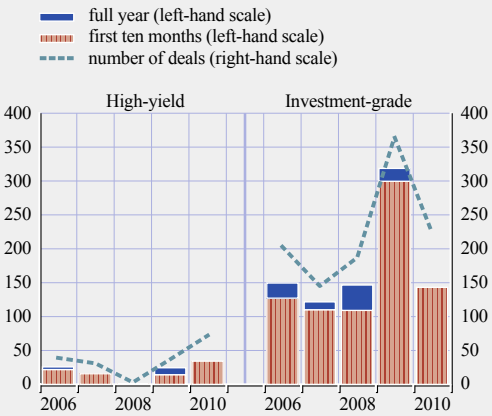
Chart 3.7 Interest rate carry-to-risk ratios for the United States and the euro area

(Jan. 2005 – Nov. 2010)

Sources: Bloomberg and ECB calculations.
Note: The carry-to-risk ratio equals the differential between the ten-year swap rate and the three-month LIBOR divided by the implied volatility extracted from three-month options on ten-year swaps.

Chart 3.8 High-yield and investment-grade bond issuance in the euro area

(Jan. 2006 – Oct. 2010; issuance in EUR billions and the number of deals)



Sources: Dealogic and ECB calculations.

CREDIT MARKETS

Debt securities issuance

After the publication of the June 2010 FSR, tensions related to sovereign credit risk hampered access to funding by euro area banks, whereas the issuance volume of, and demand for, debt securities issued by non-financial corporations remained relatively high. After a "drought" in issuance in May 2010, access to market funding by euro area financial institutions recovered in June and July 2010, but issuance volumes were still lower than a year previously.

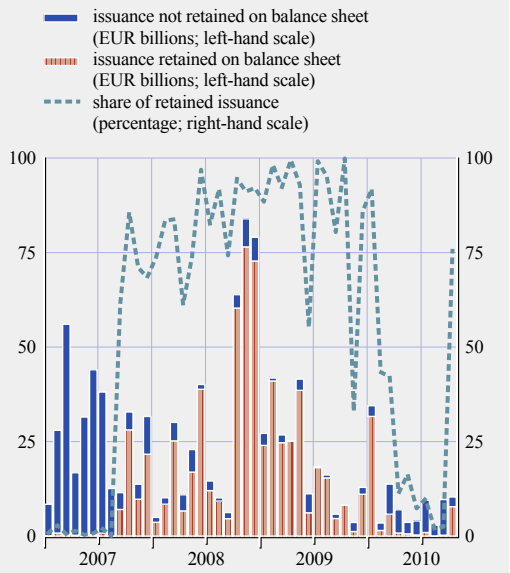
Amid strong net inflows into bond funds and search-for-yield activity driven by low nominal interest rates, gross issuance of high-yield bonds by euro area corporations in the first ten months of 2010 exceeded the annual gross issuance levels of every year since 2006 (see Chart 3.8). In the first ten months of 2010, by contrast, gross issuance of investment-grade bonds was substantially lower than in 2009, but nevertheless higher than in the first ten months of the years 2006 to 2008.

In the euro area market for asset-backed securities (ABSs), issuance volumes remained subdued in 2010 (approximately €100 billion until October 2010) and were the lowest recorded since 2003. While the share of issuance retained by euro area banks increased in October 2010, it was low in most of the months since the publication of the June 2010 FSR as the majority of new issues in the second and third quarters of 2010 were sold to external investors (see Chart 3.9). However, this may to some extent also reflect lower funding needs by euro area banks, since most of the ABSs issued over the last two years were retained on issuers' balance sheets with the aim of using them as collateral for refinancing operations with the Eurosystem.

On 23 April 2010, the Eurosystem launched the final preparatory work on the establishment of loan-level information requirements for ABSs in its collateral framework. Since the Eurosystem is one of the most important lenders against ABSs, the new requirements would clearly increase transparency in this market,

Chart 3.9 Issuance of asset-backed securities by euro area banks

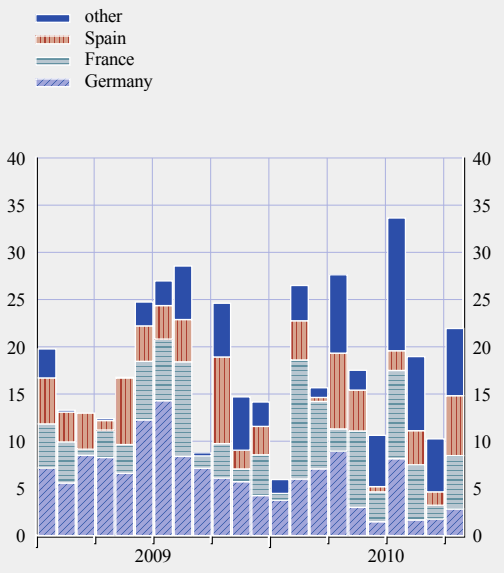
(Jan. 2007 – Oct. 2010)



Sources: Dealogic and ECB calculations.

Chart 3.10 Issuance of covered bonds in selected euro area countries

(Jan. 2009 – Oct. 2010; EUR billions)



Sources: Dealogic and ECB calculations.
Note: "Other" includes Austria, Finland, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Slovakia.

thereby contributing to more informed risk assessments and helping to restore confidence in the ABS markets. These new requirements were anticipated to become applicable for newly issued ABSs in due course.

In the euro area covered bond market, issuance activity slowed down somewhat after the publication of the June 2010 FSR, but the issuance volume remained rather robust after the end of the Eurosystem's covered bond purchase programme (CBPP) on 30 June 2010 (see Chart 3.10). Overall, it can be concluded that the functioning of the covered bond market has improved significantly since the announcement of the CBPP in May 2009.[1]

Nevertheless, the euro area covered bond market suffered from the spillover effects of higher sovereign credit risk concerns, which had a significant negative impact on banks' ability to fund themselves via covered bonds. After May 2010, however, banks from more euro area countries were able to tap covered bond markets, although sometimes only at a higher cost. It is also noteworthy that in the course of 2010 there was a shift from the issuance of Jumbo covered bonds[2] towards so-called "Jumbolino" issues with a size of less than €1 billion but more than €500 million.

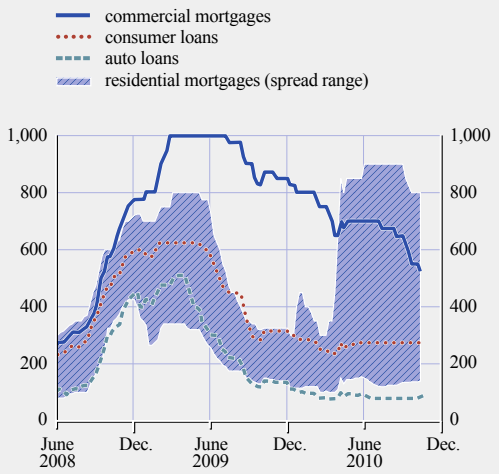
Credit spreads

By mid-November 2010, corporate bond and credit default swap (CDS) spreads had tightened somewhat in comparison with the situation at the time of the finalisation of the June 2010 FSR, with even some narrowing for lower-rated bonds. However, spreads, especially those of banks, exhibited significant volatility on account of concerns about fiscal sustainability risk and an uncertain macroeconomic outlook (see Charts S81, S82 and S83). Spreads widened markedly in mid-June 2010, but reverted thereafter. Although the spreads of both financial

1 See also Box 3 in ECB, *Monthly Bulletin*, August 2010.
2 Jumbo covered bonds are plain-vanilla covered bonds denominated in euro with a minimum issue size of €1 billion. They are also subject to certain market-making standards.

Chart 3.11 Spreads over LIBOR of euro area AAA-rated asset-backed securities

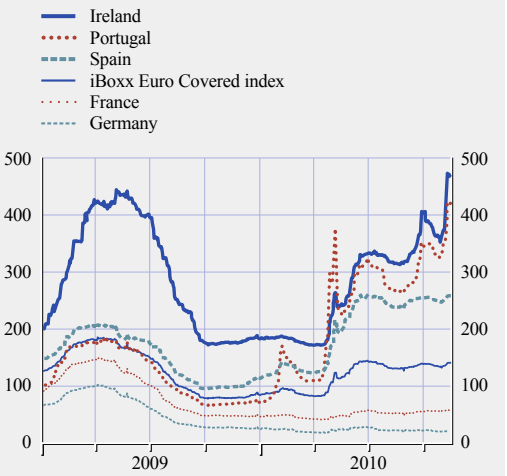
(June 2008 – Nov. 2010; basis points)



Source: JPMorgan Chase & Co.
Note: In the case of residential mortgage-backed securities, the spread range is the range of available individual country spreads in Greece, Ireland, Italy, the Netherlands, Portugal and Spain.

Chart 3.12 Spreads between covered bond yields and euro interest rate swap rates

(Jan. 2009 – Nov. 2010; basis points)



Source: iBoxx.

and non-financial corporations remained well below the peaks recorded in the aftermath of the Lehman Brothers collapse, they remained at rather elevated levels (see Chart S85).

Since late May 2010, ABS spreads have remained broadly unchanged and rather stable, except for some tightening of spreads on commercial mortgage-backed securities (see Chart 3.11), in contrast to the volatility observed in the corporate bond and CDS markets. However, this stability is merely a reflection of low liquidity and muted secondary market activity. Furthermore, by mid-November 2010, spreads on ABSs collateralised by residential mortgages in some peripheral euro area countries with the largest fiscal imbalances remained above the levels reached after the default of Lehman Brothers in September 2008.

After slightly declining in July and August 2010, the average spread between the average covered bond yield, as measured by the iBoxx Euro Covered index, and euro interest rate swap rates again started to rise in September 2010, on account of tensions in sovereign debt markets. In mid-November 2010, the average spread hovered around 140 basis points, or about 20 basis points above the levels observed in late May 2010 (see Chart 3.12).

EQUITY MARKETS

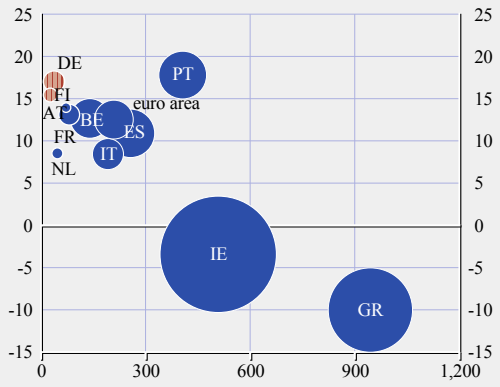
In euro area equity markets, equity indices recovered somewhat from the sharp correction in May 2010, but tended to fluctuate within certain ranges, as is often the case after big bear markets followed by a strong initial rebound (see Chart S75). The implied stock market volatility derived from euro area stock option prices also decreased (see Chart S76), but remained above the levels observed before the onset of the financial turmoil in mid-2007.

Equity prices ebbed and flowed in line with changes in market sentiment regarding fiscal sustainability risk, the soundness of the banking sector and the macroeconomic outlook. Against this background, the performance of some national stock market indices in the euro area appeared to be influenced by the levels of, and changes in, the perceived sovereign credit risk of the country in question (see Chart 3.13).

Chart 3.13 Sovereign credit risk and the performance of national stock indices

(20 May 2010 – 18 Nov. 2010)

x-axis: sovereign CDS spreads (end-period; basis points)
y-axis: stock market index (percentage change)

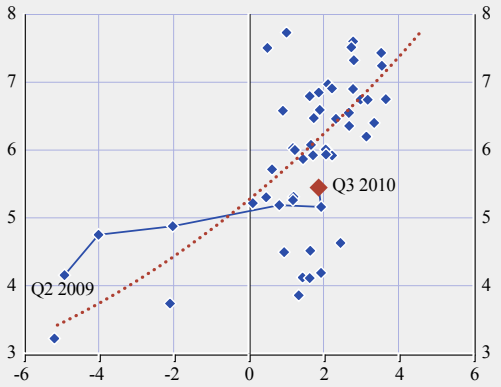


Sources: Reuters, Thomson Reuters Datastream and ECB calculations.
Notes: For the euro area, the average level of sovereign CDS spreads of all countries included in the chart and the Dow Jones EURO STOXX 50 index were used. The blue and red bubbles refer to increased and decreased sovereign CDS spreads respectively, whereas the size of a bubble is proportionate to the absolute increase or decrease.

Chart 3.14 Price/cash flow ratio and real GDP growth in the euro area

(Q1 1996 – Q3 2010)

x-axis: real GDP growth (percentage change per annum)
y-axis: price/cash flow ratio



Sources: Thomson Reuters Datastream and ECB calculations.
Notes: Real GDP growth measured in year-on-year rates. The growth figure for the third quarter of 2010 was based on Eurostat's flash estimate.

The prices of financial stocks, especially those of banks, outperformed the overall indices and tended to lead the stock market recovery over the summer of 2010. Bank stock prices were supported by the additional transparency provided by the publication of the EU-wide bank stress-test results and a lengthy implementation period for the new Basel III capital requirements, but the associated gains were subsequently moderated by worries about the macroeconomic outlook and renewed concerns about public finances in some euro area peripheral countries. After mid-October 2010, as in May 2010, bank stock prices suffered most, however, from the intensification of the renewed concerns about sovereign debt risk.

Since the finalisation of the June 2010 FSR, only better than expected realised and higher expected corporate earnings have consistently been supportive of stock prices and contributed to generally lower standard stock price valuation ratios (see Chart 3.14 and the P/E ratios in Chart S78). On the basis of various valuation measures, stock prices did not seem to be overvalued.

However, in the event that a sharper slowdown triggers revisions to the earnings outlook or that net outflows from equity investment funds increase further, the risk of substantially lower euro area equity prices cannot be ruled out in the period ahead.

4 THE EURO AREA BANKING SECTOR

The earnings of most euro area large and complex banking groups (LCBGs) continued recovering in the first three quarters of 2010 as a whole, mainly driven by further buoyant net interest income, on average lower, albeit in many cases still high, loan loss provisions and a steady stream of fee and commission income. The regulatory capital ratios of most LCBGs also increased slightly in the second and third quarters of 2010, supported by retained earnings and banks' efforts to raise capital. This notwithstanding, many challenges remain and new sources of risk have emerged. As indicated by the persistence of market concerns with respect to sovereign credit risk in some euro area countries and the large refinancing needs of euro area banks over the next few years, banks' funding conditions remain an area of vulnerability. Tensions related to sovereign credit risk have hampered access to funding by some euro area banks in wholesale markets and, despite recent signs of improvement in the euro money market, limited access to the interbank market continues to render some euro area banks too reliant on liquidity provided by the Eurosystem. Regarding LCBGs' earnings outlook, the risk that profitability may not prove sustainable in the period ahead remains, owing to volatile market conditions, sluggish demand for credit and possible upward pressure on funding costs. Moreover, a still subdued economic growth outlook and persistent pockets of weakness in the banking sector risk the emergence of multifaceted and negative feedback loops, involving fiscal imbalances and weaker macroeconomic conditions.

4.1 FINANCIAL CONDITION OF LARGE AND COMPLEX BANKING GROUPS[1]

The financial condition of large and complex banking groups (LCBGs) in the euro area continued recovering in the first three quarters of 2010 as a whole. Following a typically strong first-quarter performance, however, institutions faced tougher conditions in the second and third quarters, due to some adverse developments in the financial system. In particular, the performance of euro area LCBGs was impacted negatively by difficulties in the funding and trading markets that followed sovereign debt downgrades in some euro area countries and a weaker than expected global economic environment.

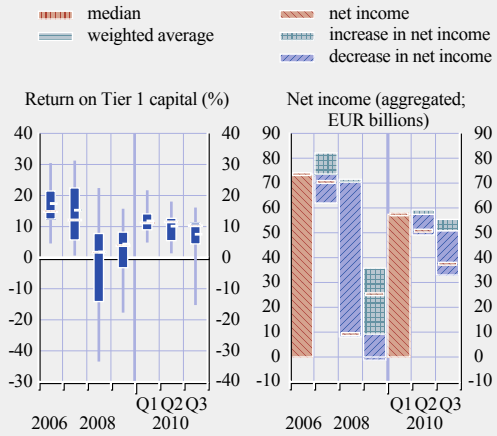
LCBGs' profitability, as measured by weighted average return on equity (ROE), remained well above the depressed levels of 2008 and 2009 throughout the first three quarters of 2010, although in comparison with the strong first quarter financial performance it decreased somewhat as the year proceeded. For the sub-sample of institutions that reported quarterly results, the dispersion of ROE decreased compared with 2009 and the interquartile distribution became more skewed towards the downside in the second and third quarters of the year (see Chart 4.1). Moreover, the same institutions reported a significant decrease in aggregate net income in those periods. This may indicate that some banking groups are experiencing more difficulties in retaining their profitability levels, although in a few cases one-off factors also contributed to the decrease.

Regarding the alternative measure of profitability, return on assets (ROA), a downward shift in the interquartile distribution in the second and third quarters was broadly similar to that recorded for the ROE of the same sub-sample of financial institutions. There was, however, a more pronounced drop in median returns (see Chart 4.2). This may be explained by the increased leverage of the institutions in the top quartile of the distribution. The augmentation of assets by those banks may have been the result, at least in part, of higher positive market values of derivatives that were due to valuation effects

1 The sample used for the majority of the analysis carried out in this section includes 20 euro area banks. The criteria for identifying them are described in ECB, "Identifying large and complex banking groups for financial system stability assessment", *Financial Stability Review,* December 2006. However, at the time of writing, not all quarterly figures were available for all banks.

Chart 4.1 Euro area LCBGs' return on equity and aggregated net income

(2006 – Q3 2010; maximum, minimum and interquartile distribution of the return on Tier 1 capital)



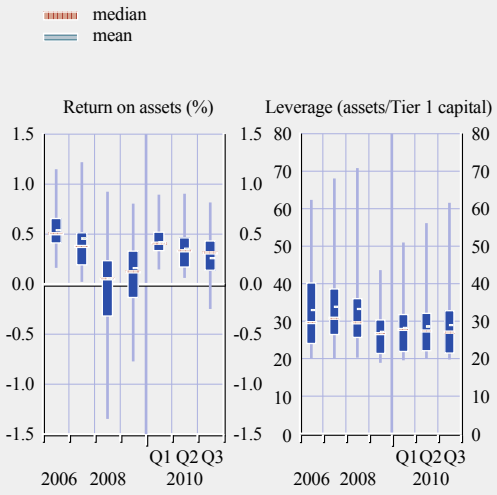
Sources: Individual institutions' financial reports and ECB calculations.
Notes: Quarterly ratios are based on available data for a sub-sample of LCBGs for which results for the first three quarters of 2010 are available. Quarterly results have been annualised. Tier 1 capital was used as a measure of equity.

induced by interest rate movements; however, for the majority of banks leverage multiples remained broadly unchanged.

The year-to-date earnings of euro area LCBGs were supported by stable income from fees and commissions, and by the continued strength of net interest income as a result of still high margins and the steepness of the yield curve (see Chart 4.3). This notwithstanding, earnings growth slowed in the second quarter, mainly driven by a remarkable decrease in trading income amid increased financial market volatility and reduced trading activity, and it moderated further in the third quarter due to a slight drop in net interest income and despite somewhat improved trading results. After the favourable developments recorded in April, the remaining months of the second quarter were marked by conditions that affected capital market activity, given falling equity prices and a return to a more risk-averse behaviour by banks. As a result of lower levels of issuance activity, revenues from fixed income securities, currency and commodity trading were particularly affected. Not all fixed income products were equally affected, however, as trading in interest rate and mortgage-related instruments remained buoyant. Foreign exchange trading also generated revenues, as spreads widened on the back of concerns about sovereign

Chart 4.2 Euro area LCBGs' return on assets and leverage

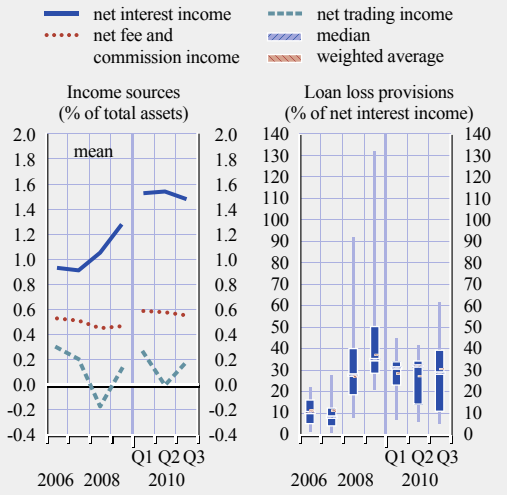
(2006 – Q3 2010; maximum, minimum and interquartile distribution)



Sources: Individual institutions' financial reports and ECB calculations.
Note: See notes to Chart 4.1.

Chart 4.3 Breakdown of euro area LCBGs' income sources and loan loss provisions

(2006 – Q3 2010; maximum, minimum and interquartile distribution)



Sources: Individual institutions' financial reports and ECB calculations.
Note: See notes to Chart 4.1.

bond holdings. Trading results for some institutions recovered somewhat in the third quarter, although they were still weaker than six months earlier in part due to subdued client activity and low market volumes.

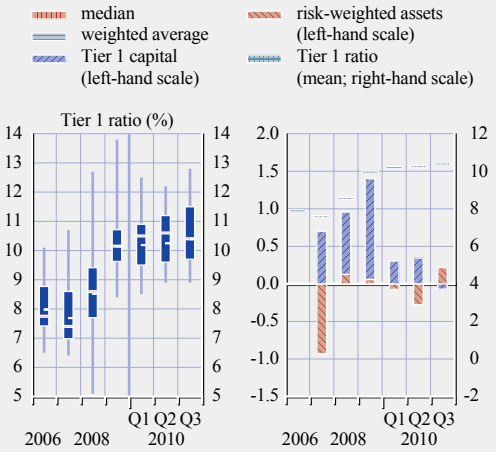
Loan loss provisions, which were a serious drag on LCBGs' profitability in 2009, decreased slightly in the first three quarters of 2010, although they remained higher than pre-crisis levels (see Chart 4.3). The frequency distribution of net loan impairment charges was less skewed in the first half of 2010, given the significant reduction in assets of those banks for which charges constituted more than 0.25% of their total assets (see Chart S89). For some institutions, the coverage of non-performing loans by loan loss reserves decreased further in the first three quarters of 2010, although to a much lesser extent than in 2009 owing to a marked deceleration of the growth of troubled loans. However, as banks' sources of revenue may decline and as banks may be negatively affected by a weaker macroeconomic outlook – particularly in some countries – lower provision flows and loan loss reserves may reduce their loss-absorption capacity in the period ahead.

The weighted average regulatory capital ratio of LCBGs increased slightly in the second and third quarters of 2010 (see Chart 4.4). The increase in capital ratios was supported by retained earnings and banks' efforts to raise capital, which were in part offset by an increase in risk-weighted assets, in particular in the second quarter of the year (see right-hand panel of Chart 4.4). In contrast, the slight improvement of the average capital ratio in the third quarter was mainly due to a decrease in risk-weighted assets. The findings of the EU-wide stress-test exercise published in July 2010 pointed to the resilience of LCBGs under the particular adverse scenarios applied in the exercise.

Regarding the proposed changes in capital regulation, the Group of Governors and Heads of Supervision (GHOS), the oversight body of the Basel Committee, reached an agreement in September 2010 on the calibration of the measures as well as the phase-in arrangements, resulting in a significant increase in minimum capital requirements. Among the main items, the new rules prescribe an increase in minimum requirements for common equity and Tier 1 capital to be phased in before 1 January 2015. The new rules also include a non-risk-based core Tier 1 leverage ratio that will serve as a backstop to the risk-based measures (for details, see Special Feature B).[2]

Chart 4.4 Euro area LCBGs' Tier 1 ratios and contribution of components to changes in the aggregate Tier 1 ratio

(2006 – Q3 2010; maximum, minimum and interquartile distribution; percentages; percentage points)



Sources: Individual institutions' financial reports and ECB calculations.
Notes: See notes to Chart 4.1. The chart in the right-hand panel shows the percentage point contributions of components to changes in the aggregate Tier 1 ratio for this sub-sample of LCBGs.

2 The cost of the new regulatory package for banks is estimated to be modest, both in the transition phase and upon full implementation (see Macroeconomic Assessment Group, "Assessing the macroeconomic impact of the transition to stronger capital and liquidity requirements – Interim Report", Bank for International Settlements, Basel, August 2010, and Basel Committee on Banking Supervision, "An assessment of the long-term economic impact of stronger capital and liquidity requirements", Bank for International Settlements, Basel, August 2010).

4.2 BANKING SECTOR OUTLOOK AND RISKS

INCOME OUTLOOK AND RISKS

Despite the recovery of earnings reported by most euro area LCBGs in the first three quarters of 2010, the overall outlook for euro area banking sector profitability remains uncertain. The recent improvements in earnings were driven, in most cases, by higher interest margins, and by the substantial cost-cutting that has been carried out by many of the LCBGs. To the extent that these developments may not continue in the future, or might even be reversed, the operating environment is likely to become less favourable for banks' earnings.

The prospects for banks' net interest income could be influenced negatively by several factors. Despite a recovery in lending for house purchase in the euro area, credit growth is likely to remain subdued, thus restraining the growth of interest income. In addition, interest expenses may increase owing to upward pressures on funding costs – particularly for some countries – stemming from elevated funding spreads in the markets for longer-term wholesale funding, albeit to varying degrees across institutions, and owing to intense competition for retail deposits. In particular, signs of heightened competition are apparent in most segments of the deposit markets, in particular in the market for household time deposits where deposit margins of euro area monetary financial institutions (MFIs) remained negative throughout the first half of 2010 (see Chart S98). Furthermore, elevated sovereign spreads for some countries and increased near-term financing requirements of governments might put additional pressure on bank funding costs. Therefore, high lending margins may be required to compensate for low or only moderately increasing credit volumes and higher funding costs which could, in turn, depress the outlook for credit growth further.

As for the possible impact of a flattening of the yield curve, banks could face the risk of reduced margins from maturity transformation activities. However, this might be compensated for, at least in part, by the widening of retail banking margins. During periods of rising market rates, bank deposit rates (in particular for current account deposits) tend to follow market rates more slowly than lending rates. The fierce competition for retail deposits, however, may contribute to reducing this offsetting effect.

As for different sources of banks' non-interest income, banks' trading results in the second and third quarters of 2010 were already negatively influenced by higher volatility and reduced trading activity in financial markets, so that they remain vulnerable to adverse changes in market conditions in the period ahead. Regarding fee and commission income, sizeable debt refinancing and, to a lesser extent, new issuance both by sovereigns and by financial and non-financial firms are still likely to support income streams from underwriting fees in 2011.

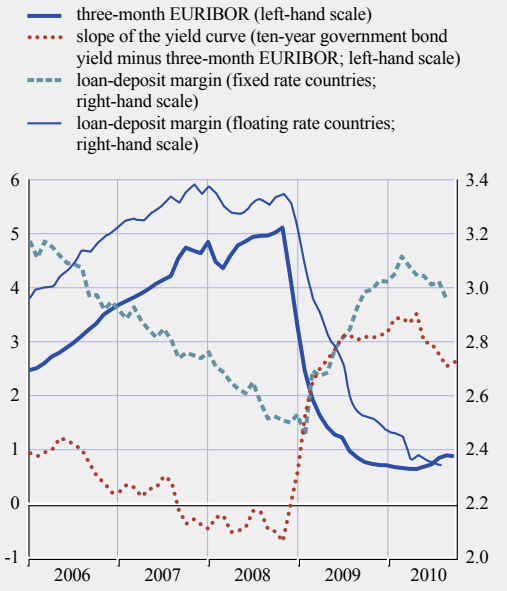
Box 7

SENSITIVITY OF EURO AREA BANKS' INTEREST INCOME TO CHANGES IN SHORT-TERM MARKET RATES

Net interest income generated by retail customer activities, such as, in particular, the collection of deposits and the granting of loans, is one of the main sources of income for euro area banks. At the current juncture, with short-term interest rates hovering at historical lows and many banks experiencing protracted difficulties in accessing both retail and wholesale funding, banks' deposit margins have been squeezed significantly. Similarly, in euro area countries where the majority of loans carry a rate of interest that is either floating or has a short period of fixation, lending margins have also come under pressure in light of the sharp decline of short-term market rates over the

Loan-deposit margins, the three-month EURIBOR and the slope of the yield curve

(Jan. 2006 – Sep. 2010; percentages)



Sources: ECB and ECB calculations.
Notes: "Floating rate countries" include Ireland, Greece, Spain, Italy, Austria, Portugal and Finland. In this group of countries, the majority of new business loans are provided with floating rates and an initial rate fixation period of up to one year. "Fixed rate countries" include Belgium, Germany, France and the Netherlands. In this group of countries, a major proportion of new business loans (in particular, to households for house purchase) is granted with an initial rate fixation period of more than five years.

Estimated changes in euro area MFIs' interest income on outstanding loans and deposits

(31 Aug. 2010 – 31 Dec. 2012; EUR billions)

	Net interest income (Aug. 2010)	Change between Aug. 2010 and Dec. 2012		
		Loans	Deposits	Net effect
Sum	293.9	25.6	17.9	7.7
Mean	26.7	2.3	1.6	0.7
Median	10.1	1.9	0.9	0.6
Maximum	84.1	6.2	5.0	2.9
Minimum	3.0	0.3	0.4	-1.4
Standard deviation	26.6	2.0	1.6	1.3
Floating rate countries[1)]				
- sum	122.3	16.6	10.3	6.3
- mean	17.5	2.4	1.5	0.9
Fixed rate countries[2)]				
- sum	171.6	9.0	7.6	1.4
- mean	42.9	2.2	1.9	0.4

Sources: ECB, Bloomberg and ECB calculations.
Notes: The effect is estimated using the updated country-specific multipliers reported in Table A of Box 13 in the June 2009 issue of the FSR. In a second step, the multiplier is combined with the aggregate amounts outstanding of loans and deposits in the country to derive the overall effect on the interest income received on loans and the interest payments on deposits of the change up to end-December 2010 in the three-month EURIBOR derived from the rates implied by three-month EURIBOR futures.
1), 2) See notes to the adjacent chart.

past two years. By contrast, banks in euro area countries where a significant part of loans are granted at rates that are fixed for a long term have tended to benefit from the relatively steep yield curve observed in 2009 and 2010 (see the chart above). Against this background, this box examines the possible implications of an increase in short-term market rates, as currently expected by market participants, on euro area banks' retail customer-related net interest income.

Market expectations, captured by the rates implied by three-month EURIBOR futures on 19 November 2010, suggest that the three-month EURIBOR was expected to increase by around 117 basis points between end-August 2010[1] and end-December 2012.[2] The impact of the expected change in short-term market rates on banks' net interest income can be estimated using a two-step approach.[3] First, country-specific error-correction regressions of the change in the average interest rate paid on outstanding loans and deposits respectively on the changes in the three-month EURIBOR are conducted.[4] Second, using the multipliers on changes in the short-term market rate from these regressions and applying the outstanding amounts of loans and deposits as of August 2010, the impact of the expected change in the short-term market rate up to end-2012 on euro area banks' retail customer-related net interest income is calculated (see the table above).

1 The latest date for which MFI interest rate statistics are available.
2 The impact of potential changes in long-term market rates is not considered in this box.
3 For details of the estimation approach, see Box 13, entitled "Elasticity of banks' interest income vis-à-vis recent changes in short-term market rates", in ECB, *Financial Stability Review,* June 2009.
4 The MFI lending and deposit rates on outstanding amounts, as reported in the ECB's MFI interest rate statistics, have been applied.

For the euro area as a whole, the banking sector's net interest income from retail activities is likely to benefit from the increase in short-term market rates expected for 2011-12. Assuming for the sake of simplicity that outstanding amounts of loans and deposits remain constant over the period, the expected increase in short-term market rates would boost the net interest income of the sample of euro area banks by slightly more than 2% (i.e. an increase of €7.7 billion in comparison with the level of €293.9 billion recorded in August 2010). Notably, the impact differs across countries and is found to depend crucially on whether bank loans in the country are tied predominantly to short-term floating interest rates or to long-term fixed interest rates. In the group of "floating rate" countries, net interest income would increase by more than 5% from its August 2010 level as a result of the rise in short-term market rates, whereas in the "fixed rate" countries the increase in net interest income would be less than 1%. Notably, in two of the fixed rate countries, the elasticity of banks' net interest income to an increase in short-term interest rates is found to be negative and hence net interest income is projected to decline somewhat.[5]

All in all, the currently prevailing market-based expectations for short-term market rates over the next two years suggest that euro area banks' net interest income might improve somewhat going forward and therefore should help the banking sector improve its retained earnings and capital position. In particular, the positive effects on net interest income from (expected) higher short-term market rates are likely to be larger in those countries where bank margins have suffered most from the current low level of short-term interest rates.[6] At the same time, an increase in short-term interest rates and a concomitant flattening of the yield curve might be expected to put downward pressure on the net interest income of banks in those countries where lending rates are predominantly fixed to the long end of the yield curve. Moreover, some banks, especially the larger ones, are likely to be largely hedged against such risks.

5 See also Deutsche Bundesbank, *Financial Stability Review*, Overview, November 2010. At the same time, net interest income is expected to even increase slightly in the other fixed rate countries (owing mainly to very sluggish deposit rates in those countries). However, it should be noted that this calculation does not take into account the impact of changes at the longer end of the yield curve on net interest income during this period, which arguably would affect the fixed rate countries more markedly than the floating rate countries.

6 It needs to be kept in mind that the overall effect on banks' net interest income depends not only on income generated through retail customer relationships, as considered in this box, but also on interest income generated by banks' securities holdings, as well as on interest payments on wholesale funding.

CREDIT RISKS

Household and corporate sector credit risks

Where banks' exposure to credit risk is concerned, euro area households' balance sheets deteriorated slightly, on average, in the first half of the year, but the impact on banks is likely to have been muted, as these developments were, to some extent, expected.

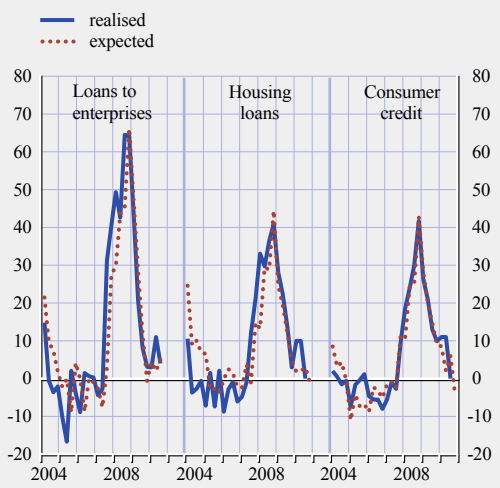
The credit risk exposures of euro area banks that arise from mortgage lending vary substantially across countries. In particular, banks in countries with higher household sector income risks and where residential property prices are still on a declining trajectory (see Section 2.4 and Table S4 in the Statistical Annex) are likely to be more exposed to credit risks from mortgage lending.

At the same time, the household sector's interest burden continued to be moderate, and for a number of countries, developments in house prices indicated that the turning point may have been reached. Against the background of high unemployment rates in some countries, any further increases are expected to be contained.

Bank lending to households continued to grow in the second and third quarters of the year, with the annual growth rate standing at 2.8% in the latter quarter. The results of the July and October Eurosystem bank lending surveys confirm these

Chart 4.5 Changes in credit standards for loans or credit lines to enterprises and households

(Q1 2004 – Q4 2010; net percentage of banks contributing to tightening standards)



Source: ECB.

positive signs in that the responses reflect a progressively lower tightening of credit standards on loans to households (see Chart 4.5).

As for exposures to the non-financial corporate sector, overall improvements in profitability and a stabilisation of leverage ratios are expected to reduce the materiality of risks for banks' credit to corporates, albeit with differences across countries and sectors. Integrated euro area accounts for the second quarter of 2010 revealed that non-financial corporations' income continued to grow at a robust pace and that these corporations recorded an upturn in investment. However, the positive developments tended to refer to the sector of large firms, while pressure remains in the sector of small and medium-sized enterprises (SMEs) with persistently low profitability, high leverage, a low capacity to generate internal funding and a stronger dependence on bank financing. The recovery of SMEs is lagging somewhat behind that of large firms, in particular as the former suffered more from relatively weak domestic demand, while large firms tended to be supported by stronger exports.

While the number of bankruptcies (of firms in all size categories) in the euro area is still expected to increase in 2010 according to market reports, before decreasing in 2011, there was a significant drop in the default rates of non-investment-grade borrowers in October 2010, which is expected to continue in the course of the year (see Chart S53).

The outlook for the SME sector remains weaker than that for large firms, even if some signs of improvement were visible in the SME survey regarding developments in the period from March to September (see Section 2.2). Banks appear to be continuing to reduce their exposures to the SME sector, as most SMEs responded that the deterioration in the availability of bank loans (new loans or renewals of existing loans) had continued in the second and third quarters of 2010, albeit to a lesser extent than that reported throughout 2009.

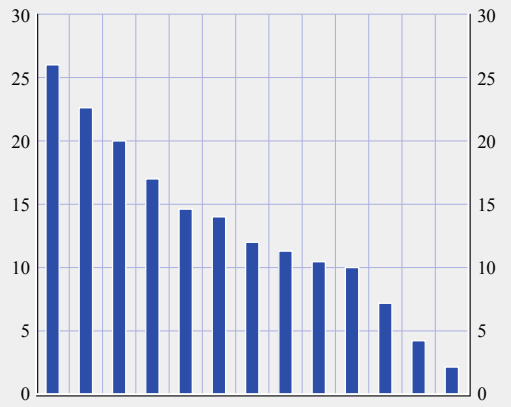
Overall, recent bank lending survey results point to some improvement in credit standards for the corporate sector. The reported further tightening of banks' credit standards on loans to corporates in the third quarter of 2010 occurred at a lower level than in previous quarters.

The overall assessment of the euro area corporate sector points to a continued improvement, especially in the segment involving larger firms, while pockets of vulnerability remain in the SME segment or among firms that are more vulnerable to domestic demand conditions.

Substantial loan exposures by some banks or banking sectors to commercial property markets continued to be a source of vulnerability. It should be noted, however, that commercial property exposures vary widely across banks. Although some euro area LCBGs have significant commercial property lending exposures (see Chart 4.6), the greatest vulnerabilities continue to be found among the more specialised commercial property lenders that extend almost all the loans used for commercial property purposes.

Chart 4.6 Commercial property loans extended by selected euro area LCBGs

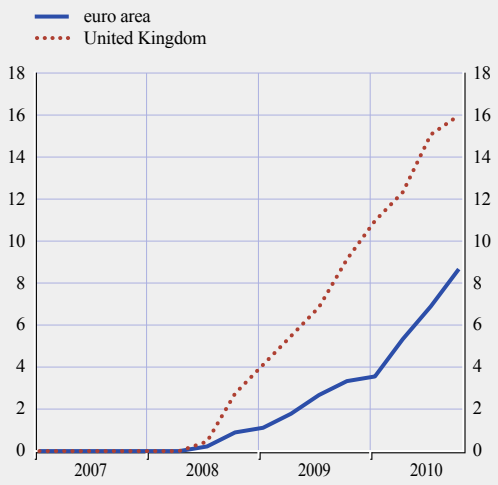
(latest available data; percentage of total loans)



Sources: Fitch Ratings and individual institutions' financial reports.

Chart 4.7 Cumulative default rates of commercial property loans included in CMBSs in the EU

(Q1 2007 – Q3 2010; percentage of the total number of loans)



Source: Fitch Ratings.

Data that became available after the cut-off date for the June 2010 FSR suggest that the correction of commercial property prices seen in many euro area countries since 2007 may have come to an end, although prices continued to decline in some countries (see Section 2.3). Nonetheless, default rates on commercial property mortgages have risen sharply in most euro area countries. While comparable default rate data are not available for euro area banks, defaults on commercial property loans included in commercial mortgage-backed securities (CMBSs) can provide a yardstick for the asset quality of banks' commercial property mortgage portfolios. At present, almost 9% of all CMBS loans are in default (see Chart 4.7). The United Kingdom – where the commercial property market correction has been more pronounced than in most euro area countries – has witnessed more defaults, with around 16% of total CMBS loans currently in default (see Chart 4.7).

Looking ahead, although most euro area countries have witnessed some improvement in commercial property markets, prices are likely to remain below the highs seen in previous years for some time to come. This poses risks for many loan-financed property investors and for CMBS deals with loans due for refinancing in the coming months and years. Further write-downs on banks' loans are therefore to be expected in the period ahead, and the outlook for more specialised commercial property mortgage lenders remains challenging.

Turning to banks' exposures to the public sector, the outlook for euro area public finances is surrounded by uncertainty and some countries are likely to have to deal with persistently high expenditure. In particular, in the June 2010 FSR, attention was drawn to the risk of a continuation of the adverse feedback between the financial sector and public finances. The measures taken by several countries to stabilise the financial sector have affected their debt positions, or could constitute a risk of higher deficits and/or debt in the future.

At the same time, the high refinancing needs that euro area sovereigns face over the next few years exacerbate the risk of an adverse feedback loop between the public and financial sectors as the public finance needs might crowd out bank issuance.

All in all, given the persistence of concerns about the sustainability of public finances, euro area banks remain exposed to the risk of an increase in their funding costs. The EU-wide stress-test exercise completed in late July aimed at reducing the scope for sovereign risk to increase banks' funding costs by providing estimates of potential marking-to-market losses originating from sovereign risk, and at increasing the transparency of individual banks' exposures to individual EU sovereigns (see Box 8 for details). Reduced uncertainty regarding such exposures can assuage market concerns about individual banks' hidden risk exposures and facilitate a recovery of the interbank market.

Assessing the resilience of LCBGs under adverse risk scenarios

The resilience of euro area LCBGs to different sources of risk can be assessed by examining the impact of a low-probability but plausible adverse scenario of future macroeconomic developments on banking performance. In contrast to the EU-wide stress-testing exercise commissioned by the Economic and Financial Committee (EFC) and coordinated by the Committee of European Banking Supervisors (CEBS), which was conducted as a bottom-up exercise, the analysis described in this section is a top-down stress test for 19 euro area LCBGs.[3]

In the prevailing environment of uncertainty about world economic prospects, the euro area financial sector remains vulnerable to possible setbacks in the economic recovery, as outlined in the previous sections of this issue of the FSR. In particular, given the uncertainty of banks' profitability, their funding difficulties and still high loan losses, there is concern that a scenario in which economic growth rates turned out to be lower than currently expected could have an adverse impact on LCBGs.

To assess the impact of such a scenario on LCBGs' profits and capital, it is assumed that a slowdown of euro area GDP growth causes a drop in economic activity, leading to a cumulative decrease of 3%, relative to the baseline scenario, in euro area real GDP over the years 2010 and 2011.[4] The size of the shock to euro area GDP was set such that its probability of materialisation at annual frequency was around 4%.

Mapping the effects of the baseline and adverse scenarios to forecasts of borrowers' probabilities of default (PDs) and losses given default (LGDs) at the individual LCBG level allows conditional expected losses under the baseline scenario to be compared with those under the adverse macroeconomic scenario.[5] Moreover, these calculations include assumptions about LCBGs' profits[6] and changes in risk-weighted assets (RWAs).[7] As is common practice in stress tests, the impact of these scenarios on banks' capital buffers is measured on the basis of the Tier 1 capital ratios.

Chart 4.8 shows the aggregate contribution of profits, loan losses and risk-weighted assets to Tier 1 capital ratios under the baseline and adverse growth scenarios. In more detail, the Tier 1 capital ratio would increase by 2.8 percentage points under the baseline scenario, due to improved profit performance, while loan losses as well as developments in risk-weighted assets would cause capital to decrease by 1.8 percentage points. Under the

3 According to the underlying definition, both bottom-up and top-down stress tests are calculated on a bank-by-bank basis. However, the bottom-up exercise involves the banks themselves and allows a certain degree of discretion, whereas the top-down stress tests are calculated centrally on the basis of supervisory data, published accounts and common assumptions.

4 The baseline scenario was taken from the ECB's latest published Survey of Professional Forecasters. Although based on more recent economic data and generated with a different model, on aggregate, the scenario – at least regarding the euro area – is comparable with that used in the EU-wide stress test.

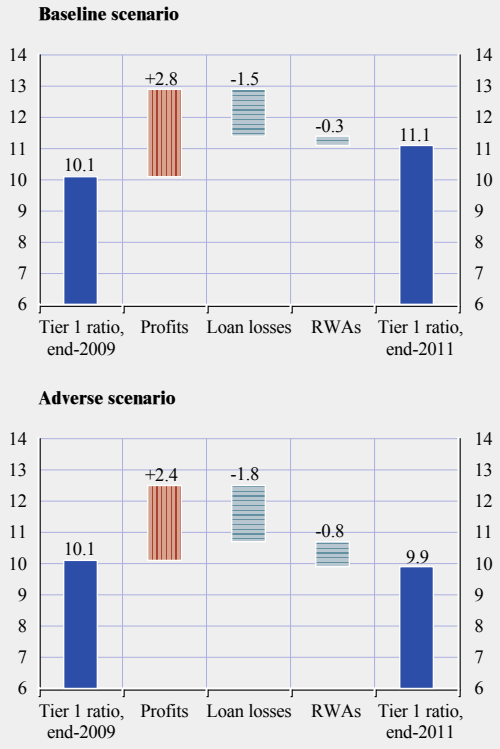
5 The mapping is based on a vector autoregressive estimation framework that incorporates macroeconomic variables and PDs or LGDs. There is full interaction between the macroeconomic variables and the PDs or LGDs that is consistent with the baseline and the adverse scenario.

6 At this stage, profits are not explicitly modelled, so that the bank-specific average of past realisations is used as a proxy in the baseline scenario. In the adverse scenarios, an additional haircut – to reflect the pressure on banks' earnings – is applied. Across both scenarios and in the case of profits, it is assumed that 25% of earnings are retained.

7 Under the baseline scenario, risk-weighted assets follow for each bank the path reported in the EU-wide stress-testing exercise of July 2010 under the baseline scenario (i.e. on aggregate 2.4% until end-2011). Under the adverse scenario, the RWAs increase on aggregate by 10%.

Chart 4.8 Aggregate contribution of profits, loan losses and risk-weighted assets to Tier 1 capital ratios under the baseline and adverse scenarios

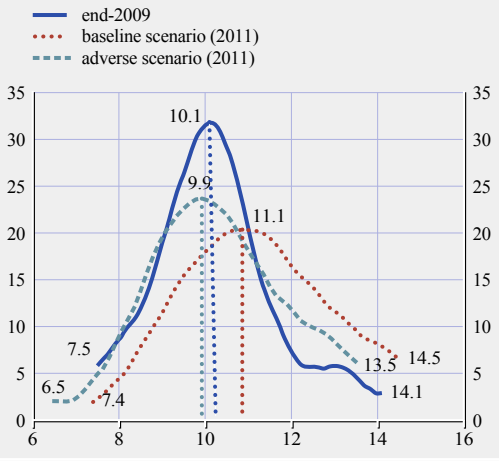
(2009 – 2011; percentages; average of 19 euro area LCBGs)



Sources: Individual institutions' financial reports, Moody's LossCalc, ECB and ECB calculations.

Chart 4.9 Distributions of Tier 1 capital ratios across euro area LCBGs under the baseline and adverse scenarios

(2009 – 2011; percentages; x-axis: Tier 1 capital ratio; y-axis: Kernel density)



Sources: Individual institutions' financial reports, Moody's LossCalc, ECB and ECB calculations.
Note: Minimum, maximum and mean values for the pre- and post-shock distributions of the 19 LCBGs' capital ratios are indicated next to the distribution lines.

adverse scenario, the Tier 1 capital ratio would deteriorate by 0.2 percentage point, driven by smaller profits and a larger increase in the contribution of loan losses and risk-weighted assets than under the baseline scenario.

Chart 4.9 illustrates the empirical distributions of Tier 1 capital ratios across euro area LCBGs under the baseline and adverse scenarios. The general improvement of LCBGs' capital buffers under the baseline scenario is reflected in the shift of the distribution towards the right between end-2009 and end-2011. At the same time, a flatter distribution points to an increase in heterogeneity among LCBGs' Tier 1 capital ratios, depending on their loan portfolios and their ability to generate profits over the coming years. Under the adverse scenario, the distribution shifts to the left in comparison with the baseline scenario at end-2011, indicating a fall in the Tier 1 capital ratio of some LCBGs.

Overall, the low-probability adverse scenario would, if it were to materialise, imply some erosion of capital in the case of more than half of the 19 LCBGs considered in this exercise. However, the capital ratios of all institutions considered remained comfortably above the regulatory minimum requirements. The top-down exercise thus supports the main findings of the EU-wide bottom-up stress tests published in July 2010, which showed that the largest euro area banks are in a good position to withstand even adverse macroeconomic developments.

Box 8

ASSESSMENT OF THE RISKS OF EU BANKS' EXPOSURES TO SOVEREIGN DEBT AS REVEALED IN THE EXERCISE UNDERTAKEN BY THE COMMITTEE OF EUROPEAN BANKING SUPERVISORS (CEBS)

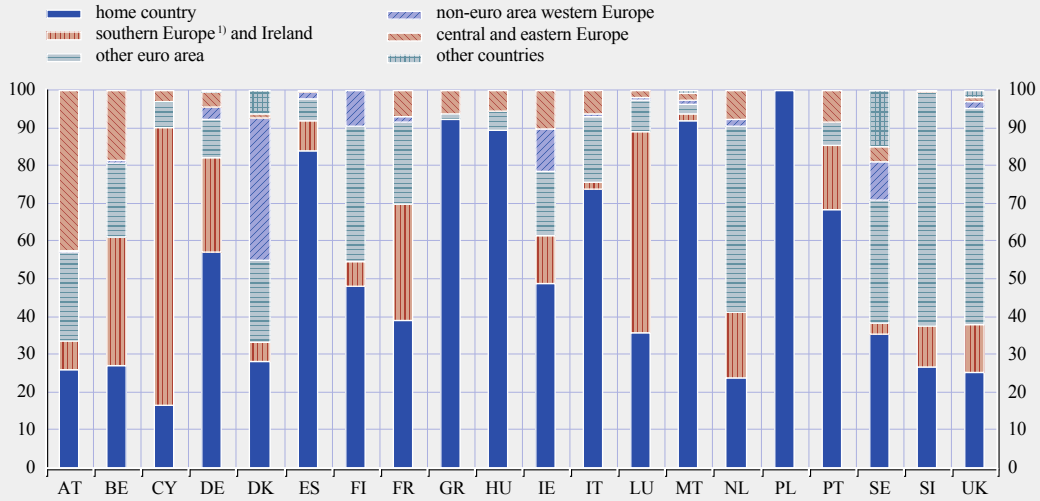
The EU-wide stress-testing exercise that was carried out in July 2010 involved, among other features, the disclosure of the exposures of all 91 participating banks to 30 European sovereigns.[1] The reason for this extensive disclosure was to provide a harmonised source of information to market participants and, thereby, to help them in assessing the scope of potential losses by individual institutions that would arise from fluctuations in the value of sovereign debt. The exercise provided evidence that the EU banks' trading-book holdings of foreign sovereign debt securities are unlikely to be large enough to create a direct channel for the propagation of systemic risk, which is somewhat contrary to the views held by some market participants prior to the disclosure.

The information that was disclosed revealed that the sovereign exposures of EU banks are primarily to the home country sovereign (see Chart A). This holds particularly true for most southern European countries, as well as for Germany and EU Member States in central and eastern Europe (the CEE region). The more significant cross-border sovereign exposures are typically associated with cross-border banking activities, i.e. business through branches and subsidiaries in host countries. For example, banks in France, Austria and the Benelux countries have exposures to various European sovereigns, but these arise mainly from the holdings of their

1 In the EU-wide stress-testing exercise, sovereign exposures included loans and receivables as well as securities.

Chart A Sovereign exposures of banks participating in the EU-wide stress-test exercise to EU countries

(Q1 2010; percentage of total sovereign exposure to EU countries)



Sources: CEBS and ECB calculations.
1) Greece, Italy, Portugal and Spain.

branches and subsidiaries in other EU Member States. In this vein, at the consolidated (or group) level, Austrian banks are exposed to CEE sovereigns, while French banks hold securities issued by sovereigns in Belgium and in southern European countries where they have significant banking activities. Of all countries, Dutch banks turned out to have the most diverse holdings of sovereign debt, with significant exposures to Germany and France, which can be partially traced to cross-border banking activities, but may also reflect the diversification by banks of their sovereign credit risk. All in all, the disclosed information suggests that 81% of all sovereign exposures reported by banks are held in the banking books, which holds particularly true for smaller banks.

As the sovereign yields of some EU countries under fiscal consolidation increased sharply in early May 2010, some market participants attempted to determine potential contagion channels of sovereign risk and their likely impact on the European banking system. However, the preliminary estimates of banks' losses stemming from sovereign exposures, done by market analysts, were plagued by data constraints (in particular, they relied to a large extent on assumptions with respect to the country-level breakdown of banks' sovereign portfolios). In addition, many estimates suffered from inaccuracies that arose from incomplete information about the allocation by banks of their holdings to the banking or trading books. Against this background, individual disclosure of sovereign exposures can be seen as an essential improvement in terms of the transparency and better understanding of banks' holdings of sovereign debt.

In the absence of harmonised data on the banks' sovereign exposures, information from the consolidated banking statistics – compiled and disseminated by the Bank for International Settlements (BIS) without a breakdown by the type of counterparty or creditor country – has sometimes been used to provide an approximation of the scale of cross-border sovereign exposures. However, the information disclosed in the context of the EU-wide stress-test exercise reveals that the bulk of cross-border exposures within the EU banking system are to private counterparties in the debtor countries. Indeed, total cross-border claims by banks on EU sovereigns account for less than 15% of total cross-border claims on EU countries (albeit with large cross-country variation). The rest of the exposures consist of loans extended to, and holdings of securities issued by, private sector counterparties. These findings seem also to be in line with the more detailed foreign claims data, which have been published by the BIS for a subset of euro area countries since June 2010.[2]

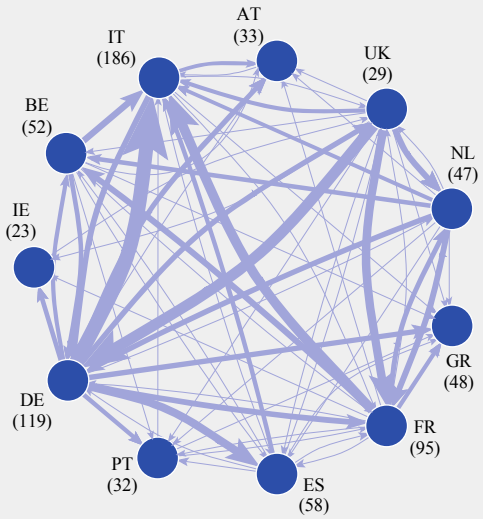
Furthermore, the approximation of sovereign exposures on the basis of the BIS consolidated banking data is impaired by the fact that the share of cross-border sovereign exposures in total claims on EU countries is not uniform across countries (see Charts B and C). To illustrate this, the United Kingdom and Greece serve as good examples. BIS data suggest that foreign claims of banks in ten euro area countries[3] that report to the BIS on counterparties in the United Kingdom account for 27% of these banking sectors' total foreign claims. The corresponding figure for sovereign exposures, as reported by banks, is merely 5%. The foreign claims of banks in the countries under analysis on Greece would amount to 2% of their corresponding total exposures according to the BIS figures and to 7% on the basis of banks' own sovereign disclosure.

2 The June and September 2010 BIS *Quarterly Reviews* present total consolidated exposures of banking groups headquartered in seven developed economies to the public, banking and private non-bank sectors in four euro area countries: Greece, Ireland, Portugal and Spain. The complete dataset covering additional countries is currently not publicly available.

3 Austria, Belgium, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and Spain.

Chart B Foreign claims on sovereigns, broken down by nationality of the reporting banks in selected EU countries

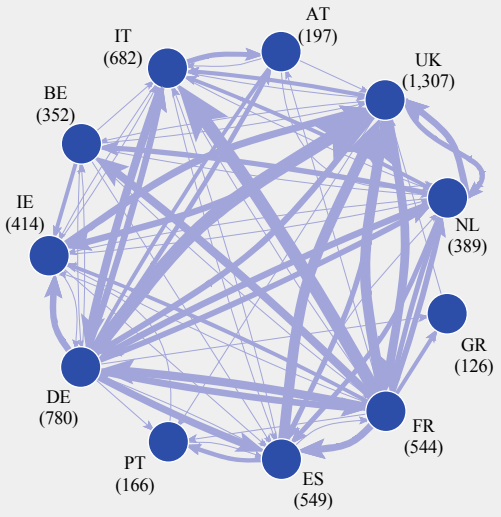
(Q1 2010; EUR billions)



Sources: CEBS and ECB calculations.
Notes: The direction of the arcs reflects the direction of lending of funds and the thickness the size of the total exposure. Arcs for lending less than €1 billion are excluded for better readability. The total cross-border sovereign exposure of banks in the 11 selected EU countries to the particular country is reported by the numbers in brackets. The thickness of the arcs is scaled, so that an arc in Chart B represents an exposure that is equal to one-fifth of the exposure represented by an arc of the same thickness in Chart C.

Chart C Foreign claims, broken down by nationality of the reporting banks in selected EU countries

(Q1 2010; EUR billions)



Sources: BIS and ECB calculations.
Notes: The direction of the arcs reflects the direction of lending of funds and the thickness the size of the total exposure. Data are given on an immediate borrower basis. Arcs for lending less than €10 billion are excluded for better readability. Total foreign claims on the particular country of banks in the 11 selected EU countries are reported by the numbers in brackets. The thickness of the arcs is scaled so that an arc in Chart B represents an exposure that is equal to one-fifth of the exposure represented by an arc of the same thickness in Chart C. The thickest arc represents the maximum bilateral exposure of €358 billion.

As a result, in this context, applying the BIS statistics which are publicly available for the approximation of sovereign exposures can paint a somewhat misleading picture of the pure sovereign credit risk exposures of European banks due to the fact that the BIS data also cover exposures that go beyond the sovereign domain.[4]

4 On the potential risks arising from the use of BIS data as a proxy for banks' sovereign debt holdings, see also the CEBS statement of 8 September 2010 on the disclosure of sovereign exposures in the context of the 2010 EU-wide stress-testing exercise (available at http://www.c-ebs.org/documents/News---Communications/2010/CEBS-2010-194-rev2-(Statement-on-disclosures-of-so.aspx).

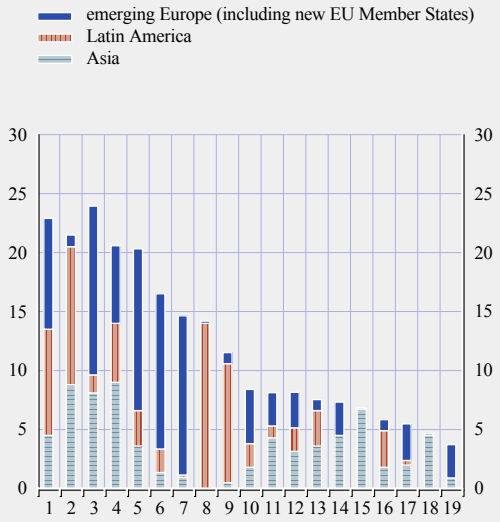
Risks emanating from emerging markets and new EU Member States

Where vulnerabilities stemming from exposures to emerging economies are concerned, the potential impact of the crystallisation of risks in these economies is uneven across LCBGs (see Chart 4.10). Over the past six months, these exposures have increased, in particular, to Asia and, to a lesser extent, to emerging Europe.

While the direct impact of a credit event in any of these countries would likely be small, spillovers across the regions, with an adverse impact on the risk premia across the emerging markets asset class, could have a material impact on some LCBGs. In an unlikely scenario of a systemic credit event, default probabilities across asset classes could reach levels seen at the height of previous emerging market crises.

Chart 4.10 Credit exposure of LCBGs to central and eastern Europe and emerging markets

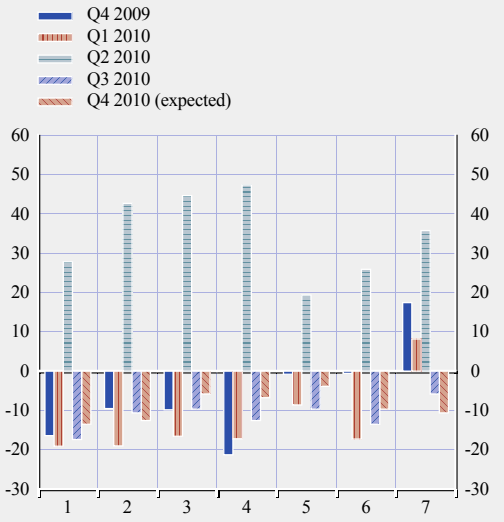
(2009; percentage of total assets)



Sources: Individual institutions' financial reports and ECB calculations.
Note: Emerging Europe includes EU Member States in central and eastern Europe and other emerging European countries.

Chart 4.11 Change in euro area banks' access to wholesale funding over the past three months

(net percentages of banks reporting deteriorated market access)



1 very short-term money market
2 short-term money market
3 short-term debt securities
4 medium to long-term debt securities
5 securitisation of corporate loans
6 securitisation of loans for house purchase
7 ability to transfer credit risk off balance sheet

Sources: Eurosystem's bank lending survey and ECB calculations.

FUNDING LIQUIDITY RISKS

Following the setback to the improvement in funding conditions in May this year, triggered by heightened concerns about sovereign risk, conditions in euro area banks' funding markets have again improved for much of the past six months, although they remain far from normal. In particular, banks' funding conditions may still be vulnerable – albeit to varying degrees across institutions and countries – to shifts in market sentiment, in particular in relation to sovereign risk and its impact on funding costs.

The difficulties banks had in tapping wholesale funding markets in the second quarter of 2010 were also apparent in the results of the Eurosystem's bank lending survey of July 2010 (as reflected in ad hoc questions related to changes in access to wholesale funding). Banks in the euro area were affected significantly across the entire spectrum of wholesale markets in the second quarter of 2010 (see Chart 4.11). The increased difficulty in accessing market funding reflected the direct impact of the sovereign debt crisis on financial market liquidity and the link between governments' fiscal positions and the health of their respective domestic banks.

In recent months, however, access to wholesale funding markets has improved for a number of banks in various segments of their funding markets, as also indicated by the results of the October bank lending survey (see Chart 4.11). With regard to short-term funding markets, the declining excess liquidity in the euro money market contributed to higher interbank activity, in particular in the overnight segment, but there have also been signs of an improved

availability of unsecured and secured term funds (see Section 3.1 for details). These improvements notwithstanding, counterparty concerns continue to be a problem for the weakest banks, and tensions related to sovereign credit risk have continued to hamper access to funding by some euro area banks. This also partly explains why EURIBOR/overnight index swap (OIS) spreads still lingered above their pre-crisis levels.

Furthermore, while the provision of official support to the banking sector improved banks' funding terms during the most acute phase of the crisis, this beneficial effect may wane if market participants should doubt the strength of governments' support as a consequence of worsened fiscal outlooks. In this context, it should be recalled that the ECB announced in early December that it would retain the commitment to meet euro area banks' demands for weekly liquidity in full until at least 12 April 2011, and for monthly and three-month liquidity in full until at least the end of the first quarter of 2011.

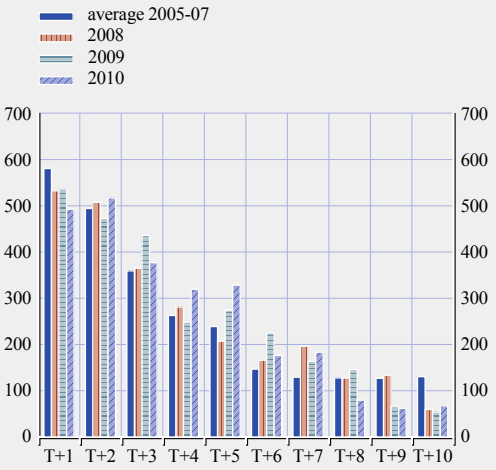
Turning to longer-term funding markets, challenges related to banks' sizeable refinancing needs over the next few years remain, even if these are not significantly different when compared with the rollover needs they faced in previous years (see Chart 4.12).

However, the drop in issuance was far more pronounced in 2010 across several debt instruments, and the cumulative 12-month net issuance of medium to long-term funding instruments has been in negative territory since May (see Chart 4.13). While euro area banks' issuance activity picked up considerably in September, issuance of longer-term debt securities in the first ten months of 2010 was nearly 10% below that in the corresponding period of the year before. Furthermore, access to markets remains difficult or rather expensive for some euro area banks.

Therefore, if issuance fails to keep up with the volume of maturing claims, some banks will be exposed to rollover risk. This is exacerbated by the fact that markets remain jittery and banks will continue to compete for funds with the public sector, the debt issuance of which, i.e. issuance of government bonds, is expected to peak over the next two years (see Chart 2.14 in Section 2.5).

Chart 4.12 Debt maturities for euro area banks

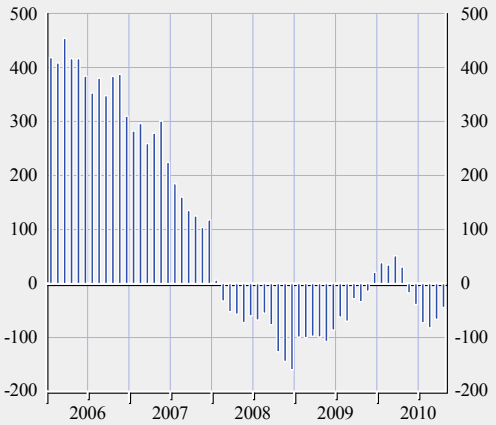
(EUR billions)



Source: Dealogic DCM Analytics.
Note: Debt instruments include bonds, covered bonds and medium-term notes.

Chart 4.13 Euro area banks' net debt issuance

(Jan. 2006 – Oct. 2010; EUR billions; 12-month moving sum)



Source: Dealogic DCM Analytics.
Note: Net issuance data cover the following debt instruments: bonds, covered bonds and medium-term notes.

Box 9

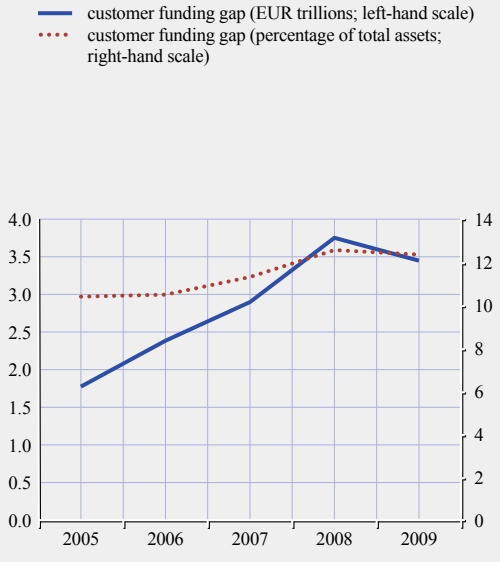
EVOLUTION OF EURO AREA BANKS' CUSTOMER FUNDING GAP

The customer funding gap is an indicator that is defined as net loans (i.e. gross lending to the non-financial sector minus provisions for non-performing loans) minus customer deposits. It shows whether banks have enough deposits to cover the expansion of their lending activities or whether they have to tap the money and capital markets to finance these activities. A customer funding gap can lead to funding risks in case liquidity unexpectedly ceases to be available, conditions experienced in autumn 2008 as well as the first half of 2010. This box looks at the development of the aggregated liabilities and at the evolution of the funding gap of the set of euro area banks that participated in the EU-wide stress-test exercise. The customer funding gap for this sample has increased in both absolute and relative (i.e. as a percentage of total assets) terms since 2005, although it declined in 2009 (see Chart A).

Publicly available balance sheet data for both the end of 2009 and the first six months of 2010 are available though for only 33 out of the 77 euro area banks considered. These 33 banks nevertheless represent approximately 74% of 2009 full euro area sample total assets. Total liabilities [1] increased by 9.7% over the first six months of 2010. This increase reflected a very

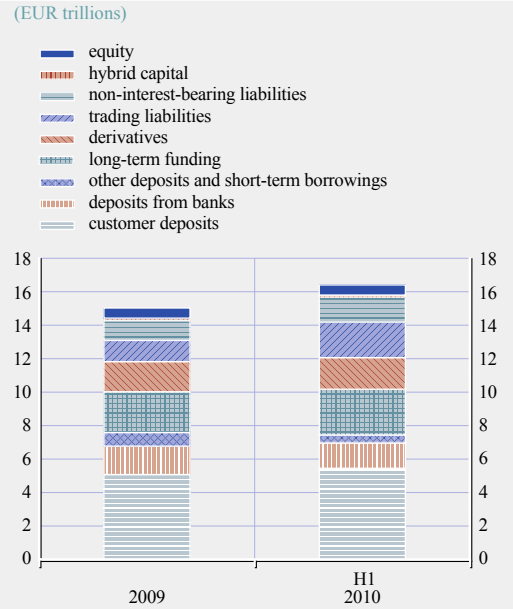
1 The balance sheet categories referred to in this box rely on Bureau van Dijk (Bankscope) classifications. Total liabilities correspond to the liabilities side balance sheet total minus hybrid capital and equity. Total funding includes deposits, money market and short-term funding, long-term funding (i.e. senior debt maturing after one year and subordinated borrowing, as well as other funding), derivatives and trading liabilities. Total liabilities equal total funding plus non-interest-bearing liabilities.

Chart A Evolution of euro area banks' customer funding gap



Source: Bureau van Dijk (Bankscope).
Note: Sample of euro area banks that participated in the EU-wide stress-test exercise.

Chart B Breakdown of euro area banks' liabilities and equity



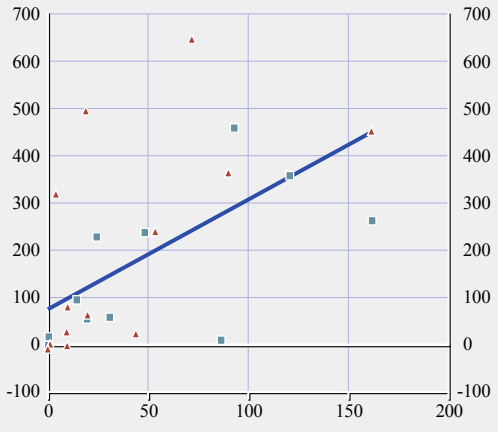
Source: Bureau van Dijk (Bankscope).
Note: Sample of 33 of the 77 euro area banks that participated in the EU-wide stress-test exercise, for which data are available for both 2009 and the first six months of 2010.

divergent development of different types of liabilities (see Chart B). Taken together, trading deposits from banks (-11%), which include central bank credit, and other short-term borrowing (-40.5%), lost around 4.6 percentage points in the share of total assets, to the benefit of trading liabilities (+67.2%) (which include the negative fair values arising from derivative financial instruments, and thus reflect the volatility in financial markets) and non-interest-bearing liabilities (e.g. accounts payable or taxes (+24.3%)). The latter two categories together increased their relative share of total assets by 5.6 percentage points. The decreases of trading deposits and other short-term borrowings are indicative of reduced activity in interbank markets, and (possibly) of banks' difficulties in rolling over short-term debt. The shares of customer deposits (+7.4%) and long-term funding (+11.7%) in total assets remained constant in relative terms. Hybrid capital (-8.5%) and equity (+0.5%) decreased by a total of half a percentage point in relative terms, compared with total assets. As the total assets of this sub-sample grew by 9.2%, mainly on account of an increase in net loans (+4.4%) and in securities (+20.3%), the customer funding gap declined by 1.5 percentage points relative to total assets in comparison with end-2009 and represented 10.8% of total assets at the end of the first half of 2010. The narrowing customer funding gap, together with the fact that both customer deposits and long-term funding exhibited higher growth rates than net loans, points to structural adjustment aimed at reducing future funding risks.

As illustrated in Chart C, the higher the banks' funding gap, the higher on average their demand for Eurosystem credit. In view of the presumably gradual normalisation of Eurosystem liquidity

Chart C Euro area banks' customer funding gap versus Eurosystem credit outstanding

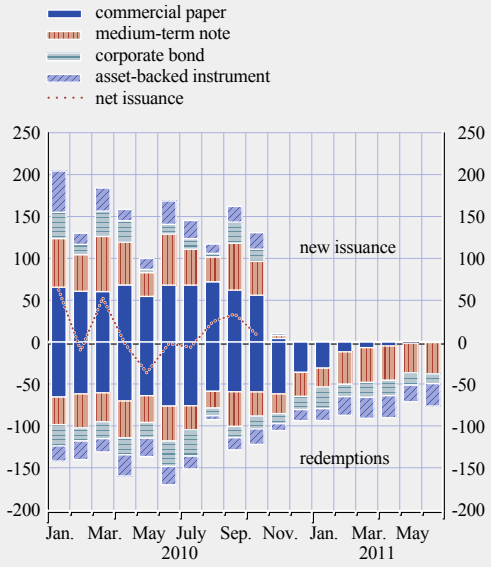
(EUR billions)



Sources: ECB and Bureau van Dijk (Bankscope).
Note: The data points represent figures (where available) for euro area banks that participated in the EU-wide stress-test exercise, aggregated at the country level for end-2009 (triangle) and the first half of 2010 (square).

Chart D Issuance profile of euro area banks

(EUR billions)



Source: Dealogic.
Notes: The underlying sample consists of the euro area banks that participated in the EU-wide stress test. Net issuance is the total new issuance minus scheduled redemptions. Dealogic does not trace instruments following their issuance and therefore some of these instruments might have been redeemed early. The asset-backed instrument category encompasses ABSs, MBSs and covered bond instruments.

operations in the period ahead, banks which currently rely excessively on liquidity from the Eurosystem in covering their funding gaps should start to take the necessary steps to reduce their dependence on Eurosystem financing.

The publication of the EU-wide stress-test exercise results is likely to have been helpful in this respect. As a matter of fact, net issuance by participating euro area banks turned positive after the stress-test results were published (Chart D), a factor that should have a supporting effect in the adjustment process. However, the aggregate figures do not reflect the discrepancies in the funding situations of individual banks and national banking sectors, as some banks in the euro area continue to face difficult funding situations and are therefore relying largely on Eurosystem financing.

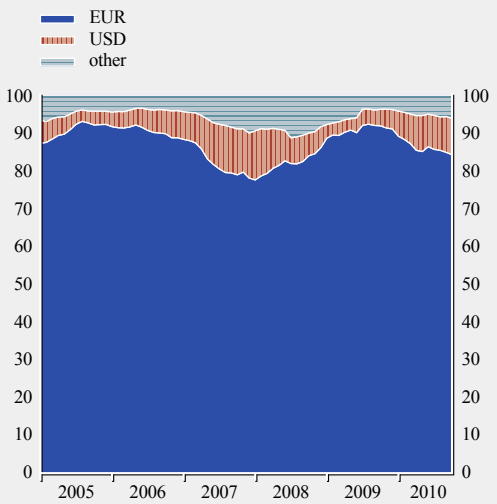
As for the currency composition of banks' debt funding, partly in response to the cost advantage in the US dollar funding market, euro area banks have increased their reliance on the US dollar funding market to a share not dissimilar to what was seen in the run-up to the recent crisis. Such carry trade strategies require a careful matching of cross-currency positions so as to prevent mismatches from possibly becoming unmanageable in times of market stress (see Chart 4.14).

Looking at developments in the cost of banks' longer-term debt funding, the average spread on senior unsecured debt in the secondary markets widened markedly on account of intensifying concerns about sovereign risk in mid-2010, but narrowed again thereafter. Nevertheless, in mid-November it remained above the levels observed in mid-April. Spreads on covered bonds in the secondary markets also remained at rather elevated levels, albeit with important differences across euro area countries (see also Section 3.2). Similarly, primary market spreads on covered bonds issued since mid-2010 were, on average, above the levels seen in the period before the intensification of sovereign risk concerns, and the dispersion of spreads across individual issuers widened significantly in comparison with that in the early months of 2010.

Regarding the cost of deposit funding, developments in deposit rates have been heterogenous across euro area countries in recent months. The spread between the average (unweighted) euro area short-term deposit rate and the three-month overnight index swap (OIS) rate rose steadily over the five months after March, although it was influenced by markedly different country developments (see Chart 4.15). In particular, in some countries where banks' access to wholesale funding was most affected by the turmoil, deposit rates increased significantly during and around the crisis months, contrasting with flat developments in countries with a more solid fiscal situation. In future, some banks could face continued upward pressure on their funding costs as a result of higher deposit

Chart 4.14 Currency decomposition of debt issuance by euro area banks

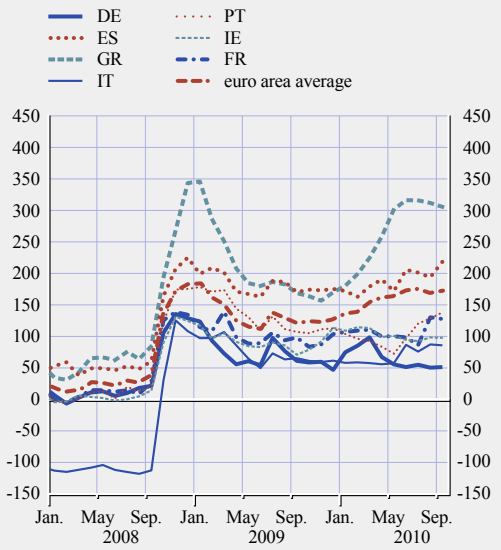
(Jan. 2005 – Oct. 2010; percentages; 12-month moving average)



Sources: Dealogic and ECB calculations.
Note: Debt comprises bonds, medium-term notes, asset-backed securities, short-term debt and covered bonds.

Chart 4.15 Spread between short-term household deposit rates and the three-month OIS rates for selected euro area countries

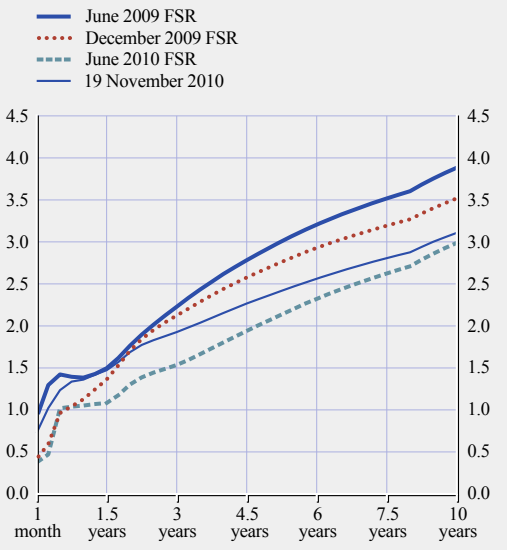
(Jan. 2008 – Sep. 2010; basis points)



Sources: ECB, Bloomberg and ECB calculations.

Chart 4.16 Euro area yield curve developments (based on euro area swap rates)

(percentages)



Source: ECB.

rates in the period ahead, should their cost of and access to wholesale term funding not improve significantly.

MARKET-RELATED RISKS

Interest rate risks

LCBGs' interest rate risks remained high after the publication of the June 2010 FSR. This was due to relatively high risk perceptions at both the short and the long ends of the euro area yield curve. In particular, on account of continuing volatility in the euro area interbank market (see Section 3.1), the implied volatility of euro area short-term interest rates remained high (see Chart S71). In addition, after a short period of relative calm over the summer of 2010, renewed tensions in some euro area countries' government bond markets pushed the volatility of long-term debt securities to again high levels after early September 2010 (see Chart S74).

Overall, the relative steepness of the curve still supported the revenues from banks' maturity transformation activities (see Chart 4.16). It may also have continued to spur interest among market participants in entering into carry trades. As the build-up of such trades creates exposure to the possibility of unexpected changes either in funding costs or in the market value of the long positions, an abrupt unwinding in the case of large unexpected losses could contribute to heightened interest rate volatility.

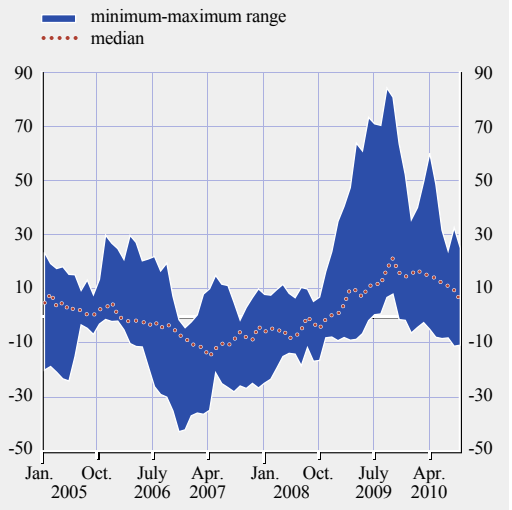
Since, at the time of writing, options markets were pricing in a greater likelihood of large upward, rather than downward, changes in short-term interest rates and since concerns about sovereign credit risks had not abated, the risk of a further increase in long-term rates remains in the euro area. In such a scenario, LCBGs' profits would be negatively impacted by increasing marking-to-market losses on the still sizeable government bond holdings (see Chart 4.17).

Exchange rate and equity market risks

Equity market risks for LCBGs remained relatively moderate in the first half of 2010, on account of low volatility. The implied volatility derived from options on the Dow Jones EURO STOXX 50 equity index (see Chart S111) was substantially below the 50% levels seen

Chart 4.17 Annual growth rates of MFIs' government bond holdings in countries where LCBGs are located

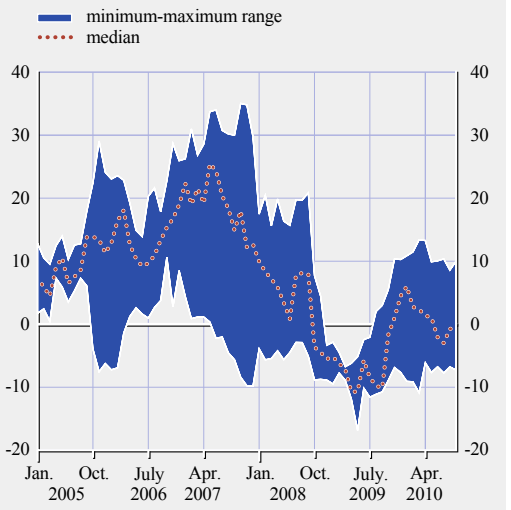
(Jan. 2005 – Sep. 2010; percentage change per annum)



Sources: ECB and ECB calculations.

Chart 4.18 Annual growth rates of shareholdings by MFIs in countries where LCBGs are located

(Jan. 2005 – Sep. 2010; percentage change per annum)



Sources: ECB and ECB calculations.

in late 2008 and in early 2009. The gradual intensification of general financial market tensions throughout spring 2010 and again after September 2010 was mirrored by a decline in the sizes of euro area banks' equity portfolios, suggesting that banks might have trimmed their exposures as a result of changes in volatility (see Chart 4.18).

Analogous to the development of equity market volatility measures, implied volatility measures for foreign exchange, which approximate foreign exchange-related risks, stabilised in 2010 at levels just above 10%, with some jumps around May 2010, which is still lower than the levels recorded in the period after the default of Lehman Brothers (when volatility in the foreign exchange markets temporarily exceeded 20% – see Chart S22). Towards the end of the period, however, renewed concerns about global imbalances contributed to some increase in volatility in the foreign exchange markets.

Box 10

USING DATA ON MFIS' STATISTICAL REVALUATIONS TO GAUGE INFORMATION ON CHANGES IN BANKS' TRADING-BOOK VALUATIONS

Valuation losses in the trading books constituted the first wave of losses suffered by euro area LCBGs in the current crisis, triggered by the collapse of the US sub-prime market. More recently, estimating potential losses from banks' government bond portfolios formed an important part of the EU-wide stress-testing exercise carried out in July 2010. The important role played by trading-book holdings for the profit and loss accounts of many LCBGs has intensified the need

for monitoring, stress testing and possibly also forecasting the valuations of banks' trading books for financial stability purposes. An important impediment to this work is the limited availability of data from public sources which consist mainly of quarterly or annual observations from banks' published financial reports. This box focuses on the statistical revaluations data collected under Regulation (EC) No 25/2009 of the ECB of 19 December 2008 concerning the balance sheet of the monetary financial institutions sector (recast) (ECB/2008/32) [1] and discusses its usefulness in providing information for the analysis of changes in trading and banking-book valuations at the aggregate banking sector level.[2]

Official statistics on transactions involving MFI holdings of securities are calculated regularly by adjusting changes in the outstanding amounts of securities for the impact of variations in market values, as well as changes in exchanges rates and instrument classifications.[3] While, in principle, euro area MFIs report holdings of securities on a marked-to-market basis, or using a close equivalent to market value (fair value), it is accepted that MFIs follow national accounting practices mainly in recognition of the tight reporting deadlines. For example, according to these practices, Member States may allow banks to value their trading portfolio at purchase price, at market price or at the lower of the two. The extent of MFI revaluations typically depends on the asset class, the classification of the asset by the bank (in the trading book or in the banking book, including its sub-categories – for instance, as available-for-sale or held-to-maturity), internal valuation strategies (in case assets are valued on a marked-to-model basis) and market conditions.[4]

The gradual introduction of the IASs/IFRSs in the European Union and their use instead of national practices for the solo accounts have contributed to the harmonisation of the valuation rules across Member States. In particular, under IAS 39, banks should value their holdings of securities in the trading book at fair value, thus bringing the revaluation adjustments reported under Regulation ECB/2008/32 for these securities closer to the concept of portfolio gains or losses. Similarly, held-to-maturity debt securities and participations are measured at amortised cost and cost respectively, so that they have no impact on the amounts of revaluations, or on the profit and loss account. Possible misalignments between the revaluation statistics and gains/losses may arise from those securities that are classified in the available-for-sale portfolio, for which IAS 39 prescribes to use the fair value: changes in prices will be recorded as revaluations, but they will be mirrored by capital and reserves, thus without any impact on the profit and loss account.

1 It should be recalled that MFI balance sheet items (BSI) statistics and supervisory data essentially differ in terms of the reporting population and the scope of geographical, sectoral and group consolidation. In particular, under the BSI framework, the reporting population consists of the MFIs resident in each Member State ("host country principle") and no consolidation is performed for non-bank subsidiaries or across national boundaries. For instance, the gains/losses of non-euro area subsidiaries of euro area MFIs are not covered in BSI statistics. For more details on methodological linkages and differences between BSI statistics and supervisory data, see CEBS/ECB, "MFI balance sheet and interest rate statistics and CEBS' guidelines on FINREP and COREP", Frankfurt, February 2010 (available at http://www.c-ebs.org).

2 Euro area MFIs' holdings of securities issued by domestic residents accounted for, on average, about 20% of their total assets in the first half of 2010, while holdings of securities issued by non-euro area residents constituted another 5% of their total assets. In BSI statistics, securities holdings are not broken down according to the accounting classification, i.e. as set out in the International Financial Reporting Standards (IFRSs): trading book, designated at fair value through profit and loss, available-for-sale, held-to-maturity, loans and receivables account and participations.

3 Hence revaluation data are collected for statistical purposes, rather than to obtain information on holding gains/losses as such, and their interpretation much depends on the accounting rules that are followed by MFIs when reporting for BSI purposes. For a given change in market values, the reported revaluations will be higher when the share of the securities portfolio reported at current market value is higher.

4 Data on revaluations of euro area MFIs' holdings of securities (broken down by instrument, sector of the issuer and currency of denomination) are published at monthly frequency in Table 2.7.3 of the "Euro area statistics" section of the ECB's *Monthly Bulletin*.

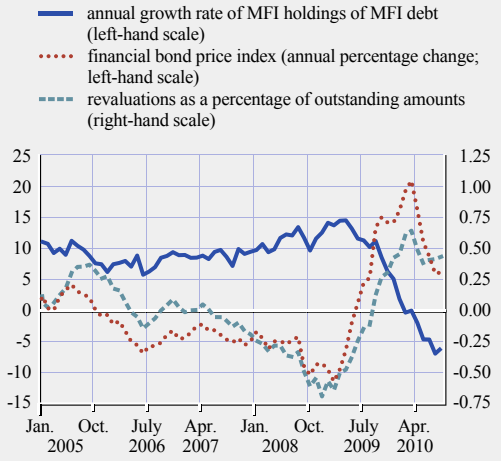
Chart A Euro area MFI holdings of debt securities issued by euro area general government, revaluations and the euro area government bond price index

(Jan. 2005 – Aug. 2010; percentages, revaluations expressed as 12-month moving sums)

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

Chart B Euro area MFI holdings of debt securities issued by euro area MFIs, revaluations and the euro area financial bond price index

(Jan. 2005 – Aug. 2010; percentages, revaluations expressed as 12-month moving sums)



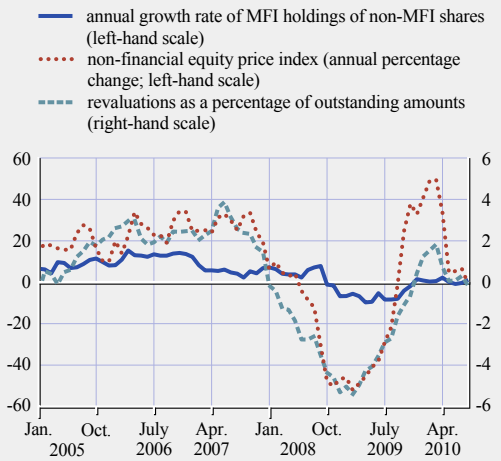
Sources: Bank of America Merrill Lynch, ECB and ECB calculations.

As regards holdings of debt securities, euro area government bonds held by MFIs suffered negative revaluations between early 2006 and the middle of 2008. As from the second half of 2009, however, they were only occasionally subject to negative revaluations that reflected the fluctuation in prices as the problems in public finances in several euro area countries gradually intensified. This coincided with a stabilisation and subsequent moderate slowdown of the annual growth rate of MFIs' government bond holdings (see Chart A). As from 2009, by contrast, there was a sharp decline in MFI holdings of debt securities issued by other banks, although MFI bond prices increased in the same period, coupled with positive revaluations (see Chart B).[5]

Regarding holdings of shares issued by the euro area private sector, euro area MFIs suffered from large negative revaluations after the default of Lehman Brothers in September 2008. These losses coincided with a large-scale shedding by banks of this type of assets (see Chart C). However, after mid-2009, the revaluation losses on the shares came to an end.

Chart C Euro area MFI holdings of shares issued by the euro area private sector, revaluations and the euro area non-financial equity price index

(Jan. 2005 – Aug. 2010; percentages, revaluations expressed as 12-month moving sums)



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

5 Holdings of debt securities issued by euro area general government and MFIs accounted for, on average, around 11% of the total assets of euro area MFIs in the first half of 2010; in some large euro area countries, however, holdings of these two securities classes came to 14% of MFIs' total assets.

Overall, despite the caveats explained in this box, the MFI revaluation data therefore provide useful information about marking-to-market changes in banks' balance sheets which can act as important triggers for changes in banks' investment decisions. These data, which are available at monthly frequency, provide more timely indications than banks' quarterly reports on revaluations of their securities holdings, which form a substantial part of LCBGs' balance sheets. In the future, subject to further efforts being undertaken to reconcile revaluation data with banks' gains/losses, these series would thus provide early-warning indicators on such losses and allow the stress testing of trading-book valuations.

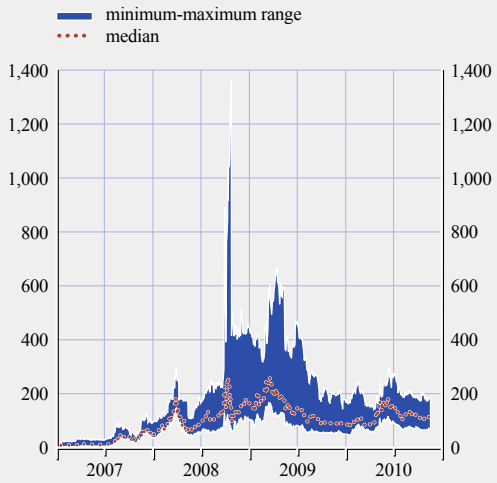
Counterparty risks

After the finalisation of the June 2010 FSR, the median cost of protection against the default of a major dealer in over-the-counter (OTC) derivatives markets, as reflected by dealers' CDS spreads, declined, thereby suggesting lower concerns about dealers' creditworthiness (see Chart 4.19). Lower counterparty credit concerns should have contributed to a better access to credit for these banks, as well as to their ability to intermediate credit to other banks, some of which, especially in peripheral euro area countries, still faced substantial counterparty credit constraints and continued to rely on Eurosystem liquidity support. Given the limited willingness to provide unsecured funding to the latter banks and perhaps also on account of the generally higher, crisis-driven preference for secured lending, the value of repos and reverse repos outstanding in the European repo market in June 2010 exceeded its pre-crisis peak.[8] In this regard, it is also noteworthy that the availability and, especially, the cost of funding secured by domestic government bonds improved significantly for a number of Spanish banks after they joined an international clearing counterparty.

A revival of open repos, a convenient short-term financing tool in which the repurchase date is unspecified and which can be terminated by either party at any time, could be interpreted as an indicator of improved confidence among market participants. Similarly, the second quarterly survey of price and non-price credit terms and conditions in US dollar-denominated securities financing and OTC derivatives markets, the results of which were published in early October 2010, revealed a greater appetite for counterparty credit risk across the institutions surveyed.[9] Surveyed dealers, some of which were European LCBGs, indicated that they had generally loosened the credit terms offered to important groups of non-bank clients, including hedge funds, across the spectrum of securities financing and OTC derivatives transactions.

Chart 4.19 Dispersion of the CDS spreads of selected major European and US dealers in OTC derivatives markets

(Jan. 2007 – Nov. 2010; spreads in basis points; senior debt, five-year maturity)



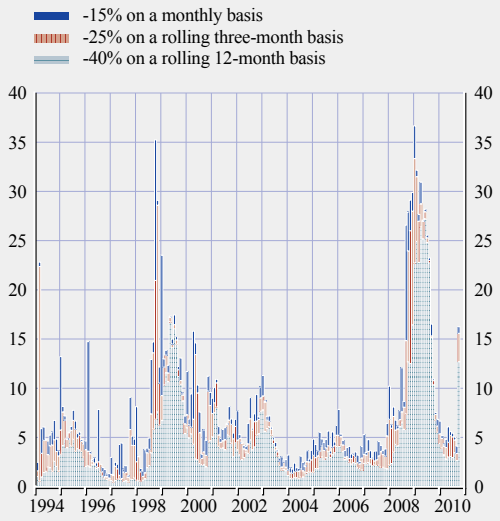
Sources: Bloomberg and ECB calculations.
Note: The dispersion analysis includes 12 major dealers.

8 International Capital Market Association, "European repo market survey", September 2010.

9 Board of Governors of the Federal Reserve System, "Senior Credit Officer Opinion Survey on Dealer Financing Terms", September 2010. The survey included 20 financial institutions that account for almost all of the dealer financing of US dollar-denominated securities to non-dealers and that are the most active intermediaries in OTC derivatives markets.

Chart 4.20 Estimated proportion of hedge funds breaching triggers of cumulative total NAV decline

(Jan. 1994 – Oct. 2010; percentage of total reported NAV)



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. 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.

Higher risk tolerance with respect to credit exposures towards hedge funds – important and usually very active leveraged non-bank counterparties – has to some extent been offset by the positive cumulative average investment performance of hedge funds since May 2010 (see also Section 1.3). Furthermore, the estimated proportion of hedge funds breaching triggers of cumulative total decline in net asset value (NAV) [10] has been declining (see Chart 4.20). A higher proportion in October 2010 should be interpreted cautiously because the most recent data are subject to incomplete reporting and because estimated proportions for each point in time are based only on hedge funds that reported respective NAV data and for which the change in NAV could thus be computed.

4.3 OUTLOOK FOR THE BANKING SECTOR ON THE BASIS OF MARKET INDICATORS

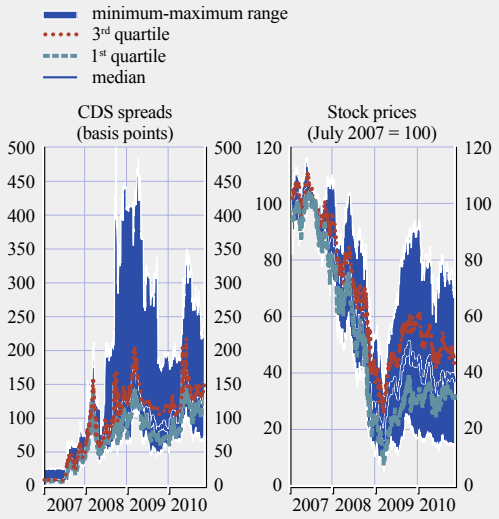
After the finalisation of the June 2010 FSR, market indicators based on euro area LCBGs' securities prices or credit default swap (CDS) spreads pointed to a gradual improvement in the outlook for the euro area banking sector, which also owed something to the publication of the EU-wide stress-tests results in July. By mid-November, the LCBGs' CDS spreads had decreased substantially from the record high levels reached in mid-May. This was accompanied by a gradual recovery of the euro area LCBGs' stock prices (see Chart 4.21). Nevertheless, in August market participants' fears about the condition of some banks re-emerged, which, to some extent, reversed the earlier improvements in these indicators observed in June and July. This notwithstanding, in the view of market participants, the outlook for the euro area banking sector improved in comparison with early May 2010 when fears about sovereign risk had become particularly acute, leading to the establishment of the European Financial Stabilisation Mechanism by the ECOFIN Council on 9 May.

Turning to the assessment of market participants' perceptions of systemic risk, it should be recalled that on 7 May, the ECB's systemic risk indicator, which provides a market-based assessment of the probability of simultaneous default of two or more euro area LCBGs over the next two years, reached an all-time high of 14% (see Chart 4.22). Since mid-June, when the extension of the EU-wide stress-testing exercise was first announced, it has followed a downward trend and dropped significantly further after the publication

10 NAV triggers can be based on a cumulative decline in either total NAV or NAV per share, and allow creditor banks to terminate transactions with a particular hedge fund client and 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.

Chart 4.21 Euro area LCBGs' equity prices and five-year senior CDS spreads

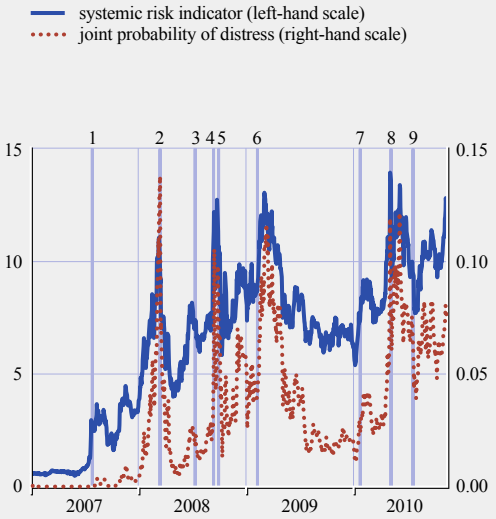
(Jan. 2007 – Nov. 2010; spreads in basis points; senior debt; five-year maturity; stock prices (index: July 2007 = 100))



Sources: Bloomberg and ECB calculations.

Chart 4.22 Systemic risk indicator and joint probability of distress of euro area LCBGs

(Jan. 2007 – Nov. 2010; probability; percentages)



1 Turmoil begins
2 Bear Stearns rescue take-over
3 Rescue plan of US Fannie Mae and Freddie Mac announced
4 Lehman Brothers defaults
5 US Senate approves Paulson plan
6 T. Geithner announces Financial Stability Plan
7 Greek fiscal problems gain media attention
8 European Financial Stabilisation Mechanism established
9 Publication of EU-wide stress tests

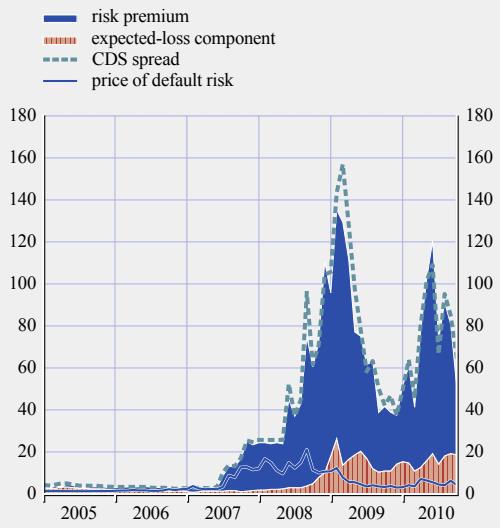
Sources: Bloomberg and ECB calculations.
Notes: Both indicators are based on the information embedded in the spreads of five-year CDS contracts for euro area LCBGs. See the box entitled "A market-based indicator of the probability of adverse systemic events involving large and complex banking groups" in ECB, *Financial Stability Review*, December 2007, and the box entitled "Measuring the time-varying risk to banking sector stability" in ECB, *Financial Stability Review*, December 2008, for details.

of the results of the stress tests on 23 July. Similar trends were indicated by the joint probability of distress (JPoD), another indicator of systemic risk, which looks at the probability of joint failure of all euro area LCBGs. Nevertheless, since early September 2010, owing to renewed fears about the fiscal situation in some euro area countries, the indicator started rising again and by mid-November it had already reached a level higher than prior to the publication of the Committee of European Banking Supervisors' stress-test results.

Some light can be shed on the reasons for the recent surge and the subsequent decline in the systemic risk indicator by decomposing the movements of the CDS spreads of euro area LCBGs. In the second quarter of 2010 both the expected-loss component, which represents the part of the CDS spread that is driven by pure default risk, and the risk-premium component, which represents the part of the CDS spread that is driven by factors other than pure default risk, increased, contributing to higher CDS spreads of euro area LCBGs. Nevertheless, in relative terms, the increase in the expected-loss component was larger than the increase in the risk-premium component, which led to a decrease in the price of default risk, i.e. the amount that is paid by credit risk protection

Chart 4.23 Decomposition of one-year senior CDS spreads of euro area LCBGs and the price of default risk

(Jan. 2005 – Oct. 2010; basis points)



Sources: Bloomberg, Moody's KMV and ECB calculations.
Notes: Since expected-loss components and risk premia were calculated for each LCBG individually, their medians do not necessarily add up to the median CDS spread. See the box entitled "Price of default risk as a measure of aversion to credit risk" in ECB, *Financial Stability Review*, December 2008, for a description of how the price of default indicator was constructed.

buyers to protection sellers for bearing default risk (see Chart 4.23).

All in all, these patterns tend to suggest that CDS market participants considered the surge in LCBGs' CDS spreads that was observed in May 2010 as being driven mostly by default risk, while the price they demanded for selling protection against default actually declined. On the positive side, both the expected-loss component and the risk-premium component receded in July, which also led to a further decrease in the price of default risk.

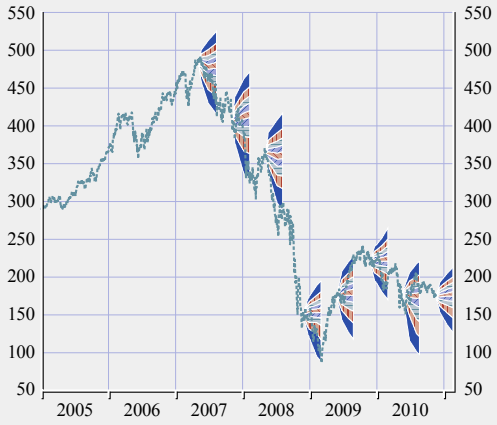
Turning to the assessment of the recent movements in the equity prices of euro area LCBGs, it is worth comparing them with the changes in the earnings of these institutions. While the annual changes in quarterly earnings have increased markedly in 2010 and earnings forecasts remain favourable (see Chart S109), price/earnings (P/E) ratios based on ten-year trailing earnings barely changed and, by end-October, the average of these ratios calculated for all LCBGs remained at very low levels by historical standards (see Chart S113). All in all, this suggests that, in spite of recent increases in LCBGs' stock prices, the potential for further upside movements remains, as prices did not seem particularly overvalued in the context of banks' long-term earnings potential. That said, however, low levels of P/E ratios may also reflect a systematically lower potential to generate high returns on equity by banks in view of future Basel III rules which will place tougher limits on banks' leverage.

Turning to the short-term outlook for euro area LCBGs' earnings, one can assess the short-term market indicators based on the option prices of the euro area bank stock index, namely risk reversal and strangle. In particular, in May 2010 these indicators reached their record lowest and record highest levels, respectively. Taken together, these indicator readings suggested that, in the view of market participants, the probability of further large declines in the stock prices of euro area LCBGs increased substantially in May 2010. Since the establishment of the European Financial Stabilisation Mechanism these indicators have returned to the levels observed at the beginning of 2010, which indicates that the short-term uncertainty about further adverse movements has receded to a marked degree, although in mid-November they remained at elevated levels in comparison with the pre-crisis era.

This also seems to be evident in the distribution of option-implied risk-neutral density bands. Recently this distribution has narrowed materially, while the downward skewness of the lowest confidence intervals has become less pronounced (see Chart 4.24). Similarly, as in the case of the indicators based on options trading strategies, this suggests that the probability which market participants assign to the likelihood of further substantial declines in banks' stock prices over the horizon of the next three months has recently decreased substantially.

Chart 4.24 Dow Jones EURO STOXX bank index and option-implied risk-neutral density bands

(Jan. 2005 – Feb. 2011; index value; 10%, 30%, 50%, 70% and 90% confidence intervals)



Sources: Bloomberg and ECB calculations.
Note: The fan charts cover the horizon of three months and are based on the option prices as at 11 May 2007, 8 November 2007, 6 May 2008, 27 November 2008, 28 May 2009, 27 November 2009, 20 May 2010 and 19 November 2010.

Thanks to the gradual improvement in the outlook for the euro area banking sector, the ratings of euro area LCBGs improved slightly, with some upgrades to the AA- category. Moreover, the balance of rating changes has turned positive for the first time since the autumn of 2007 when, in the aftermath of the eruption of the financial market turmoil, the number of downgrades started to exceed the number of upgrades (see Charts S114 and S115). However, looking ahead, the credit rating outlook for euro area LCBGs remains unfavourable, as more than 35% of the rating outlooks available are negative, compared with only one positive rating outlook (see Table S7).

Overall, the picture presented by market indicators based on the securities prices and CDS spreads of euro area LCBGs suggests a gradual abatement of the credit risk associated with these institutions and an improved outlook for their earnings, while uncertainty about the future movements of banks' equity prices has receded. That said, systemic risk, as measured by the systemic risk indicator, remains at high levels by historical standards. All in all, this tends to suggest that, while the situation of individual euro area LCBGs continues to improve, fears among market participants about the systemic consequences of increased sovereign risks remain. In addition, there is uncertainty about the sustainability of LCBGs' increased profitability, in view of possibly high refinancing needs and possible increases in funding costs in the period ahead. In the future, continued efforts by euro area governments to implement the necessary fiscal consolidation measures, if credible, may lead to a further improvement in these indicators and, in particular, to a further decrease in the systemic risk associated with the euro area banking sector.

4.4 OVERALL ASSESSMENT

The shock-absorption capabilities of euro area LCBGs have improved further over the past six months, albeit to a lesser extent than in 2009, as the increase in capital ratios was supported by retained earnings and banks' efforts to raise capital. This was in part offset by an increase in risk-weighted assets, in particular in the second quarter of the year. Furthermore, the aggregate results of the EU-wide stress test also suggest that LCBGs and most other euro area banks have sufficient loss-absorption capacity to withstand possible further shocks.

Despite an improved financial performance of most euro area LCBGs in the first three quarters of 2010, however, the overall outlook for euro area banking sector profitability remains uncertain. Concerns voiced earlier in the year that the recent recovery of bank profitability may not prove durable may, to some extent, have materialised in the second quarter of the year, as illustrated by a decrease in trading income amid increased financial market volatility and reduced trading activity. The still wide dispersion of bank profitability levels and the fact that this distribution became more skewed to the downside in the second and third quarters of 2010 suggest that some banks are experiencing greater difficulties in sustaining their profitability levels in a more challenging macro-financial environment, following the deterioration of conditions in the second quarter.

The prospects for banks' net interest income, which has been the key source of revenue supporting the improvement in banks' operating income, could be influenced negatively by several factors. Despite a recovery in lending for house purchase, credit growth in the euro area is likely to remain moderate, thus restraining the growth of interest income. Interest expenses may increase owing to upward pressures on funding costs – particularly for some countries – stemming from still elevated funding spreads in longer-term wholesale markets, albeit to varying degrees across institutions, and owing to intense competition for retail deposits. Furthermore, uncertainty about the future slope of the yield curve, and the extent to which banks will continue to benefit from it, also clouds the outlook for the sustainability of banks' profitability. However, the sharp divergence of long-term bond yields across individual euro area countries also implies that the interest rate risks faced by banks domiciled in different parts of the euro area could be very different in nature.

Following a setback to the improvement in funding conditions in May this year, triggered by heightened concerns about sovereign risk, conditions in euro area banks' funding markets have again improved in recent months, although they remain far from normal. These improvements notwithstanding, challenges related to banks' sizeable refinancing needs over the next few years remain as banks will continue to compete for funds with the public sector, for which debt is expected to peak over the next two years. Banks' funding conditions may still be vulnerable – albeit to varying degrees across institutions and countries – to shifts in market sentiment, in particular in relation to sovereign risk and its impact on funding costs. Furthermore, the continued reliance of some euro area banks on Eurosystem refinancing facilities continues to be a concern. Looking ahead, LCBGs should take all necessary steps to prepare themselves for a further gradual normalisation of Eurosystem liquidity operations.

The most significant risks that euro area LCBGs currently face include:

- ⬆ interest rate risks, which, however, at the current juncture, vary substantially across countries were LCBGs operate;
- ➡ the risk that profitability may not prove sustainable in the period ahead, owing to volatile market conditions, sluggish demand for credit and possible upward pressure on funding costs;
- ➡ challenges related to the sizeable refinancing needs over the next few years in the context of more intense competition for funds with the public sector; and
- ➡ the continued reliance of some euro area banks on public support measures, including Eurosystem refinancing facilities.

⬆ *Increased risk since the June 2010 FSR*
➡ *Unchanged since the June 2010 FSR*
⬇ *Decreased risk since the June 2010 FSR*

It is important to bear in mind that the enhanced solvency positions of euro area LCBGs indicate sufficient shock-absorption capacity among these institutions to weather the risks they currently face, should they materialise.

The agreement on new revisions to capital and liquidity regulation contributed to reducing the uncertainty that has weighed on banks since the outbreak of the crisis and it should allow banks to optimise their capital and liquidity planning and, where necessary, to adjust their business models. Of potential relevance for some LCBGs, a possibly higher loss-absorbing capacity for systemically important institutions may in the future add to the capital required for regulatory purposes, with a possible impact on financing costs and profitability.

5 THE EURO AREA INSURANCE SECTOR

Euro area insurers' financial performance remained stable, on average, in the second and third quarters of 2010, which was in line with the expectations outlined in the June 2010 Financial Stability Review (FSR), although results varied across institutions. Underwriting and investment income stabilised and contained losses supported the overall results. Nevertheless, most of the risks faced by insurers remain, in particular those associated with the low level of yields on AAA-rated government bonds and the moderate recovery in economic activity. This contributes to some continuing uncertainty about the outlook for the euro area insurance sector. This notwithstanding, available information on the solvency positions of euro area insurers suggests that, on average, they have a reasonable amount of shock-absorption capacity to weather a materialisation of the risks they currently face.

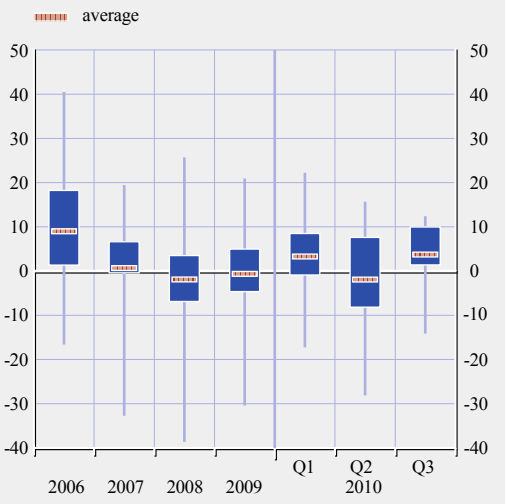
5.1 FINANCIAL CONDITION OF LARGE PRIMARY INSURERS AND REINSURERS

FINANCIAL PERFORMANCE OF LARGE PRIMARY INSURERS[1]

The financial performance of large primary insurers in the euro area remained broadly stable in the second and third quarters of 2010 – which was in line with the expectations in the June 2010 FSR – after improvements in the fourth quarter of 2009 and the first quarter of 2010. However, performance across insurers was diverse and the moderate economic activity continued to weigh on underwriting performance for some insurers (see Chart 5.1). In addition, some non-life markets continued to be affected by strong competition. Insurers' financial results were, however, supported by relatively contained losses in the second and third quarters of 2010. Combined ratios, which had been pushed above 100% for many insurers in the first quarter of 2010 mainly on account of losses caused by windstorm Xynthia in western Europe and the earthquake in Chile in February, declined (see Chart S119; a combined ratio of more than 100% indicates an underwriting loss for an insurer).

Chart 5.1 Distribution of gross-premium-written growth for a sample of large euro area primary insurers

(2006 – Q3 2010; percentage change per annum; maximum, minimum and interquartile distribution)



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

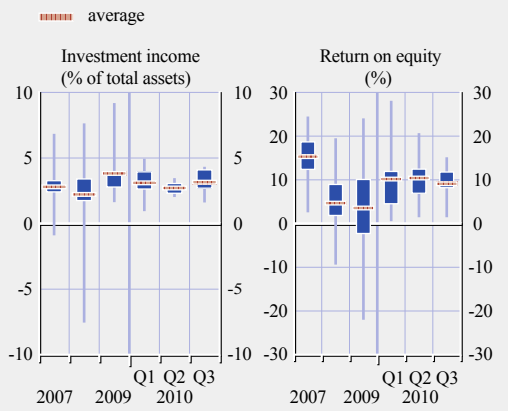
Investment income in the second and third quarters of 2010 remained broadly stable and all the insurers avoided investment losses (see Chart 5.2).

All in all, the profitability of large primary insurers remained stable in the second and third quarters of 2010 (see Chart 5.2). The average return on equity stood at 9% in the third quarter of 2010, compared with 10.2% in the first quarter.

1 The analysis of the financial performance and condition of large euro area primary insurers is based on the consolidated accounts of a sample of 20 listed insurers with total combined assets of about €4.2 trillion. They represent around 60% of the gross premiums written in the euro area insurance sector. However, at the time of writing, not all figures were available for all companies.

Chart 5.2 Distribution of investment income and return on equity for a sample of large euro area primary insurers

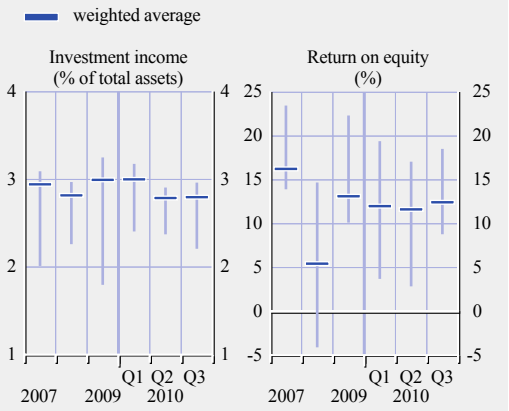
(2007 – Q3 2010; maximum, minimum and interquartile distribution)



Sources: Bloomberg, individual institutions' financial reports and ECB calculations.
Note: The quarterly data are annualised.

Chart 5.4 Distribution of investment income and return on equity for a sample of large euro area reinsurers

(2007 – Q3 2010; maximum-minimum distribution)



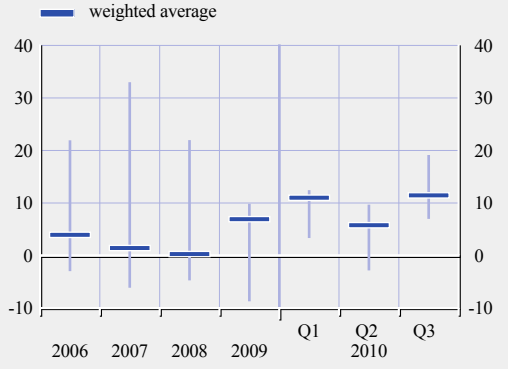
Sources: Bloomberg, individual institutions' financial reports and ECB calculations.
Note: The quarterly data are annualised.

FINANCIAL PERFORMANCE OF MAJOR REINSURERS[2]

The financial performance of euro area reinsurers remained broadly stable in the second and third quarters of 2010. Year-on-year growth in premiums written slowed in the second quarter – mainly due to reduced demand from primary insurers which also put pressure on reinsurance prices for the 1 July 2010 renewal period – but rebounded in the third quarter (see Chart 5.3).

Chart 5.3 Distribution of gross-premium-written growth for a sample of large euro area reinsurers

(2006 – Q3 2010; percentage change per annum; maximum-minimum distribution)



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

Reinsurers' financial performance was supported by lower losses in the second and third quarters of 2010 and combined ratios decreased for all the reinsurers considered (see Chart S122).

Reinsurers' investment income was somewhat lower in the second and third quarters of 2010, compared with previous quarters (see Chart 5.4). Nonetheless, overall profitability remained broadly stable, with the average return on equity standing at around 12.5% in the third quarter of 2010 (see Chart 5.4).

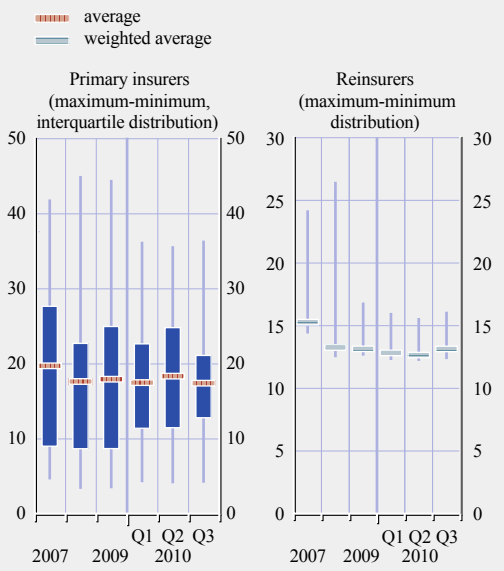
SOLVENCY POSITIONS OF LARGE PRIMARY INSURERS AND REINSURERS

Primary insurers' and reinsurers' capital positions remained broadly stable in the second and third quarters of 2010 (see Chart 5.5). Equity buffers were supported by positive net income for almost all insurers considered as well as positive changes in revaluation reserves.

2 The analysis of the financial performance and condition of major euro area reinsurers is based on the consolidated accounts (also including primary insurance activity, where applicable) of a sample of three reinsurers with total combined assets of about €310 billion, representing about 30% of total global reinsurance premiums.

Chart 5.5 Distribution of capital positions for a sample of large euro area insurers

(2007 – Q3 2010; percentage of total assets)



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 5.6 Earnings per share (EPS) for a sample of large euro area insurers, and euro area real GDP growth

(Q1 2002 – Q4 2011)

Sources: ECB, Thomson Reuters Datastream and ECB calculations.

All in all, capital positions in the third quarter of 2010 appeared, on average, to include a reasonable amount of shock-absorption capacity. This was in part due to the fact that insurers often keep their capital levels in excess of regulatory requirements, with the objective of obtaining a targeted credit rating from rating agencies. However, it is difficult to measure capital adequacy consistently across insurance companies in the current Solvency I regime, in view of different national and company practices and disparate levels of disclosure.

5.2 INSURANCE SECTOR OUTLOOK AND RISKS

OUTLOOK

Analysts expect euro area insurers' earnings to remain stable in the remainder of 2010 and in 2011, but still below pre-crisis levels (see Chart 5.6). Earnings are likely to be held back by the moderate recovery in economic activity, as the latter could lead to sluggish demand for both life and non-life insurance products, and by persistently low interest rates, which will put continued pressure on investment income. It should be noted, however, that there is uncertainty surrounding the insurance sector outlook because the uncertainty about the economic outlook remains elevated (see Chart 5.6 and Section 2.1). Some renewed pressure on insurers' earnings cannot be excluded if economic growth in 2011 is at the lower end of the forecast range, or indeed weaker than currently expected (see Chart 5.6).

All in all, the conditions in the euro area insurance sector are likely to remain stable in the period ahead, although there are a number of risks facing insurers that could affect them negatively if they materialise.

MAIN RISKS

The most significant risks that euro area insurers currently face include, in no particular order:

- the risk that yields on AAA-rated government bonds will remain at low levels;
- credit investment risks;
- risks associated with the moderate recovery in economic activity;
- contagion risks from banking activities or via links to banks and other financial institutions; and
- the risk of losses from catastrophic events exceeding projected losses.

These risks are discussed below. It should be noted that they are not necessarily the most likely future scenarios that could affect insurers negatively, but are rather potential and plausible events that could, should they occur, materially impair the solvency of insurers.

Financial market/investment risks

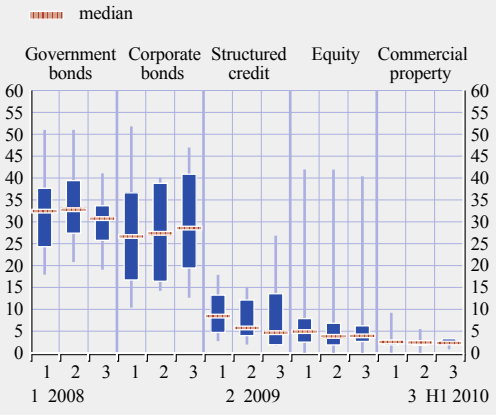
Financial market and other investment risks continue to be one of the most prominent risks that insurers face.

In mid-2010 large euro area insurers continued to be most exposed to government and corporate bonds, although investment strategies differ substantially across institutions (see Chart 5.7). Some shifts away from government bonds into higher-yielding high-quality corporate bonds were observed during the first half of 2010, due to the low returns on highly rated government bonds.

In general, the level of uncertainty regarding, and the likelihood of, investment losses in the main markets in which insurers invest has remained rather elevated since the June 2010 FSR (see Chart 5.8). The low yields on highly rated government bonds are in particular making it challenging for insurers to achieve good investment returns. The uncertainty about

Chart 5.7 Distribution of bond, structured credit, equity and commercial property investment for a sample of large euro area insurers

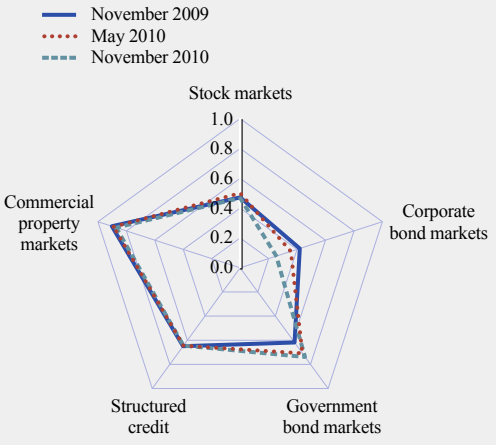
(2008 – H1 2010; percentage of total investments; maximum, minimum and interquartile distribution)



Sources: Individual institutions' financial reports and ECB calculations.
Note: The equity exposure data exclude investment in mutual funds.

Chart 5.8 Investment uncertainty map for euro area insurers

(the level of uncertainty increases with the distance from the centre of the map)



Sources: ECB, Bloomberg, JPMorgan Chase & Co., Moody's, Jones Lang LaSalle and ECB calculations.
Notes: "Stock markets" is the average of the index level and the price/earnings ratio of the Dow Jones EURO STOXX 50 index; "Corporate bond markets" is the average of euro area A-rated corporations' bond spreads and the actual and forecast European speculative-grade corporations' default rates; "Government bond markets" is the euro area ten-year government bond yield and the option-implied volatility for ten-year government bond yields in Germany; "Structured credit" is the average of euro area residential mortgage-backed securities and European commercial mortgage-backed securities spreads; and "Commercial property markets" is the level of year-on-year changes in euro area commercial property prices and rents. For further details on how the uncertainty map is created, see Box 13 in ECB, *Financial Stability Review*, December 2009.

future developments in some of the markets in which insurers invest contributes to continued relatively high investment risks.

The risk that yields on AAA-rated government bonds remain at low levels

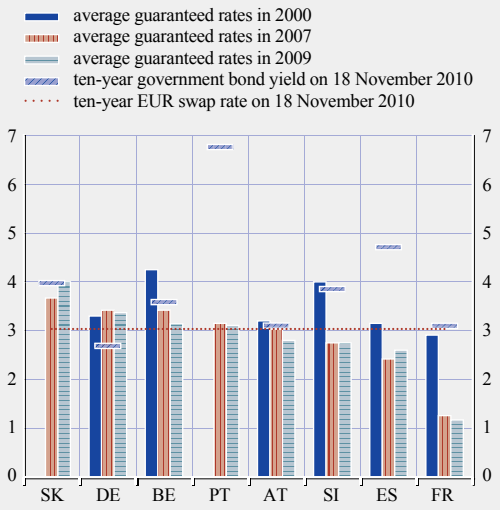
Because insurers in general invest a majority of their financial assets in government bonds, they continue to face the risk of AAA-rated government bond yields remaining at low levels.[3] A prolonged period of low interest rates is mainly a concern for life insurers (and pension funds) that have a large stock of guaranteed-return contracts with guaranteed rates close to or above current long-term risk-free rates (see Chart 5.9).

Data for a sample of large euro area insurers suggest that government bond exposures were somewhat lower in mid-2010 than at the end of 2009, although the share remains high (see Chart 5.7). The high share of government bond investment is supported by some provisional estimates based on internal ECB data for all euro area insurance companies and pension funds which show that they held about €1.2 trillion of debt securities issued by euro area governments in the second quarter of 2010, which was €112 billion more than in the fourth quarter of 2009. This represents 47% of insurers' and pension funds' total holdings of debt securities and 17% of their total financial assets.

Average ten-year government bond yields in the euro area declined further after the finalisation of the June 2010 FSR, and the level of uncertainty in the markets has increased somewhat (see Chart 5.8). This, together with continued large exposures to highly rated government bonds, suggest that the associated risk for insurers has increased somewhat during the past six months.

Chart 5.9 Average guaranteed interest rates on life insurance policies, ten-year government bond yields and the ten-year EUR swap rate

(percentages)



Sources: Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS) and Bloomberg.
Note: Data for Slovakia and Portugal for 2000 are not available.

Credit investment risks

Although corporate bond exposures remain high and even increased slightly in the course of the first half of 2010 (see Chart 5.7), the improvements in the markets after the finalisation of the June 2010 FSR imply that the associated investment risk for insurers has continued to decline somewhat (see Chart 5.8). Nevertheless, corporate spreads remain wide by historical standards and bankruptcies are expected not to have peaked yet (see Section 2.2).

In addition to corporate credit risks, euro area insurers, due to their large government bond exposures, run the risk of a further deterioration in the credit quality of some sovereign bond issuers. Lower prices of the government bonds held by insurers would lead to marking-to-market valuation declines on insurers' balance sheets. However, investment exposures of large euro area insurers to government bond issues by some of the euro area countries where sovereign bond yields are highest appear in general to be manageable.

Other investment risks

As mentioned in previous FSRs, most insurers shifted their investment strategies away from

3 For a discussion of the impact on insurers of low risk-free interest rates, see Box 16 in ECB, *Financial Stability Review*, June 2010.

equities during the financial crisis. Equity exposures remained reasonably stable in the first half of 2010, although some insurers announced and implemented plans to increase their equity investment to some extent (see Chart 5.7). Overall, although uncertainties in the stock markets remain, the generally low exposure levels suggest that insurers should be able to withstand any adverse developments in stock markets, although exposures vary across institutions and some insurers maintain rather large equity investments (see Chart 5.7).

Some insurers have significant exposures to commercial property markets, via direct investment in property and investment in property funds or commercial mortgage-backed securities. Conditions in many commercial property markets in the euro area remain fragile, although the outlook has improved somewhat (see Section 2.3 and Chart 5.8). This could, in turn, negatively affect insurers' commercial property investments.

Risks associated with the moderate recovery in economic activity

Euro area insurers continue to face challenges due to the moderate recovery in economic activity. Notwithstanding the slight improvements in the economic outlook after the finalisation of the June 2010 FSR, growth is likely to remain moderate in the near term and the uncertainty about the outlook remains elevated (see Section 2.1).

As mentioned in previous FSRs, there are several ways in which this could continue to affect insurers negatively. Insurance underwriting and investment income developments typically follow trends in the overall economy. Underwriting and investment income are therefore likely to remain subdued in many segments until the economic recovery has gained more momentum. In addition, the moderate economic conditions have caused vulnerabilities in some segments of the corporate sector and intensified sovereign credit risks. This could result in losses on insurers' investments in corporate and government bonds, structured credit products and various types of commercial property investment.

Contagion risks from banking activities or via links to banks and other financial institutions

As highlighted in previous issues of the FSR, insurers engaged in banking activities or that are part of a financial conglomerate have in many cases been more severely affected by the financial crisis, due to the especially challenging environment in which banks have been operating.

In addition, many insurers have significant investment exposures to banks through holdings of equity, debt and debt securities, and therefore remain vulnerable to possible adverse developments in the banking sector. Some provisional estimates based on internal ECB data show that euro area insurance companies and pension funds held about €569 billion of debt securities issued by euro area monetary financial institutions (MFIs) in the second quarter of 2010, up from €528 billion in the fourth quarter of 2009. This represents 22% of insurers' and pension funds' total holdings of debt securities and 8% of their total financial assets. At the same time, euro area insurers and pension funds held about €49 billion of quoted shares issued by euro area MFIs in the second quarter of 2010, which was less than the €58 billion held in the fourth quarter of 2009.

Many risks and challenges facing the euro area banking sector remain, as do the links between insurers and banks, and the associated risks for insurers therefore remain broadly unchanged.

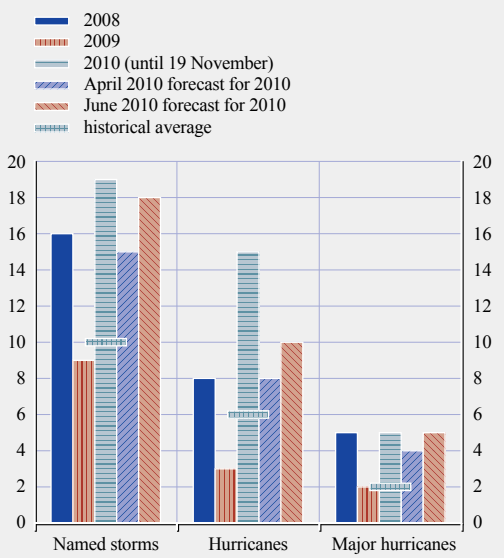
The risk of losses from a catastrophic event exceeding projected losses

For reinsurers and non-life insurers, one of the most prominent risks they face remains the potential for losses from catastrophic events to be larger than projected.

The level of activity during the 2010 Atlantic hurricane season was higher than the historical average (see Chart 5.10). Forecasts made earlier in the year did, however, foresee above-average

Chart 5.10 Atlantic hurricanes and storms

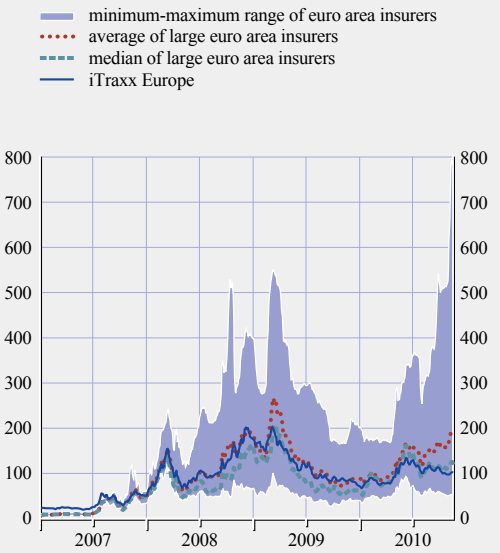
(2008 – 2010; number of hurricanes and storms)



Source: Colorado State University (CSU).

Chart 5.11 CDS spread for a sample of large euro area insurers and the iTraxx Europe main index

(Jan. 2007 – Nov. 2010; basis points; five-day moving average; five-year maturity; senior debt)



Sources: Bloomberg and JPMorgan Chase & Co.

activity, which should have helped insurers set aside adequate reserves. Nevertheless, the forecasts had to be revised upwards (see Chart 5.10), and some losses will still have to be borne by insurers in the coming months.

All in all, catastrophic events during 2010 did not cause severe losses for euro area insurers and the risk that future losses would be above projected losses decreased somewhat after the finalisation of the June 2010 FSR.

5.3 OUTLOOK FOR THE INSURANCE SECTOR ON THE BASIS OF MARKET INDICATORS

Market indicators for insurers signal a somewhat more uncertain outlook than they did six months ago.

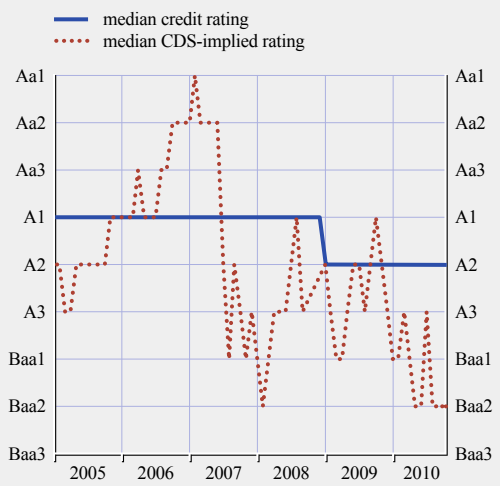
Euro area insurers' credit default swap (CDS) spreads have been rather volatile after the finalisation of the June 2010 FSR and were on average around 50 basis points wider in mid-November than in mid-May. Furthermore, the dispersion across large euro area insurers widened significantly, which was mainly due to large increases of CDS spreads of some insurers domiciled in those euro area countries where also sovereign yields increased substantially in recent months. At the same time, the average CDS spread for large euro area insurers rose above the overall iTraxx index (see Chart 5.11).

Many euro area insurers saw their credit ratings downgraded by rating agencies during the financial crisis. Rating agencies have maintained their negative outlook for some of the large euro area insurers covered in this section, mainly because the insurers are expected to be unlikely to return to pre-crisis profitability. However, there were no further rating downgrades after the finalisation of the June 2010 FSR.

Given the wider CDS spreads but stable credit ratings after the finalisation of the June 2010 FSR, the gap between insurers' credit ratings and CDS-based market-implied ratings (MIRs) also widened over recent months (see Chart 5.12). This implies that CDS investors consider large euro area insurers' credit risk to be higher than

Chart 5.12 Credit rating and market-implied rating for a sample of euro area insurers

(Jan. 2005 – Nov. 2010)



Source: Moody's.

rating agencies do, although it should be noted that factors other than credit risk – such as liquidity risk – can have an impact on the level of CDS spreads.

The stock prices of insurance companies have witnessed some volatility after the finalisation of the June 2010 FSR but in mid-November stood about 11% above the levels seen in mid-May 2010, which is comparable to the increase in the overall stock market (see Chart S128).

All in all, patterns in market indicators over the past six months imply a somewhat more uncertain outlook for the euro area insurance sector.

5.4 OVERALL ASSESSMENT

The improvement of the financial performance of primary insurers and reinsurers in the fourth quarter of 2009 and the first quarter of 2010 was not maintained in the second and third quarters of 2010, although on average performances stabilised. Many of the pre-existing risks and challenges for the sector remain, which contributes to some continuing uncertainty about the outlook for the euro area insurance sector. In particular, the low levels of yields on AAA-rated government bonds and the uncertainty prevailing in financial markets continue to pose challenges for the stability of insurers' investment income. At the same time, the moderate recovery in economic activity, and the uncertainty surrounding it, are continuing to weigh on the underwriting performance of euro area insurers.

The most significant risks that euro area insurers currently face include:

- ⇧ the risk that yields on AAA-rated government bonds will remain at low levels;
- ⇩ credit investment risks;
- ⇨ risks associated with the moderate recovery in economic activity;
- ⇨ contagion risks from banking activities or via links to banks and other financial institutions; and
- ⇩ the risk of losses from catastrophic events exceeding projected losses.

⇧ *Increased risk since the June 2010 FSR*
⇨ *Unchanged since the June 2010 FSR*
⇩ *Decreased risk since the June 2010 FSR*

It is important to bear in mind that disclosed solvency positions of euro area insurers indicate a reasonable amount of shock-absorption capacity to weather the risks they currently face, should they materialise.

6 STRENGTHENING FINANCIAL SYSTEM INFRASTRUCTURES

After the finalisation of the June 2010 Financial Stability Review (FSR), the operational performance of the key euro payment and securities settlement infrastructures continued to be stable and robust. In particular, TARGET2, with a market share of 90% in terms of the total value processed by large-value payment systems in the euro area, ran smoothly and showed a high level of resilience.

As a result of the market turmoil in early May, the Continuous Linked Settlement (CLS) system experienced a significant increase in foreign exchange trading instructions to nearly double the normal levels. This caused occasional backlogs, for which a number of remedial actions were taken.

As a follow-up to the G20 mandate to promote safety and efficiency with respect to the over-the-counter (OTC) derivatives markets, important regulatory developments took place both in the United States and in Europe. Appropriate US legislation was signed into law in July, and on 15 September the Commission published its formal legislative proposal for a regulation on OTC derivatives, central counterparties (CCPs) and trade repositories. In this respect, the Eurosystem attaches particular importance to the issue of global consistency, also taking into account the ongoing general review of standards for financial market infrastructures by the Committee on Payment and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO).

Payment and settlement systems play an important role for the stability and efficiency of the financial sector and the euro area economy as a whole. For instance, the daily average total value of payments processed in TARGET2 corresponds to roughly a quarter of euro area GDP. The smooth operation of systemically important payment and settlement infrastructures also contributes to the implementation of the single monetary policy of the Eurosystem. The main objective of the Eurosystem's oversight activities is to prevent disturbances in the infrastructures and, should they appear, to preclude their spilling over into the financial system and the economy.

6.1 PAYMENT INFRASTRUCTURES AND INFRASTRUCTURE SERVICES

DEVELOPMENTS IN KEY EURO PAYMENT INFRASTRUCTURES

TARGET2

Operational performance

In the first half of 2010 the average daily value of settled transactions amounted to €2.31 trillion, which represents an increase in comparison with the second half of 2009 (€2.06 trillion). The daily average volume of transactions amounted to 350,947, a slight increase compared with the second half of 2009 (347,804).

In the first half of 2010 the hourly average values settled on the Single Shared Platform (SSP) were highest in the first and in the last but one hour of operations during the day (see Chart S133).

The overall level of non-settled payments[1] in the first half of 2010 was higher than in the second half of 2009. The daily average number of non-settled transactions increased from 581 to 826, whereas the daily average value of these payments increased from €24 billion to €40 billion. This means that, in terms of value, a mere 1.7% of the total daily average turnover was not settled.

TARGET2 maintained its leading position among large-value payment systems in the euro area, with a market share of 90% in terms of value and 62% in terms of volume.

1 It should be noted that the data should be evaluated with care owing to the fact that the reason for non-settlement cannot be identified.

Incidents

The TARGET2 oversight function devotes particular attention to the regular monitoring and assessment of incidents that occur, focusing – primarily, but not exclusively – on significant disruptions that are classified as major incidents.[2] The reason for such an approach is that these events may point out potential risks and vulnerabilities inherent in the system which, should they materialise, might have implications for its compliance with Core Principle VII on security and operational reliability.

The analysis of all incidents in TARGET2 in the first half of 2010 did not identify any significant risks in this respect. The number of minor incidents was the same as in the previous six months. Since none of these events resulted in a complete downtime, the calculated availability ratio of TARGET2 over the reporting period remained at 100% (see Chart S134). The operator of the system followed up properly on all failures and there was no impact on the secure and operationally reliable functioning of TARGET2 in the reporting period.

Oversight assessment

In the framework of its ad hoc oversight activities, the TARGET2 oversight function assesses, inter alia, technical and functional changes in the system. In the reporting period the assessment of the new software release to be put in place in November 2010 was initiated. The TARGET2 oversight function has been focusing on the most important change, namely the implementation of internet access, but has also been assessing the other changes, as well as the whole implementation process. The internet-based access to TARGET2 is an alternative connection mode to the SSP that offers direct access to the main TARGET2 services without requiring a full-fledged connection to the SWIFT network. The internet-based access is intended, in particular, to meet the needs of small and medium-sized banks and will not, for example, be available for the connection of ancillary systems to TARGET2. The assessment will be finalised before the implementation of the new release.

TARGET2 simulator

The TARGET2 simulator, an analytical tool based on payments data, has been available to the Eurosystem central banks since 1 July 2010. It provides a pan-European dataset of TARGET2 activity containing all transactions, liquidity information and participant information, as well as a simulation tool which closely replicates the settlement process of TARGET2. The simulation software was developed on the basis of the widely used payment system simulator of Suomen Pankki – Finlands Bank (BoF-PSS2) and is provided jointly by the TARGET2-operating central banks, namely the Banca d'Italia, the Banque de France, the Deutsche Bundesbank and Suomen Pankki – Finlands Bank.

Payment system simulations enable overseers and operators to obtain the results of a settlement process in counterfactual experiments. For example, the outcome of the settlement process can be simulated subject to deviations from real historical data introduced to the transaction flow or the design of the settlement process. In the literature, simulations have been used to assess the impact of operational failures by participants on the stability of both a system and other participants, for scenario analyses of high and low liquidity levels in a system or for simulations of the introduction of design changes. In addition, payments data have been used for statistical and structural analyses, such as studies on the network properties or the identification of specific payment flows such as those related to overnight money market transactions between banks.

A limited group of staff members from the Eurosystem central banks and from ESCB NCBs connected to TARGET2 can access the tool for

2 Major incidents are those that last more than two hours, that lead to a delayed closing of the system or that delay the settlement of very critical payments by more than 30 minutes.

the purpose of conducting analyses to support the safety and efficiency of TARGET2, i.e. for oversight and operational purposes, in line with a decision of the Governing Council of the ECB that was published in the Official Journal of the European Union on 12 August 2010. The analyses will be coordinated by the Payment and Settlement Systems Committee and carried out by separate user groups from the oversight and operational functions.

EURO1

Main developments

Since June 2010, EURO1 has been settling in TARGET2 via the Ancillary System Interface (ASI) of the SSP, using the Standard Multilateral Settlement Procedure 4 (TARGET2-ASI4) for end-of-day settlement. With the migration of EURO1 end-of-day settlement to TARGET2-ASI4, the ECB, as the settlement provider of EURO1, has been supporting the settlement of multilateral cash balances of EURO1 transactions in TARGET2 by settling payment instructions submitted by the EURO1 system in batch mode (XML format).

EBA CLEARING will also make use of the TARGET2 option of using the Guarantee Fund Mechanism (GFM). The GFM will be activated in abnormal circumstances (e.g. if one or more EURO1 participants do not meet their obligations under the EURO1 settlement process, or do not do so in a timely manner) in order to allow the settlement of all payment instructions involved in the EURO1 settlement by providing the complementary liquidity needed.

Before the migration to TARGET2-ASI4, the ECB as lead overseer of the EURO1 system (together with the Banca d'Italia and De Nederlandsche Bank) assessed the potential impact of this development on the compliance of EURO1 with the applicable oversight standards and concluded that the migration does not adversely affect EURO1's compliance with the Core Principles for Systemically Important Payment Systems.

The compliance of EURO1 and TARGET2 with the BCOE

In 2010, the ECB, in cooperation with several Eurosystem NCBs, completed an assessment of the compliance of EURO1 and TARGET2 with the Business Continuity Oversight Expectations (BCOE). The BCOE, which were endorsed by the ECB's Governing Council in 2006, lay down a set of oversight expectations aimed at ensuring sufficiently robust and consistent levels of resilience across the critical market infrastructures operating in the euro area. The assessment confirmed that the business continuity and crisis communication arrangements of EURO1 and TARGET2 are being maintained at high standards.[3]

The Eurosystem will continue to carefully monitor, from an oversight perspective, the performance of EURO1 and TARGET2 in order to ensure the smooth functioning of these systemically important euro payment systems.

CLS

A key feature of CLS is the settlement of gross-value instructions with multilateral net funding on a payment versus payment (PvP) basis. PvP ensures that when a foreign exchange trade in one of the 17 CLS-eligible currencies is settled, each of the two parties to the trade pays out (sells) one currency and receives (buys) a different currency, thus eliminating the foreign exchange settlement risk for its settlement members. Furthermore, CLS is offering settlement services related to single-currency transactions (non-PvP transactions), which mainly include non-deliverable forward transactions and credit derivative transactions. The process is managed by CLS Group Holdings AG and its subsidiary companies, including a settlement bank (CLS Bank) that is supervised by the Federal Reserve. Given the multi-currency nature and systemic relevance of the system, the Group of Ten (G10) central banks, the ECB and the

3 The full BCOE assessment report is available on the ECB's website at: http://www.ecb.europa.eu/press/pr/date/2010/html/pr100908.en.html

central banks whose currencies are settled in CLS have worked cooperatively in overseeing the system. In 2008 a protocol was established for the cooperative oversight arrangement, with the Federal Reserve as the primary overseer.

In the past few months the number of CLS participants has continued to grow. Since April 2010, one new settlement member and another 2,091 third-party users (2,069 of which were investment funds) joined the CLS system. At the beginning of October 2010, there were 60 settlement members, as well as 9,611 third-party users, in the system (namely 477 banks, corporates and non-bank financial institutions plus 9,134 investment funds).

Operational performance

During the reporting period (from April 2010 to August 2010) the daily average volumes settled in CLS initially decreased slightly in April, then reached a record high in May and subsequently decreased again, returning to the level recorded at the beginning of April. The peak reached in May was due to a significant increase in the foreign exchange trading instructions submitted to CLS in response to the acute uncertainty that prevailed in financial markets on 6 and 7 May, ahead of the establishment of the European Financial Stabilisation Mechanism. While days with business peaks are not unusual for CLS, especially in a specific currency on a business day that follows a public holiday in that currency area, input levels under the stressed market conditions experienced in early May at times surged to nearly double the normal levels.

This caused occasional backlogs and some processing delays for CLS and its members, and highlighted the need to address capacity constraints across the so-called CLS eco-system. CLS has since called upon its members through the eco-system forum to identify and contribute to understanding these issues and to develop potential solutions and best practices (related mainly to current capacity limits in their back-office systems and the technical capability to prioritise very time-critical value instruction submissions over others).

Overall, on average during the reporting period, a volume of 417,000 trades per day were settled with an average daily value equivalent to USD 4.1 trillion. The shares of US dollar and euro trades remained stable during the reporting period, with the former accounting for 45% of the settled transactions and the latter for about 20% (the share of euro trades had peaked at 22.6% in April 2010 and dropped to 19% in August 2010).

The share of single-currency transactions (non-PvP transactions) is still small in relative terms (on average, 0.63% of transactions denominated in all currencies in terms of value). The Eurosystem monitors the turnover of non-PvP settlements in euro in view of CLS's compliance with the Eurosystem's location policy. During the reporting period, this amounted to a daily average (calculated over a 12-month period) of €0.2 billion.

OVERSIGHT OF INFRASTRUCTURE SERVICE PROVIDERS

SWIFT

S.W.I.F.T. scrl, the Society for Worldwide Interbank Financial Telecommunication (hereafter referred to as "SWIFT"), is a limited liability cooperative company based in Brussels. Its core activity is providing secure messaging services to more than 7,500 financial institutions around the world. The G10 central banks perform cooperative oversight of SWIFT due to its importance as a messaging service provider for most of the systemically important payment and securities clearing systems, as well as their participating financial institutions. Given that SWIFT is incorporated in Belgium, the Nationale Bank van België/Banque Nationale de Belgique is the lead overseer of the cooperative oversight function with respect to this critical service provider.

Main developments

Over the past few months, there have been many both business and infrastructure-related developments at SWIFT. The most important of these developments relates to the completion of the migration of its processing to a multi-zone messaging architecture, namely the Transatlantic and the European zone. At the time of the publication of this report, SWIFTNet and FIN had achieved 99.999% and 99.998% availability respectively in both messaging zones. SWIFT is now focusing on completing Phase 2 of the Distributed Architecture programme, which involves the construction of a new global operational centre in Europe to serve both zones.

Given the importance of SWIFT's infrastructure for global financial stability, G10 central banks, including the ECB, have been closely monitoring developments with respect to Phase 2 of the Distributed Architecture programme, which is expected to be completed by 2014.

Operational performance

Statistics published by SWIFT show that in June 2010 year-to-date FIN traffic increased by 8.1% in comparison with 2009. In particular, FIN messaging for securities-related messages grew by 8.6%, payment messages by 7.8%, and treasury-related messages by 6.5%. The large majority of these messages (approximately 67.2%) were exchanged by participants located in Europe, the Middle East and Africa. On 11 May, SWIFT recorded a peak day with 18,361,704 messages.

6.2 SECURITIES CLEARING AND SETTLEMENT INFRASTRUCTURES

OTC DERIVATIVES

The follow-up work to the G20 mandate to promote the use of CCPs and electronic trading platforms for standardised OTC derivatives, as well as the reporting of all OTC derivatives contracts to trade repositories, continued with great intensity during the second half of 2010. Efforts have focused on the establishment of legislative frameworks to ensure both appropriate usage and the safe and efficient functioning of OTC derivatives infrastructures in some major jurisdictions, as well as on measures to ensure an effective global convergence of such frameworks and their practical implementation.

In the United States, the Dodd-Frank Wall Street Reform and Consumer Protection Act was signed into law on 21 July 2010.[4] In the EU, the European Commission put forward its proposal for a regulation on OTC derivatives, CCPs and trade repositories on 15 September 2010. The proposal is currently going through the co-decision procedure with the European Parliament and Council, with the objective of finalising the regulation by the end of the year.

The Eurosystem has been closely involved in the development of the draft regulation and will contribute to its finalisation in the coming period.

As set out in the Eurosystem's contribution to the European Commission's public consultation on derivatives and market infrastructures in July 2010, the Eurosystem attaches particular importance to the issue of global consistency in order to ensure a level playing field across infrastructures and to pre-empt the potential for regulatory arbitrage. Against this background, the Eurosystem feels that any national legislation should be consistent with the CPSS-IOSCO standards for financial market infrastructures. In order to achieve this, legislation should avoid prescribing an excessive level of detail, which should instead be defined on the basis of technical measures that are in line with CPSS-IOSCO standards. A further advantage of the use of technical implementing measures for the fine-tuning of requirements for market infrastructures is also the greater ease with which such measures can be adapted in view

4 The definition and implementation of many regulatory details of the law is expected to take up to 18 months.

of market developments and refinements of global best regulatory and oversight practices. In this context, it should be noted that the CPSS-IOSCO is currently conducting a major review of its recommendations for financial market infrastructures, which will take into account the lessons learnt from the financial crisis, the specific challenges faced by infrastructures for OTC derivatives and overall market developments that have occurred since the standards were first adopted. The revised set of standards is scheduled to be issued in early 2011.

Another Eurosystem priority regarding the forthcoming EU regulation concerns the adequate consideration of the role of central banks in the respective regulatory and oversight frameworks and in the authorisation processes, in the setting of technical standards and in the determination of mandatory clearing obligations for OTC derivatives products and the recognition of CCPs and trade repositories that are domiciled in third-country jurisdictions. Finally, the Eurosystem attaches great importance to the independence of central banks in deciding on the potential access of market infrastructures to its facilities.

IV SPECIAL FEATURES

A STRESS-TESTING BANKS IN A CRISIS

This special feature describes the key characteristics of macro stress tests for banks specifically in relation to their use during financial crises. The analysis draws on recent experiences in the United States in 2009 and in the EU in 2010, where macro stress tests for banks were used in one of the most severe financial crises in decades.

INTRODUCTION

Macro stress tests are a tool to measure the resilience of the financial system or its key components to various stress factors, based on the quantification of the link between macroeconomic variables and the health of either individual financial institutions or the financial sector as a whole.[1] Starting with the macro stress tests in the Financial System Assessment Programs (FSAPs) conducted by the International Monetary Fund (IMF) in the late 1990s, the use of macro stress tests has become common practice among central banks and international institutions.[2]

The focus on the systemic dimension of risk and resilience, and the link with a fully fledged macroeconomic scenario distinguish macro stress tests from so-called sensitivity analyses – where only a single risk factor is simulated to reach stressed levels – and from stress tests that are applied to an individual financial institution in isolation from other parts of the financial system. The latter two typologies of stress test are more commonly used by supervisory authorities, as they are more suitable for assessing the condition of individual institutions or if the focus is on the specific risk exposures of an individual financial firm. However, in both supervisory and macro stress tests the analysis is typically undertaken well before such stress factors have severely affected the viability of financial institutions. In other words, these are routine "health checks" that are conducted irrespective of whether the financial system or individual firms are in crisis.

This special feature takes a different perspective and restricts the analysis to the – admittedly few – cases in which macro stress tests have been carried out during a financial crisis, i.e. at times when the system-wide resilience of the financial sector has been at stake. Because of their focus on systemic risk, macro stress tests can address the need to cover the system-wide nature of the drivers and the impact of a financial crisis. The focus is further narrowed to consider macro stress tests for banks only.[3]

The motivation for this approach is the experience gained in the recent financial crisis, where macro stress tests for banks were used as a policy tool to restore market confidence and improve market functioning. This indicates that macro stress tests can be employed to communicate with market participants and to increase transparency on the condition of financial institutions.

In this light, it is possible to identify three crucial features for the effectiveness of macro stress tests conducted in a crisis:

- synchronisation in the publication of results across institutions, authorities and possibly countries, and related communication policies;
- high levels of disclosure;
- complementarities with other policy actions for institutions that do not "pass" the test.

1 See ECB, Special Feature A, entitled "Country-level macro stress-testing practices", *Financial Stability Review*, June 2006, for a discussion of the main features of macro stress tests.

2 For a recent overview of stress tests for the banking sector, see M. Quagliariello (ed.), *Stress-testing the Banking System, Methodologies and Applications*, Cambridge University Press, 2009. The practice and theory of macro stress tests is still being developed, and authorities continue to improve their stress-testing frameworks. For a brief discussion of their role in macro-prudential oversight, see ECB, Special Feature B, entitled "Analytical models and tools for the identification and assessment of systemic risks", *Financial Stability Review*, June 2010.

3 Stress tests are also routinely carried out by supervisors on financial institutions other than banks. For instance, an EU-wide stress test was recently conducted for the insurance sector. For additional details, see Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS), "Results of CEIOPS EU-wide stress test for the insurance sector", press release accompanying the publication of the results, 16 March 2010.

This special feature discusses these characteristics against the experience of the two most prominent examples in the recent crisis, i.e. the macro stress tests for banks conducted in the United States in 2009 and in the EU in 2010.[4] Although more insights will be gained over time,[5] and there is clearly room for improvement in implementing crisis stress tests,[6] the concluding remarks present the features that may be the most effective in similar circumstances in the future.

TWO RECENT EXPERIENCES

In 2009 the US authorities conducted a macro stress test under the framework of the Supervisory Capital Assessment Program (SCAP).[7] The key publications associated with this exercise were the note on methodological features,[8] issued two weeks prior to the finalisation of the exercise, and the report presenting bank-level results and the associated policy prescriptions, issued in early May 2009.[9] 19 bank holding companies were included in the SCAP, covering approximately 66% of total US banking sector assets, on a global consolidated level. The exercise was run over a two-year horizon (2009 and 2010).

At the time of the SCAP, the major concerns over the resilience of the US banking sector were related to banks' exposures to real estate and their holdings of complex financial instruments used for trading purposes. The results from the SCAP provided detailed information on related losses under the baseline and the "more adverse" scenarios. Both the banking and the trading-book credit exposures of banks were covered (first and second lien mortgages, credit cards and other consumer loans, commercial and industrial loans, commercial real estate, and other loans), as well as holdings of complex trading instruments in the trading book for banks with trading account assets exceeding $100 billion as of 31 December 2008 (projections of trading-related losses for the "more adverse" scenario including losses from counterparty credit risk exposures, potential counterparty defaults and credit valuation adjustments on those counterparties where the probability of default was expected to increase during the stress event).

The minimum capital thresholds used in the exercise were 6% for the Tier 1 capital adequacy ratio and 4% for Tier 1 common capital. According to the methodological note, the probability of the "more adverse" scenario was roughly 10% in terms of house price dynamics, and roughly 15% in terms of GDP growth and unemployment.

In the EU, the stress-test exercise, coordinated by the Committee of European Banking Supervisors (CEBS) and developed in close cooperation with the ECB and the European Commission, was completed in 2010.

4 Other examples include the stress tests conducted by the UK Financial Services Authority in 2009, around the time of the US Supervisory Capital Assessment Program in May 2009, and by the Swiss Prudential Supervisor (FINMA) in 2010, around the time of the EU-wide stress test in July 2010. These examples are not described in detail here, but it is important to note that in both cases the level of disclosure was not as high as in the US and European exercises. This difference may reflect the fact that market concerns were focused on the United States and the EU in 2009 and 2010 respectively.

5 For the Supervisory Capital Assessment Program, several reviews from the official sector and academics have become available over time. See, for example, B. J. Hirtle, T. Schuermann and K. J. Stiroh, "Macroprudential Supervision of Financial Institutions: Lessons from the SCAP", *Federal Reserve Bank of New York Staff Reports*, No 409, November 2009 and A. E. Wall, "The 2009 Stress Tests: A Model for Periodic Transparent Examinations of the Largest Bank Holding Companies", *LLM Long Paper, International Finance Seminar*, Harvard Law School, April 2010. An official review was undertaken by Congress; see the June Oversight Report, "Stress Testing and Shoring up Bank Capital", Congressional Oversight Panel, 11-12 June 2009.

6 Some of the areas for improvement of stress tests in a crisis are discussed at the end of this special feature. Other, more general deficiencies of macro stress tests (e.g. the need to improve the modelling of interconnectedness within the financial system or in capturing the two-way relationship between the financial sector and the economy at large), although applicable also to stress tests in a crisis, are not discussed here.

7 The SCAP was run jointly by the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation and the Office of the Comptroller of the Currency.

8 Board of Governors of the Federal Reserve System, "The Supervisory Capital Assessment Program: Design and Implementation", 24 April 2009.

9 Board of Governors of the Federal Reserve System, "The Supervisory Capital Assessment Program: Overview of Results", 7 May 2009.

The methodological note and test results were released on the same day in July.[10] The exercise covered 91 EU banks, representing around 65% of the assets of the EU banking sector, on a global consolidated level, and at least 50% of each EU country's total banking sector assets. Because of the cross-border operations of large European banks, seven EU countries were included in the exercise through subsidiaries of EU banks. Also in the EU case, the stress horizon was two years (2010 and 2011), and two scenarios, a benchmark and an adverse scenario, were used.[11]

Similarly to the SCAP, the European exercise devoted particular attention to a specific type of exposure, responding to the main source of market concerns at the time. In the European case, this was exposures to sovereign risk from EU countries on account of which interbank market liquidity had fallen markedly in Europe, especially in the euro area. The European exercise covered credit risk in the banking book, as well as market and sovereign risk in the trading book. To reflect the primacy of sovereign risk in the design of the EU-wide stress test, the deterioration in macroeconomic conditions under the adverse scenario was compounded by an additional increase in long-term interest rates, of a size comparable to that experienced in early May in the European sovereign bond markets.

The minimum capital threshold for "passing" the test was 6% Tier 1 capital. According to ECB estimates, the probability of the adverse scenario was roughly 5% in terms of GDP growth.

The European stress test involved a large number of countries and national supervisory authorities, but its success relied, among other factors, on the respective national efforts being consistent in terms of their methodology and underlying assumptions. To this end, the macroeconomic scenarios, which were designed by the ECB for each European country on the basis of the European Commission's forecasts and ECB computations for the adverse scenario, were to be employed by each country. The ECB also provided reference values for the risk parameters (probability of default and loss given defaults for different types of portfolio in the banking book), although supervisors could allow some differences in the way the macroeconomic scenarios were translated into the risk parameters for the banks with the most sophisticated risk-modelling capacity. Nonetheless, participants made efforts to ensure the consistency of internal parameters with the ECB input. Haircuts on sovereign bonds in the trading book were computed for all EU sovereigns by the ECB, and were used in the same way by all banks. CEBS also provided detailed guidance for the computation of market risk in the trading book, as well as on the treatment of both accounting (i.e. adoption of the International Financial Reporting Standards, IFRS) and regulatory (i.e. adoption of Basel II) standards.

MAIN FEATURES

A number of features of the US and European exercises are relevant from the perspective of drawing lessons on the use of macro stress tests in a crisis. As a starting point, stress tests in a crisis must address the systemic dimension. Although modelling the interconnectedness within the financial system – a key aspect of systemic risk – remains work in progress, and the associated data needs are demanding and in part still unmet, at the very minimum all institutions that have a bearing on the resilience of the system should be included in the stress-test exercise. If necessary, this may require adjusting the sample of relevant institutions between normal and crisis times. Separately, the success of a stress test in a crisis is closely associated with its impact on market conditions, as the stress test is

10 See Committee of European Banking Supervisors, "CEBS's press release on the results of the 2010 EU-wide stress testing exercise", press release, 23 July 2010, and the CEBS summary report mentioned therein, entitled "Aggregate outcome of the 2010 EU-wide stress test exercise coordinated by CEBS in cooperation with the ECB".

11 An intermediate adverse scenario, excluding sovereign risk, was also constructed in the CEBS exercise. See Annex 2 of the CEBS summary report (op. cit.), which provides a detailed description of the scenarios.

employed as a policy tool to respond to the crisis. To achieve this goal, authorities need to engage in a dialogue with market participants that is more intense than in normal times.

Turning to the most distinguishing features of the recent US and European macro stress tests during the recent crisis, five can be identified and are presented below.

First, *communication* was carefully prepared ahead of the publication of the results, with a much higher profile than in normal times. For the US authorities, the release of the technical note two weeks before the results offered the opportunity to convey information on key details of the exercise, especially the severity of the "more adverse" scenario. In the European case, a CEBS press release issued on 18 June,[12] following the conclusions of the meeting of the European Council on 17 June,[13] officially announced the plan to publish bank-level results in July.[14] This news was highly significant. CEBS had conducted stress tests in the past,[15] and national authorities within the EU routinely run stress tests in line with best supervisory practices. However, the 2010 EU-wide exercise was to be critically different, in that detailed data were to be published, bank by bank. In addition, in a second communication three weeks prior to the finalisation of the exercise,[16] CEBS announced that the sample of banks had expanded to 91 banks, and their names were made public, in contrast to the 22 anonymous banks covered in 2009. This was done to respond to the systemic nature of the crisis and the need to increase transparency and dispel general market concerns.

A second and related feature was *synchronisation* in releasing the results, as this can critically contribute to the maximum market impact of stress tests in a crisis. In both the US and the European cases, publication was coordinated by the authorities in charge, although there were additional hurdles to be overcome in the latter case. The EU-wide exercise involved the supervisory authorities of all the EU countries, with the additional complication of the need to coordinate the release of information by home and host authorities where cross-border banks were involved. Moreover, some national supervisory authorities did not have the power to release information on individual institutions, as the data were considered to be proprietary information of the banks. As can be evinced from CEBS's accurate description of the timeline for the release of information,[17] synchronising the publication of the EU-wide exercise required careful planning.

Third, a high level of *detail on the methodology* employed in the exercise was provided by the time of the release of the results. This reflected the importance of market participants having confidence in the quality of the analysis. In particular, they needed to have sufficient information to be able to replicate the stress-test exercise, and the technical features were an essential component to this end. The detailed technical notes provided by the US and European authorities were made available to respond to this goal.[18]

Fourth, in both the SCAP and EU-wide exercises, the level of *disclosure* of the stress-test results was higher than in past macro stress tests or even supervisory stress tests.

12 See Committee of European Banking Supervisors, "CEBS's press release on state of play with the 2010 EU-wide stress testing exercise", press release, 18 June 2010.
13 See paragraph 14 of the Conclusions of the European Council, 17 June 2010.
14 The publication date was announced in Committee of European Banking Supervisors, "CEBS's statement on key features of the extended EU-wide stress test", press release, 7 July 2010.
15 For the exercise conducted in 2009, CEBS issued a press release summarising the main thrust of the results and the macroeconomic scenario. See Committee of European Banking Supervisors, "CEBS's press release on the results of the EU-wide stress testing exercise", press release, 1 October 2009.
16 See Committee of European Banking Supervisors, "CEBS's statement on key features of the extended EU-wide stress test", press release, 7 July 2010.
17 See Committee of European Banking Supervisors, "CEBS's statement on the time of publication of the results of the EU-wide stress testing exercise", press release, 19 July 2010.
18 As an example of the complications arising from incomplete disclosure of technical details, it can be recalled that some market commentaries were critical when discrepancies appeared between banks' quarterly reports in late summer and their disclosure in July under the EU-wide stress test. This prompted a clarification from CEBS. See Committee of European Banking Supervisors, "CEBS Statement on the disclosure of sovereign exposures in the context of the 2010 EU-wide stress testing exercise", press release, 8 September 2010.

By design, stress-tests are a "what if" type of exercise and are based on scenarios that are more adverse than the central forecasts. Because of this, and the market sensitivity of the results of a stress-test exercise, the output of routine macro stress tests has usually not been published, or only some aggregate information (e.g. across groups of banks) has been released.[19] The argument of market sensitivity was reversed in the crisis, as market reaction – via increased transparency and market confidence – was one of the goals of the US and the European exercises. Although in any macro stress test some institutions may not "pass" the test and there is a risk that they are penalised in the markets, in the recent financial crisis this concern was addressed by specific policy provisions, as explained below, rather than by making the results confidential. Moreover, even for institutions that were perceived to be weak, the publication of detailed results may have been beneficial as it reduced the scope for ongoing market pressure and put an upper bound on the potential scale of losses.[20]

A related point concerns additional disclosure in conjunction with the publication of the stress-test results. In the European exercise, all 91 banks were expected to disclose non-stressed exposures to each EU sovereign in their banking and trading books. As such, this disclosure was unrelated to the stress test but an important complement to it. In the US case, there was less emphasis on disclosure of the volume of exposures to real estate or complex financial instruments. This can be partly explained by the fact that information gathering on this type of exposure had already been organised at the international level, starting in 2008, although exposure data were typically disclosed only to national supervisory agencies.[21] Overall, this kind of additional information was useful to provide the context within which to assess losses from the stress test exercise.

Finally, *backstops* were put in place in both the United States and in each relevant EU country in case some banks were found to have capital buffers below the threshold adopted in the stress-test exercise. Although in both the US and European exercises a market solution to increase banks' solvency ratios was clearly preferred, publishing bank-level results during a financial crisis could have exposed weaker banks to a negative market reaction. To avoid this, authorities provided information on the type of backstop that would be available to the weaker banks. In the US case, banks that needed to increase their capital base in order to establish a buffer were required to develop a detailed capital-raising plan over the following thirty days and implement it in the following six months. This could include either applying to the US Treasury for capital via the Capital Assistance Program, or exchanging banks' existing Capital Purchase Program preferred stock. In addition, several other programmes had been put in place by the US Treasury and the Federal Reserve System by that time.[22] In the European exercise, banks needing additional capital were expected

19 See, for instance, the format of the publication of banks' stress tests in the financial stability reports by the Swiss National Bank, or by the IMF in the FSAP reports. On the other hand, Sveriges Riksbank publishes bank-by-bank results on a regular basis, based on banks' reports and the central bank's own risk models. Moreover, in June 2010 Sveriges Riksbank began publishing a new chapter in its Financial Stability Report, dedicated to macro stress tests and the discussion of bank-level results.

20 For instance, at the time of the EU stress test, market concerns about the condition of the Spanish savings banks ("cajas"), known to have large exposures to the troubled domestic residential real estate sector, were particularly acute. The especially large coverage of the Spanish banking sector in the 2010 EU-wide stress test is noticeable, and it may be ascribed to the decision to take advantage of the test to increase transparency and dispel market concerns about the smaller cajas.

21 The Financial Stability Forum (FSF) provided a template for this disclosure (page 63) in its report, entitled "Report of the Financial Stability Forum on Enhancing Market and Institutional Resilience", April 2008, and home supervisory authorities of the major banks were expected to monitor compliance with this disclosure template in the context of the implementation of the FSF recommendations. CEBS contributed to the EU-level implementation of this FSF recommendation with the release of its own templates for disclosure, both in 2009 and 2010. The latest CEBS report on disclosure, entitled "CEBS Principles for disclosures in times of stress (Lessons learned from the financial crisis)", was issued on 26 April 2010.

22 For an overview of various policy initiatives up to May 2010, see, for instance, S. M. Stolz and M. Wedow, "Extraordinary measures in extraordinary times – Public measures in support of the financial sector in the EU and the United States", *Occasional Paper Series*, No 117, ECB, July 2010. For an assessment of these policies' impact, up to end-2009, see the paper issued by the Bank for International Settlements, entitled "An assessment of financial sector rescue programmes", *BIS Papers*, No 48, July 2009.

to take the necessary steps to reinforce their capital positions through private sector means and by resorting, if necessary, to facilities set up by Member State governments, in full compliance with EU state aid rules. In particular, they were expected to propose a plan to address the weaknesses revealed by the stress test, and the plan was to be implemented within a period of time agreed with the supervisory authority. As in the US case, a number of other policies, independent of the stress tests, had already been put in place to sustain market functioning and alleviate concerns over specific risk exposures. In particular, two programmes were launched earlier on in the EU in order to address market fears of sovereign default and were addressed at European sovereigns: the European Financial Stabilisation Mechanism (EFSM)[23] and the European Financial Stability Facility (EFSF).[24] Simultaneously, in early May 2010, the ECB established the Securities Markets Programme (SMP) to contain adverse movements in sovereign bond yields. The EFSM has been operational since 10 May 2010, and the EFSF became fully operational on 4 August 2010. The EFSF has been authorised to issue bonds in the market, which will be guaranteed by the euro area countries. Loans to a country in difficulty under the EFSM and EFSF must be accompanied by a detailed and demanding set of policy conditions.

Notwithstanding the many similarities between the US and European exercises, it is useful to bear in mind one important difference, related to the timing of the exercise in relation to the phases of the crisis. This difference can also shed light on useful features of macro stress tests in a crisis.

The SCAP was conducted at a time when the financial crisis had a truly global dimension with, at its core, the US financial system, and when the level of uncertainty regarding the resilience of the financial sectors in several countries was at its most acute. The European exercise came at a later phase in the financial crisis, at a time when the concerns were more localised, but also when financial firms had been further debilitated by a prolonged period of stress.[25] The main implication is that the design of stress tests needs to reflect these factors, by adjusting not only the main risk drivers (e.g. sub-prime mortgages and complex trading instruments versus sovereign risk), but also the scope of the exposures at risk, i.e. those to which the stress factors are to be applied. By way of example, the European exercise covered a wider range of banking book exposures, including non-financial corporations, sovereign and other financial institutions, as well as all types of exposure to the household sector. This reflects the fact that as a financial crisis – i.e. a crisis that originates in the financial system – progresses, more traditional banking book exposures become increasingly relevant for the assessment of the resilience of banks. As a result, such exposures need to be given more prominence.

ARE MACRO STRESS TESTS USEFUL IN A CRISIS?

Following the example of the SCAP, an expectation may have started to build up among market participants that authorities will respond to a crisis with macro stress tests, among other tools. The EU-wide exercise is likely to have strengthened this perception and, as macro stress tests may be used again in the event of future financial crises, it is helpful to review here the most useful lessons.

It can be safely said that the publication of the results of both the European and the US exercises contributed to an immediate reduction in market tensions. However, over time, the market impact may be reinforced or weakened by intervening factors. For instance, the US macroeconomic outlook improved around the time the SCAP results were published, thus removing one major downside risk to the banks.

23 See the press release of the Economic and Financial Affairs Committee, Council of the European Union, No 9596/10, 9/10 May 2010, announcing the establishment of the EFSM.

24 More information is available on the EFSF website (http://www.efsf.europa.eu).

25 By the time of the EU-wide stress test, several EU financial institutions had already received government support in the form of capital injections, impaired asset relief schemes or guarantees on liabilities (see S. M. Stolz and M. Wedow, op. cit.).

In the European case, just one business day after publication of the results, global regulators announced important progress in finalising the new regulatory framework for banks (Basel III) – in a direction that was seen as less demanding than banks initially feared. This boosted confidence in the banking sector in Europe and in other regions, irrespective of the EU-wide stress test.

Another qualifier concerns the underlying drivers of the crisis, which can adjust at different speeds across different financial crises. For instance, concerning holdings of complex financial instruments assessed in the SCAP, origination of these products had come to a halt by the time the SCAP was carried out, which helped to put a firm upper bound on banks' exposures and potential losses. In the European case, the risk content of exposures to sovereign risk could only change more slowly, as fiscal consolidation requires time, even after budgetary plans are agreed at the national level.

As regards the most critical features of a successful stress test in a crisis, it is clear that both in the US and European cases, disclosure was paramount. In both exercises, enough information was provided to put an upper bound on the losses of key banks, thus helping to dispel concerns about hidden exposures and related losses. It is important to recognise that three components are important for disclosure to be fully informative: volume of losses, remaining capital buffers, and methodology and assumptions. Such a level of disclosure can expose the exercise to criticism, as happened both in the US and European cases,[26] but will provide sufficient elements for market participants to replicate the exercise, and even apply potentially different assumptions.

A second lesson – closely related to the high levels of disclosure – is that stress tests cannot be used in isolation during crisis times. As already mentioned, it is necessary that stress tests be part of a package of other policy measures. This is essential for banks that need to increase their capital buffers based on the findings of the exercise and, more broadly, to address the underlying drivers, such as sovereign risk in the European case.

A third lesson is that communication policies have to be carefully managed. Here it is important to strike a balance between early communication, so as to achieve some initial attenuation of market tensions and better reception by market participants, and the need to safeguard the position of the financial institutions under analysis before finalising the exercise. In the US and European cases, less than a couple of weeks passed between communicating the analytical details and publishing the results, and this time frame may be a useful benchmark for future stress tests. In this context, it is also important to emphasise the importance of synchronising the release of the results across authorities, firms and possibly countries. The simultaneous release of results has a number of advantages. It encourages market discipline, especially where financial firms themselves are expected to provide additional information,[27] and, more importantly, it avoids a situation where market pressure is concentrated on firms that disclose at a later stage. In addition, it allows for comparisons across institutions that are perceived to be in a similar position, thus increasing the credibility of the exercise, as cross-checks enable an assessment of the robustness of the methodology.

Finally, the challenge of coordination is obviously far greater when the exercise covers more than one country. Clear institutional arrangements supporting such cross-country coordination are needed for the success of joint exercises. In the European context, this was greatly facilitated by the roles played by CEBS, the ECB and the European Commission.

26 For instance, the macroeconomic "more adverse" scenario in the SCAP was seen as too "soft" in some initial market commentaries; likewise, pre-publication leaks about the level of sovereign haircuts created some scepticism with regard to the European exercise.

27 In the European exercise, a few banks did not publish information on their exposures to EU sovereign risk on 23 July 2010 according to the agreed format. Following negative reactions in market commentaries and a build-up of market pressure, these banks decided to release the information in compliance with the CEBS templates.

Overall coordination will be further enhanced by the participation, in the near future, of the European Banking Authority (EBA) and the European Systemic Risk Board (ESRB). Such a level of coordination may be far more difficult to achieve in other cross-country combinations.

Before concluding, it is important to point to areas where improvement in the conduct of macro stress tests in a crisis would be beneficial. Of special importance are features of stress tests that are harder to standardise across financial firms. For instance, profitability assumptions are very much dependent on the specific quality of each portfolio held by each financial firm, as well as a firm's business model. In both the SCAP and the EU-wide exercises, authorities engaged in extensive discussions with each bank in order to assess the validity of their profitability assumptions. To support this dialogue, further efforts in the research on bank profitability modelling would be beneficial, as the models' results could be used by authorities as a reference in their dialogue with firms.[28]

An additional area for improvement is the governance aspect of stress-test exercises. Supervisory authorities have the power to instruct banks to conduct a stress test. However, given the need for speed and consistent implementation across firms during a crisis, national and international authorities may consider whether more far-reaching provisions are necessary to facilitate the conduct of coordinated stress tests during a crisis.

CONCLUDING REMARKS

This special feature has reviewed the recent experiences, in the United States and the EU, with macro stress tests for banks during a financial crisis. Disclosure of methodologies and final results, complementarities with other policies, and communication with market participants are key contributors to the success of this type of policy initiative. These attributes could be usefully retained in stress tests in future crises.

More broadly, these lessons could also be taken into account for future macro stress tests in normal times, in addition to the routine firm-specific stress tests conducted by supervisory authorities. For instance, in the United States, although there are no plans to repeat the SCAP, new legislation for the financial sector requires that large financial institutions undertake annual stress tests, and that each instituition publish a summary of its own results.[29] In the EU, national and regional authorities have expressed interest in continuing the conduct of macro stress tests.[30] As already mentioned, the new institutional framework (EBA, ESRB) is expected to be used. In this context, regional and international cooperation can contribute to identifying best practices for macro stress tests and promoting their adoption.[31]

28 There are some useful examples in the literature (see, for example, R. Beckmann, "Profitability of Western European banking systems: panel evidence on structural and cyclical determinants", *Deutsche Bundesbank Discussion Paper*, Series 2, No 17/2007; U. Albertazzi and L. Gambacorta, "Bank profitability and the business cycle", *Journal of Financial Stability*, Vol. 5(4), 2009; W. Bolt, L. de Haan, M. Hoeberichts, M. van Oordt and J. Swank, "Bank Profitability during Recessions", *De Nederlandsche Bank Working Paper*, No 251, 2010), however the development of bank profitability models remains work in progress.

29 The Dodd-Frank Wall Street Reform and Consumer Protection Act was signed into law on 21 July 2010. The Act requires all financial companies that have total consolidated assets over $10 billion and that are regulated by specified federal financial regulators (namely the federal banking regulators, the Securities and Exchange Commission and the Commodity Futures Trading Commission) to conduct an annual stress test. The federal financial regulators are required to issue rules implementing the annual stress-test requirement. Each agency's rules must, for entities regulated by it, define the term "stress test", establish methodologies for conducting the stress test that include at least three sets of conditions (baseline, adverse and severely adverse), and establish the form and content of a report regarding the stress test which must be submitted to the Federal Reserve Board and to the entity's primary federal financial regulator.

30 For instance, on 4 October 2010, the Informal ECOFIN issued a press release, entitled "Main results of the Informal ECOFIN", stating that ministers and governors had "a fruitful exchange of views on the lessons learned from the implementation of banks stress tests as a response to the financial crisis. '*Our discussion demonstrated the necessity to organize stress tests in a coordinated fashion to restore confidence in the banking sector. It is also crucial to publish the results and to repeat this exercise on a regular basis using a transparent and robust methodology*', summarized the Belgian finance minister, Didier Reynders."

31 For instance, CEBS published the "CEBS revised Guidelines on stress testing" on 26 August 2010, which can be used by national authorities to achieve robust and methodologically sound results.

B BASEL III

The financial crisis has revealed a number of shortcomings in the existing framework of prudential regulation. This special feature outlines the main elements of the Basel Committee on Banking Supervision's proposals to strengthen global capital and liquidity regulations, commonly referred to as Basel III.

INTRODUCTION

The recent financial crisis has clearly demonstrated that both the quality and size of the capital and liquidity base of the global banking system were insufficient to withstand severe economic shocks. Hence, at their Pittsburgh Summit in September 2009, the G20 leaders agreed to strengthen international frameworks for prudential regulation.

In December 2009 the Basel Committee on Banking Supervision (Basel Committee) published for consultation a package of proposals to strengthen global capital and liquidity regulations with the goal of promoting a more resilient banking sector.[1] At its meetings in July and September 2010, the Group of Governors and Heads of Supervision (GHOS), the oversight body of the Basel Committee, endorsed the design and calibration of the proposed measures.

MAIN ELEMENTS OF THE BASEL COMMITTEE'S REFORM PACKAGE

THE NEW DEFINITION OF CAPITAL

As revealed by the crisis, the existing definition of prudential own funds (capital) suffers from several fundamental flaws: (i) lack of a precise boundary between different capital components, (ii) inconsistent definition and application of regulatory adjustments[2] and (iii) weak transparency of the regulatory capital bases.

Under the existing Basel II rules, there is some divergence with regard to the classification of certain capital instruments. For example, the precise boundary between core Tier 1 and additional Tier 1 instruments is sometimes blurred, as is the case for certain types of preferred stock.

Moreover, there is no harmonised list of regulatory adjustments, which leads to divergent application in practice. In general, regulatory adjustments are currently applied to total Tier 1 capital or to a combination of Tier 1 and Tier 2.

Finally, the current disclosures by banks about their regulatory capital bases usually lack quality and detail. This makes it harder for stakeholders of a particular bank to adequately assess the quality of its capital base or to perform meaningful peer analyses.

In order to improve the quality and quantity of capital, the Basel Committee agreed on detailed capital measures. These measures are targeted at the different components of the capital base, as well as at the regulatory adjustments. In the future, all regulatory capital instruments must be capable of absorbing losses at least in "gone concern" situations (i.e. in the event of non-viability/insolvency). The main changes to the existing definition of regulatory capital are briefly summarised in Table below.

First, the quality and consistency of the common equity element of Tier 1 capital ("core Tier 1" or CET1) will be significantly improved. Going forward, common equity Tier 1 will only comprise common shares (or the equivalent for non-joint stock companies) plus retained earnings. Regulatory capital adjustments will be harmonised and taken generally from common equity. Instead of full deduction, some items will receive limited recognition in common equity, such as deferred tax assets arising from "temporary differences", significant investments

1 Basel Committee on Banking Supervision, "Strengthening the resilience of the banking sector – consultative document", BIS, December 2009 and "International framework for liquidity risk measurement, standards and monitoring – consultative document", BIS, December 2009.

2 The term "regulatory adjustments" generally relates to certain deductions from the capital elements (e.g. goodwill), as well as limits on the recognition of certain items in capital (e.g. minority interest).

Main changes to the definition of regulatory capital

	Basel II requirements	8%	Basel III requirements	8%
Tier 3			Abolished	
Tier 2	E.g. undisclosed reserves, subordinated debt - Deductions	4%	No substantial alterations	2%
Additional Tier 1	Some preference shares Hybrid capital - Deductions	2%	Some preference shares Portions of minority interests Hybrids with innovative features no longer accepted	1.5%
Core Tier 1	Common equity Retained earnings Minority interests Some preference shares - Deductions	2%	Common equity Retained earnings Portions of minority interests Preference shares generally excluded Silent partnerships generally excluded Portions of minority interests excluded - All existing deductions - Additional deductions (e.g. deferred tax assets)	4.5%

Source: ECB.
Note: GHOS agreement allows for a ten-year phasing-out period for certain instruments issued by non-joint stock companies.

in the equity of unconsolidated financial and insurance entities, and mortgage servicing rights (a particular type of intangible asset which is prevalent in the United States).

All in all, more emphasis will be placed on core Tier 1 to make it the most predominant form of capital.

Second, capital instruments eligible for the remaining portion of Tier 1 ("additional going concern capital") will need to be loss absorbent on a going concern basis. This requires in turn that instruments are subordinated, have fully discretionary non-cumulative dividends or coupons and have neither a maturity date nor an incentive to redeem.

The Tier 2 capital element will be simplified by removing the existing sub-categories (i.e. upper and lower Tier 2). In order to be loss absorbent on a "gone concern" basis, eligible instruments will need to be subordinated to depositors and general creditors, and have an original maturity of at least five years. The existing Tier 3 capital will be entirely abolished.

In order to meet the stated objective of improving transparency of the capital base, banks will be required to make enhanced disclosures about their capital base, for example by disclosing all regulatory capital elements and fully reconciling them back to the balance sheet in the audited financial statements.

ELIGIBILITY OF SPECIFIC INSTRUMENTS UNDER BASEL III

Hybrids with innovative features. Hybrid instruments with a redemption incentive, such as "step-up clauses", will no longer be eligible for inclusion in Tier 1 capital. This is because the eligibility criteria for both common equity Tier 1 and additional Tier 1 capital preclude capital instruments that contain any such incentive to redeem. Under the existing Basel II rules, hybrid instruments with a redemption incentive that are issued with the aim of generating cost-efficient Tier 1 capital are limited to a maximum of 15% of Tier 1 capital.[3]

Non-joint stock issues, such as cooperative shares. Shares issued by cooperative banks may be eligible for inclusion in common equity (core) Tier 1 capital, provided that they meet the general eligibility criteria ("substance over form"), i.e. they are fully subordinated to all other claims in liquidation, have a principal that is

3 See Basel Committee on Banking Supervision, "Instruments eligible for inclusion in Tier 1 capital", press release, 27 October 1998.

perpetual and classified as equity for accounting and solvency purposes, carry no obligation or expectation as to repurchase or redemption, and their dividends are fully discretionary.

Preferred stock. Issued shares with preferential features (either cumulative or non-cumulative) will most likely no longer meet the eligibility requirements for common equity (core) Tier 1 capital. The new eligibility criteria require there to be "no preferential distributions, including in respect of other elements classified as the highest quality issued capital". On the other hand, it seems that some types of perpetual preferred stock would continue to be eligible as additional Tier 1 capital, since the applicable criteria do not exclude capital instruments with a distribution preference over common stockholders.

Country-specific hybrids, such as silent participations. Alternative funding through silent participations plays a major role in certain jurisdictions, notably Germany. These instruments would need to be adapted to the new rules in order to keep their eligibility for inclusion in core and additional Tier 1 capital for non-joint-stock companies and for additional capital of joint-stock companies, respectively.

COUNTERPARTY CREDIT RISK

In addition to raising the quality of the capital base, the Basel Committee considerably strengthened the rules underlying counterparty credit risk, thus providing a more comprehensive treatment of exposures arising from derivatives, repos and securities financing activities. Going forward, capital requirements for counterparty credit risk should be calculated using stressed inputs. A capital charge associated with the deterioration in the creditworthiness of a counterparty has also been introduced to complement the charge associated with default risk. Weaknesses related to interconnectedness within the financial system and the lack of transparency of the over-the-counter (OTC) derivatives markets are being addressed not only through increased risk weights but also through incentives to standardise market instruments and the widespread use of central counterparties. These new rules complement previously agreed changes mostly related to trading-book exposures[4] and aimed at minimising incentives for regulatory arbitrage between the banking and trading books.

Overall, this set of rules implies higher risk weights and thus affects the denominator of the solvency ratio, to ensure that the capital adequacy framework encompasses all the relevant risks to credit institutions.

POTENTIAL IMPACT OF CAPITAL RULES ON BUSINESS MODELS

It can reasonably be expected that universal banks and large investment banks that carry out a range of different business activities will be hardest hit by the new, tougher requirements. Those banks may have significant "cross-holdings" (either consolidated or unconsolidated) which are subject to stricter conditions (e.g. minority interests and significant investments in the equity of unconsolidated financial and insurance entities), as well as significant amounts of deferred tax assets and intangibles which will (at least partly) need to be deducted from common equity Tier 1 capital. In addition, investment banks and universal banks, especially those with large trading and derivatives books, will also be significantly affected by the higher risk weights envisaged for these types of exposure. On the other hand, the new requirements will almost certainly have a severe impact on specific banking structures where banks often do not have direct access to capital markets, and hence have to rely on alternative funding (e.g. hybrid capital instruments). It seems fair to assume that many of these hybrid instruments will be excluded at least from the highest-quality capital component

4 These other requirements specific to the trading book will be implemented at an earlier stage than the counterparty credit risk framework, i.e. by the end of 2011. The most prominent features of these rules include: (i) the requirement for institutions using internal models in the trading book to calculate Value at Risk (VaR) by using parameters that account for more stressed economic conditions, (ii) strengthened treatment of certain types of securitisation and (iii) a higher credit conversion factor for short-term liquidity facilities to off-balance-sheet conduits.

(i.e. common equity). In consideration of the potential consequences, the GHOS September agreement[5] allows for a moderate phasing-out of instruments that no longer meet the eligibility criteria for common equity.

The imposed limits on the recognition of non-controlling interest (minority interest) in common equity Tier 1 capital may also potentially affect investments in emerging economies. These investments often require a local investor to take a minority stake; the non-eligibility of portions of this minority interest for capital purposes may render such investments less attractive.

LEVERAGE RATIO

Against the background of the excessive leverage in the banking sector prior to the onset of the financial crisis, the Basel Committee developed a simple, transparent and non-risk-based measure as a credible supplementary measure to the risk-based requirements. The leverage ratio will comprise a Tier 1 capital measure (numerator) and a total exposures measure (denominator). Off-balance-sheet items will be converted into on-balance-sheet items by means of "uniform credit conversion factors" (CCFs). These CCFs will be subject to further review to ensure that they are appropriately conservative based on historical experience.

A number of issues may need to be addressed. First, the interactions with other elements of the reform package and potential impacts on pro-cyclicality should be carefully explored. Second, a number of concerns have been raised with regard to the potential impacts of the leverage ratio on certain business models (in particular low-risk mortgage finance). Finally, there are different views with regard to the potential migration of the measure to Pillar 1, which is subject to an assessment of the results of a "test phase".

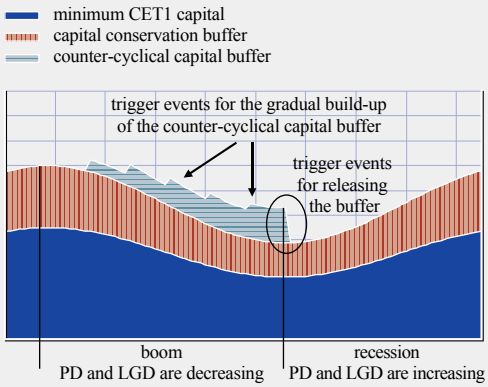
COUNTER-CYCLICAL BUFFERS

The Basel Committee aims to introduce a counter-cyclical capital framework requiring banks to build up capital buffers above the required minimum in good times so that they can be drawn down in periods of stress. More precisely, the Basel Committee has proposed a capital conservation buffer range of 2.5% of common equity Tier 1 established above the minimum, which could be extended up to an additional 2.5% of common equity Tier 1 or other fully loss-absorbing capital in periods of excessive credit growth (the so-called "counter-cyclical buffer"; see the chart below for an illustration). The proposal was published for comments following the July Basel Committee meeting. On the basis of the feedback received, a revised proposal will be submitted to the Basel Committee for endorsement by the end of this year.

The objective of the counter-cyclical buffer is to protect the banking sector from periods of excessive aggregate credit growth. In this context, mitigating the credit cycle is considered only as a side benefit. The proposal is based on a guided discretion approach, where the gap between the current level of private sector credit to GDP and its long-term trend provides

5 Basel Committee on Banking Supervision, "Group of Governors and Heads of Supervision announces higher global minimum capital standards", press release, 12 September 2010.

The development of minimum CET1 capital and buffer requirements for a given portfolio in boom and recession periods – stylised illustration



Source: ECB.
Notes: This chart is based on the assumptions of a constant portfolio composition, and a gradual build-up of the counter-cyclical buffer in equal steps and release in one step. The risk-weights fluctuate, reflecting changes in the probability of default (PD) and the loss given default (LGD) during the business cycle.

the buffer guide. The actual value of the buffer would be equal to the weighted average of buffers across countries, based on the principle of reciprocity in cross-border application.

It is important to emphasise, however, that the authorities will have to use all available information in making buffer decisions. Importantly, different indicators of excesses may perform differently in various stages of the economic cycle (boom versus bust indicators) and across countries. Therefore, effective international coordination mechanisms may need to be developed among authorities in order to allow for a timely identification of periods of excess in a cross-border context.

As regards mitigating cyclicality of the minimum (e.g. by using through-the-cycle or stress "probability of default" estimations) and forward-looking provisioning, the Basel Committee has not yet made any specific proposals. In this context, the potential interactions between the counter-cyclical buffer proposal and the other elements of the reform package would need to be identified and thoroughly assessed.

LIQUIDITY FRAMEWORK

Prior to the crisis that started in mid-2007, the financial system was characterised by ample liquidity, as measured, for instance, by compressed spreads and low volatility. Two key trends crucially affected the impact on liquidity observed during the crisis: first, the increased reliance on capital markets for funding and, second, the increased reliance on short-term maturity funding instruments. These trends were in turn reinforced by the concurrent build-up of contingent liquidity claims (e.g. from off-balance-sheet vehicles) and margining requirements (e.g. from derivatives transactions), against the backdrop of rapid financial innovation. The crisis clearly exposed the failure of both banks' liquidity risk management practices and supervisory standards to keep up with these developments.

In response to these crisis experiences, an international liquidity risk framework is being developed to improve banks' resilience to liquidity shocks and to increase market confidence in the liquidity position of banks. The framework consists of two main measures. A short-term measure, the Liquidity Coverage Ratio (LCR), establishes a minimum level of high-quality liquid assets to withstand an acute stress scenario lasting one month. A structural longer-term measure, the Net Stable Funding Ratio (NSFR), ensures that longer-term assets are funded by more stable medium or longer-term liability and equity financing. These measures are complemented by a set of tools to facilitate the ongoing monitoring of liquidity risk exposures and information exchange among supervisors.

LCR measure

The LCR measures the amount that banks hold as unencumbered, high-quality liquid assets to meet net cash outflows under a well-defined stress scenario persisting for a one-month period.

At their July 2010 meeting, the GHOS agreed to define the stress scenario underlying the LCR "to achieve a conservative bank level and plausibly severe system wide shock". The scenario consists of a combined idiosyncratic and market-wide shock. This entails, among other things, a three-notch downgrade in the institution's public credit rating, the run-off of a proportion of retail deposits, a loss of unsecured wholesale funding, a loss of secured short-term financing transactions for all but high-quality liquid assets, increases in market volatilities that impact the quality of collateral or the potential future exposure of derivatives positions.

These stress assumptions then define the cumulative cash outflows and inflows over the 30-day period. The cash outflows are computed by multiplying outstanding balances of liabilities by run-off factors which reflect the expected roll-off of the different short-term sources of funding, or by multiplying drawdown

amounts to the off-balance-sheet commitments. For instance, short-term unsecured wholesale funding provided by financial institutions is assumed to roll off entirely. Stable retail deposits are assumed to roll off at 5%. Whereas the December consultation paper left it to the banks' discretion to determine the rollover of the lending activity during the stress period, the GHOS, in its July press release,[6] clarified that the LCR measure should specify a concrete harmonised treatment that reflects supervisory assumptions. The difference between these cumulative cash outflows and inflows determines the net cash outflows – the denominator of the LCR.

To cope with the net cash outflows, the LCR sets a minimum required level of assets to remain liquid during the stress. The definition of liquid assets agreed by the GHOS separates liquid assets into two categories. The first category consists of level 1 liquid assets which are defined as: (i) government and public sector entity assets qualifying for the 0% risk weight and (ii) sovereigns that do not have a 0% risk weight, allowing the inclusion of domestic sovereign debt issued in a foreign currency (to the extent that the currency matches the currency needs of the bank's operations in that jurisdiction). The level 2 liquid asset category can include up to 40% of the stock of liquid assets and can comprise: (i) government and public sector entity assets qualifying for the 20% risk weight under Basel II and (ii) high-quality corporate and covered bonds (not self-issued). In order to determine the eligibility of level 2 liquid assets, the GHOS specifies that additional criteria have to be used, as well as external ratings. A 15% haircut would apply to the level 2 liquid assets.

NSFR measure

The NSFR sets a minimum amount of stable funding required by the liquidity characteristics of various assets or activities (which also comprise, for example, off-balance-sheet contingent exposures and exposures from securitisation pipelines) held by institutions over a one-year horizon.

Assets that are more liquid and can more easily be used as a source of longer-term liquidity, i.e. in terms of outright sale or because they can be used as collateral in secured borrowing, will require a lower level of stable funding during stressed conditions than assets that are less liquid. This liquidity aspect is reflected through the use of weighting factors, i.e. the required stable funding factor. This total required stable funding enters into the denominator of the NSFR measure.

The required stable funding of a bank's activities has to be offset by the liabilities that determine the available stable funding. The stable funding comprises equity and liability financing over a one-year horizon, as well as a portion of non-maturity or term deposits with maturities of under one year that are expected to remain in the bank under the conditions of the envisaged extended stress event.[7] Weighting factors, i.e. the available stable funding factor, are used to recognise the stability of the funding. For instance, under the GHOS agreement, stable retail deposits receive a 90% weighting factor, thus assuming that 10% of the retail deposits flow out under the extended stress assumption. The total amount of stable funding enters the numerator of the NSFR measure.

Impact on financial markets and monetary policy

The new liquidity risk rules are likely to have an impact to some extent on the behaviour of financial markets and institutions, as well as central banks' monetary policy and its transmission mechanism.

For example, the definition of the liquid assets underlying the LCR measure will probably, as a direct effect, prompt banks to favour liquid assets over the defined illiquid assets, with potential impacts on yields and spreads. An (intended) impact of the rules on financial markets

6 Basel Committee on Banking Supervision, "The Group of Governors and Heads of Supervision reach broad agreement on Basel Committee capital and liquidity reform package", press release, 26 July 2010.

7 The GHOS's July press release (op. cit.) states that the Basel Committee will continue to consider whether and to what extent to recognise the matched funding within the one-year time frame.

is reduced reliance on short-term unsecured wholesale funding, which can diminish the activity at the short end of the money market. These effects on financial markets will require a close monitoring of the implications for the transmission of monetary policy.

As central bank funding obtained through open market operations or lending facilities is recognised as liquid assets within the LCR measure, the liquidity rules could affect the demand and the variation in demand for central bank liquidity. Additionally, as the liquidity rules provide incentives to finance activities over the longer rather than shorter term, banks might try to shift their participation in open market operations. However, opposing effects may come into play, given the rollover assumption on secured central bank funding against collateral which is not considered in the regulatory definition of liquid assets within the LCR.

Furthermore, the rollover assumption on central bank refinancing backed by illiquid assets, together with a central bank-eligible collateral pool which is broader than the regulatory definition of liquid assets, provides banks with the incentive to retain the most liquid assets and to pledge the more illiquid assets as collateral at the central bank.

In view of the difficulty in fully identifying the potential impact of the liquidity risk regulation on financial markets and monetary policy, the new rules and their implications will be carefully assessed during the transition period, in order to avoid any unintended consequences.[8]

CALIBRATION AND PHASE-IN ARRANGEMENTS

At its meeting in September 2010, the GHOS reached an agreement on the calibration of the measures as well as on the phase-in arrangements, resulting in a significant increase in minimum capital requirements. The minimum requirement for common equity Tier 1 capital will be increased from the current level of 2% to 4.5% and will be accompanied by an additional 2.5% capital conservation buffer, representing a de facto minimum CET1 requirement of 7% for banks. Additional capital requirements in the form of counter-cyclical buffers, as well as possible capital surcharges for systemically important financial institutions, will come on top of these requirements.

National implementation of the new measures will be gradual, beginning on 1 January 2013. The transition period will continue through 2018, and the new regime will become fully effective on 1 January 2019.

Existing public sector capital injections will be grandfathered until 1 January 2018. In addition, banks that issued prior to 12 September 2010 certain capital instruments that no longer meet the stricter eligibility criteria will receive a ten-year period (until 2023) to replace those instruments.

As mentioned above, the new capital requirements will be supplemented by a non-risk-based leverage ratio. A minimum Tier 1 leverage ratio of 3% will be tested during a parallel run period (2013-17). Based on the results of this "observation period" and subject to appropriate review and calibration, the leverage ratio may be introduced as a Pillar 1 measure on 1 January 2018. Similarly, after observation periods beginning in 2011 and 2012, the Liquidity Coverage Ratio and the Net Stable Funding Ratio will be introduced on 1 January 2015 and 1 January 2018 respectively.

CONCLUDING REMARKS

The proposed measures, which represent a major overhaul of the current regulatory regime, will substantially strengthen banks' capital and liquidity positions and thus enhance the resilience of the financial system as a whole. The extended phasing-in and observation periods aim to ensure that the new measures do not represent an excessive burden on the financial sector nor hinder the ongoing recovery.

8 Basel Committee on Banking Supervision, "Group of Governors and Heads of Supervision announces higher global minimum capital standards", press release, 12 September 2010.

In this context, the agreed implementation schedule gives the financial institutions sufficient time to adjust to the new regulatory requirements (e.g. by earnings retention) without major adverse short-term effects on market dynamics and lending behaviour. In addition, any potential unintended consequences will be continuously monitored by regulators and supervisors, taking full advantage of the observation periods in the case of the leverage and liquidity ratios.

With regard to the long-term effects of the measures on the real economy, the impact assessments undertaken by the Basel Committee and the Financial Stability Board revealed that despite certain transitory costs, the enhanced capital and liquidity regulation may have substantial long-term benefits, stemming mostly from the reduced frequency of future crises.[9]

The Basel Committee's proposals were endorsed by the G20 leaders at their summit in November 2010. The Basel Committee is expected to publish the new capital and liquidity framework in December 2010.

In parallel with the work at the international level, the European Commission intends to implement the measures in the EU by means of further amendments to the Capital Requirements Directive (commonly referred to as "CRD IV"). The Commission plans to publish draft legislation in the first quarter of 2011, accompanied by an in-depth impact assessment aimed at supporting the right calibration of the capital and liquidity measures.

9 See the following reports: Basel Committee on Banking Supervision, "An assessment of the long-term economic impact of stronger capital and liquidity requirements", BIS, August 2010 and Basel Committee on Banking Supervision and Financial Stability Board, "Assessing the macroeconomic impact of the transition to stronger capital and liquidity requirements", BIS, August 2010.

C COMPARING MACRO-PRUDENTIAL POLICY STANCES ACROSS COUNTRIES

Macro-prudential policy aims to secure the stability of the financial system. The global financial crisis has shown how linkages between countries play a significant role in transmitting financial shocks. It is therefore of interest to examine macro-prudential policy for a group of countries as a whole. The macro-prudential policy stance based on an analysis of a group of countries may differ from the policies resulting from an analysis of each country in isolation. This special feature examines how similar stand-alone macro-prudential policies would have been for a selected group of countries and compares the desired stand-alone policies to a policy derived from a portfolio analysis. The desired macro-prudential policy stances (tight, neutral or accommodating) are derived from a set of historical indicators intended to measure systemic risk, but which clearly need further refinement. The degree of similarity between the countries' policy stances varies over time. During some time periods it is quite high. Furthermore, the analysis shows that the desired macro-prudential policy stance derived from individual country data at times broadly corresponds to the policy stance derived from aggregated data for the portfolio. In Europe the increased focus on macro-prudential policy has led to the establishment of the European Systemic Risk Board (ESRB). The ESRB will have responsibility for EU-wide macro-prudential oversight and policy recommendation.

INTRODUCTION

In order to secure financial stability, it is important to evaluate how risks may increase or build up over time (the time dimension) and to be aware that some financial institutions and countries are more important than others in the financial system (the cross-sectional dimension or contagion dimension). The policies therefore aim to reduce the build-up of risk over time ("leaning against the wind") while paying particular attention to systemically important institutions.

National authorities are usually concerned with the domestic financial system. However, the global financial crisis has shown how strong the effects of interlinkages between countries can be in a crisis situation. It is therefore increasingly important to assess and secure the financial stability of global or regional financial systems, where a region consists of a portfolio of countries. Does the assessment of financial stability for a portfolio of countries differ from the assessment for a single country? A domestic financial stability analysis is usually based on an assessment of risk using indicators reflecting data aggregated at the country level (time dimension), and the degree of systemic importance of financial institutions is measured with respect to the country's financial system (cross-sectional dimension). This method of analysing financial stability may be extended to a portfolio of countries by aggregating data at the group level and by focusing on institutions and countries that are important at the aggregate level. Accordingly, macro-prudential policy could then be implemented with a view to securing financial stability for the whole group of countries. Macro-prudential policy based on country-level assessments may differ from the macro-prudential policy based on portfolio-wide assessments. A portfolio-wide policy would probably be the same for all countries, while policies developed at the country level may differ. The macro-prudential policy stance and the change in policy stances over time may therefore vary between countries. Furthermore, differences in policies and regulation may lead to regulatory arbitrage, i.e. where a choice is made to conduct business in more favourable jurisdictions.

FINANCIAL STABILITY INDICATORS

Indicators used to evaluate financial stability and systemic risk reflect the different events that may disrupt financial stability. Many central banks summarise their evaluation of financial stability in financial stability reports. These reports typically present the indicators that are used to form the opinion on financial stability.

In some instances financial stability indices are used to summarise the underlying data.[1]

Several types of indicators are relevant. Macroeconomic indicators measure developments in data compiled at the country level, such as growth in total credit, growth in country-wide house prices and unemployment rates. Data for financial institutions are often aggregated and consolidated to reflect developments in the financial sector's assets and earnings. Since the banking sector is so important in many countries, systemic risk is often tied to the possibility of large credit losses, funding risk or the workings of the payment system. Data from securities markets, such as developments in equity prices and bond spreads, are another important source of information. Analyses of developments in stock prices and credit spreads of systemically important institutions are often carried out in order to learn about the "market's view" of the institutions.

In order to show quantitatively how financial stability indicators develop for a group of countries, three "macro" indicators are computed for ten countries: Austria, Belgium, Finland, France, Germany, Ireland, Italy, the Netherlands, Spain and Portugal. The countries were chosen primarily owing to data availability. The indicators are private debt growth,[2] growth of the private debt-to-GDP ratio[3] and unemployment growth. A high debt growth and growth in debt-to-GDP may indicate that imbalances are building up and are thereby leading to an increased probability of future abrupt corrections. An increase in unemployment may lead to future losses in the mortgage market. The time series of indicators are transformed by removing the trend and normalising the observation by the standard deviation.[4] The median of the transformed variables is used as the country's financial stability indicator.[5] In a comprehensive financial stability analysis these indicators would not be used in isolation, since the interpretation of the indicators may depend on the current situation in the economy. Increased credit growth, for instance, may indicate increased activity in the economy which is a positive sign at the end of a recession. In the following analysis, however, higher values shown by indicators are assumed to be related to an increased risk of future financial instability.

The development in the countries' risk indicators measures how risks develop over time (the time dimension). Chart C.1 shows the median of the countries' risk indicators and the risk indicator based on aggregated portfolio data. The chart also shows a measure of dispersion between the country indicators, measured as the range between the 2 and 8 deciles of the indicators. These indicators are relatively stable with long periods of positive values indicating high risk (1988-90, 1996-2000 and 2005-08), or negative values indicating low risk (1991-95 and 2001-04). At times most of the countries have positive or negative values of the risk indices, indicating a high degree of synchronisation of risks to financial stability between the countries.

1 See, for instance, the description of a financial stress indicator for Canada in M. Illing and Y. Liu, "Measuring financial stress in a developed country: An application to Canada", *Journal of Financial Stability*, Vol. 2, Issue 3, 2006, pp. 243-265, and for the euro area in M. Blix Grimaldi, "Detecting and interpreting financial stress in the euro area", *ECB Working Paper Series,* No 1214, June 2010.

2 A wide definition of credit to the private sector is used. The debt is item 32d in the IMF's International Financial Statistics (IFS).

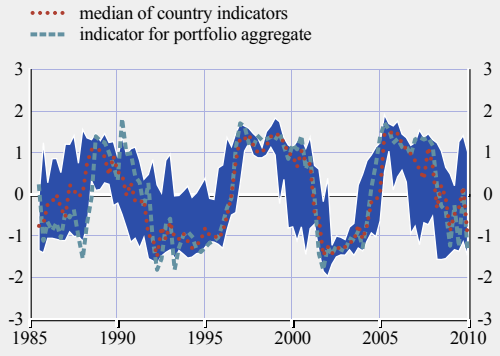
3 One example of a measure to reduce pro-cyclicality using the debt-to-GDP indicator is the counter-cyclical capital buffer (CCB) suggested by the Basel Committee on Banking Supervision (Basel Committee), see Basel Committee on Banking Supervision, "Countercyclical capital buffer proposal" Consultative Document, July 2010. The CCB is intended to come on top of the capital conservation buffer and will restrict payout of earnings (dividends) if capital is below the maximum buffer level. The Basel Committee suggests that the CCB is based on the difference between actual credit-to-GDP growth and trend credit-to-GDP growth. Growth above trend would imply a positive CCB and growth below trend would imply no buffer. Authorities will, however, use judgement and not apply the above or below-trend measure mechanically. The judgement may be based on variables other than credit-to-GDP growth.

4 The observation is the average growth over 12 quarters (three years). This average is used as the observation with a standard deviation based on eight quarters (two years) and the trend is the average of the observation for eight quarters. Other transformations involving, e.g. HP filters, may alternatively be used. Note that the observation is only based on historical data – it is not forward-looking.

5 The median of detrended and normalised financial stability indicators has been used to analyse time-varying capital surcharges for banks. See Bank of England, "The Role of Macroprudential Policy – Discussion Paper", November 2009. The purpose of the analysis was to show how such surcharges may be calibrated.

Chart C.1 Financial stability indicators

(Q3 1985 – Q1 2010; the shaded area reflects the range between the 2 and 8 deciles of the country-specific risk indicators)



Sources: ECB, Eurostat, IMF, OECD and ECB calculations.
Notes: The variables unemployment growth, debt growth and growth in the debt-to-GDP ratio are detrended and normalised by their respective standard deviations. The median of these three transformed variables is used as the financial stability indicator for, respectively, each country and the portfolio of countries.

At other times, however, the risks to financial stability seem to be less correlated. The correlation may therefore be time-dependent and will, of course, be linked to the characteristics of the countries in the portfolio.

Table C.1 shows the correlation coefficients between the median-transformed indicators for each country. Based on the entire time period, the correlation between the countries is mainly positive. Exceptions are a negative, but low, correlation between Germany and, respectively, Spain, Finland, France and the Netherlands. The correlation is also negative between Finland and Portugal. The correlation is highest – at about 0.7 – between France and Spain and between France and Italy. For many countries the coefficients are higher for the time period after 1995, suggesting that systemic risks as measured by the indicators have become more synchronised.

MACRO-PRUDENTIAL POLICY

Authorities may use a wide range of tools to ensure financial stability. While micro-prudential regulation aims to secure the sustainability of individual institutions, macro-prudential regulation aims to secure the sustainability of the financial system. The tools used in prudential regulation are usually capital regulation, liquidity regulation, or more direct measures such as loan-to-value (LTV) or loan-to-income (LTI) ratios.[6] The tools used for macro and micro-prudential regulation are often the same. What makes macro-prudential regulation different from micro-prudential regulation is primarily the purpose of the regulatory action.[7]

6 For a wider discussion of the tools, see ECB, "Macro-prudential policy objectives and tools", *Financial Stability Review*, June 2010.

7 See P. Clement, "The term 'macroprudential': origins and evolution", *BIS Quarterly Review*, March 2010. "The distinction between the micro and macro-prudential dimensions of financial stability is best drawn in terms of the objective of the tasks and the conception of the mechanisms influencing economic outcomes. It has less to do with the instruments used in the pursuit of those objectives."

Table C.1 Correlation coefficients between country indicators

(Q3 1985 – Q1 2010: lower left triangle; Q1 1996 – Q1 2010: upper right triangle)

	AT	BE	DE	ES	FI	FR	IE	IT	NL	PT
AT	1.0	0.4	0.4	0.4	0.1	0.3	0.5	0.2	0.4	0.3
BE	0.4	1.0	0.3	0.5	-0.2	0.5	0.5	0.5	0.2	0.5
DE	0.3	0.0	1.0	0.0	-0.1	0.0	0.0	0.1	0.3	0.3
ES	0.4	0.6	-0.2	1.0	0.2	0.6	0.8	0.6	0.3	0.4
FI	0.1	0.2	-0.2	0.4	1.0	0.1	0.1	0.0	0.0	-0.2
FR	0.3	0.6	-0.1	0.7	0.4	1.0	0.4	0.8	0.3	0.6
IE	0.3	0.3	0.0	0.5	0.2	0.4	1.0	0.4	0.2	0.2
IT	0.2	0.4	0.1	0.5	0.2	0.7	0.3	1.0	0.3	0.8
NL	0.1	0.2	-0.1	0.3	0.0	0.2	0.0	0.2	1.0	0.5
PT	0.1	0.1	0.4	0.1	-0.2	0.3	0.2	0.6	0.0	1.0

Sources: ECB, Eurostat, IMF, OECD and ECB calculations.
Notes: The variables unemployment growth, debt growth and growth in the debt-to-GDP ratio are detrended and normalised by their respective standard deviations. The median of these three transformed variables is used as the financial stability indicator for each country.

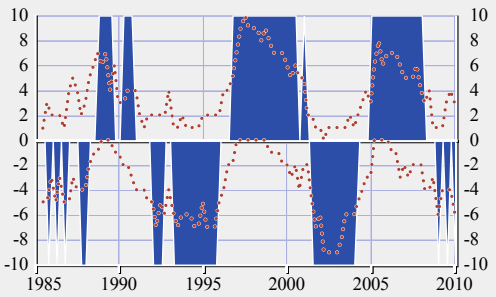
In this special feature, the derived indicators are used as measures of the desirable stance of macro-prudential policies. If the financial stability indicator is higher than level H the macro-prudential policy stance should be "tight"; if the transformed variable is below level L it should be "accommodating"; in between the levels H and L the policy stance should be "neutral". This rule is used to derive desired policy stances but does not provide guidance about which policy measures to use. It is simply a warning system and the actual threshold levels should, in theory, be based on an empirical analysis of thresholds that balance type I and type II errors in an optimal fashion. Chart C.1 showing the financial stability indicators gives an indication of the policy that would have followed from this rule. Threshold levels of 1 or -1 would have resulted in short periods with tight or accommodating policies and policy would have been mainly neutral. Threshold levels below 1 or above -1 will increase the period of time when the desired policy would either be tight or accommodating.

Chart C.2 shows the number of countries in the portfolio with a desired tight or accommodating policy stance since 1985 when H=0.8 and L=-0.8. The chart shows a cyclical pattern with periods when most countries had a desired tight policy stance (1989, 1997 and 2006), followed by periods when most countries had a desired accommodating policy (1993, 2002 and 2009). If the policy stance is derived from aggregated data for the portfolio,[8] Chart C.2 shows that the desired portfolio-wide policy stance after the 1980s depicted a similar pattern as the policy stances calculated at the country levels.

Even though Chart C.2 shows that the country indicators at times would have induced similar desired policy stances across countries, it is important to underline that a proper in-depth country-by-country assessment of financial stability could have given a different outcome. An in-depth analysis would have included additional financial stability indicators and an analysis of the underlying factors causing a high level of the risk indicators. As an example, consider the different factors that may cause strong credit growth. If high credit growth is caused by financial institutions competing for market share by lowering credit standards, increased credit growth will be of concern since it may lead to increased future credit losses. If, on the other hand, credit growth is caused by an adjustment to a higher level of credit in the economy due to more structural changes, such as a change in the tax treatment of interest expenses, the temporary high credit growth will be less of a concern.

Chart C.2 Number of countries with desired tight or accommodating policy stance

(Q3 1985 – Q1 2010; number of countries with desired tight (+) or accommodating (-) policy stance)



Sources: ECB, Eurostat, IMF, OECD and ECB calculations.
Notes: There are ten countries in the portfolio. The desired policy stance is tight (+) if the financial stability indicator is larger than 0.8 and accommodating (-) if it is below -0.8. The shaded area indicates whether the desired policy stance is tight or accommodating when the portfolio risk indicator is used to derive the portfolio policy stance.

CROSS-SECTIONAL DIMENSION

The difference between policies based on domestic assessments and policies based on portfolio assessments will depend on the financial stability indicators and on similarities between the countries in the portfolio. If the country-specific risks are synchronised between countries, then the desired macro-prudential policy stances derived from an indicator as described in this special feature will also be similar. The positive correlation of macro-prudential policies based on domestic assessments is here primarily a result of the time dimension of systemic risk. The cross-sectional

8 This means, for instance, that the debt-to-GDP ratio is computed as portfolio debt divided by portfolio GDP.

dimension in relation to other countries may, however, also be part of a domestic financial stability assessment. This will, for instance, be the case where instability in a country is amplified in later-round effects owing to contagion via other countries.

Financial institutions operating in several countries may be crucial for the financial system in each country. Distress in such institutions may therefore directly threaten the financial stability of several countries. Such institutions are therefore included in analyses of possible cross-country contagion. There are, however, several, more indirect channels of contagion. The interbank market may be analysed using network theory, and measures of network characteristics, such as centrality, may assist in assessing contagion risk.[9] Money and securities markets are another potential contagion channel. The presence of information asymmetry, where market participants are less informed about financial institutions' risk exposures and financial standing than management and authorities, may lead to sudden changes in market prices if it is perceived that events in one country may occur in others. This may cause temporary funding problems for financial institutions, even though their underlying economic situation is sound. Any measure of cross-sectional importance of financial institutions or countries is therefore likely to take several possible contagion channels into account.

Based on an analysis of the cross-sectional dimension, an indicator measuring contagion risk could be developed. As a first step, size, as measured by the country's debt level or the correlation coefficients from Table C.1, could be explored. Such an indicator could then be used to adjust the macro-prudential policy in each country. A country with a high value for the "contagion index" should follow a tighter policy than a country with a low value. In addition to influencing the calibration of policy measures, cross-sectional assessments may also influence the policy stance. One alternative is that the threshold level H, triggering a tight macro-prudential policy stance, could depend on both the financial stability indicator of the country and the contagion index, such that systemically important countries start to follow a tight policy earlier.

CONCLUDING REMARKS

The financial crisis has led to increased emphasis on macro-prudential regulation and oversight at the national level.[10] The financial crisis has also revealed the extent to which national financial systems are interlinked, thereby increasing the focus on the regional and global levels. It is therefore increasingly important to assess and secure financial stability by evaluating portfolios of countries – going beyond the country level. When financial instability is simultaneously present across countries, the macro-prudential policies are also likely to be positively correlated. However, similar macro-prudential policy stances do not mean that the portfolio aspect can be ignored. Increased cooperation, at the very least to assess the vulnerabilities related to cross-country contagion, is necessary to secure financial stability in financial systems comprising several nations.

In the EU, the ESRB will have responsibility for EU-wide macro-prudential oversight and policy recommendations. The macro-prudential perspective means that the ESRB must decide whether it is necessary to recommend measures for a country or group of countries in order to mitigate or prevent the build-up of risk in the EU. Such a recommendation will be based on an evaluation of the development of risk in individual countries or a group of countries, as well as of the consequences of financial instability in individual countries or groups of countries for other countries in the EU.

9 For an overview of network theory applied to financial stability analysis, see ECB, "Financial networks and financial stability", *Financial Stability Review*, June 2010.

10 The United States and the United Kingdom are examples of countries giving increased focus to system-wide surveillance and regulation. In the United States the structure of regulation has been reformed and a Financial Stability Oversight Council established with system-wide responsibilities. In the United Kingdom the structure of supervision is being reorganised and macro-prudential policy is suggested to be the responsibility of a new Financial Policy Committee of the Bank of England. See HM Treasury, "A new approach to financial regulation: judgement, focus and stability", July 2010.

D TOWARDS MACRO-FINANCIAL MODELS WITH REALISTIC CHARACTERISATIONS OF FINANCIAL INSTABILITY

The global financial crisis has revealed important deficiencies of the standard macroeconomic models in capturing financial instabilities. Realistic characterisations of such instabilities include bank defaults, financial market illiquidity, extreme events, and related non-linearities. None of these feature in the macroeconomic models regularly used for forecasting and monetary policy analysis and only recently has more emphasis been given to better developing the role of financial sectors in these models. This gap is of particular concern given the ongoing efforts to establish serious macro-prudential oversight and regulation to counter systemic risks. The aim of this special feature is to provide an overview of the recent upsurge in research papers trying to integrate more developed financial sectors in standard macroeconomic models and to compare this work with what is needed for the support of macro-prudential policies. One conclusion is that very significant further research efforts are needed, including attempts using modelling approaches that deviate from the currently dominating macroeconomic paradigm. It is of great importance that the academic and policy-oriented research communities join forces in working towards this objective.

INTRODUCTION

Mainstream macroeconomic models developed before the global financial crisis did not attempt to model the way in which the financial sector operates and interacts with the real economy. This, certainly from today's perspective, might seem surprising. While recent contributions are slowly starting to bridge the gaps, the road ahead is still long. The aim of this special feature is to review progress made so far and to highlight important aspects of financial instability that need to be accounted for before the macro-financial models can become truly useful policy tools and fill the gaps in central banks' analytical toolkits, in particular for the currently developed new macro-prudential supervisory policy function.[1]

The basis for the common neglect of financial markets in macroeconomics was the prevalent, if implicit, assumption of market completeness and the seminal Modigliani-Miller theorem.[2] The former implied that a representative agent set-up could be solved and used to back out prices of all financial assets, while the latter asserted that the value of the firm should be independent of how it finances itself. This was sometimes interpreted as suggesting that the dynamics of variables such as leverage – i.e. the ratio of debt to equity – should be of no consequence to asset valuations and aggregate fluctuations.

Such results rested on strong assumptions. Markets were assumed to be efficient and complete and there was no room for imperfect or asymmetric information, bankruptcy costs or distortionary taxation. Incidents of financial instability made the perfect information assumption look untenable. This accounted for the large impact of the contributions of Bernanke-Gertler[3] and, thereafter, Kiyotaki-Moore[4] and Bernanke-Gertler-Gilchrist.[5] They demonstrated how asymmetric information and moral hazard could amplify business cycles and showed that the existence of collateralised borrowing could amplify shock propagation.

1 Jean-Claude Trichet, in his speech opening the ECB-CEPR-CFS conference on macro-prudential regulation as an approach to contain systemic risk (27 September 2010), mentioned the introduction of developed financial sectors and non-linearities to capture realistic characterisations of widespread financial instability in macro models as one of the three key areas that require future work. The remaining two areas are an increased understanding of how regulation contains risk and affects the growth potential of economies, and the systemic importance of non-bank financial intermediaries. As one contribution to filling these gaps, the European System of Central Banks (ESCB) has launched a macro-prudential research network called MaRs. Various special features in the June 2010 and December 2009 FSRs have illustrated what macro-prudential policy analysis involves.

2 F. Modigliani and M. Miller, "The cost of capital, corporation finance and the theory of investment", *American Economic Review*, Vol. 48(3), June 1958.

3 B. Bernanke and M. Gertler, "Agency Costs, Net Worth, and Business Fluctuations", *American Economic Review*, Vol. 79(1), March 1989.

4 N. Kiyotaki and J. Moore, "Credit Cycles", *Journal of Political Economy*, Vol. 105, No 2, April 1997.

5 B. Bernanke, M. Gertler and S. Gilchrist, "The financial accelerator in a quantitative business cycle framework", in J. Taylor and M. Woodford (eds.), *Handbook of Macroeconomics*, Elsevier, 1999.

While seminal, these papers did not intend to capture typical financial instability, such as bank defaults, illiquidity, feedback effects, extreme events and related non-linearities. This led to an emergence of *new* contributions which, while partly building upon earlier developments, focused more closely on certain aspects of macro-financial transmission. This special feature analyses the new contributions from a macro-prudential oversight perspective and therefore with a special focus on realistic financial instability.

To facilitate an overview of that work and to lay the ground for a discussion of modelling deficiencies, the approach taken is to focus on three areas whose importance was highlighted during the crisis, but less so in the early literature.

First, arguably, a large part of the recent turbulence played out in the banking sector. This meant that the models omitting banks would be incapable of addressing these events, but it also suggested that financial frictions occur along more margins than previously allowed for – e.g. they could be caused by asymmetric information involving the banker. Equally, the growth of wholesale financial markets meant that the highly leveraged institutions operating in them assumed an important role in the supply of credit to the real economy (occasionally supplanting more traditional banking activities).[6] Consequently, the first criterion used by this special feature to organise the surveyed papers relates to the market segment where the friction takes place, as well as its form (focusing, where appropriate, on implications for financial instability).

Second, the high leverage ratios combined with increased maturity mismatches in banks' balance sheets paved the way for "liquidity spirals", which acted as crucial amplification mechanisms during the recent turmoil.[7] Liquidity spirals have the potential to exacerbate small equity losses, especially when: (i) the financial institutions hit by the shock are highly leveraged, (ii) their balance sheet maturity mismatch is large and (iii) the amount of funds they are able to "lever" on the market (i.e. the "margin requirement") is sensitive to asset prices. Accordingly, the shock propagation mechanism or, more broadly, the way in which systemic risk materialises is the second dimension used to organise the surveyed papers, with a focus on related non-linearities.

Third, in many cases the interplay between leverage and asset prices results in externalities and leads to inefficient equilibria. This implies that policy interventions have the potential to improve welfare. However, financial crisis prevention and crisis management policies have not been analysed or even considered by the pre-crisis literature. This lacuna is particularly striking in the context of the planned overhaul of financial regulation (e.g. Basel III) and in the light of the widespread use of unconventional policy measures (some taking the form of direct lending in credit markets). Given the importance of these questions for the design of macro-prudential policies, the third aspect of the new models which this special feature highlights is the implied externality (if any) and its implications for policy – both crisis management and prevention.

GENERAL EQUILIBRIUM MODELS OF FINANCIAL INTERMEDIATION: RECENT TRENDS

Banks are institutions which intermediate between savers and borrowers. Many recent contributions distinguish themselves by emphasising that these interactions are subject to frictions and lead to amplified economic volatility.[8] However, few papers capture relevant features of financial instability such as bank defaults or extreme events. Most recent contributions model imperfections as *collateral constraints* à la Kiyotaki-Moore and, ultimately, as some sort of debt-deflation mechanism.

6 See, for example, T. Adrian and H. S. Shin, "Money, Liquidity, and Monetary Policy", *American Economic Review: Papers and Proceedings*, Vol. 99(2), 2009.

7 M. Brunnermeier, "Deciphering the 2007-08 Liquidity and Credit Crunch", *Journal of Economic Perspectives*, Vol. 23(1), 2009, pp. 77-100.

8 For a discussion of the dual nature of financial frictions, see ECB, "Financial development: concepts and measures", *Financial Integration in Europe*, April 2008.

The table classifies some of the papers focused on in this special feature by friction type, propagation mechanism and inefficiency.

RETAIL VERSUS WHOLESALE MARKETS

The recent crisis had two prominent features. First, as already mentioned, a large part of the turbulence played out in the banking sector. Second, it followed the rapid development of the market-based banking sector and the surge in this sector's leverage. Adrian-Shin [9] show that broker-dealers' (i.e. investment banks') leverage has been highly pro-cyclical and increased about threefold during the six-year expansion that preceded the crisis. These developments occurred alongside the growth in importance of broker-dealers in the supply of credit to the real economy.

Most of the recent literature attempts to account for the first feature by exploring the effects of banks being financially constrained, as opposed to the real sector. For example, Meh-Moran [10] present a benchmark dynamic stochastic general equilibrium (DSGE) model where the standard moral hazard problem between entrepreneurs and banks is supplemented with another moral hazard problem between banks and households.[11] The incentive constraints in the model ensure that entrepreneurs choose "good" projects and banks decide to monitor. As a result, the capital position of banks affects their ability to attract loanable funds and influences the business cycle through a bank capital transmission channel. Hirakata et al.[12] adopt a similar "double friction", but using Bernanke-Gertler's original costly state verification framework.

One major caveat to the above models is that they focus on the financing conditions of a traditional banking sector and the relationship between commercial banks and depositors, while the recent financial crisis originated in the wholesale financial market. Gertler-Kiyotaki's [13] contribution is the first attempt to incorporate the interbank market within DSGE models. The authors assume a moral hazard problem à la Kiyotaki-Moore, which constrains banks' borrowing both from households (deposits) and from other banks (interbank loans). The borrowing constraint entails a relationship between banks' leverage and banks' franchise value. This dependence is at the core of liquidity spirals.

LIQUIDITY SPIRALS AND THE DEBT-DEFLATION MECHANISM

For many observers, one of the main vectors of contagion and propagation during the recent crisis was the liquidity shortage in the financial sector and the two liquidity spirals that compounded it. For example, Brunnermeier makes the distinction between the loss spiral and the margin/haircut spiral.[14]

The *loss spiral* resembles the traditional debt-deflation mechanism, with the difference that it occurs in the highly leveraged banking sector, as opposed to the real sector. Building upon previous works on the debt-deflation mechanism, the recent literature has modelled the loss spiral by introducing ad hoc borrowing constraints into otherwise standard frameworks. While such constraints may be motivated by different financial frictions, their form differs marginally across models. For example, Jermann-Quadrini [15] consider an incentive problem, which implies that the principal of a loan must not exceed a certain fraction of the borrower's equity. In contrast, Bianchi-Mendoza [16] consider a limited

9 T. Adrian and H. S. Shin, "Financial Intermediaries, Financial Stability, and Monetary Policy", *Federal Reserve Bank of New York Staff Report*, No 346, September 2008.

10 C. Meh and K. Moran, "The role of bank capital in the propagation of shocks", *Journal of Economic Dynamics and Control*, Vol. 34, Issue 3, 2010.

11 This double moral hazard framework builds upon B. Holmström and J. Tirole, "Financial intermediation, loanable funds, and the real sector", Q*uarterly Journal of Economics*, Vol. 112(3), August 1997.

12 N. Hirakata, N. Sudo and K. Ueda, "Chained credit contracts and financial accelerators", *IMES Discussion Paper Series*, No 2009-E-30, 2009.

13 See M. Gertler and N. Kiyotaki, "Financial Intermediation and Credit Policy in Business Cycle Analysis", 2009, unpublished manuscript, available at http://www.econ.nyu.edu/user/gertlerm/.

14 M. Brunnermeier, "Financial Crises: Mechanisms, Prevention, and Management", in M. Dewatripont, X. Freixas and R. Portes (eds.), *Macroeconomic Stability and Financial Regulation: Key Issues for the G20*, CEPR, 2009.

15 U. Jermann and V. Quadrini, "Macroeconomic Effects of Financial Shocks", *NBER Working Paper*, No 15338, September 2009.

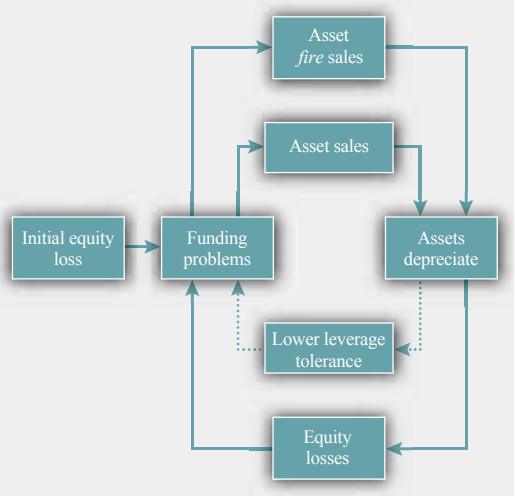
16 J. Bianchi and E. Mendoza, "Overborrowing, Financial Crises and 'Macro-prudential' Taxes", *NBER Working Paper*, No 16091, June 2010.

enforcement problem, which implies that the total repayment of the loan (i.e. principal plus interest) is constrained by the borrower's asset value. The general principle behind these various approaches is that the borrower's total debt-to-equity ratio must not exceed a certain constant and exogenously given threshold. In a nutshell, banks have to maintain a constant leverage ratio or margin.[17] Under this constraint, a mark-to-market equity depreciation reduces the bank's borrowing capacity and forces it to sell off long-term assets at short notice so as to keep its leverage ratio constant. Obviously, banks would do this only when the maturing short-term assets are insufficient to cover the payments of maturing short-term debts. In general, however, a bank's balance sheet exhibits such maturity mismatches. Mechanically, asset fire sales are all the more significant when borrowers are leveraged and their balance sheet maturity mismatch is important. Asset fire sales generate a market liquidity problem and a further depreciation in asset prices and marked-to-market equity.

This liquidity spiral, represented by the solid arrows in Chart D.1, corresponds to the standard debt-deflation mechanism. However, it is only one part of the propagation mechanism as margin requirements and leverage have, in fact, been highly cyclical rather than constant. Variations in leverage have a huge impact on the price of assets, potentially contributing to economic bubbles and busts. Geanakoplos[18] refers to this phenomenon as the *leverage cycle*, while Brunnermeier[19] calls it the *margin spiral*. This second spiral works as follows. When asset prices fall and investment opportunities have lower returns, borrowers typically have less incentive to behave well (e.g. to exert effort in line with lenders' interests). To restore the right incentives, lenders then tend to tolerate lower leverage ratios (or higher margins) so as to force borrowers to "have more skin in the game". It follows that margin requirements in general increase as a bank's equity falls in value. The leverage cycle demultiplies the adjustments required after a mark-to-market of equity loss and the effects of the loss spiral (see the dotted arrows in Chart D.1).

Few papers so far have modelled the margin spiral. One notable exception is Brunnermeier-Sannikov.[20] They follow the recent trend in the literature, in that borrowing is limited owing to financial frictions in the form of moral hazard. However, their model also includes some important novel features. First, the borrower's incentive constraint requires a higher margin requirement in downturns, when equilibrium asset prices are depressed. Therefore negative macro shocks that reduce the collateral value of banks' assets trigger both the loss and margin spirals, causing long-lasting adverse feedback loops. Second, because their analysis is not restricted to local effects around a steady state and, therefore, breaks away from the certainty equivalence characteristics of the standard linearised DSGE model, Brunnermeier-Sannikov

Chart D.1 The two liquidity spirals



Source: ECB.

17 The leverage is the reciprocal of the margin, namely the ratio of the asset value to the cash needed to purchase it.
18 J. Geanakoplos, "The Leverage Cycle", in D. Acemoglu, K. Rogoff and M. Woodford (eds.), *NBER Macroeconomics Annual,* Vol. 24, 2009.
19 M. Brunnermeier, "Deciphering the 2007-08 Liquidity and Credit Crunch", op. cit., pp. 92-93.
20 M. Brunnermeier and Y. Sannikov, "A Macroeconomic Model with a Financial Sector", unpublished manuscript, 2010, available at http://www.eu-financial-system.org/index.php?id=96.

also account for the feedback effects of asset price volatility on asset prices. As asset price volatility increases, risk-averse households are inclined to hoard more cash and reduce their demand for assets. This accumulation of precautionary savings during downturns is responsible for asset price volatility and plays a crucial role in the dynamics of their model.

POLICY IMPLICATIONS

Existing macroeconomic models are ill-equipped to assess the effects of the various extraordinary policy interventions that have taken place since the start of the financial crisis. Over the past three years, the research community has become aware that a greater understanding is needed of how *crisis management* policies and *crisis prevention* policies (inter)act at the aggregate level. Some efforts have been made in these two domains, from both a normative and a positive perspective.

In many cases the liquidity spirals described above result from externalities and lead to inefficient equilibria. A strand of the recent literature rationalises micro-prudential policies (such as some of the Basel III reforms) by their ability to prevent the build-up of financial imbalances and the occurrence of crises and thereby improve welfare. Mendoza,[21] Bianchi-Mendoza[22] and Brunnermeier-Sannikov,[23] for example, develop dynamic equilibrium models where private agents face an "occasionally binding" borrowing constraint. In the decentralised competitive equilibrium, private agents do not internalise the effects of their individual borrowing plans on the market price of assets and, therefore, on the value of their collateral and borrowing capacity. Compared with a constrained social planner who internalises these effects, they undervalue the benefits of an increase in self-financing "ex post" when the constraint binds. Typically, they accumulate too much debt. Since both the social planner and the private agents are forward-looking, these differences in valuation lead to differences in the private and social benefits of debt accumulation "ex ante" when the constraint is not binding (i.e. in good times). In this context, constrained-efficient allocations imply less frequent and milder crises than the decentralised equilibrium because the social planner accumulates extra precautionary savings in good times that makes the constraint less likely to bind. These extra precautionary savings need not be large to reduce the probability and size of crises. The social planner can decentralise the constrained-efficient allocations as a competitive equilibrium by introducing an optimal schedule of state-contingent taxes on debt. By doing so, it can neutralise the adverse effects of the credit externality and increase social welfare. The tax is higher when the economy is building up leverage and becoming vulnerable to shocks, but before a crisis actually occurs, so as to induce private agents to value the accumulation of precautionary savings more than in a competitive equilibrium without taxes. In effect, a tax on debt of about 1% would suffice to reduce sharply the probability and severity of financial crises. Although a tax on debt is not featured in the Basel III reform package, Bianchi[24] shows that such a tax is equivalent to tighter capital or liquidity requirements. Overall, this research work therefore supports the recent proposal of the Basel Committee on Banking Supervision (Basel Committee) on counter-cyclical capital buffers.[25]

In parallel with this literature, some research efforts have been devoted to assessing crisis management policies. For example, Gertler-Kiyotaki[26] and Gertler-Karadi[27] focus

21 E. Mendoza, "Sudden Stops, Financial Crises and Leverage", *American Economic Review*, forthcoming. See also O. Jeanne and A. Korinek, "Managing Credit Booms and Busts: A Pigouvian Taxation Approach", unpublished manuscript, 2010, available at http://www.eu-financial-system.org/index.php?id=96.

22 J. Bianchi and E. Mendoza, op. cit.

23 M. Brunnermeier and Y. Sannikov, op. cit.

24 J. Bianchi, "Over-borrowing and Systemic Externalities in the Business Cycle", *MPRA Paper*, No 16270, University Library of Munich, Germany, April 2009.

25 See Basel Committee on Banking Supervision, "Countercyclical capital buffer proposal – consultative document", July 2010. Bengui uses a similar approach, with private agents facing a borrowing constraint, but focuses on the negative externalities of excess debt maturity mismatches. See J. Bengui, "Systemic Risk and Inefficient Debt Maturity", unpublished manuscript, 2010, available at http://www.eu-financial-system.org/index.php?id=96.

26 Gertler-Kiyotaki, op. cit.

27 See M. Gertler and P. Karadi, "A model of Unconventional Monetary Policy", *Journal of Monetary Economics,* forthcoming.

on unconventional monetary policies. To combat the crisis, monetary policy and fiscal authorities have employed various unconventional policy measures that involve some form of direct lending in credit markets, whereby central bank lending substitutes private bank lending. Gertler-Kiyotaki find that such policies moderate the contractions that follow adverse technology shocks, monetary shocks or banks' equity losses. They also describe how long it takes for the economy to endogenously "phase out" these unconventional policies. In effect, the exit timing depends on the ability of private banks to recapitalise and become unconstrained. As they build up their balance sheets, private banks can gradually absorb assets from the central bank's balance sheet and return to normal. The speed of exit is thus shown to be inversely related to the size of the central bank's intervention.

MISSING CHANNELS AND OPEN QUESTIONS

While some progress has been made in the contributions surveyed above, here we focus on relevant aspects of financial market activity still missing from current macroeconomic models.

Given the key role of the recent crisis in driving the research agenda, we use a taxonomy of financial market instability to organise the discussion. Financial instability is frequently categorised as either being "horizontal" or "vertical".[28] The former is related to any form of systemic risk within the financial system while the latter focuses on two-sided interactions between the economy and the financial system. As the previous analysis made clear, most recent papers abstract from modelling the interbank market and so essentially neglect "horizontal" factors. But crucially, even the interbank market only accounts for a small part of where horizontal risk can materialise and what macroeconomic models should capture. Naturally, abstracting from this high degree of interconnectedness makes it hard to analyse risks related to contagion, as well as the information-intensive relationships between unsecured interbank lending and potential liquidity shortages.[29] Perhaps more importantly, failing to account for the diversity within the financial sector also makes it difficult to account for crucial aspects of the build-up and unravelling of the widespread imbalances that ultimately led to the crisis.

Further, while depositor insurance schemes have all but eliminated classic bank runs,[30] the recent near shutdown of the interbank market, with banks refusing to extend credit and hoarding liquidity, displayed many related features. Additionally, while the asymmetric impact of macro shocks on banks' balance sheets has received much scrutiny, their role in amplifying contagion risks is less well covered.

Other than contagion, another group of "horizontal" factors yet to be analysed within a DSGE framework is related to the functioning of over-the-counter derivatives markets. New derivatives contracts arguably allowed institutions to increase their leverage, potentially acting as automatic "destabilisers" and leading to inefficient allocations once risks crystallised.[31] Equally, the impact of asset price falls on traders' ability to provide liquidity – compromised via collateral effects – also appears to have played a role in the crisis but is conspicuous by its absence in DSGE set-ups.

Broadly, many of these "horizontal" instability factors reflect information imperfections which can cause adverse selection and moral hazard, and lead to rational herding behaviour.[32]

28 The analysis here builds on the discussion in ECB, "The concept of systemic risk", *Financial Stability Review*, December 2009, although the distinction between vertical and horizontal instability was first used in O. De Bandt and P. Hartmann, "Systemic risk: A survey", *ECB Working Paper Series*, No 35, November 2000.

29 For an overview of financial market contagion research, see ECB, "Financial market contagion", *Financial Stability Review*, December 2005.

30 For a seminal theoretical analysis see, for instance, D. Diamond and P. Dybvig, "Bank runs, deposit insurance and liquidity", *Journal of Political Economy*, Vol. 91, No 3, June 1983. It has also been pointed out that while deposit insurance might limit the risk of bank runs, it can also lead to reduced monitoring effort and encourage investment in riskier banks where the value of the implicit insurance scheme is larger.

31 The planned introduction of clearing houses for derivatives contracts aims to mitigate some of these risks.

32 See, for example, A. Banerjee, "A simple model of herd behavior", *Quarterly Journal of Economics*, Vol. 107, August 1992 and S. Bikhchandani, D. Hirshleifer and I. Welch, "A theory of fads, fashion, custom and cultural change in informational cascades", *Journal of Political Economy*, Vol. 100(5), October 1992.

It has been argued, for example, that adverse selection and the inability of banks to distinguish the quality of assets led them to hoard liquidity, which contributed to the sudden drop in lending in unsecured interbank markets.

The absence of many aspects of imperfect information from general equilibrium set-ups coupled with the occasional lack of descriptive realism – e.g. ignoring the impact of remuneration incentives – meant that the vital importance of financial contract information intensity and balance sheet structures was largely neglected. Since banks address information problems, their failure can accentuate these problems leading to inefficient allocations. This becomes crucial when trying to assess the costs of crises and devise adequate macro-prudential policies (and still has not been addressed in recent DSGE literatures).[33]

"Vertical" factors – i.e. financial real economy interactions – also deserve closer scrutiny in models. One such factor is the slow build-up of imbalances and their interplay with financial sector stability. Such imbalances can mean that risks are neglected in good times and lead to a situation in which small shocks make large financial crises possible.[34]

While leverage cycles have been analysed in the macro literature,[35] a feature that has received less attention – and is again related to imperfect information – is the potential impact of low interest rates on banks' incentives to screen borrowers and on banks' efforts to provide riskier loans in attempts to rebuild margins.[36] Equally, straddling macro and finance – and largely unaccounted for in the DSGE literature – is the impact of government bailouts on the riskiness of agents' investment choices, as well as the role of existing micro-prudential regulation in exacerbating financial fluctuations.[37]

Finally, there are other issues – unrelated to "horizontal" or "vertical" instability – but still potentially relevant for modellers and policy-makers alike.[38] For example, all of the DSGE models surveyed in this special feature are stable – i.e. in the absence of shocks they always converge back to equilibrium. This, though increasing tractability and ostensibly aligned with business-cycle analysis, ultimately eliminates hysteresis and most likely profoundly underestimates the welfare costs of financial instability.

Further, and related to the potential analysis of macro-prudential issues, the general equilibrium paradigm implies that markets always clear. This is especially questionable in times of financial distress, which are often associated with structural transformation and significant resource under-utilisation, as well as considerable ambiguity over loss size and "ownership" (e.g. following the bursting of asset price bubbles). Again this would tend to make the costs of crises much smaller in theoretical models than they may be in practice.

Finally, the models discussed largely ignore cross-sectional heterogeneity. This implies that asset price changes in the models have no redistributive effects, which could – to the extent that agents differ – act as economic "shocks". And, clearly, these shocks would be exacerbated by financial innovation which permits greater risk-taking.

33 Because bank default destroys the specific knowledge banks have about borrowers, it shrinks the common pool of liquidity and may also have adverse implications for other institutions – particularly if the value of illiquid bank assets goes down. See, for example, D. Diamond and R. Rajan, "Liquidity shortages and banking crises", *Journal of Finance*, Vol. 60(2), 2005 and V. Acharya and T. Yorulmazer, "Cash-in-the-market pricing and optimal resolution of bank failures", *Review of Financial Studies*, Vol. 21(6), November 2008.

34 Empirically, banking crises appear more probable after lending booms rather than tranquil periods. See also P.-O. Gourinchas, R. Valdes and O. Landerretche, "Lending booms: Latin America and the world", *Economia,* Vol. 1, No 2, 2001.

35 J. Geanakoplos, op. cit.

36 G. Dell'Arricia and R. Marquez, "Lending booms and lending standards", *Journal of Finance*, Vol. 61, Issue 5, October 2006.

37 E. Farhi and J. Tirole, "Collective moral hazard, maturity mismatch and systemic bailouts", *NBER Working Paper*, No 15138, July 2009.

38 Some of the arguments are taken from J. Stiglitz's Adam Smith lecture, "Rethinking Macroeconomics – What went wrong and how to fix it", delivered at the European Economic Association Congress, Glasgow, 24 August 2010.

Another under-researched facet relates to solution methods to deal with non-linearities – and in particular allowing for sudden switches from financial booms to deep recessions. Arguably, standard methods might insufficiently penalise inaccuracy under crisis situations. While these occur rarely, an argument can be made that small mistakes in times of financial instability can be very costly, suggesting overweighting accuracy in states of turmoil.[39]

Related issues include assessing the quantitative relevance of many of the channels discussed above, as well as the fit of models allowing for financial instability. As mentioned above, standard methods, such as comparing impulse responses to those of vector autoregressions or comparing model-implied moments to those of the data, might give too much weight to set-ups which do well in normal times but are inadequate in times of financial turmoil.

CONCLUDING REMARKS

This special feature surveyed the recent literature on incorporating financial factors in DSGE models from a macro-prudential perspective, with a special focus on the realistic characterisation of financial instability. The literature has started reacting to the issues raised by the recent financial crisis, and the surveyed contributions go some way towards capturing several aspects of financial market activity. However, many areas and facets of financial instability still need to be accounted for.[40] These should focus on combining the notions of financial instability and systemic risk within macro-financial models and capturing more aspects of the two-way relationship between the financial system and the wider economy (e.g. deepening our understanding of the interaction between financial instability and economic performance). The relevant questions – certainly from the point of view of the new trend of establishing serious macro-prudential oversight and regulation to counter systemic risks – include the following. How does widespread financial instability affect the real economy? What are the main transmission channels of financial instability at the aggregate level? What role is played by non-linearities, amplification and feedback effects, as well as oligopolistic market structures and herding? What level of descriptive realism is necessary for the macro-financial models to become viable tools in assessing the advantages and disadvantages of different macro-prudential policies and is useful in stress tests and simulations? Crucially, as mentioned in the overview, only the development of aggregate models with realistic characterisations of widespread financial instability will enable macro stress-testing models and other essential analytical tools for assessing systemic risk, as well as macro-prudential policies, to be further improved significantly. This may well require the development and use of modelling approaches outside the presently dominating macroeconomic paradigm. It is therefore of great importance that the academic and policy-oriented research communities join forces to address these discrepancies and find answers to the open questions.

39 This is, of course, directly related to issues such as the adequacy of linearisation techniques, or even higher order, local solution methods for solving DSGE models with financial instability.

40 C. Goodhart, C. Osorio and D. Tsomocos also stress this point: "… the appeal of DSGEs withered during the current financial crisis because they failed to provide a suitable framework for the analysis of financial (in)stability...". See "Analysis of Monetary Policy and Financial Stability: A New Paradigm", *CESifo Working Paper*, No 2885, December 2009.

An overview of the post-crisis literature

Study	Character of the friction		Mechanisms and propagation		Inefficiency		
	Market segment where friction occurs	Type of friction	Mechanism	Materialisation of systemic risk	Externality	Policy implication	
						Crisis prevention	Crisis management
Bengui	banks-firms	cc	debt deflation; fire sales	excessive maturity mismatch	misperceived asset-debt loop	counter-cyclical tax; short-term debt	–
Bianchi-Mendoza	banks-firms	cc (occasionally binding)	debt deflation; fire sales; regime switching (i.e. effects amplified by non-linearity)	excessive leverage; instability; fire sales	misperceived asset-debt loop	counter-cyclical tax on leverage; capital requirements; liquidity requirements	–
Brunnermeier-Sannikov	generic borrowers-lenders	cc (occasionally binding)	debt deflation; fire sales; regime switching (i.e. effects amplified by non-linearity)	excessive leverage; endogenous amplification	misperceived asset-debt loop	minimum capitalisation; discourage securitisation	–
Gertler-Karadi	banks-households	csv (cash diversion)	debt deflation	fire sales; endogenous amplification	–	–	unconventional monetary policy
Gertler-Kiyotaki	wholesale financial market	csv (cash diversion)			–	–	unconventional monetary policy
Jeanne-Korinek	generic borrowers-lenders	cc (occasionally binding)		excessive leverage; instability; fire sales	misperceived asset-debt loop	counter-cyclical tax on leverage	–
Meh-Moran	banks-firms	csv; dmh	bank capital channel	endogenous amplifications	–	–	–

Notes: "cc" stands for collateral constraints; "csv" stands for costly state verification; "dmh" stands for double moral hazard; "efp" stands for external finance premium; "–" indicates none or not applicable.

E NEW QUANTITATIVE MEASURES OF SYSTEMIC RISK

A host of new quantitative measures of systemic risk have recently been proposed in the academic and central banking literature. The stated purpose of these tools is to support macro-prudential oversight and inform policy decisions. This special feature surveys these measures, focusing primarily on the most recent developments that have not yet been covered in the ECB's Financial Stability Review,[1] and explains what can be learned from them. The strengths and weaknesses of approaches when applied in a macro-prudential context are discussed. Significant research in this area has addressed how to measure the systemic importance of specific financial intermediaries, for example by estimating the externalities they may exert on the financial system. With the rising number of different analytical measures and models it becomes increasingly important to prioritise between them and to construct a system of measures that, overall, covers all dimensions of systemic risk and how they relate to each other.

INTRODUCTION

The financial crisis has raised new challenges for central bank policy, in particular in relation to strengthening the macro-prudential aspects of financial supervision. Such macro-prudential oversight is expected to identify, assess, prioritise and help mitigate systemic risks. As one element in the required macro-prudential analyses, new quantitative measures for systemic risk have recently been proposed in the academic and central banking literature. These measures can serve as tools and indicators for the identification and assessment of systemic risks and events. Systemic events can be understood broadly as financial instabilities spreading to the extent that the financial intermediation process is impaired and economic growth and welfare suffer materially. Systemic risk is the risk of experiencing a systemic event.

This special feature is structured as follows. The first section recalls the main elements of the ECB's conceptual framework for systemic risk, which is then applied to the survey (although other categorisations may be possible). The second section discusses new approaches on how to assess contagion risks and, particularly, the contribution of individual financial intermediaries to the combined risk of all intermediaries.[2] The third section reviews recent contributions that assess the impact of aggregate shocks on financial systems. The fourth section discusses measures of widespread financial imbalances. The last section concludes.

REMINDER ON THE CONCEPT OF SYSTEMIC RISK

The quantitative literature captures different types of systemic events and risks through different modelling frameworks. In the context of the great complexity of systemic risk and the need to formulate well-targeted policy responses, it has proven to be useful to distinguish three main forms of systemic risk, as laid out recently, for example by the President of the ECB and Financial Stability Review special feature articles.[3] First, contagion risk refers to an initially idiosyncratic problem that becomes more widespread in the cross-section, often in a

1 For an overview of the main approaches on how to identify and assess systemic risks for the purposes of macro-prudential supervision, see ECB, "Analytical models and tools for the identification and assessment of systemic risks", *Financial Stability Review,* June 2010. For systemic risk measures regularly used in the Financial Stability Review see, for example, the boxes entitled "Measuring the time-varying risk to banking sector stability" and "A market-based indicator of the probability of adverse systemic events involving large and complex banking groups" in, respectively, the December 2008 and December 2007 issues of the ECB's Financial Stability Review.

2 The order of papers in the survey is not indicative of their relative value for macro-prudential oversight.

3 See J.-C. Trichet, "Systemic risk", *Clare Distinguished Lecture in Economics and Public Policy*, delivered at the University of Cambridge, 10 December 2009; V. Constâncio, "Macro-prudential supervision in Europe", speech delivered at the ECB-CEPR-CFS conference, *Macro-prudential regulation as an approach to containing systemic risk: economic foundations, diagnostic tools and policy instruments*, Frankfurt am Main, 27 September 2010; ECB, "The concept of systemic risk", *Financial Stability Review*, December 2009; ECB, 2010, op. cit.; and O. de Bandt, P. Hartmann and J.-L. Peydró-Alcade, "Systemic risk in banking: An update", in A. Berger, P. Molyneux and J. Wilson (eds.), *Oxford Handbook of Banking*, Oxford University Press, 2009.

sequential fashion. Second, shared exposure to financial market shocks or adverse macroeconomic developments may cause simultaneous problems for a range of financial intermediaries and markets. Third, financial imbalances, such as credit and asset market bubbles that build up gradually over time, may unravel suddenly, with detrimental effects on intermediaries and markets. These forms of systemic risk can also be interrelated. For example, contagion risk may be more pronounced in a business cycle downturn, when financial intermediaries are already weakened. Similarly, in such a situation a relatively small financial shock may be sufficient to unravel a pent-up imbalance. It is important that the set of quantitative measures of systemic risk used in macro-prudential oversight covers all of these phenomena, as well as all systemically important financial intermediaries, markets, infrastructures and instruments.

CONTAGION RISK AND MEASURES OF SYSTEMIC RISK CONTRIBUTION

The studies discussed in this section focus on the systemic risk contribution of individual firms. Thus, systemic risk is understood as the extent to which an individual firm pollutes the "public good" of overall financial stability. If such measures were accurate, they could in principle be used for Pigouvian taxes, levies or other regulatory interventions aimed at internalising the negative externalities.

Acharya et al.[4] present a simple model of systemic risk and show how each financial institution's contribution to systemic risk can be measured and priced. The extent to which an institution may impose a negative externality on the system is proxied by the *systemic expected shortfall* (SES), measuring an institution's propensity to be undercapitalised when the system as a whole is hit by a financial shock. The nature of the externality, however, is not specified exactly. The SES can be estimated and aggregated. An institution's SES increases in its leverage, equity volatility, equity correlation with a market index, and tail dependence. The last three components are summarised by an institution's *marginal expected shortfall* (MES), which in turn is defined as the institution's expected shortfall when the market return is below a given low percentile. The authors provide some evidence that leverage and MES are able to capture emerging systemic instability, for example during the financial crisis of 2007-09.

Brownlees and Engle[5] use the set-up of Acharya et al. and provide improved MES estimates. While the latter calculate the MES of each firm using equity returns on the worst 5% of days in a given year according to a market index, Brownlees and Engle employ sophisticated econometric tools to estimate firms' time-varying conditional volatilities, time-varying correlations with a market index, and corresponding joint tail indices. Thus, Brownlees and Engle effectively make use of a small amount of publicly available information to assess the likelihood of a given firm being undercapitalised in adverse conditions. The risk measures can be updated frequently, and are currently published online as the NYU Stern systemic risk rankings. The fact that a small amount of publicly available information yields information about systemic risk externalities is an intriguing prospect. On the other hand, the logical link between a decline in an intermediary's equity market valuation and its institutional failure is quite indirect. A decline in the market value of a firm's equity may be an adverse signal, but it does not necessarily imply a subsequent capital shortage or insolvency. Acharya et al. seek to provide such a link empirically, by comparing ex ante MES and SES measures with the capital shortfalls estimated from the 2009 US bank stress tests and realised equity returns during the crisis. The reported scatter plots have R-squared statistics between 6% and 33%.

4 V. V. Acharya, L. H. Pedersen T. Philippon and M. Richardson, "Measuring systemic risk", *New York University Working Paper,* May 2010.

5 C. T. Brownlees and R. Engle, "Volatility, correlation, and tails for systemic risk measurement", *New York University Working Paper,* May 2010.

Huang et al.[6] propose a systemic risk measure called the *distress insurance premium*, or DIP. The DIP represents a hypothetical insurance premium against systemic financial distress, defined as total equity losses that exceed a given threshold, say 15%, of total liabilities. Each bank's marginal contribution to systemic risk is a function of its size, default probability, and asset correlation. The last two components need to be estimated from market data. The DIP measure is closely related to Brownlees and Engle's MES, except that credit default swap (CDS) spreads are used as data input instead of equity returns, and that technical difficulties are overcome differently, in particular regarding the calculation of the tail expectation. CDS returns are driven in part by investors' risk appetites and changes in risk liquidity premiums. As a result, an increase in measured risk may not be due to increased physical risk but to a decrease in overall risk appetite. This ambiguity complicates generally the application of indicators based on observed market prices.

Adrian and Brunnermeier[7] suggest *CoVaR* as a measure of systemic risk. It is the Value at Risk (VaR) of the financial system conditional on an individual institution being under stress. An institution's individual contribution to systemic risk is defined as the difference between CoVaR and the unconditional VaR of the financial system. CoVaR is related to the risk measures presented in Acharya et al. and Huang et al. (2009) respectively, but it has drawbacks in that it does not give a bigger weight to larger systemic events, is only bivariate and cannot easily be aggregated. The direction of CoVaR is from individual distress to the system, rather than the other way around. This direction may be more in line with the definition of systemic risk.[8] Neither risk measure – CoVaR nor MES – should be interpreted as a causal effect.

The methods surveyed so far rely on market data and are therefore only precise to the extent that market participants are sufficiently well-informed, good at assessing financial risk, and not subject to herding and other behavioural biases. Also, all measures more or less ignore the important role of financial institutions' specific capital structures. On the other hand, this strand of research indicates what macro-prudential overseers can learn from a limited amount of publicly available and easily observed data.

Segoviano and Goodhart[9] define banking stability measures which capture the distress dependence among financial firms in a system. These measures allow an assessment of common stress, distress between specific groups of banks and distress associated with a specific firm. In this non-parametric approach, a panel of individual banks' time-varying default probabilities is taken as input. In principle, these conditional probabilities can be obtained using various methods and data sources (none of which is perfect). A posterior density is fitted as closely as possible to a proposal density. The multivariate density permits computation of the *joint probability of distress*, i.e. the time-varying probability that all (or a large number of) banks in a system become distressed. Relative changes of stability over time can also be examined. A *Banking Stability Index* (BSI) is calculated, which captures the expected number of banks to become distressed given that at least one bank has become distressed.[10] Naturally, a higher number implies increased instability. The downside of this approach is that the dependence matrix grows quadratically with

6 X. Huang, H. Zhou and H. Zhu, "A framework for assessing the systemic risk of major financial institutions", *Journal of Banking and Finance*, No 33, 2009 and X. Huang, H. Zhou and H. Zhu, "Systemic risk contributions", *Federal Reserve Board Working Paper*, August 2010.

7 T. Adrian and M. Brunnermeier, "CoVar", *Federal Reserve Bank of New York Staff Reports*, No 348, 2008.

8 The motivation for conditioning individual returns on the systemic event is risk attribution. The SES is the key measure of each bank's expected contribution to a systemic crisis.

9 M. A. Segoviano and C. Goodhart, "Banking stability measures", *IMF Working Paper,* No WP/09/4, January 2009.

10 This measure was developed by X. Huang, "Statistics of bivariate extreme values," Tinbergen Institute Research Series, PhD thesis, No 22, Erasmus University Rotterdam, 1992, and applied in bivariate and multivariate contexts by P. Hartmann, S. Straetmans and C. de Vries in "Asset market linkages in crisis periods", *Review of Economics and Statistics*, Vol. 86, No 1, 2004, and "The breadth of currency crises", presented at the Center for Financial Studies and The Wharton School joint conference on *Liquidity Concepts and Financial Instabilities*, Eltville, 12-14 June 2003.

the number of banks. This suggests a curse of dimensionality. With 100 banks in the system, 10,000 elements of the distress dependence matrix would need to be inferred. The method works best when applied to a smaller number of banks regarded a priori as systemically important.

Billio et al.[11] propose several econometric measures of systemic risk to capture dependence among the monthly returns of hedge funds, banks, brokers and insurance companies. The risk measures capture changes in dependence by means of principal component analysis, and changes in the direction of correlation through predictive (Granger) causality tests. An indicator for systemic risk can be constructed as the total number of financial institutions that are connected, in the sense that their returns causally impact each other at a given significance level. The proposed statistics are relatively easy to compute. Parts of the shadow banking system (hedge funds, broker-dealers, and insurers) can be taken into account provided their returns are observed. Predictive causality, however, is not an entirely straightforward concept. A causal link between financial institutions is neither necessary nor sufficient for one institution's returns to Granger cause another institution's returns. For example, Granger causality tests are vulnerable to common factors (such as the business cycle or term structure) driving returns if the returns load on shared factors at different lags. In that case, predictive ability will be found but it does not imply a causal connection between two institutions. The failure of one would not necessarily affect the other as a result. Conversely, not finding Granger causality does not necessarily mean an absence of dependence. Instead, it might "hide" in the tails where it cannot be detected with measures not focusing on extreme values.

Tarashev et al.[12] suggest a methodology for attributing overall financial system risk to individual institutions. The methodology is based on concepts from cooperative game theory, such as the Core and the Shapley value. Gauthier et al.[13] apply several methodologies, including the Shapley value, to determine the systemic risk contribution of Canadian financial firms.

Castren and Kavonius[14] seek to identify aggregate counterparty risk exposures between the different financial and macroeconomic sectors based on euro area financial accounts (flow of funds) data. Local shocks are propagated in a sector-level network of bilateral balance sheet exposures. Contingent claims (option pricing) theory is used to extend the accounting-based information into a risk-based network of exposures. Not surprisingly, high financial leverage and high asset value volatility increase the financial sector's vulnerability to the transmission of shocks. Correlations among sector-level risk indicators are elevated during the outbreak of the recent financial crisis. CoVaR measures of sector risk contribution can also be defined.

Hartmann et al.[15] are the first to apply extreme value theory to banking system risk, deriving indicators of the severity and structure of banking system risk from asymptotic interdependencies between banks' equity prices. A semi-parametric estimation approach is applied to estimate

11 M. Billio, M. Getmansky, A. W. Lo and L. Pelizzon, "Econometric measures of systemic risk in the finance and insurance sectors", *NBER Working Paper,* No 16223, July 2010.

12 N. Tarashev, C. Borio, and K. Tsatsaronis, "Attributing systemic risk to individual institutions", *BIS Working Paper*, No 308, May 2010.

13 C. Gauthier, A. Lehar and M. Souissi, "Macroprudential Regulation and Systemic Capital Requirements", *Bank of Canada Working Paper*, No 4, 2010. As regards the systemic risk contribution of individual institutions, see also Bank of England, "The Role of Macroprudential Policy – Discussion Paper", 21 November 2009.

14 O. Castrén and I. K. Kavonius, "Balance sheet interlinkages and macro-financial risk analysis in the euro area", *ECB Working Paper Series,* No 1124, December 2009, and Box 13 in ECB, *Financial Stability Review*, June 2010. Earlier studies applying a contingent claim analysis to the financial sector include A. Lehar, "Measuring systemic risk: A risk management approach", *Journal of Banking and Finance*, Vol. 29, 2005, and D. Gray, R. Merton and Z. Bodie, "New framework for measuring and managing macro-financial risk and financial stability", *NBER Working Paper*, No 13607, 2007.

15 P. Hartmann, S. Straetmans and C. de Vries, "Banking system stability: A cross-Atlantic perspective", *NBER Working Paper,* No 11698, 2005.

extreme spillover risk among multiple banks, as well as extreme systematic risk that is due to shared exposure to a common observed factor (tail-beta). The authors provide evidence that tail dependencies are time-varying. A particular challenge in estimating tail dependencies is the limited number of jointly extreme observations. One contribution of the extreme value literature is to derive the optimal number of tail observations to be used in the estimators. A relatively low number of low frequency data could lead to imprecise estimates. Using too high a number of observations could lead to biased estimates.

RISK OF AGGREGATE SHOCKS

This section reviews studies that focus on the impact of macroeconomic shocks (such as the adverse macroeconomic scenarios used in stress testing) on the financial system. Some of the most recent macro-financial studies have started to integrate other forms of systemic risk, such as cross-sectional contagion dynamics.

A systematic worsening of credit risk conditions is a dominant source of bank risk. Macroeconomic shocks matter for financial stability inter alia because they tend to affect all firms in an economy, financial and non-financial, at least to some extent. A macro shock causes an increase in correlated default losses, with detrimental effects on financial stability.

Stress-testing models are designed to map adverse macro-financial scenarios into losses in shared credit and asset exposures. As such, they are an important tool for financial systemic risk assessment. The practical stress-testing literature is too extensive to be reviewed here. Sorge, Segoviano and Padilla; Castren et al.; Borio and Drehmann; and Breuer et al., among many others, are relevant contributions to this literature.[16] The remainder of this section focuses on a few key examples that help to assess the evolution of systemic risk over time.

Aikman et al.[17] propose a "Risk Assessment Model for Systemic Institutions" (RAMSI) to assess the impact of macroeconomic and financial shocks on both individual banks, as well as the banking system. RAMSI is a suite of smaller models which are combined in a larger framework that allows for some feedback loops between its parts. Systemic risks stem from the connectedness of bank balance sheets via interbank exposures, "fire sale" interactions between balance sheets and asset prices, and confidence effects that may affect institutions' funding conditions. Importantly, RAMSI can aid the assessment of the impact of potential policy measures. This is not the case for many other macro-financial frameworks. As a suite of reduced form models, RAMSI is as reliable as its individual parts and the behavioural "rules of thumb" that connect them. The model structure is not derived from micro foundations, and the model's risk predictions may be different from, e.g. markets' assessments of risk. The latter feature is not necessarily a disadvantage.

Aspachs-Bracons et al.[18] propose a measure of financial stability that is based on the general equilibrium model of Goodhart et al.[19] The model comprises a household sector, a small number of heterogeneous banks, a regulator,

16 M. Sorge, "Stress testing financial systems: an overview of current methodologies", *BIS Working Paper*, No 165, December 2004; M. A. Segoviano and P. Padilla, "Portfolio credit risk and macroeconomic shocks: Applications to stress testing under data-restricted environments, *IMF Working Paper*, WP/06/283, 2006; O. Castrén, S. Dées and F. Zaher, "Global macro-financial shocks and expected default frequencies in the euro area", *ECB Working Paper Series,* No 875, February 2008; C. Borio and M. Drehmann, "Towards an operational framework for financial stability: "fuzzy" measurement and its consequences", *BIS Working Paper*, No 284, June 2009; T. Breuer, M. Jandačka, J. Mencía and M. Summer, "A systematic approach to multi-period stress testing of portfolio credit risk", *Banco de España Working Paper*, No 1018, 2010.

17 D. Aikman, P. Alessandri, B. Eklund, P. Gai, S. Kapadia, E. Martin, N. Mora, G. Sterne and M. Wilson, "Funding liquidity risk in a quantitative model of systemic stability", *Bank of England Working Paper,* No 372, 2009. The work on RAMSI was based on earlier work at the Oesterreichische Nationalbank, see M. Boss, G. Krenn, C. Puhr and M. Summer, "Systemic Risk Monitor: A model for Systemic Risk Analysis and Stress Testing of Banking Systems", *Financial Stability Report*, No 11, Oesterreichische Nationalbank, 2006.

18 O. Aspachs-Bracons, C. A. E. Goodhart, D. P. Tsomocos and L. Zicchino, "Towards a measure of financial fragility", *Annals of Finance,* Vol. 3(1), January 2007.

19 C. A. E. Goodhart, P. Sunirand, and D. P. Tsomocos, "A model to analyse financial fragility", *Economic Theory*, Vol. 27, 2006.

incomplete markets and endogenous default on debt. Financial instability can arise as an equilibrium phenomenon either through systematic shocks, contagion after idiosyncratic shocks, or a combination of both. The proposed measure of financial instability is a combination of intermediaries' default probabilities and profitability. Introducing the possibility of defaulting intermediaries is a very important advance in the theoretical systemic risk literature. Naturally, financial instability is increasing in institutions' default probabilities and decreasing in profits. In another paper, Goodhart et al.[20] calibrate an extended version of the model to the UK banking sector. The calibration effort is enormous. For example, even if only three banks are considered, a system of 56 equations needs to be solved numerically for 56 endogenous variables, given values for 87 exogenous parameters. At present, the framework is theoretically appealing but may be regarded as less operational for practical systemic risk measurement.

Giesecke and Kim[21] define systemic risk as the conditional probability of failure of a large number of financial institutions. This failure probability can be plotted against time, and is based on a dynamic hazard rate model. The model captures the influence of observed macroeconomic and sector-specific risk factors, as well as the impact of spillovers related to network effects and unobserved risk factors. In and out-of-sample tests demonstrate that point-in-time risk measures are relatively accurate. A similar study based on a large number of macroeconomic and financial covariates is Koopman et al.[22] In either case, however, the model-implied estimates of financial distress are based on actual default experience. Such data are naturally sparse, in particular with respect to financial defaults (the authors report 83 US financial defaults over the last 21 years, and 12 European ones). The reported results are therefore subject to substantial estimation uncertainty.

The probability of simultaneous failure of multiple financial intermediaries can also be inferred from the market prices of traded credit derivatives. This approach is used for one of the ECB's indicators that is regularly reported in the Financial Stability Review, which gives the probability of two or more bank failures over different time horizons.[23] Avesani et al.[24] determine these default probabilities using credit derivative prices on large financial institutions. Since these probabilities are based on market perceptions, they could in principle give a valuable forward-looking assessment of joint risk. Whether this is the case in practice is arguable. The modelling output may also be sensitive to the precise modelling choices (such as the copula and factor structure), most of which need to be inferred from stock market returns.

RISK OF WIDESPREAD FINANCIAL IMBALANCES

The studies reviewed in this section relate to the build-up of financial imbalances over time. For example, bubbles in asset and credit markets can have severe adverse effects on income and employment if they burst suddenly. Financial imbalances are not easily characterised and are difficult to quantify. Inference on the extent of financial misalignments can be based on observed covariates, such as current and past credit-to-GDP ratios, total lending and money growth, changes in property and asset prices, bank leverage, maturity mismatch, capital adequacy, and sector-level flow of funds. For studies relating observed covariates to financial stress, see, for example, Borio and Lowe, Misina and Tkacz, Alessi and Detken, and Barrell

20 C. A. E. Goodhart, P. Sunirand, and D. P. Tsomocos, "A time series analysis of financial fragility in the UK banking system", *Annals of Finance,* Vol. 2(1), January 2006.

21 K. Giesecke and B. Kim, "Systemic risk: What defaults are telling us", *Stanford University Working Paper*, September 2009, revised March 2010.

22 S. J. Koopman, A. Lucas, and B. Schwaab, "Forecasting Cross-Sections of Frailty-Correlated Default", *Tinbergen Institute Discussion Paper*, 029/04, 2008.

23 See Box 16 in ECB, *Financial Stability Review*, December 2007.

24 R. G. Avesani, A. G. Pascual and J. Li, "A new risk indicator and stress testing tool: A multifactor nth-to-default CDS basket", *IMF Working Paper*, WP/06/105, 2006. Related studies include R. G. Avesani, "FIRST: A market-based approach to evaluate financial system risk and stability", *IMF Working Paper*, WP/05/232, 2005.

et al.[25] Recent progress has significantly improved such early-warning indicators and models. At the same time major challenges remain in that they may still not predict new crises well and exhibit great uncertainty about when instability may strike.

In a later paper Koopman et al.[26] investigate the sources of default clustering in a setting where credit and macroeconomic developments are assumed to be driven by latent dynamic factors. These risk factors can be estimated from observed data, and permit an assessment of both the current state of the credit cycle, as well as financial industry distress. Shared variation in defaults and macroeconomic conditions need not coincide at all times. The authors argue that a persistent and significant decoupling of the two processes is possible and may indicate a widespread imbalance in credit markets.

CONCLUDING REMARKS

A host of new quantitative measures of systemic risk have been proposed in the literature. This feature surveyed the most recent developments in this area. The main results of the survey could be summarised as follows. There is currently no widely accepted single indicator or model capturing systemic risks and instabilities comprehensively. Most developments rather cover one or a few specific aspects of systemic risk. Recently, the literature has focused particularly on the systemic risk contribution of individual large and complex financial intermediaries.

Each of these risk measures has strengths and weaknesses if applied in a macro-prudential context. Policy-makers need therefore to rely on a wide range of measures and tools, covering different parts of financial systems, different shocks and transmission mechanisms of instability. The challenges are therefore to prioritise among the increasing number of measures; to ensure that the recent focus on risk contributions of individual intermediaries using market data does not distract attention from other forms of systemic risk and from the risk that market data in tranquil times may not reflect crisis relationships very well; to establish how to construct a comprehensive systemic risk surveillance and assessment system using the measures and tools; and to make progress in combining a wider range of risks in more comprehensive models.

25 C. E. V. Borio and P. W. Lowe, "Asset prices, financial and monetary stability: Exploring the nexus", *BIS Working Paper,* No 114, 2002; M. Misina and G. Tkacz, "Credit, asset prices, and financial stress in Canada", *Bank of Canada Working Paper*, 2008-10; L. Alessi and C. Detken, "'Real time' early warning indicators for costly asset price boom/bust cycles: a role for global liquidity", *ECB Working Paper Series,* No 1039, March 2009; R. Barrell, E. P. Davis, D. Karim and I. Liadze, "Bank regulation, property prices and early warning systems for banking crises in OECD countries", *Journal of Banking and Finance,* Vol. 34, Issue 9, pp. 2255-2264, September 2010.

26 S. J. Koopman, A. Lucas and B. Schwaab, "Macro, frailty, and contagion effects in defaults: Lessons from the 2008 credit crisis", *Tinbergen Institute Discussion Paper*, No 004/2, August 2010.

GLOSSARY

Adjustable rate mortgage (ARM): A mortgage with an interest rate that remains at a predetermined (usually favourable) level for an initial fixation period, but can thereafter be changed by the lender. While ARMs in many countries allow rate changes at the lender's discretion (also referred to as "discretionary ARMs"), rate changes for most ARMs in the United States are based on a pre-selected interest rate index over which the lender has no control.

Alternative-A (Alt-A): A mortgage risk category that falls between prime and sub-prime. The credit risk associated with Alt-A mortgage lending tends to be higher than that of prime mortgage lending on account of e.g. little or no borrower documentation (i.e. income and/or asset certainties) and/or a higher loan-to-value ratio, but lower than that of sub-prime mortgage lending due to a less (or non-)adverse credit history.

Asset-backed commercial paper (ABCP): A short-term debt instrument that is backed by a form of collateral provided by the issuer, which generally has a maturity of no more than 270 days and is either interest-bearing or discounted. The assets commonly used as collateral in the case of financing through ABCP conduits include trade receivables, consumer debt receivables and collateralised debt obligations.

Asset-backed security (ABS): A security that is collateralised by the cash flows from a pool of underlying assets, such as loans, leases and receivables. Often, when the cash flows are collateralised by real estate, an ABS is called a mortgage-backed security.

Basel II: An accord providing a comprehensive revision of the Basel capital adequacy requirements issued by the Basel Committee on Banking Supervision (BCBS). Pillar I of the accord covers the minimum capital adequacy standards for banks, Pillar II focuses on enhancing the supervisory review process and Pillar III encourages market discipline through increased disclosure of banks' financial conditions.

Central bank credit (liquidity) facility: A standing credit facility which can be drawn upon by certain designated account holders (e.g. banks) at a central bank. The facility can be used automatically at the initiative of the account holder. The loans typically take the form of either advances or overdrafts on an account holder's current account which may be secured by a pledge of securities or by repurchase agreements.

Collateralised debt obligation (CDO): A structured debt instrument backed by the performance of a portfolio of diversified securities, loans or credit default swaps, the securitised interests in which are divided into tranches with differing streams of redemption and interest payments. When the tranches are backed by securities or loans, the structured instrument is called a "cash" CDO. When the tranches are backed only by loans, it is referred to as a collateralised loan obligation (CLO) and when backed by credit default swaps, it is a "synthetic" CDO.

Collateralised loan obligation (CLO): A CDO backed by whole commercial loans, revolving credit facilities or letters of credit.

Combined ratio: A financial ratio for insurers, which is calculated as the sum of the loss ratio and the expense ratio. Typically, a combined ratio of more than 100% indicates an underwriting loss for the insurer.

Commercial mortgage-backed security (CMBS): A security with cash flows generated by debt on property that focuses on commercial rather than residential property. Holders of such securities receive payments of interest and principal from the holders of the underlying commercial mortgage debt.

Commercial paper: Short-term obligations with maturities ranging from 2 to 270 days issued by banks, corporations and other borrowers. Such instruments are unsecured and usually discounted, although some are interest-bearing.

Conduit: A financial intermediary, such as a special-purpose vehicle (SPV) or a structured investment vehicle (SIV), which funds the purchase of assets through the issuance of asset-backed securities such as commercial paper.

Credit default swap (CDS): A swap designed to transfer the credit exposure of fixed income products between parties. The buyer of a credit swap receives credit protection, whereas the seller of the swap guarantees the creditworthiness of the product. By doing this, the risk of default is transferred from the holder of the fixed income security to the seller of the swap.

Debit balance: The amount that an enterprise or individual owes a lender, seller or factor.

Delinquency: A (mortgage) debt service payment that is more than a predefined number of days behind schedule (typically at least 30 days late).

Distance to default: A measure of default risk that combines the asset value, the business risk and the leverage of an asset. The distance to default compares the market net worth to the size of a one standard deviation move in the asset value.

Drawdown: A measure of investment performance that refers to the cumulative percentage decline from the most recent historical performance peak.

Earnings per share (EPS): The amount of a company's earnings that is available per ordinary share issued. These earnings may be distributed in dividends, used to pay tax, or retained and used to expand the business. Earnings per share are a major determinant of share prices.

EMBIG spreads: J.P. Morgan's Emerging Markets Bond Index Global (EMBI Global) spreads. The EMBI Global tracks US dollar-denominated debt instruments issued by sovereign and quasi-sovereign entities in emerging markets, such as Brady bonds, loans and Eurobonds. It covers over 30 emerging market countries.

Euro commercial paper (ECP): A short-term debt instrument with a maturity of up to one year that is issued by prime issuers on the euro market, using US commercial paper as a model. Interest is accrued or paid by discounting the nominal value, and is influenced by the issuer's credit rating.

Euro interbank offered rate (EURIBOR): The rate at which a prime bank is willing to lend funds in euro to another prime bank. The EURIBOR is calculated daily for interbank deposits with a maturity of one week, and one to 12 months, as the average of the daily offer rates of a representative panel of prime banks, rounded to three decimal places.

Euro overnight index average (EONIA): A measure of the effective interest rate prevailing in the euro interbank overnight market. It is calculated as a weighted average of the interest rates on unsecured overnight lending transactions denominated in euro, as reported by a panel of contributing banks.

Euro overnight index average (EONIA) swap index: A reference rate for the euro on the derivatives market, i.e. the mid-market rate at which EONIA swaps, as quoted by a representative panel of prime banks that provide quotes in the EONIA swap market, are traded. The index is calculated daily at 4.30 p.m. CET and rounded to three decimal places using an actual/360 day-count convention.

Exchange-traded fund (ETF): A collective investment scheme that can be traded on an organised exchange at any time in the course of the business day.

Expected default frequency (EDF): A measure of the probability that an enterprise will fail to meet its obligations within a specified period of time (usually the next 12 months).

Expense ratio: For insurers, the expense ratio denotes the ratio of expenses to the premium earned.

Fair value accounting (FVA): A valuation principle that stipulates the use of either a market price, where it exists, or an estimation of a market price as the present value of expected cash flows to establish the balance sheet value of financial instruments.

Financial obligations ratio: A financial ratio for the household sector which covers a broader range of financial obligations than the debt service ratio, including automobile lease payments, rental payments on tenant-occupied property, homeowners' insurance and property tax payments.

Foreclosure: The legal process through which a lender acquires possession of the property securing a mortgage loan when the borrower defaults.

Funding liquidity: A measure of the ease with which asset portfolios can be funded.

High watermark: A provision stipulating that performance fees are paid only if cumulative performance recovers any past shortfalls.

Home equity borrowing: Borrowing drawn against the equity in a home, calculated as the current market value less the value of the first mortgage. When originating home equity borrowing, the lending institution generally secures a second lien on the home, i.e. a claim that is subordinate to the first mortgage (if it exists).

Household debt service ratio: The ratio of debt payments to disposable personal income. Debt payments consist of the estimated required payments on outstanding mortgage and consumer debt.

Implied volatility: A measure of expected volatility (standard deviation in terms of annualised percentage changes) in the prices of e.g. bonds and stocks (or of corresponding futures contracts) that can be extracted from option prices. In general, implied volatility increases when market uncertainty rises and decreases when market uncertainty falls.

Initial margin: A proportion of the value of a transaction that traders have to deposit to guarantee that they will complete it. Buying shares on margin means contracting to buy them without actually paying the full cash price immediately. To safeguard the other party, a buyer is required to deposit a margin, i.e. a percentage of the price sufficient to protect the seller against loss if the buyer fails to complete the transaction.

Interest rate swap: A contractual agreement between two counterparties to exchange cash flows representing streams of periodic interest payments in one currency. Often, an interest rate swap involves exchanging a fixed amount per payment period for a payment that is not fixed (the floating side of the swap would usually be linked to another interest rate, often the LIBOR). Such swaps can be used by hedgers to manage their fixed or floating assets and liabilities. They can also be used by speculators to replicate unfunded bond exposures to profit from changes in interest rates.

Investment-grade bonds: A bond that has been given a relatively high credit rating by a major rating agency, e.g. "BBB" or above by Standard & Poor's.

iTraxx: The brand name of a family of indices that cover a large part of the overall credit derivatives markets in Europe and Asia.

Large and complex banking group (LCBG): A banking group whose size and nature of business is such that its failure or inability to operate would most likely have adverse implications for financial intermediation, the smooth functioning of financial markets or other financial institutions operating within the financial system.

Leverage: The ratio of a company's debt to its equity, i.e. to that part of its total capital that is owned by its shareholders. High leverage means a high degree of reliance on debt financing. The higher a company's leverage, the more of its total earnings are absorbed by paying debt interest, and the more variable are the net earnings available for distribution to shareholders.

Leveraged buyout (LBO): The acquisition of one company by another through the use of primarily borrowed funds, the intention being that the loans will be repaid from the cash flow generated by the acquired company.

Leveraged loan: A bank loan that is rated below investment grade (e.g. "BB+" and lower by Standard & Poor's and Fitch, or "Ba1" and lower by Moody's) to firms characterised by high leverage.

LIBOR: The London interbank offered rate is an index of the interest rates at which banks offer to lend unsecured funds to other banks in the London wholesale money market.

Loss ratio: For insurers, the loss ratio is the net sum total of the claims paid out by an insurance company or underwriting syndicate, expressed as a percentage of the sum total of the premiums paid in during the same period.

Margin call: A procedure related to the application of variation margins, implying that if the value, as regularly measured, of the underlying assets falls below a certain level, the (central) bank requires counterparties to supply additional assets (or cash). Similarly, if the value of the underlying assets, following their revaluation, were to exceed the amount owed by the counterparties plus the variation margin, the counterparty may ask the (central) bank to return the excess assets (or cash) to the counterparty.

Mark to market: The revaluation of a security, a commodity, a futures or options contract or any other negotiable asset position to its current market, or realisable, value.

Mark to model: The pricing of a specific investment position or portfolio based on internal assumptions or financial models.

Market liquidity: A measure of the ease with which an asset can be traded on a given market.

Monetary financial institution (MFI): One of a category of financial institutions which together form the money-issuing sector of the euro area. Included are the Eurosystem, resident credit institutions (as defined in EU law) and all other resident financial institutions, the business of which is to receive deposits and/or close substitutes for deposits from entities other than MFIs and, for their own account (at least in economic terms), to grant credit and/or invest in securities. The latter group consists predominantly of money market funds.

Mortgage-backed security (MBS): A security with cash flows that derive from the redemption of principal and interest payments relating to a pool of mortgage loans.

Net asset value (NAV): The total value of a fund's investments less liabilities. It is also referred to as capital under management.

Open interest: The total number of contracts in a commodity or options market that are still open, i.e. that have not been exercised, closed out or allowed to expire.

Originate-to-distribute model: A business model in which debt is generated, i.e. originated, and subsequently broken up into tranches for sale to investors, thereby spreading the risk of default among a wide group of investors.

Overnight index swap (OIS): An interest rate swap whereby the compounded overnight rate in the specified currency is exchanged for some fixed interest rate over a specified term.

Price/earnings (P/E) ratio: The ratio between the value of a corporation, as reflected in its stock price, and its annual profits. It is often calculated on the basis of the profits generated by a corporation over the previous calendar year (i.e. a four-quarter moving average of profits). For a market index such as the Standard & Poor's 500, the P/E ratio is the average of the P/E ratios of the individual corporations in that index.

Primary market: The market in which new issues of securities are sold or placed.

Private equity: Shares in privately held companies that are not listed on a public stock exchange.

Profit and loss (P&L) statement: The financial statement that summarises the difference between the revenues and expenses of a firm – non-financial or financial – over a given period. Such statements may be drawn up frequently for the managers of a business, but a full audited statement is normally only published for each accounting year.

Residential mortgage-backed security (RMBS): A security with cash flows that derive from residential debt such as mortgages and home equity loans.

Return on equity (ROE): A measure of the profitability of holding (usually) ordinary shares in a company that is arrived at by dividing the company's net after-tax profit, less dividends on preference shares, by the ordinary shares outstanding.

Risk reversal: A specific manner of quoting similar out-of-the-money call and put options, usually foreign exchange options. Instead of quoting the prices of these options, dealers quote their volatility. The greater the demand for an options contract, the greater its volatility and its price. A positive risk reversal means that the volatility of calls is greater than the volatility of similar puts, which implies that more market participants are betting on an appreciation of the currency than on a sizeable depreciation.

Risk-weighted asset: An asset that is weighted by factors representing its riskiness and potential for default, i.e. in line with the concept developed by the Basel Committee on Banking Supervision (BCBS) for its capital adequacy requirements.

Secondary market: A market in which existing securities (i.e. issues that have already been sold or placed through an initial private or public offering) are traded.

Securitisation: The process of issuing new negotiable securities backed by existing assets such as loans, mortgages, credit card debt, or other assets (including accounts receivable).

Senior debt: Debt that has precedence over other obligations with respect to repayment if the loans made to a company are called in for repayment. Such debt is generally issued as loans of various types with different risk/return profiles, repayment conditions and maturities.

Skewness: A measure of data distributions that shows whether large deviations from the mean are more likely towards one side than towards the other. In the case of a symmetrical distribution, deviations either side of the mean are equally likely. Positive skewness means that large upward deviations are more likely than large downward ones. Negative skewness means that large downward deviations are more likely than large upward ones.

Solvency ratio: The ratio of a bank's own assets to its liabilities, i.e. a measure used to assess a bank's ability to meet its long-term obligations and thereby remain solvent. The higher the ratio, the more sound the bank.

Sovereign wealth fund (SWF): A special investment fund created/owned by a government to hold assets for long-term purposes; it is typically funded from reserves or other foreign currency sources, including commodity export revenues, and predominantly has significant ownership of foreign currency claims on non-residents.

Special-purpose vehicle (SPV): A legal entity set up to acquire and hold certain assets on its balance sheet and to issue securities backed by those assets for sale to third parties.

Speculative-grade bond: A bond that has a credit rating that is not investment grade, i.e. below that determined by bank regulators to be suitable for investments, currently "Baa" (Moody's) or "BBB" (Standard & Poor's).

Strangle: An options strategy that involves buying a put option with a strike price below that of the underlying asset, and a call option with a strike price above that of the underlying asset (i.e. strike

prices that are both out-of-the-money). Such an options strategy is profitable only if there are large movements in the price of the underlying asset.

Stress testing: The estimation of credit and market valuation losses that would result from the realisation of extreme scenarios, so as to determine the stability of the financial system or entity.

Structured credit product: A transaction in which a bank, typically, sells a pool of loans it has originated itself to a bankruptcy-remote special-purpose vehicle (SPV), which pays for these assets by issuing tranches of a set of liabilities with different seniorities.

Structured investment vehicle (SIV): A special-purpose vehicle (SPV) that undertakes arbitrage activities by purchasing mostly highly rated medium and long-term, fixed income assets and that funds itself with cheaper, mostly short-term, highly rated commercial paper and medium-term notes (MTNs). While there are a number of costs associated with running a structured investment vehicle, these are balanced by economic incentives: the creation of net spread to pay subordinated noteholder returns and the creation of management fee income. Vehicles sponsored by financial institutions also have the incentive to create off-balance-sheet fund management structures with products that can be fed to existing and new clients by way of investment in the capital notes of the vehicle.

Subordinated debt: A debt that can only be claimed by an unsecured creditor, in the event of a liquidation, after the claims of secured creditors have been met, i.e. the rights of the holders of the stock of debt are subordinate to the interests of depositors. Debts involving speculative-grade bonds are always subordinated to debts vis-à-vis banks, irrespective of whether or not they are secured.

Subordination: A mechanism to protect higher-rated tranches against shortfalls in cash flows from underlying collateral provided in the form of residential mortgage-backed securities (RMBSs), by way of which losses from defaults of the underlying mortgages are applied to junior tranches before they are applied to more senior tranches. Only once a junior tranche is completely exhausted will defaults impair the next tranche. Consequently, the most senior tranches are extremely secure against credit risk, are rated "AAA", and trade at lower spreads.

Sub-prime borrower: A borrower with a poor credit history and/or insufficient collateral who does not, as a consequence thereof, qualify for a conventional loan and can borrow only from lenders that specialise in dealing with such borrowers. The interest rates charged on loans to such borrowers include a risk premium, so that it is offered at a rate above prime to individuals who do not qualify for prime rate loans.

TARGET (Trans-European Automated Real-time Gross settlement Express Transfer system): A payment system comprising a number of national real-time gross settlement (RTGS) systems and the ECB payment mechanism (EPM). The national RTGS systems and the EPM are interconnected by common procedures (interlinking) to provide a mechanism for the processing of euro payments throughout the euro area and some non-euro area EU Member States.

TARGET2: New generation of TARGET, designed to offer a harmonised level of service on the basis of a single technical platform, through which all payment transactions are submitted and processed in the same technical manner.

Term auction facility (TAF): A form of central bank credit (liquidity) facility.

Tier 1 capital: Equity represented by ordinary shares and retained profit or earnings plus qualifying non-cumulative preference shares (up to a maximum of 25% of total Tier 1 capital) plus minority interests in equity accounts of consolidated subsidiaries. The level of Tier 1 capital is a measure of the capital adequacy of a bank, which is calculated as the ratio of a bank's core equity capital to its total risk-weighted assets.

Tier 2 capital: The second most reliable form of financial capital, from a regulator's point of view, that is also used as a measure of a bank's financial strength. It includes, according to the concept developed by the Basel Committee on Banking Supervision (BCBS) for its capital adequacy requirements, undisclosed reserves, revaluation reserves, general provisions, hybrid instruments and subordinated term debt.

Triggers of net asset value (NAV) cumulative decline: Triggers of total NAV or NAV-per-share cumulative decline represent contractual termination events which allow counterparties to terminate transactions and seize the collateral held.

Value at risk (VaR): A risk measure of a portfolio's maximum loss during a specific period of time at a given level of probability.

Variation margin: In margin deposit trading, these are the funds required to be deposited by an investor when a price movement has caused funds to fall below the initial margin requirement. Conversely, funds may be withdrawn by an investor when a price movement has caused funds to rise above the margin requirement.

Write-down: An adjustment to the value of loans recorded on the balance sheets of financial institutions. A loan is written down when it is recognised as having become partly unrecoverable, and its value on the balance sheet is reduced accordingly.

Write-off: An adjustment to the value of loans recorded on the balance sheets of financial institutions. A loan is written off when it is considered to be totally unrecoverable, and is removed from the balance sheet.

Yield curve: A curve describing the relationship between the interest rate or yield and the maturity at a given point in time for debt securities with the same credit risk but different maturity dates. The slope of the yield curve can be measured as the difference between the interest rates at two selected maturities.

STATISTICAL ANNEX

1 EXTERNAL ENVIRONMENT

2 INTERNATIONAL FINANCIAL MARKETS

3 EURO AREA ENVIRONMENT

4 EURO AREA FINANCIAL MARKETS

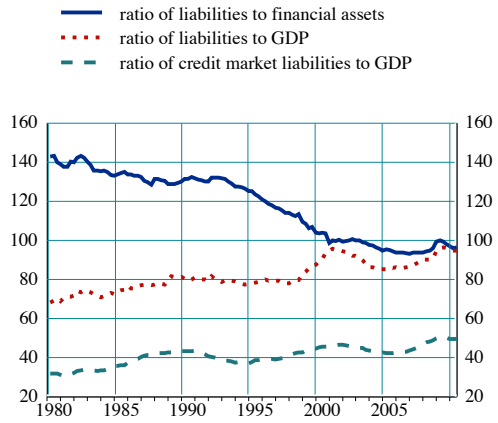
5 EURO AREA FINANCIAL INSTITUTIONS

6 EURO AREA FINANCIAL SYSTEM INFRASTRUCTURES

I EXTERNAL ENVIRONMENT

Chart S1 US non-farm, non-financial corporate sector business liabilities

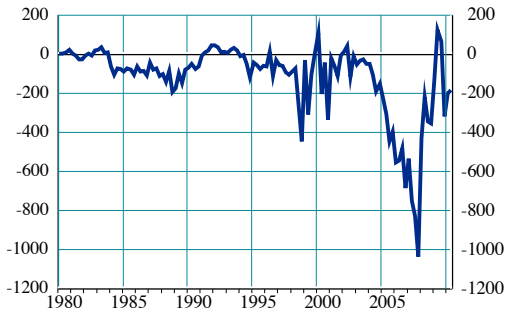
(Q1 1980 - Q2 2010; percentage)



Sources: Thomson Reuters Datastream, Bank for International Settlements (BIS), Eurostat and ECB calculations.

Chart S2 US non-farm, non-financial corporate sector business net equity issuance

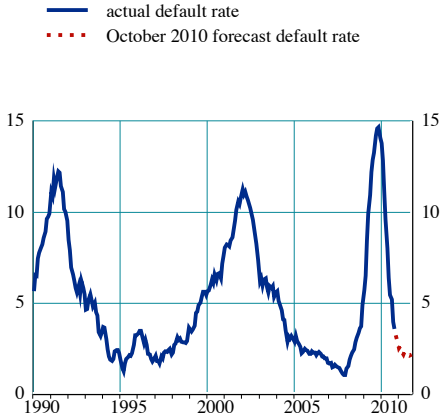
(Q1 1980 - Q2 2010; USD billions; seasonally adjusted and annualised quarterly data)



Source: BIS.

Chart S3 US speculative-grade corporations' actual and forecast default rates

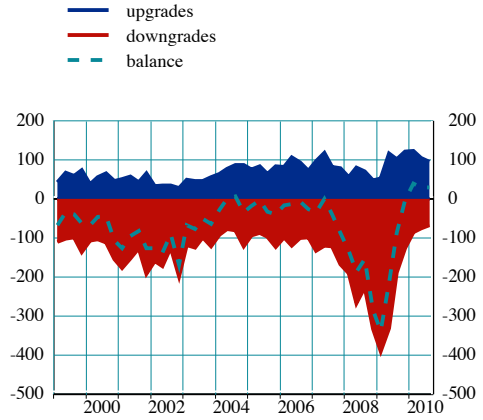
(Jan. 1990 - Oct. 2011; percentage; 12-month trailing sum)



Source: Moody's.

Chart S4 US corporate sector rating changes

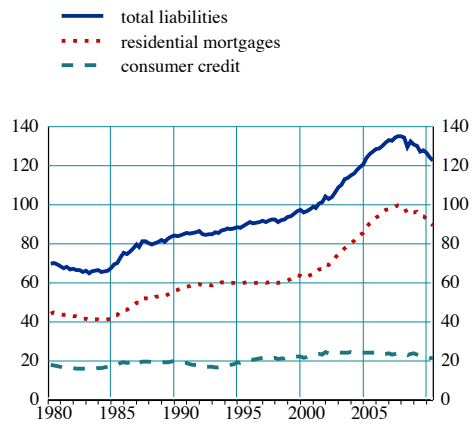
(Q1 1999 - Q3 2010; number)



Sources: Moody's and ECB calculations.

Chart S5 US household sector debt

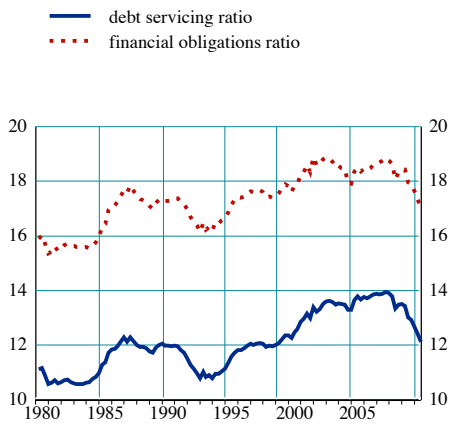
(Q1 1980 - Q2 2010; percentage of disposable income)



Sources: Thomson Reuters Datastream, BIS and ECB

Chart S6 US household sector debt burden

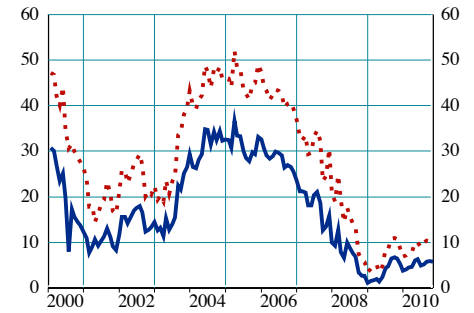
(Q1 1980 - Q2 2010; percentage of disposable income)



Source: Thomson Reuters Datastream.
Notes: The debt servicing ratio represents the amount of debt payments as a percentage of disposable income. The financial obligations ratio also includes automobile lease payments, rental payments on tenant-occupied property, homeowners' insurance and property tax payments.

Chart S7 Share of adjustable-rate mortgages in the United States

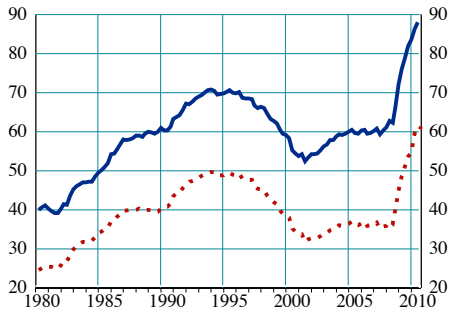
(Jan. 2000 - Oct. 2010; percentage of total new mortgages)



Source: Thomson Reuters Datastream.

Chart S8 US general government and federal debt

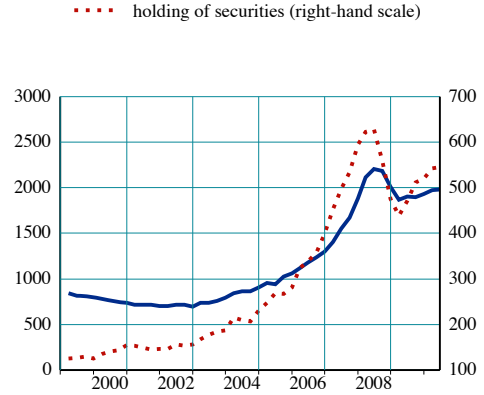
(Q1 1980 - Q3 2010; percentage of GDP)



Sources: Board of Governors of the Federal Reserve System, Eurostat, Thomson Reuters Datastream and ECB calculations.
Note: General government gross debt comprises federal, state and local government gross debt.

Chart S9 International positions of all BIS reporting banks vis-à-vis emerging markets

(Q1 1999 - Q2 2010; USD billions)



Sources: BIS and ECB calculations.

Table S1 Financial vulnerability indicators for selected emerging market economies

	Real GDP growth (% change per annum)			Inflation (% change per annum)			Current account balance (% of GDP)		
	2009	2010	2011	2009	2010	2011	2009	2010	2011
Asia									
China	9.1	10.5	9.6	0.7	3.5	2.7	6.0	4.7	5.1
Hong Kong	-2.8	6.0	4.7	-2.3	2.7	3.0	8.7	8.3	8.3
India	5.7	9.7	8.4	15.0	8.6	5.7	-2.9	-3.1	-3.1
Indonesia	4.5	6.0	6.2	2.8	5.9	5.8	2.0	0.9	0.1
Korea	0.2	6.1	4.5	2.8	3.0	3.5	5.1	2.6	2.9
Malaysia	-1.7	6.7	5.3	1.2	2.2	2.1	16.5	14.7	13.8
Singapore	-1.3	15.0	4.5	-0.8	4.1	1.1	17.8	20.5	18.4
Taiwan	-1.9	9.3	4.4	-6.4	2.3	1.5	11.3	10.0	9.5
Thailand	-2.2	7.5	4.0	3.5	1.5	5.8	7.7	3.6	2.5
Emerging Europe									
Russia	-7.9	4.0	4.3	8.8	7.5	6.8	4.0	4.7	3.7
Turkey	-4.7	7.8	3.6	6.5	7.6	6.2	-2.3	-5.2	-5.4
Ukraine	-15.1	3.7	4.5	12.3	12.0	9.8	-1.5	-0.4	-1.3
Latin America									
Argentina	0.9	7.5	4.0	7.7	11.0	11.0	2.0	1.7	1.2
Brazil	-0.2	7.5	4.1	4.3	5.2	4.8	-1.5	-2.6	-3.0
Chile	-1.5	5.0	6.0	-1.4	3.7	3.0	2.6	-0.7	-2.0
Colombia	0.8	4.7	4.6	2.0	3.2	3.3	-2.2	-2.7	-2.8
Mexico	-6.5	5.0	3.9	3.5	4.5	3.0	-0.6	-1.2	-1.4
Venezuela	-3.3	-1.3	0.5	25.1	33.3	31.0	2.6	7.8	8.2

Sources: International Monetary Fund (IMF) and ECB calculations.
Notes: Data for 2010 and 2011 are forecasts. In the case of current account balance for Chile and India the data for 2009 are estimates.

Table S2 Financial condition of global large and complex banking groups

(2005 - H1 2010)

	Minimum	First quartile	Median	Average	Weighted average [1]	Third quartile	Maximum
	Return on shareholders' equity (%)						
2005	7.91	14.93	15.91	17.03	16.35	18.05	28.71
2006	12.47	15.25	17.98	18.17	16.40	21.41	24.91
2007	-11.34	8.34	11.16	10.87	10.36	13.73	26.72
2008	-52.01	-17.23	3.36	-5.12	-6.49	5.71	14.18
2009	-12.98	-2.74	2.71	3.43	4.15	7.09	18.67
2010 H1	0.34	7.83	9.44	9.13	7.99	11.54	15.72
	Return on risk-weighted assets (%)						
2005	1.00	1.66	1.82	2.12	1.94	2.32	4.78
2006	1.45	1.61	2.00	2.34	1.92	2.92	4.35
2007	-1.33	1.24	1.46	1.25	1.16	1.82	2.27
2008	-6.97	-2.78	0.50	-0.70	-0.84	0.61	2.60
2009	-2.78	-0.48	0.44	0.43	0.61	0.98	3.10
2010 H1	0.05	1.26	1.44	1.75	1.22	2.37	4.09
	Total operating income (% of total assets)						
2005	2.07	3.08	3.89	3.88	3.56	4.48	5.91
2006	2.08	2.73	3.72	3.91	3.46	4.76	6.63
2007	1.41	2.68	3.54	3.45	2.85	4.11	5.85
2008	0.37	1.38	3.08	2.93	2.27	3.76	6.16
2009	1.95	2.34	3.07	3.65	3.39	4.94	6.20
2010 H1	2.06	2.66	4.21	4.00	3.61	5.23	6.27
	Net income (% of total assets)						
2005	0.39	0.71	0.80	0.89	0.86	1.00	1.65
2006	0.43	0.67	0.88	1.03	0.86	1.14	2.76
2007	-0.22	0.36	0.81	0.63	0.51	0.94	1.04
2008	-1.43	-0.70	0.23	-0.08	-0.33	0.26	1.04
2009	-1.19	-0.15	0.25	0.17	0.27	0.58	1.58
2010 H1	0.02	0.53	0.64	0.64	0.52	0.92	1.14
	Net loan impairment charges (% of total assets)						
2005	-0.02	0.05	0.23	0.23	0.26	0.38	0.53
2006	-0.02	-0.01	0.22	0.23	0.26	0.36	0.57
2007	-0.01	0.02	0.33	0.33	0.35	0.51	0.77
2008	0.04	0.15	0.65	0.71	0.75	0.99	1.74
2009	0.05	0.14	0.85	0.94	1.19	1.57	2.18
2010 H1	-0.01	0.03	0.64	0.69	0.81	1.08	1.54
	Cost-to-income ratio (%)						
2005	48.73	53.48	65.71	62.31	59.27	69.95	75.39
2006	46.87	52.87	60.42	59.75	57.62	66.79	71.60
2007	49.43	57.39	59.28	66.56	63.55	70.96	111.32
2008	48.63	62.33	67.67	76.92	73.50	88.97	133.20
2009	35.79	53.75	59.64	67.83	58.07	72.91	119.14
2010 H1	46.15	54.43	61.35	61.23	28.94	69.28	74.30
	Tier 1 ratio (%)						
2005	6.90	8.08	8.50	9.19	8.62	10.15	12.80
2006	7.50	8.20	8.64	9.67	8.86	10.65	13.90
2007	6.87	7.55	8.40	8.69	8.01	9.31	11.20
2008	8.00	9.15	11.00	12.17	10.65	13.30	20.30
2009	9.60	11.10	13.00	13.27	11.95	15.30	17.70
2010 H1	10.30	11.99	13.20	13.50	12.35	15.20	16.50
	Overall solvency ratio (%)						
2005	10.90	11.45	12.02	12.36	11.99	13.25	14.10
2006	10.70	11.70	12.30	13.17	12.43	14.10	18.40
2007	10.70	11.11	12.20	12.26	11.92	12.98	14.50
2008	11.20	13.60	15.00	16.24	14.65	17.90	26.80
2009	12.40	14.80	16.10	16.43	15.26	18.20	20.60
2010 H1	13.40	14.77	16.40	16.57	15.51	17.20	21.80

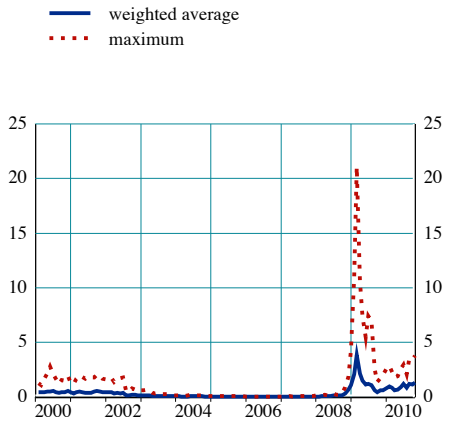
Sources: Bloomberg, individual institutions' financial reports and ECB calculations.

Notes: Based on available figures for 13 global large and complex banking groups. Figures for H1 2010 are annualised.

1) The respective denominators are used as weights, i.e. the total operating income is used in the case of the "Cost-to-income ratio", while the risk-weighted assets are used for the "Tier 1 ratio" and the "Overall solvency ratio".

Chart S10 Expected default frequency (EDF) for global large and complex banking groups

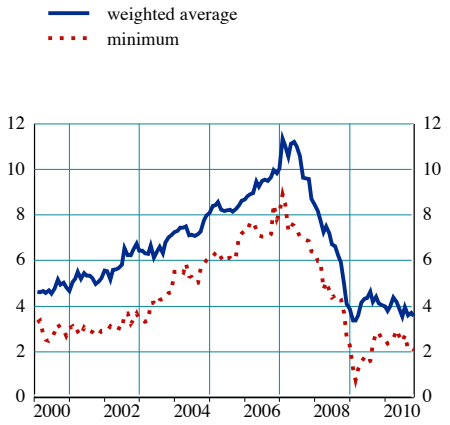
(Jan. 2000 - Oct. 2010; percentage probability)



Sources: Moody's KMV and ECB calculations.
Notes: The EDF provides an estimate of the probability of default over the following year. Due to measurement considerations, the EDF values are restricted by Moody's KMV to the interval between 0.01% and 35%. The weighted average is based on the amounts of non-equity liabilities outstanding.

Chart S11 Distance-to-default for global large and complex banking groups

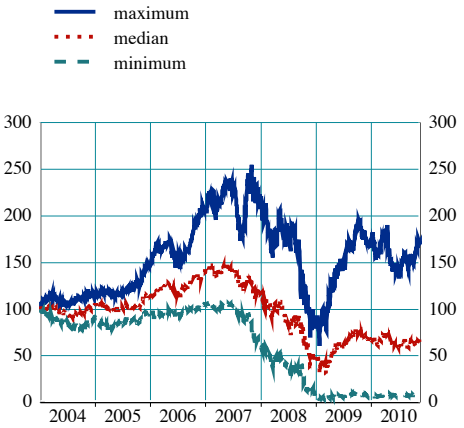
(Jan. 2000 - Oct. 2010)



Sources: Moody's KMV and ECB calculations.
Notes: An increase in the distance-to-default reflects an improving assessment. The weighted average is based on the amounts of non-equity liabilities outstanding.

Chart S12 Equity prices for global large and complex banking groups

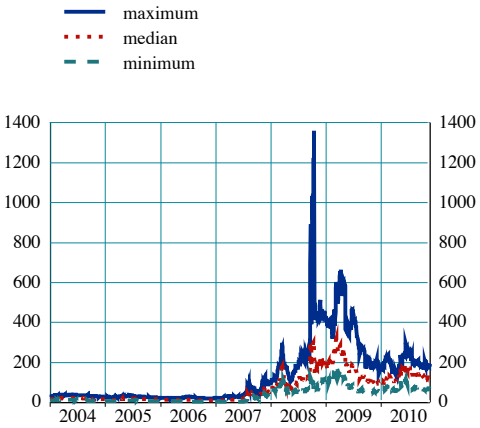
(Jan. 2004 - Nov. 2010; index: Jan. 2004 = 100)



Sources: Bloomberg and ECB calculations.

Chart S13 Credit default swap spreads for global large and complex banking groups

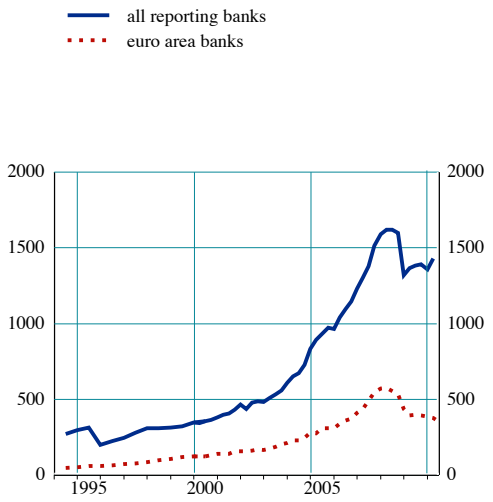
(Jan. 2004 - Nov. 2010; basis points; senior debt five-year maturity)



Sources: Bloomberg and ECB calculations.

Chart S14 Global consolidated claims on non-banks in offshore financial centres

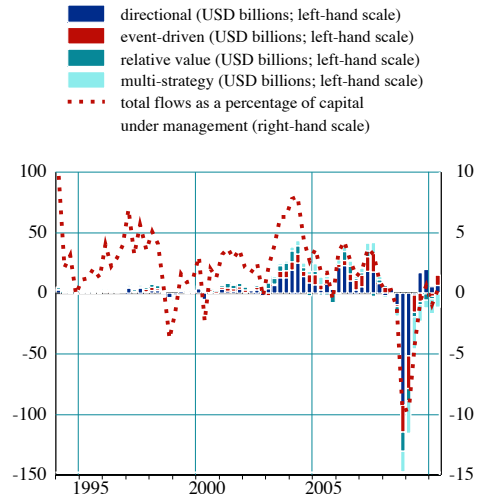
(Q1 1994 - Q2 2010; USD billions; quarterly data)



Sources: BIS and ECB calculations.
Note: Aggregate for euro area banks derived as the sum of claims on non-banks in offshore financial centres of euro area 12 countries (i.e. euro area excluding Cyprus, Malta, Slovakia and Slovenia).

Chart S15 Global hedge fund net flows

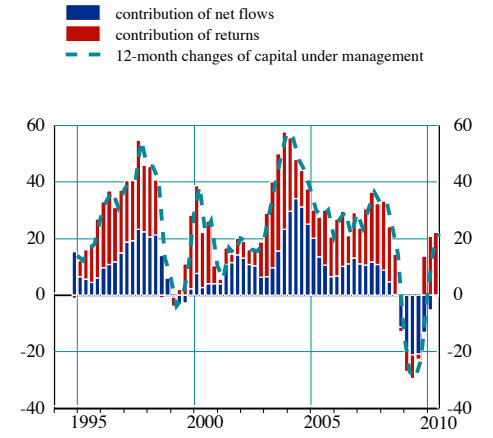
(Q1 1994 - Q2 2010)



Sources: Lipper TASS and ECB calculations.
Notes: Excluding funds of hedge funds. The directional group includes long/short equity hedge, global macro, emerging markets, dedicated short-bias and managed futures strategies. The relative-value group consists of convertible arbitrage, fixed income arbitrage and equity market-neutral strategies.

Chart S16 Decomposition of the annual rate of growth of global hedge fund capital under management

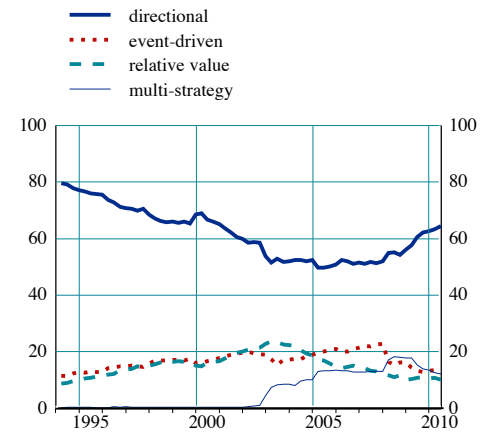
(Q4 1994 - Q2 2010; percentage)



Sources: Lipper TASS and ECB calculations.
Notes: Excluding funds of hedge funds. The estimated quarterly return to investors equals the difference between the change in capital under management and net flows. In this dataset, capital under management totalled USD 1.2 trillion at the end of December 2009.

Chart S17 Structure of global hedge fund capital under management

(Q1 1994 - Q2 2010; percentage)

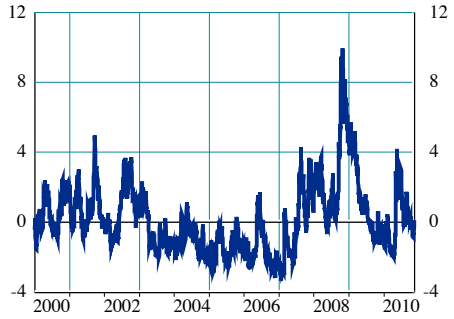


Sources: Lipper TASS and ECB calculations.
Notes: Excluding funds of hedge funds. The directional group includes long/short equity hedge, global macro, emerging markets, dedicated short-bias and managed futures strategies. The relative-value group consists of convertible arbitrage, fixed income arbitrage and equity market-neutral strategies.

2 INTERNATIONAL FINANCIAL MARKETS

Chart S18 Global risk aversion indicator

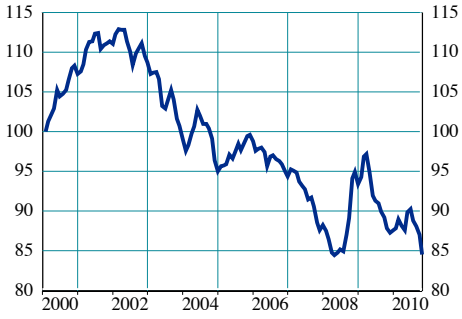
(Jan. 2000 - Nov. 2010)



Sources: Bloomberg, Bank of America Merrill Lynch, UBS, Commerzbank and ECB calculations.
Notes: The indicator is constructed as the first principal component of five risk aversion indicators currently available. 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.

Chart S19 Real broad USD effective exchange rate index

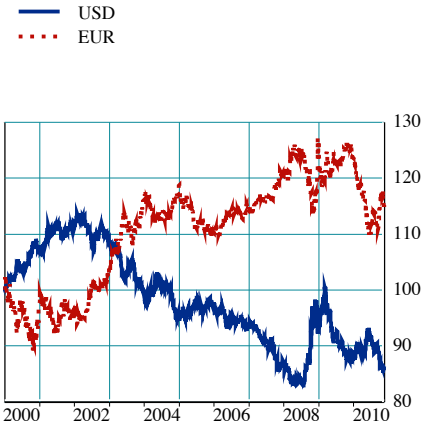
(Jan. 2000 - Oct. 2010; index: Jan. 2000 = 100)



Source: Thomson Reuters Datastream.
Notes: Weighted average of the foreign exchange values of the US dollar against the currencies of a large group of major US trading partners, deflated by the US consumer price index. For further details, see "Indexes of the foreign exchange value of the dollar", *Federal Reserve Bulletin*, Winter 2005.

Chart S20 Selected nominal effective exchange rate indices

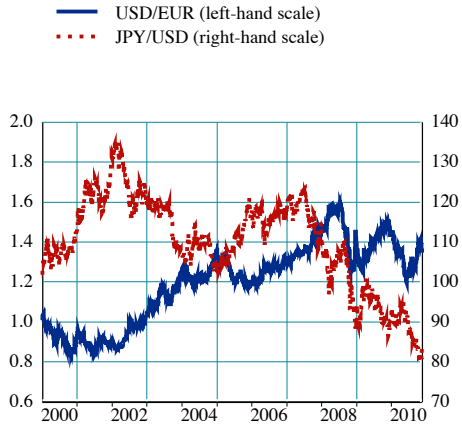
(Jan. 2000 - Nov. 2010; index: Jan. 2000 = 100)



Sources: Bloomberg and ECB.
Notes: Weighted averages of bilateral exchange rates against major trading partners of the euro area and the United States. For further details in the case of the euro area, see ECB, "The effective exchange rates of the euro", *Occasional Paper Series*, No 2, February 2002. For the United States see the note of Chart S19.

Chart S21 Selected bilateral exchange rates

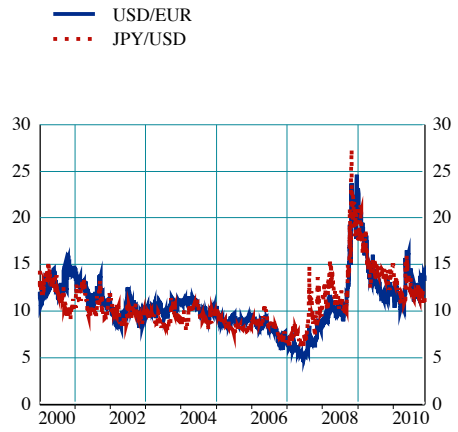
(Jan. 2000 - Nov. 2010)



Source: ECB.

Chart S22 Selected three-month implied foreign exchange market volatility

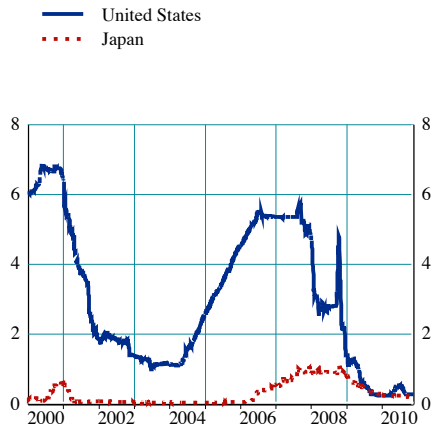
(Jan. 2000 - Nov. 2010; percentage)



Source: Bloomberg.

Chart S23 Three-month money market rates in the United States and Japan

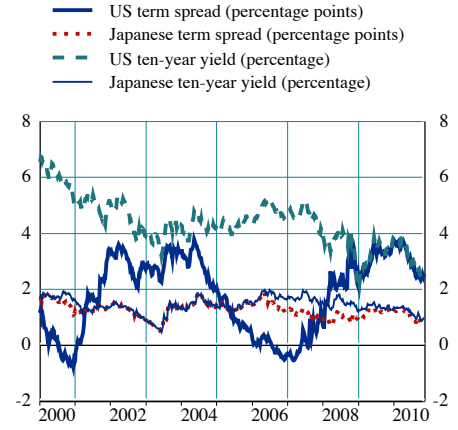
(Jan. 2000 - Nov. 2010; percentage)



Source: Thomson Reuters.
Note: US Dollar and Japanese Yen 3-month LIBOR.

Chart S24 Government bond yields and term spreads in the United States and Japan

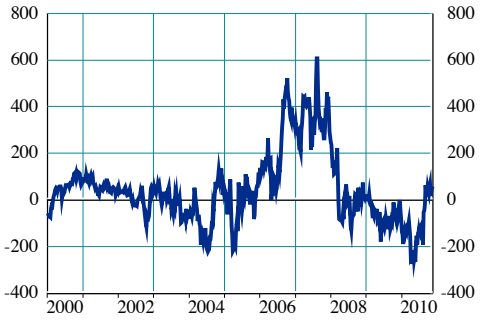
(Jan. 2000 - Nov. 2010)



Sources: Bloomberg, Thomson Reuters and ECB calculations.
Note: The term spread is the difference between the yield on ten-year bonds and that on three month T-bills.

Chart S25 Net non-commercial positions in ten-year US Treasury futures

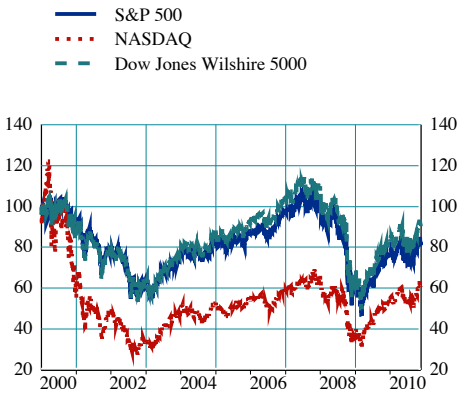
(Jan. 2000 - Nov. 2010; thousands of contracts)



Sources: Bloomberg and ECB calculations.
Notes: Futures traded on the Chicago Board of Trade.
Non-commercial futures contracts are contracts bought for purposes other than hedging.

Chart S26 Stock prices in the United States

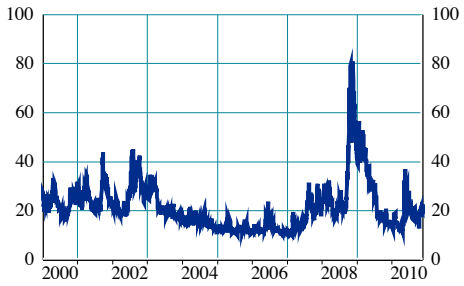
(Jan. 2000 - Nov. 2010; index: Jan. 2000 = 100)



Sources: Bloomberg, Thomson Reuters and ECB calculations.

Chart S27 Implied volatility for the S&P 500 index

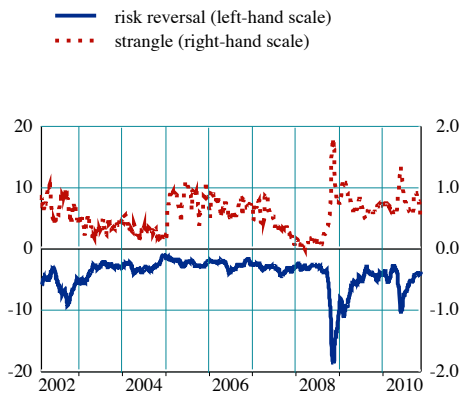
(Jan. 2000 - Nov. 2010; percentage)



Source: Thomson Reuters Datastream.
Notes: Chicago Board Options Exchange (CBOE) Volatility Index (VIX). Data calculated as a weighted average of the closest options.

Chart S28 Risk reversal and strangle of the S&P 500 index

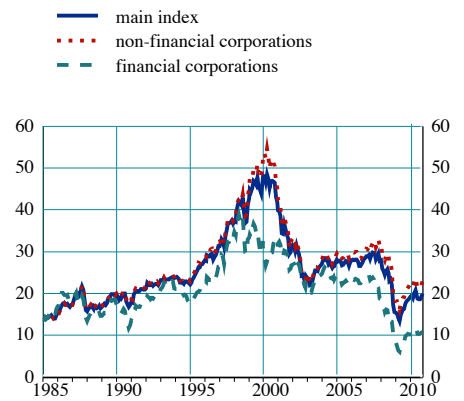
(Feb. 2002 - Nov. 2010; percentage; implied volatility; 20-day moving average)



Sources: Bloomberg and ECB calculations.
Notes: The risk-reversal indicator is calculated as the difference between the implied volatility of an out-of-the-money (OTM) call with 25 delta and the implied volatility of an OTM put with 25 delta. The strangle is calculated as the difference between the average implied volatility of OTM calls and puts, both with 25 delta, and the at-the-money volatility of calls and puts with 50 delta.

Chart S29 Price/earnings (P/E) ratio for the US stock market

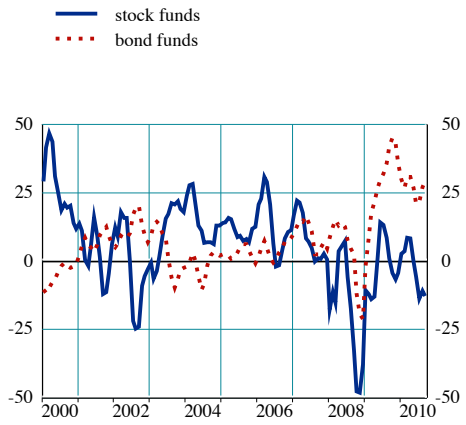
(Jan. 1985 - Oct. 2010; percentage; ten-year trailing earnings)



Sources: Thomson Reuters Datastream and ECB calculations.
Note: The P/E ratio is based on prevailing stock prices relative to an average of the previous ten years of earning.

Chart S30 US mutual fund flows

(Jan. 2000 - Sep. 2010; USD billions; three-month moving average)



Source: Thomson Reuters Datastream.

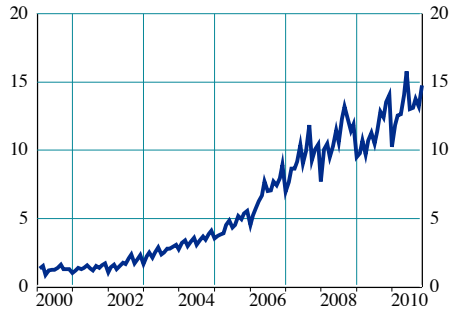
Chart S31 Debit balances in New York Stock Exchange margin accounts

(Jan. 2000 - July 2010; USD billions)

Source: Bloomberg.
Note: Borrowing to buy stocks "on margin" allows investors to use loans to pay for up to 50% of the price of a stock.

Chart S32 Open interest in options contracts on the S&P 500 index

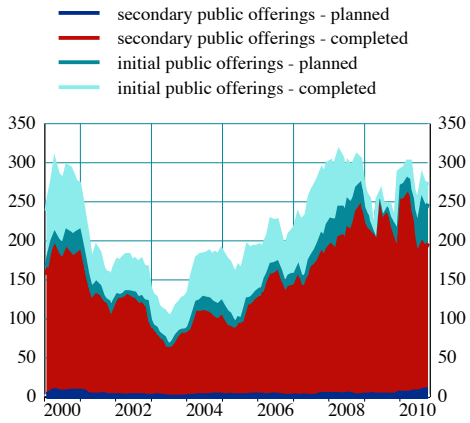
(Jan. 2000 - Oct. 2010; millions of contracts)



Source: Bloomberg.

Chart S33 Gross equity issuance in the United States

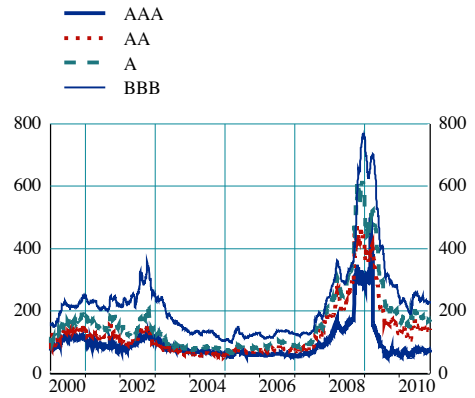
(Jan. 2000 - Oct. 2010; USD billions)



Source: Thomson ONE Banker.

Chart S34 US investment-grade corporate bond spreads

(Jan. 2000 - Nov. 2010; basis points)



Source: Merrill Lynch.
Note: Options-adjusted spread of the seven to ten-year corporate bond indices.

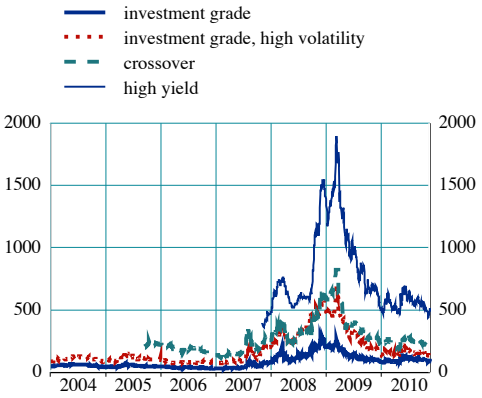
Chart S35 US speculative-grade corporate bond spreads

(Jan. 2000 - Nov. 2010; basis points)

Source: Merrill Lynch.
Note: Options-adjusted spread of the US domestic high-yield index (average rating B+, average maturity of 7½ years).

Chart S36 US credit default swap indices

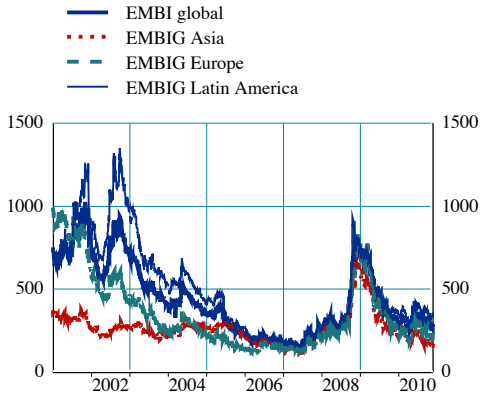
(Jan. 2004 - Nov. 2010; basis points; five year maturity)



Sources: Bloomberg and ECB calculations.

Chart S37 Emerging market sovereign bond spreads

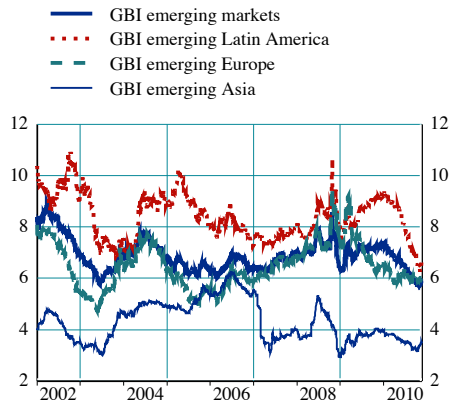
(Jan. 2001 - Nov. 2010; basis points)



Sources: Bloomberg and ECB calculations.

Chart S38 Emerging market sovereign bond yields, local currency

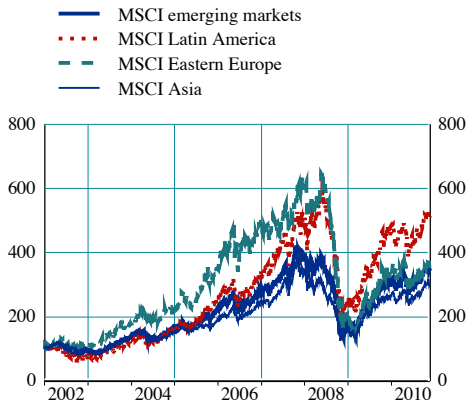
(Jan. 2002 - Nov. 2010; percentage)



Source: Bloomberg.
Note: GBI stands for "Government Bond Index".

Chart S39 Emerging market stock price indices

(Jan. 2002 - Nov. 2010; index: Jan. 2002 = 100)



Sources: Bloomberg and ECB calculations.
Note: MSCI stands for "Morgan Stanley Capital International".

Table S3 Total international bond issuance (private and public) in selected emerging markets

(USD millions)

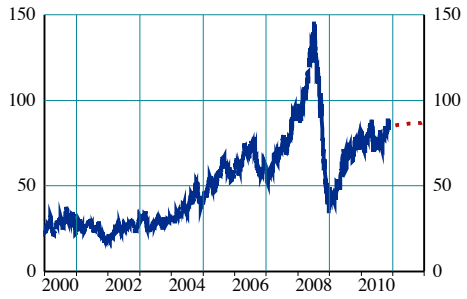
	2003	2004	2005	2006	2007	2008	2009	2010
Asia	**32,257**	**63,256**	**47,533**	**48,373**	**68,021**	**40,802**	**39,665**	**56,440**
of which								
China	1,781	4,484	5,830	1,945	2,196	0	4,400	8,320
Hong Kong	11,350	7,680	6,500	2,500	2,000	1,500	1,000	1,800
India	1,558	6,529	4,634	7,001	14,882	12,101	7,000	9,000
Indonesia	500	1,540	4,456	4,603	4,408	3,790	4,700	5,600
Malaysia	907	4,132	2,765	1,620	0	0	3,950	3,350
Singapore	1,355	1,841	1,948	2,293	2,401	1,300	800	2,000
South Korea	6,750	26,000	15,250	20,800	39,111	20,600	15,205	21,810
Taiwan	4,692	4,962	530	1,050	1,210	412	720	1,030
Thailand	300	1,400	2,236	935	765	523	370	1,000
Emerging Europe	**11,100**	**19,952**	**25,242**	**30,014**	**57,725**	**32,150**	**16,747**	**30,250**
of which								
Russia	6,686	10,140	15,620	21,342	46,283	26,520	10,500	20,000
Turkey	3,417	6,439	8,355	7,236	6,163	4,150	4,482	6,500
Ukraine	0	1,457	1,197	962	4,525	1,230	200	2,500
Latin America	**33,884**	**35,143**	**41,085**	**35,846**	**39,868**	**28,566**	**45,123**	**46,000**
of which								
Argentina	0	918	2,734	3,123	5,504	2,025	0	2,500
Brazil	13,160	10,943	14,831	15,446	16,907	16,008	19,000	21,500
Chile	2,130	2,375	1,200	1,463	250	100	1,500	2,300
Colombia	2,047	1,545	2,304	2,866	1,762	1,000	5,000	2,500
Mexico	10,181	12,024	8,804	7,769	9,093	4,431	9,000	11,500
Venezuela	3,763	4,260	6,143	100	1,250	4,650	6,000	4,000

Source: Thomson Reuters Datastream.
Notes: Data for 2009 are mainly estimates and for 2010 are forecasts. Series include gross public and private placements of bonds denominated in foreign currency and held by non-residents. Bonds issued in the context of debt restructuring operations are not included. Regions are defined as follows: Asia: China, Special Administrative Region of Hong Kong, India, Indonesia, Malaysia, South Korea, the Philippines, Singapore, Taiwan,Thailand and Vietnam; Emerging Europe: Croatia, Russia, Turkey and Ukraine; and Latin America: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, Uruguay and Venezuela.

Chart S40 The oil price and oil futures prices

(Jan. 2000 - Dec. 2011; USD per barrel)

historical price
futures prices on 18 November 2010

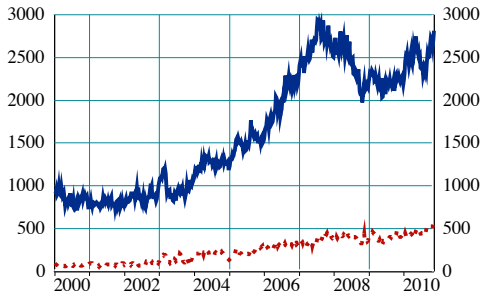


Sources: Thomson Reuters, Bloomberg and ECB calculations.

Chart S41 Crude oil futures contracts

(Jan. 2000 - Nov. 2010; thousands of contracts)

total futures contracts
non-commercial futures contracts

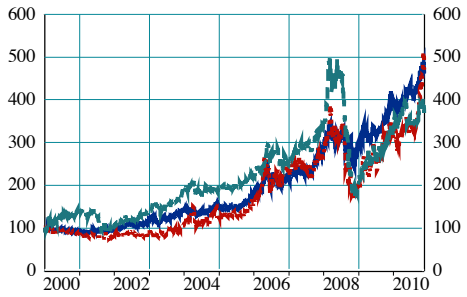


Source: Bloomberg.
Notes: Futures traded on the New York Mercantile Exchange. Non-commercial futures contracts are contracts bought for purposes other than hedging.

Chart S42 Precious metal prices

(Jan. 2000 - Nov. 2010; index: Jan. 2000 = 100)

gold
silver
platinum

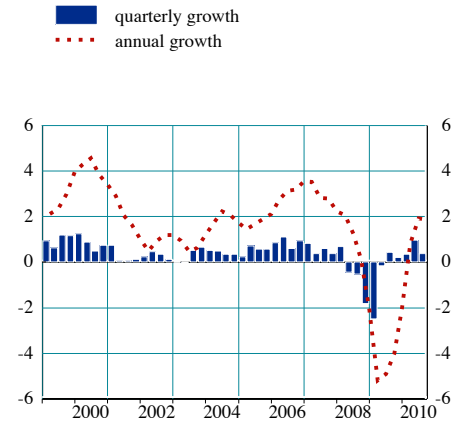


Sources: Bloomberg and ECB calculations.
Note: The indices are based on USD prices.

3 EURO AREA ENVIRONMENT

Chart S43 Real GDP growth in the euro area

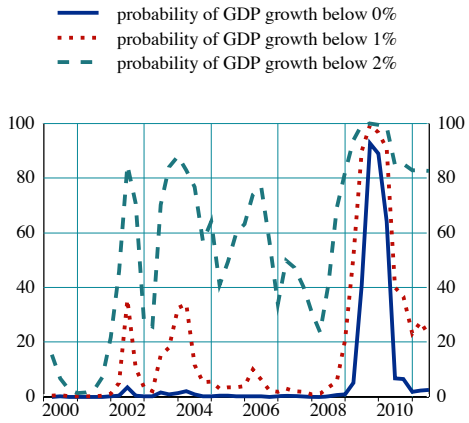
(Q1 1999 - Q3 2010; percentage change)



Sources: Eurostat and ECB calculations.

Chart S44 Survey-based estimates of the four-quarter-ahead downside risk of weak real GDP growth in the euro area

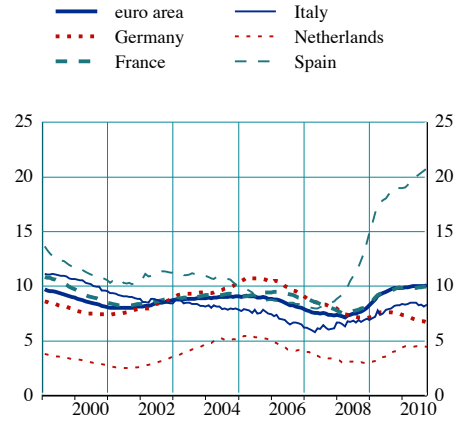
(Q1 2000 - Q2 2011; percentage)



Sources: ECB Survey of Professional Forecasters (SPF) and ECB calculations.
Notes: The indicators measure the probability of real GDP growth expectations being below the indicated threshold in each reference period. Estimates are calculated four quarters ahead after each official release of GDP figures.

Chart S45 Unemployment rate in the euro area and in selected euro area countries

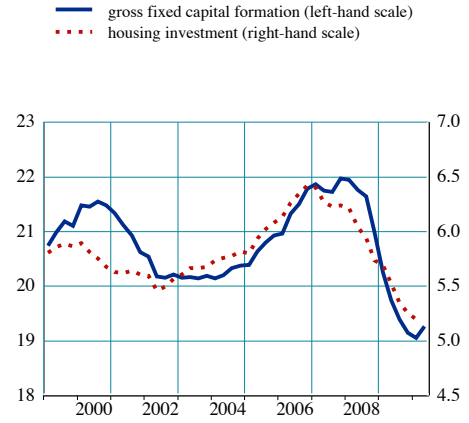
(Jan. 1999 - Sep. 2010; percentage of workforce)



Source: Eurostat.

Chart S46 Gross fixed capital formation and housing investment in the euro area

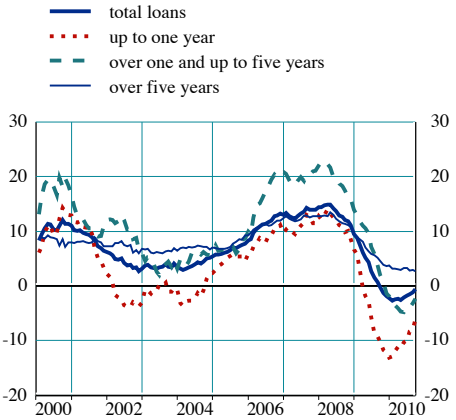
(Q1 1999 - Q2 2010; percentage of GDP)



Sources: Eurostat and ECB calculations.

Chart S47 Annual growth in MFI loans to non-financial corporations in the euro area

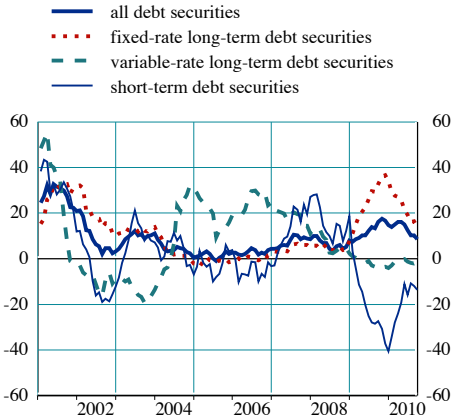
(Jan. 2000 - Sep. 2010; percentage change per annum)



Sources: ECB and ECB calculations.
Notes: Data are based on financial transactions relating to loans provided by monetary financial institutions (MFIs) and are not corrected for the impact of securitisation. For further details, see ECB, "Securitisation in the euro area", *Monthly Bulletin*, February 2008.

Chart S48 Annual growth in debt securities issued by non-financial corporations in the euro area

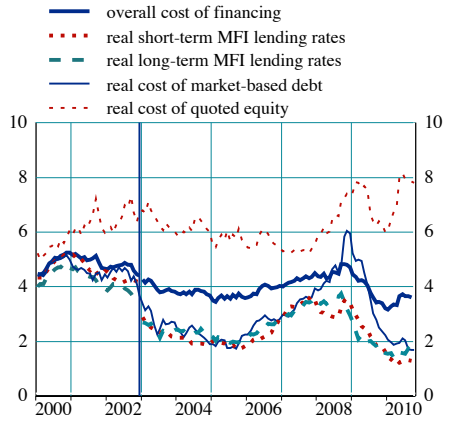
(Jan. 2001 - Sep. 2010; percentage change per annum)



Source: ECB.

Chart S49 Real cost of the external financing of euro area non-financial corporations

(Jan. 2000 - Oct. 2010; percentage)



Sources: ECB, Thomson Reuters Datastream, Merrill Lynch, Consensus Economics Forecast and ECB calculations.
Notes: The real cost of external financing is calculated as the weighted average of the cost of bank lending, the cost of debt securities and the cost of equity, based on their respective amounts outstanding and deflated by inflation expectations. The introduction of MFI interest rate statistics at the beginning of 2003 led to a statistical break in the series.

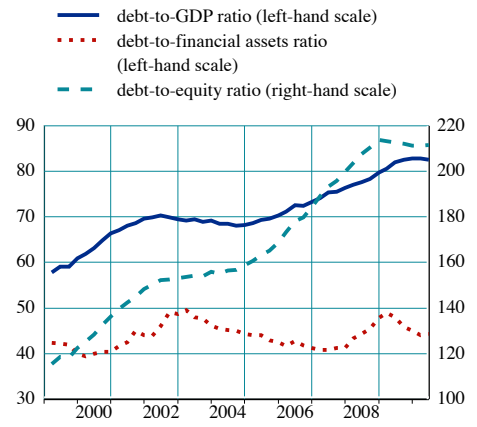
Chart S50 Net lending/borrowing of non-financial corporations in the euro area

(Q1 2000 - Q2 2010; percentage of gross value added of non-financial corporations; four-quarter moving sum)

Sources: ECB and ECB calculations.

Chart S51 Total debt of non-financial corporations in the euro area

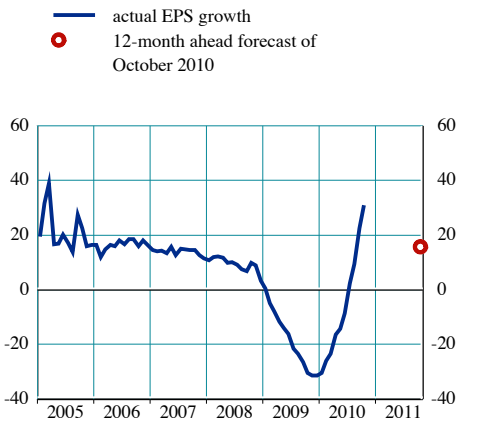
(Q1 1999 - Q2 2010; percentage)



Sources: ECB, Eurostat and ECB calculations.
Notes: Debt includes loans, debt securities issued and pension fund reserves. The debt-to-equity ratio is calculated as a percentage of outstanding quoted shares issued by non-financial corporations, excluding the effect of valuation changes.

Chart S52 Growth of earnings per share (EPS) and 12-month ahead growth forecast for euro area non-financial corporations

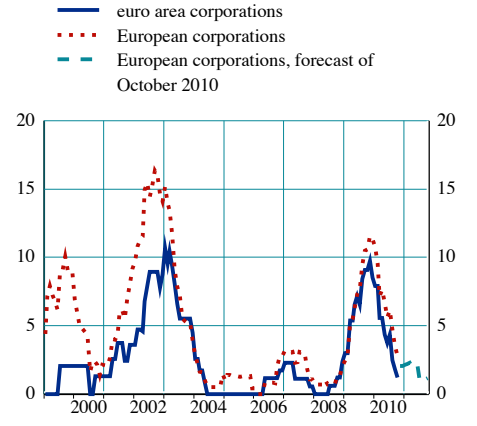
(Jan. 2005 - Oct. 2011; percentage change per annum)



Sources: Thomson Reuters Datastream and ECB calculations.
Note: Growth rates are derived on the basis of aggregated EPS of Dow Jones STOXX indices for euro area non-financial corporation sub-sectors, using 12-month trailing EPS for actual figures and 12-month ahead EPS for the forecast.

Chart S53 Euro area and European speculative-grade corporations' actual and forecast default rates

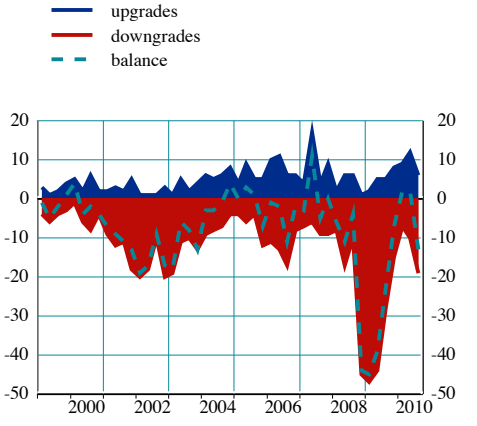
(Jan. 1999 - Oct. 2011; percentage; 12-month trailing sum)



Source: Moody's.

Chart S54 Euro area non-financial corporations' rating changes

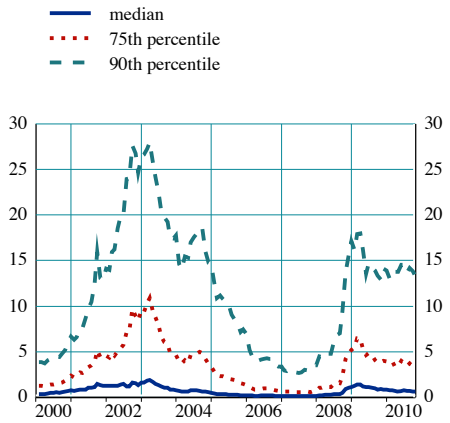
(Q1 1999 - Q3 2010; number)



Sources: Moody's and ECB calculations.

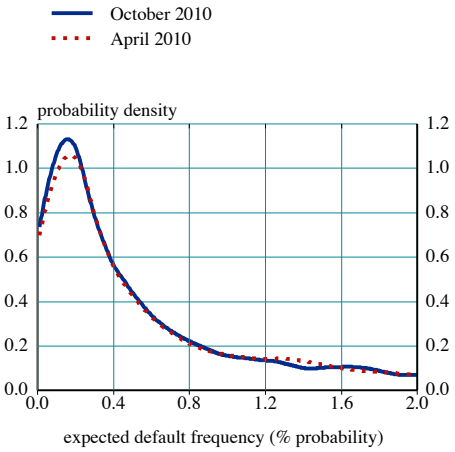
Chart S55 Expected default frequency (EDF) of euro area non-financial corporations

(Jan. 2000 - Oct. 2010; percentage probability)



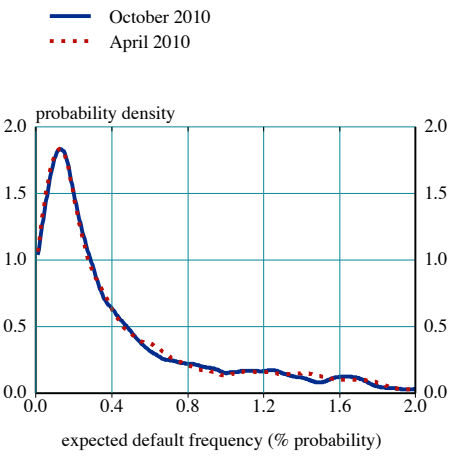
Sources: Moody's KMV and ECB calculations.
Notes: The EDF provides an estimate of the probability of default over the following year. Due to measurement considerations, the EDF values are restricted by Moody's KMV to the interval between 0.01% and 35%.

Chart S56 Expected default frequency (EDF) distributions for euro area non-financial corporations



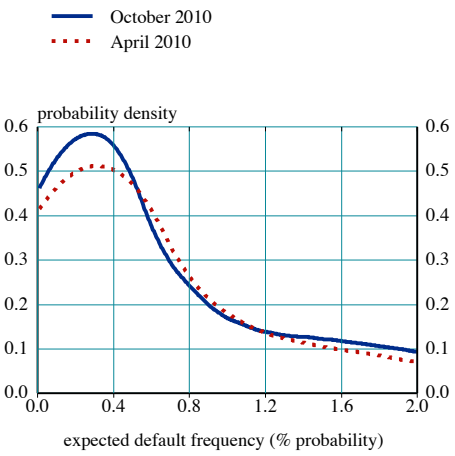
Sources: Moody's KMV and ECB calculations.

Chart S57 Expected default frequency (EDF) distributions for large euro area non-financial corporations



Sources: Moody's KMV and ECB calculations.
Note: The sample covers euro area non-financial corporations with a value of liabilities that is in the upper quartile of the distribution.

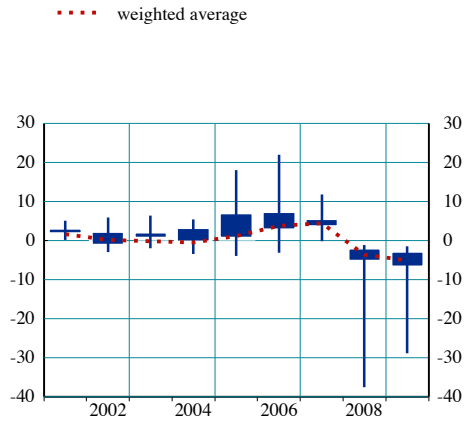
Chart S58 Expected default frequency (EDF) distributions for small euro area non-financial corporations



Sources: Moody's KMV and ECB calculations.
Note: The sample covers euro area non-financial corporations with a value of liabilities that is in the lower quartile of the distribution.

Chart S59 Euro area country distributions of commercial property capital value changes

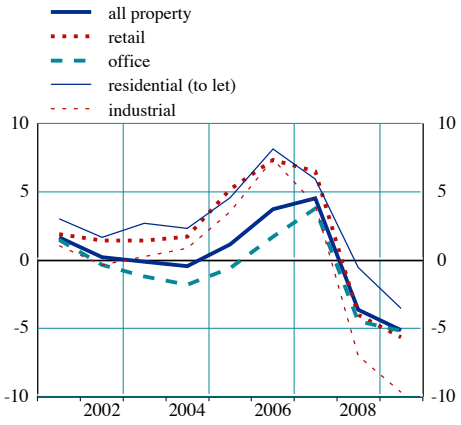
(2001 - 2009; capital values; percentage change per annum; minimum, maximum and interquantile distribution)



Sources: Investment Property databank and ECB calculations.
Notes: Distribution of country-level data, covering ten euro area countries. The coverage of the total property sector within countries ranges from around 20% to 80%. Capital values are commercial property prices adjusted downward for capital expenditure, maintenance and depreciation. The values of the national commercial property markets are used as weights for the cross-country weighted averages.

Chart S60 Euro area commercial property capital value changes in different sectors

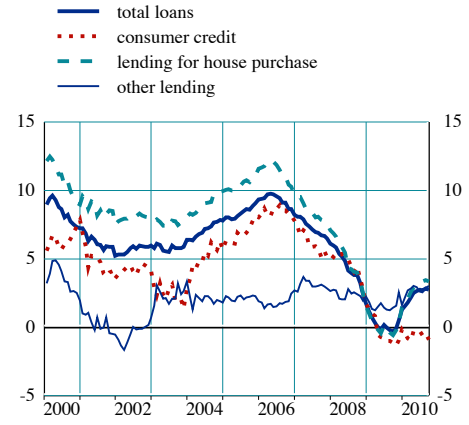
(2001 - 2009; capital values; percentage change per annum; cross-country weighted average)



Sources: Investment Property databank and ECB calculations.
Notes: The data cover ten euro area countries. The coverage of the total property sector within countries ranges from around 20% to 80%. Capital values are commercial property prices adjusted downward for capital expenditure, maintenance and depreciation. The values of the national commercial property markets are used as weights for the cross-country weighted averages.

Chart S61 Annual growth in MFI loans to households in the euro area

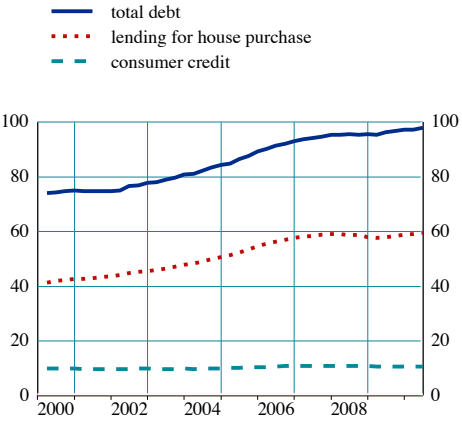
(Jan. 2000 - Sep. 2010; percentage change per annum)



Sources: ECB and ECB calculations.
Notes: Data are based on financial transactions relating to loans provided by MFIs and are not corrected for the impact of securitisation. For more details, see the note of Chart S47.

Chart S62 Household debt-to-disposable income ratios in the euro area

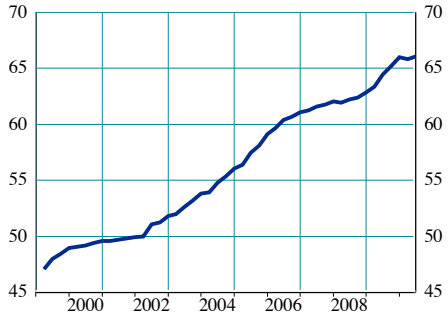
(Q1 2000 - Q2 2010; percentage of disposable income)



Sources: ECB and ECB calculations.
Note: These series are the fourth-quarter moving sums of their raw series divided by the disposable income for the respective quarter.

Chart S63 Household debt-to-GDP ratio in the euro area

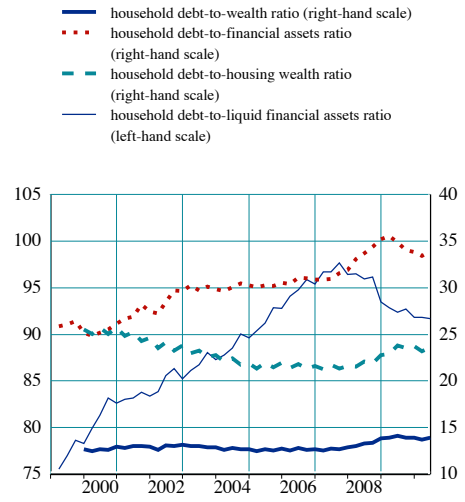
(Q1 1999 - Q2 2010; percentage)



Sources: ECB, Eurostat and ECB calculations.

Chart S64 Household debt-to-assets ratios in the euro area

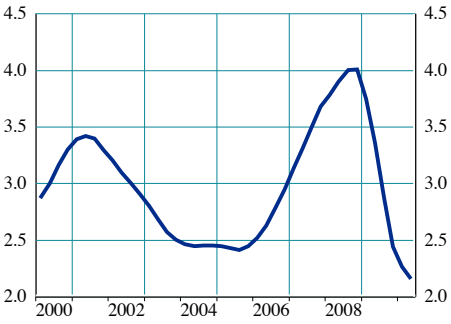
(Q1 1999 - Q2 2010; percentage)



Sources: ECB and ECB calculations.

Chart S65 Interest payment burden of the euro area household sector

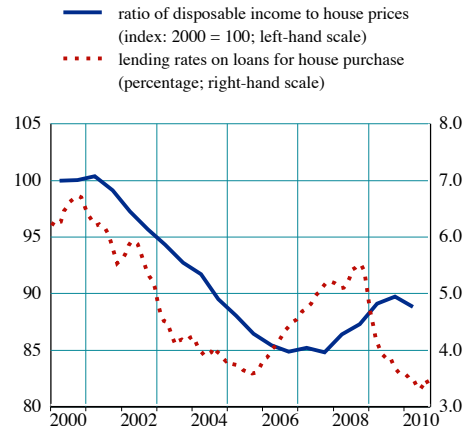
(Q1 2000 - Q2 2010; percentage of disposable income)



Source: ECB.

Chart S66 Narrow housing affordability and borrowing conditions in the euro area

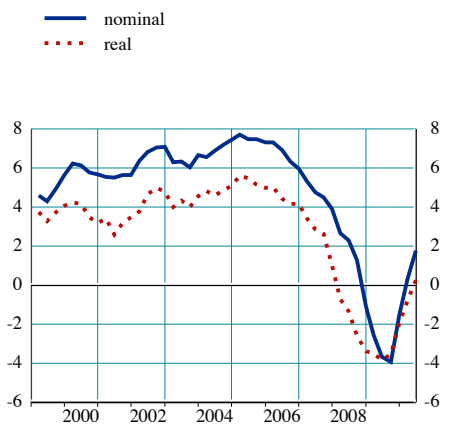
(Jan. 2000 - Sep. 2010)



Sources: ECB and ECB calculations.
Note: The narrow measure of housing affordability given above is defined as the ratio of the gross nominal disposable income to the nominal house price index.

Chart S67 Residential property price changes in the euro area

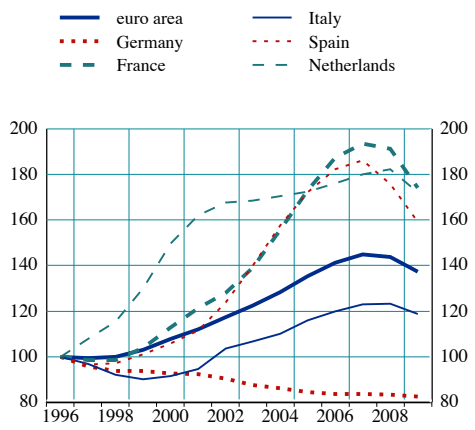
(Q1 1999 - Q2 2010; percentage change per annum)



Sources: Eurostat and ECB calculations based on national sources.
Note: The real price series has been deflated by the Harmonised Index of Consumer Prices (HICP).

Chart S68 House price-to-rent ratio for the euro area and selected euro area countries

(1996 - 2009; index: 1996 = 100)



Sources: Eurostat and ECB calculations based on national sources.
Note: For information on the sources and coverage of the series displayed, refer to Table S4. For Spain, data prior to 2007 refer to another national source.

Table S4 Changes in residential property prices in the euro area countries

(percentage change per annum)

	Weight	1999 2006	2007	2008	2009	2009 H2	2010 H1	2009 Q4	2010 Q1	2010 Q2	2010 Q3
Belgium[1]	3.8	8.0	9.3	4.9	-0.4	-0.1	4.9	1.2	3.8	6.0	5.6
Germany[2]	26.7	-0.4	1.0	1.0	0.0	-	-	-	-	-	-
Ireland[2, 3]	1.8	-	-0.5	-9.1	-13.7	-16.1	-17.9	-18.5	-18.9	-17.0	-14.8
Greece[4]	2.6	-	5.9	1.7	-3.7	-4.6	-3.3	-4.0	-1.8	-4.7	-4.3
Spain[2, 6]	11.7	-	-	-1.5	-6.7	-5.7	-1.9	-4.4	-2.9	-1.0	-
France[1, 6]	21.6	10.8	6.6	1.2	-7.1	-6.2	3.9	-4.4	1.6	6.2	8.6
Italy[2]	16.9	6.0	5.0	2.6	-0.4	-0.6	-0.3	-	-	-	-
Cyprus[2, 7]	0.2	-	15.0	13.0	-6.0	-	-	-	-	-	-
Luxembourg[2]	0.4	10.4	10.1	-	-	-	-	-	-	-	-
Malta[2]	0.1	8.9	1.1	-2.7	-5.0	-2.0	2.4	-1.4	4.5	0.5	-
Netherlands[1, 6]	6.3	8.4	4.2	2.9	-3.3	-5.1	-3.2	-5.0	-4.3	-1.9	-0.6
Austria[2, 8]	3.1	0.8	4.1	1.2	3.6	2.6	5.5	1.9	5.7	5.3	5.0
Portugal[2, 3]	1.8	3.6	1.3	3.9	0.4	-0.7	1.4	-0.6	1.3	1.6	-
Slovenia[1, 6]	0.4	-	22.6	3.1	-8.2	-8.0	2.6	-5.0	1.1	4.1	-
Slovakia[1]	0.7	-	23.9	22.1	-11.1	-13.3	-6.0	-12.3	-8.3	-3.7	-1.3
Finland[1, 6]	1.9	-	5.5	0.6	-0.3	4.1	10.9	7.9	11.4	10.3	7.8
euro area	100.0	6.3	4.6	1.3	-2.9	-2.7	1.0	-1.5	0.3	1.8	-

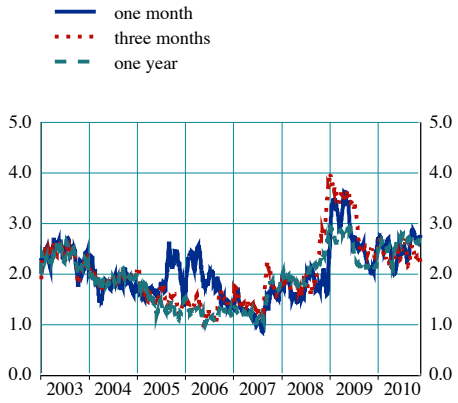
Sources: National sources and ECB calculations.
Notes: Weights are based on 2009 nominal GDP and are expressed as a percentage. The estimates of the euro area aggregate include quarterly contributions for Germany and Italy based on interpolation or temporal disaggregation of annual or semi-annual data, respectively. For Germany from 2008 on, quarterly estimates take into account early information from seven cities.

1) Existing dwellings (houses and flats); whole country.
2) All dwellings (new and existing houses and flats); whole country.
3) Series compiled by national private institutions.
4) All flats; whole country.
5) Series compiled by other national official sources.
6) Series compiled by the national statistical institutes.
7) The property price index is estimated by the Central Bank of Cyprus, using data on valuations of property received from several MFIs and other indicators relevant to the housing market.
8) Up to 2000, data are for Vienna only.

4 EURO AREA FINANCIAL MARKETS

Chart S69 Bid-ask spreads for EONIA swap rates

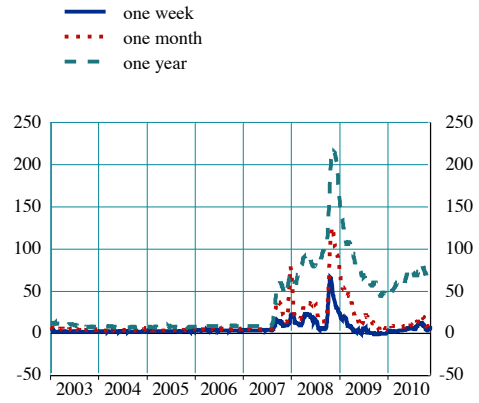
(Jan. 2003 - Nov. 2010; basis points; 20-day moving average; transaction-weighted)



Sources: Thomson Reuters and ECB calculations.

Chart S70 Spreads between euro area interbank deposit and repo interest rates

(Jan. 2003 - Nov. 2010; basis points; 20-day moving average)



Sources: Thomson Reuters and ECB calculations.

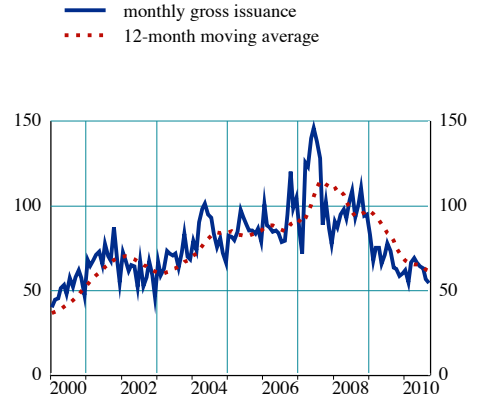
Chart S71 Implied volatility of three-month EURIBOR futures

(Jan. 2000 - Nov. 2010; percentage; 60-day moving average)

Sources: Bloomberg and ECB calculations.
Note: Weighted average of the volatility of the two closest options.

Chart S72 Monthly gross issuance of short-term securities (other than shares) by euro area non-financial corporations

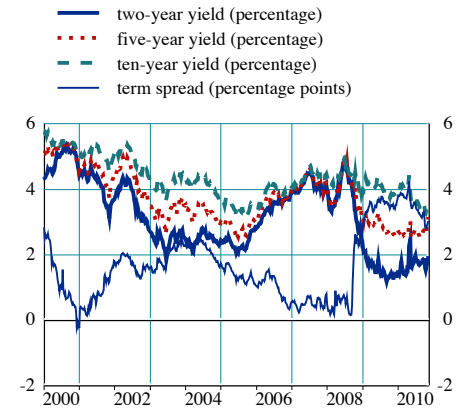
(Jan. 2000 - Sep. 2010; EUR billions; maturities up to one year)



Sources: ECB and ECB calculations.

Chart S73 Euro area government bond yields and the term spread

(Jan. 2000 - Nov. 2010; weekly averages)



Sources: ECB, Thomson Reuters, Bloomberg and ECB calculations.
Note: The term spread is the difference between the yield on ten-year bonds and that on three-month T-bills.

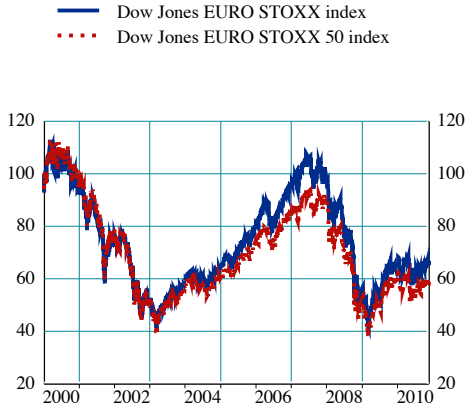
Chart S74 Option-implied volatility for ten-year government bond yields in Germany

(Jan. 2000 - Nov. 2010; percentage; implied volatility; 20-day moving average)

Sources: Bloomberg and ECB calculations.

Chart S75 Stock prices in the euro area

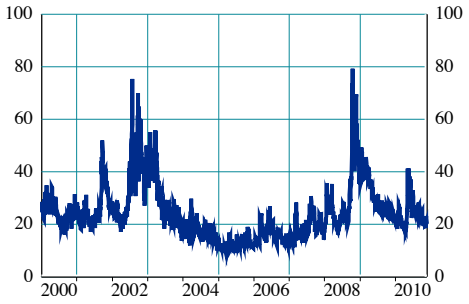
(Jan. 2000 - Nov. 2010; index: Jan. 2000 = 100)



Sources: Bloomberg and ECB calculations.

Chart S76 Implied volatility for the Dow Jones EURO STOXX 50 index

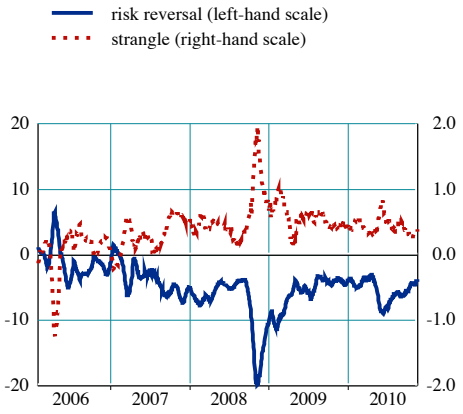
(Jan. 2000 - Nov. 2010; percentage)



Sources: Bloomberg and ECB calculations.

Chart S77 Risk reversal and strangle of the Dow Jones EURO STOXX 50 index

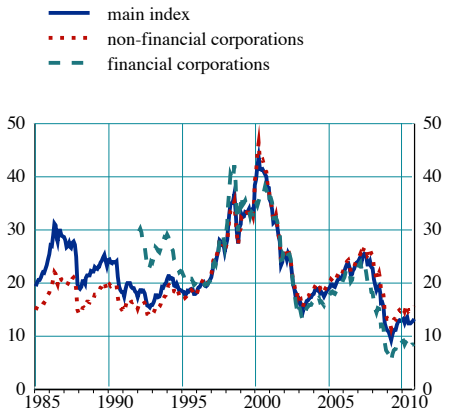
(Jan. 2006 - Nov. 2010; percentage; implied volatility; 20-day moving average)



Sources: Bloomberg and ECB calculations.
Notes: The risk-reversal indicator is calculated as the difference between the implied volatility of an out-of-the-money (OTM) call with 25 delta and the implied volatility of an OTM put with 25 delta. The strangle is calculated as the difference between the average implied volatility of OTM calls and puts, both with 25 delta, and the at-the-money volatility of calls and puts with 50 delta.

Chart S78 Price/earnings (P/E) ratio for the euro area stock market

(Jan. 1985 - Oct. 2010; ten-year trailing earnings)



Sources: Thomson Reuters Datastream and ECB calculations.
Note: The P/E ratio is based on prevailing stock prices relative to an average of the previous ten years of earnings.

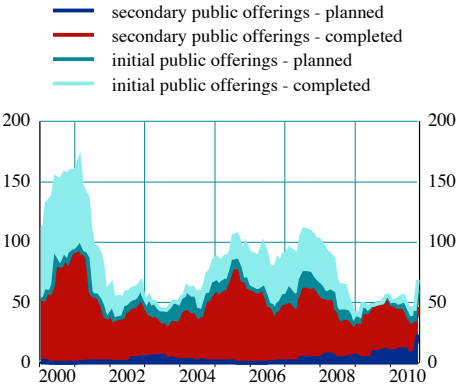
Chart S79 Open interest in options contracts on the Dow Jones EURO STOXX 50 index

(Jan. 2000 - Oct. 2010; millions of contracts)

Sources: Eurex and Bloomberg.

Chart S80 Gross equity issuance in the euro area

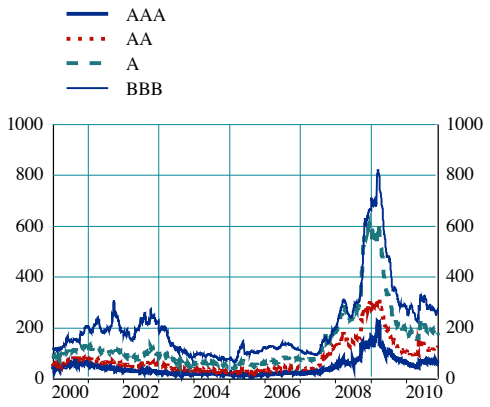
(Jan. 2000 - Oct. 2010; EUR billions; 12-month moving sum)



Source: Thomson ONE Banker.

Chart S81 Investment-grade corporate bond spreads in the euro area

(Jan. 2000 - Nov. 2010; basis points)



Source: Merrill Lynch.
Note: Options-adjusted spread of seven to ten-year corporate bond indices.

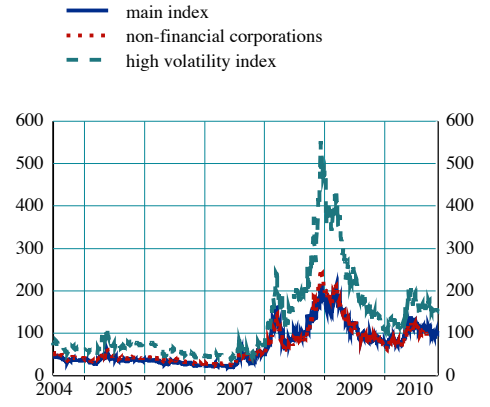
Chart S82 Speculative-grade corporate bond spreads in the euro area

(Jan. 2000 - Nov. 2010; basis points)

Source: Merrill Lynch.
Note: Options-adjusted spread of euro area high-yield index (average rating BB3, average maturity of around 6 years).

Chart S83 iTraxx Europe five-year credit default swap indices

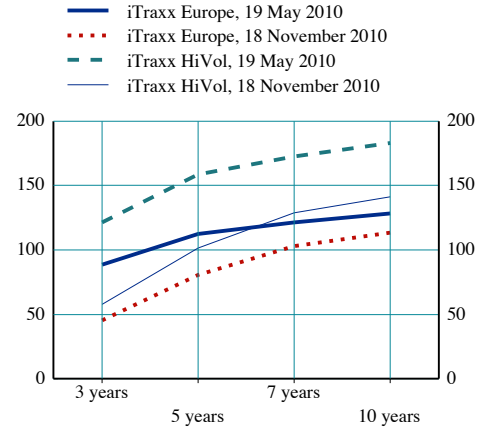
(June 2004 - Nov. 2010; basis points)



Sources: Bloomberg and ECB calculations.
Note: Data for non-financial corporations stops on 16 September 2010.

Chart S84 Term structures of premiums for iTraxx Europe and HiVol

(basis points)

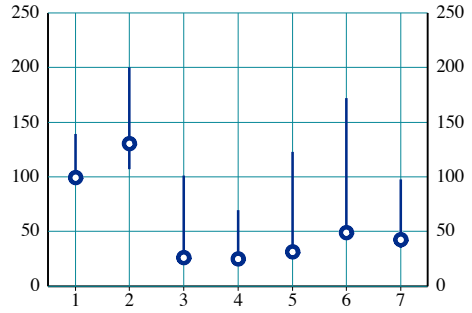


Source: Bloomberg.

Chart S85 iTraxx sector indices

(May 2010 - Nov. 2010; basis points)

1 main index
2 financial
3 energy
4 consumer
5 industrials
6 autos
7 TMT



Source: Bloomberg.
Note: The points show the most recent observation (18 Nov. 2010) and the bars show the range of variation over the six months to the most recent daily observation.

5 EURO AREA FINANCIAL INSTITUTIONS

Table S5 Financial condition of large and complex banking groups in the euro area

(2005 - H1 2010)

	Minimum	First quartile	Median	Average	Weighted average [1]	Third quartile	Maximum
	Return on Tier 1 capital (%)						
2005	2.39	7.62	13.25	13.60	14.83	17.63	30.81
2006	4.55	12.11	14.83	16.62	17.40	21.55	30.46
2007	0.66	5.23	12.12	14.18	15.27	22.57	31.26
2008	-33.44	-15.03	1.75	-2.75	1.82	8.22	22.43
2009	-17.69	-4.77	3.87	1.59	4.37	8.55	15.76
2010 H1	-12.50	5.81	9.01	7.77	9.90	12.17	17.74
	Return on shareholders' equity (%)						
2005	2.32	6.89	10.04	11.92	11.93	13.18	33.80
2006	4.79	12.41	14.81	14.44	13.83	17.52	26.01
2007	0.71	6.69	11.97	11.64	12.30	15.81	24.69
2008	-143.32	-15.67	2.26	-14.71	1.68	5.62	18.88
2009	-19.15	-8.27	2.97	0.42	3.93	8.98	14.34
2010 H1	-19.81	6.64	8.38	7.20	9.41	12.18	16.51
	Return on risk-weighted assets (%)						
2005	0.19	0.64	1.06	1.11	1.20	1.53	2.26
2006	0.35	1.02	1.31	1.35	1.39	1.71	2.66
2007	0.05	0.43	0.98	1.10	1.17	1.69	2.55
2008	-2.57	-1.20	0.15	-0.19	0.15	0.62	1.77
2009	-1.93	-0.49	0.36	0.17	0.44	0.88	1.82
2010 H1	-1.33	0.64	0.91	0.83	1.03	1.38	1.94
	Net interest income (% of total assets)						
2005	0.52	0.58	0.70	0.94	0.92	1.30	1.87
2006	0.33	0.54	0.72	0.93	0.92	1.22	2.03
2007	0.26	0.55	0.78	0.91	0.88	1.20	1.95
2008	0.52	0.64	0.87	1.05	1.01	1.43	2.19
2009	0.57	0.84	1.23	1.28	1.30	1.52	2.68
2010 H1	0.58	0.65	1.04	1.21	1.28	1.57	2.53
	Net trading income (% of total assets)						
2005	0.01	0.05	0.15	0.22	0.28	0.32	0.83
2006	0.04	0.09	0.22	0.30	0.34	0.49	1.08
2007	-0.28	-0.06	0.13	0.20	0.29	0.42	0.96
2008	-0.98	-0.44	-0.16	-0.17	-0.14	0.02	0.43
2009	-1.07	0.06	0.19	0.13	0.18	0.29	0.47
2010 H1	-0.43	0.04	0.14	0.08	0.17	0.26	0.42
	Fees and commissions (% of total assets)						
2005	0.07	0.24	0.41	0.51	0.57	0.84	1.27
2006	0.08	0.24	0.47	0.53	0.60	0.80	1.10
2007	0.08	0.24	0.51	0.51	0.58	0.70	1.10
2008	0.07	0.21	0.45	0.45	0.49	0.68	0.90
2009	0.07	0.22	0.43	0.47	0.54	0.72	0.84
2010 H1	0.07	0.19	0.40	0.43	0.52	0.72	0.92
	Other income (% of total assets)						
2005	-0.02	0.05	0.11	0.14	0.13	0.16	0.64
2006	0.00	0.06	0.14	0.18	0.16	0.25	0.71
2007	-0.12	0.05	0.11	0.14	0.15	0.21	0.51
2008	-0.58	-0.16	0.06	0.01	0.10	0.24	0.54
2009	-0.35	-0.09	0.04	0.02	0.02	0.10	0.33
2010 H1	-0.17	0.01	0.04	0.05	0.05	0.10	0.27
	Total operating income (% of total assets)						
2005	0.78	1.23	1.72	1.82	1.90	2.30	3.32
2006	0.77	1.29	1.82	1.94	2.01	2.49	3.81
2007	0.51	1.02	1.78	1.77	1.89	2.40	3.61
2008	-0.18	0.52	1.31	1.35	1.46	1.96	3.66
2009	0.76	1.18	1.86	1.88	2.03	2.23	3.86
2010 H1	0.51	0.96	1.92	1.85	2.05	2.38	3.82

Table S5 Financial condition of large and complex banking groups in the euro area (continued)

(2005 - H1 2010)

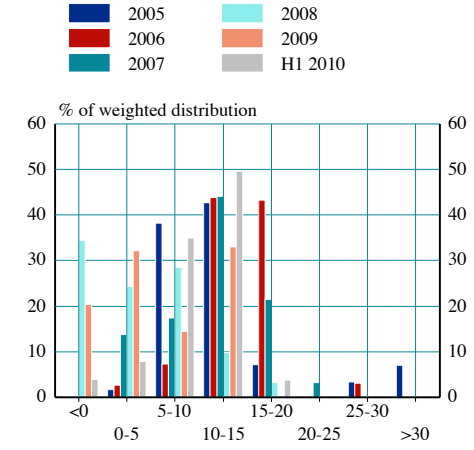
	Minimum	First quartile	Median	Average	Weighted average [1]	Third quartile	Maximum
	Net income (% of total assets)						
2005	0.08	0.31	0.41	0.45	0.48	0.50	0.97
2006	0.16	0.41	0.50	0.54	0.54	0.66	1.15
2007	0.02	0.18	0.38	0.46	0.46	0.55	1.22
2008	-1.35	-0.37	0.05	-0.06	0.05	0.28	0.93
2009	-0.77	-0.21	0.12	0.06	0.16	0.33	0.81
2010 H1	-0.46	0.19	0.34	0.31	0.37	0.47	0.89
	Net loan impairment charges (% of total assets)						
2005	0.01	0.05	0.08	0.11	0.10	0.17	0.34
2006	0.01	0.05	0.07	0.11	0.10	0.13	0.36
2007	0.01	0.03	0.05	0.10	0.10	0.08	0.38
2008	0.04	0.20	0.27	0.31	0.28	0.40	0.91
2009	0.17	0.35	0.45	0.55	0.48	0.68	1.60
2010 H1	0.05	0.17	0.24	0.32	0.32	0.37	0.85
	Cost-to-income ratio (%)						
2005	40.75	53.28	60.69	58.88	61.20	64.85	73.70
2006	38.16	51.40	55.95	56.56	59.04	61.10	70.20
2007	41.25	55.18	63.00	62.39	60.62	69.05	86.34
2008	41.86	62.50	71.01	81.99	69.83	95.57	159.42
2009	40.44	54.83	61.45	62.87	60.57	71.45	97.35
2010 H1	40.30	55.28	60.20	62.34	57.86	64.36	120.00
	Tier 1 ratio (%)						
2005	6.50	7.55	7.89	8.20	8.08	8.75	11.60
2006	6.50	7.41	7.75	8.07	7.98	8.82	10.10
2007	6.40	6.95	7.40	7.77	7.69	8.60	10.70
2008	5.10	7.60	8.59	8.58	8.53	9.51	12.70
2009	8.40	9.55	10.15	10.33	10.14	10.73	13.80
2010 H1	8.20	9.85	10.40	10.51	10.39	11.00	14.90
	Overall solvency ratio (%)						
2005	8.50	10.37	11.05	11.23	11.13	11.90	13.50
2006	10.00	10.60	11.06	11.25	11.20	11.77	12.90
2007	8.80	9.65	10.60	10.71	10.62	11.50	13.00
2008	8.30	10.05	11.70	11.37	11.31	12.27	13.90
2009	9.70	12.56	13.60	13.37	13.22	14.20	16.10
2010 H1	9.80	12.20	13.90	13.28	13.25	14.20	15.30

Sources: Individual institutions' financial reports and ECB calculations.
Notes: Based on available figures for 20 IFRS-reporting large and complex banking groups in the euro area. Figures for H1 2010 are annualised.

1) The respective denominators are used as weights, i.e. the total operating income is used in the case of the "Cost-to-income ratio", while the risk-weighted assets are used for the "Tier 1 ratio" and the "Overall solvency ratio".

Chart S86 Frequency distribution of returns on shareholders' equity for large and complex banking groups in the euro area

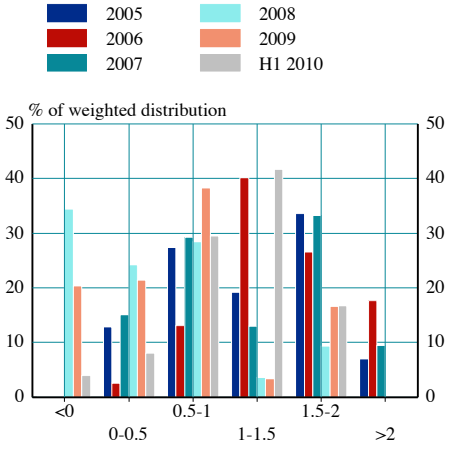
(2005 - H1 2010; percentage)



Sources: Individual institutions' financial reports and ECB calculations.
Notes: Distribution weighted by total assets. Based on available figures for 20 IFRS-reporting large and complex banking groups in the euro area. Figures for H1 2010 are annualised.

Chart S87 Frequency distribution of returns on risk-weighted assets for large and complex banking groups in the euro area

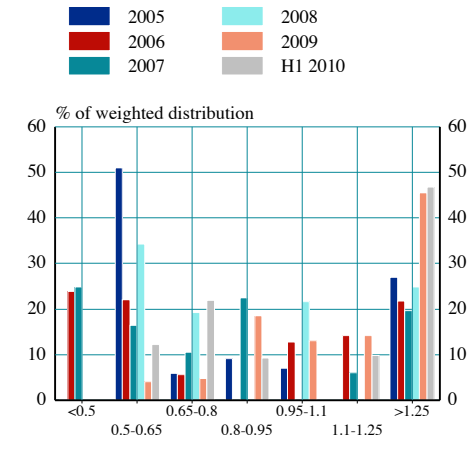
(2005 - H1 2010; percentage)



Sources: Individual institutions' financial reports and ECB calculations.
Notes: Distribution weighted by total assets. Based on available figures for 20 IFRS-reporting large and complex banking groups in the euro area. Figures for H1 2010 are annualised.

Chart S88 Frequency distribution of net interest income for large and complex banking groups in the euro area

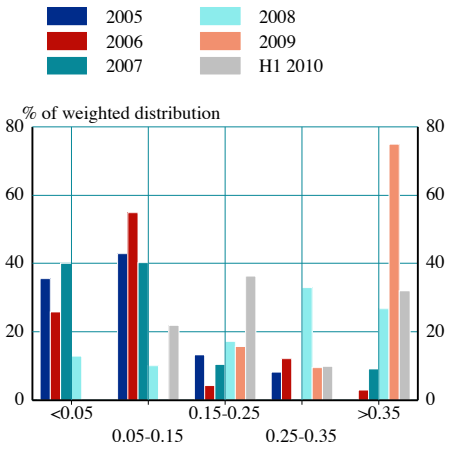
(2005 - H1 2010; percentage of total assets)



Sources: Individual institutions' financial reports and ECB calculations.
Notes: Distribution weighted by total assets. Based on available figures for 20 IFRS-reporting large and complex banking groups in the euro area. Figures for H1 2010 are annualised.

Chart S89 Frequency distribution of net loan impairment charges for large and complex banking groups in the euro area

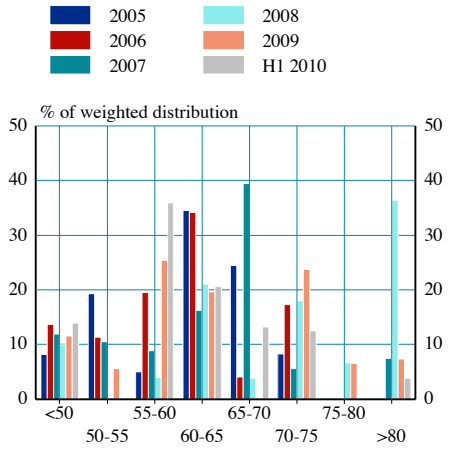
(2005 - H1 2010; percentage of total assets)



Sources: Individual institutions' financial reports and ECB calculations.
Notes: Distribution weighted by total assets. Based on available figures for 20 IFRS-reporting large and complex banking groups in the euro area. Figures for H1 2010 are annualised.

Chart S90 Frequency distribution of cost-to-income ratios for large and complex banking groups in the euro area

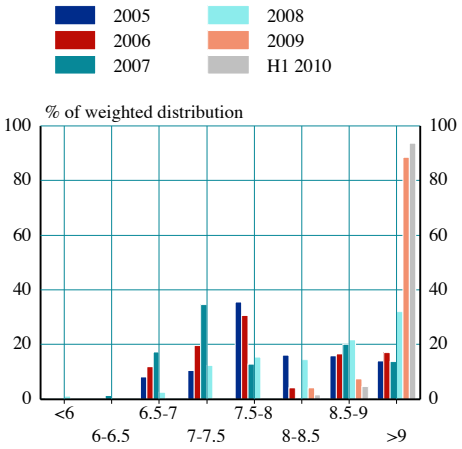
(2005 - H1 2010; percentage)



Sources: Individual institutions' financial reports and ECB calculations.
Notes: Distribution weighted by total assets. Based on available figures for 20 IFRS-reporting large and complex banking groups in the euro area.

Chart S91 Frequency distribution of Tier 1 ratios for large and complex banking groups in the euro area

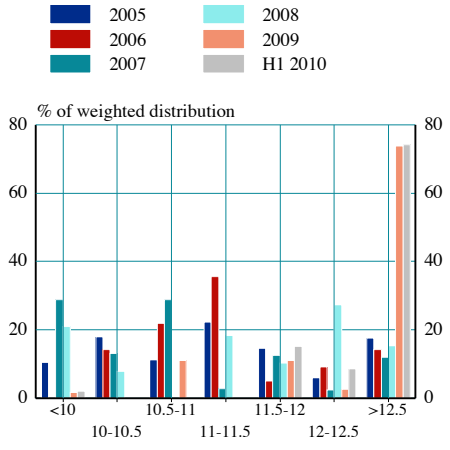
(2005 - H1 2010; percentage)



Sources: Individual institutions' financial reports and ECB calculations.
Notes: Distribution weighted by total assets. Based on available figures for 20 IFRS-reporting large and complex banking groups in the euro area.

Chart S92 Frequency distribution of overall solvency ratios for large and complex banking groups in the euro area

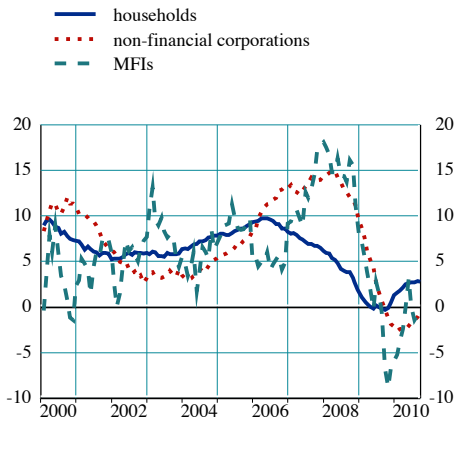
(2005 - H1 2010; percentage)



Sources: Individual institutions' financial reports and ECB calculations.
Notes: Distribution weighted by total assets. Based on available figures for 20 IFRS-reporting large and complex banking groups in the euro area.

Chart S93 Annual growth in euro area MFI loans, broken down by sectors

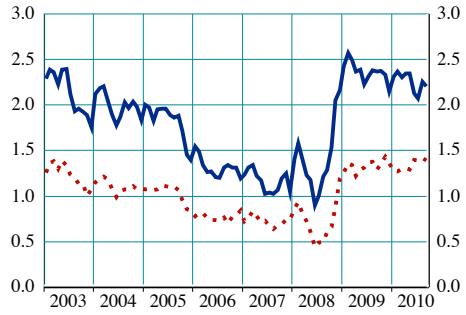
(Jan. 2000 - Sep. 2010; percentage change per annum)



Sources: ECB and ECB calculations.
Notes: Data are based on financial transactions of MFI loans, not corrected for the impact of securitisation. For more details see the note of Chart S47.

Chart S94 Lending margins of euro area MFIs

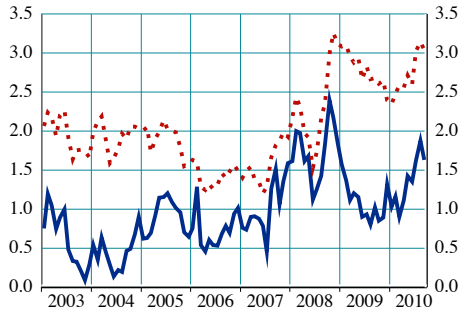
(Jan. 2003 - Sep. 2010; percentage points)



Sources: ECB, Thomson Reuters, Thomson Reuters Datastream and ECB calculations.
Notes: Margins are derived 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.

Chart S95 Euro area MFI loan spreads

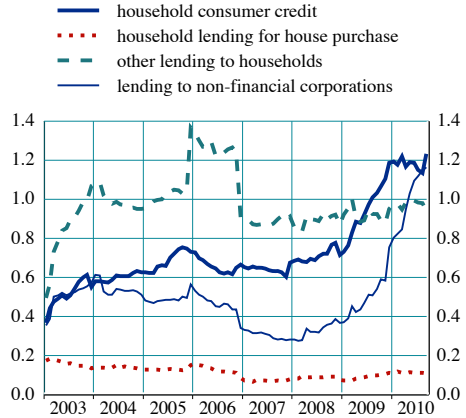
(Jan. 2003 - Sep. 2010; basis points)



Sources: ECB, Thomson Reuters Datastream and ECB calculations.
Notes: The spread is the difference between the rate on new business loans to non-financial corporations with an initial period of rate fixation of one to five years and the three-year government bond yield. Loans are categorised as small for amounts of up to EUR 1 million and as large for amounts above EUR 1 million.

Chart S96 Write-off rates on euro area MFI loans

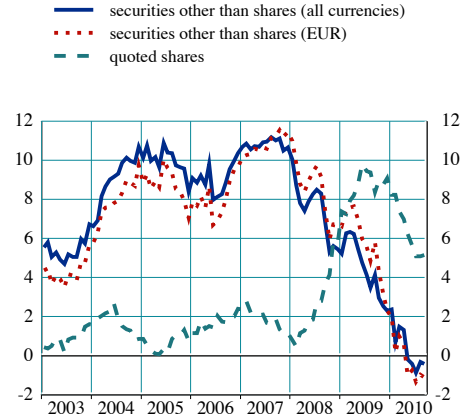
(Jan. 2003 - Sep. 2010; 12-month moving sums; percentage of the outstanding amount of loans)



Sources: ECB and ECB calculations.

Chart S97 Annual growth in euro area MFI's issuance of securities and shares

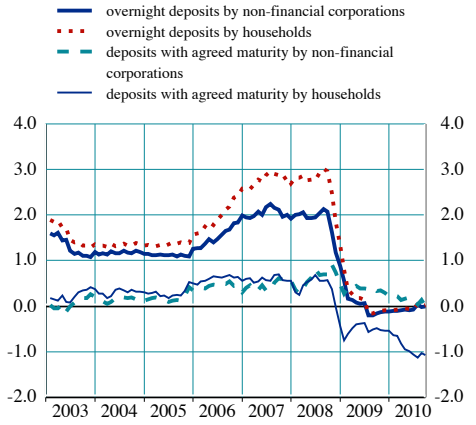
(Jan. 2003 - Sep. 2010; percentage change per annum)



Source: ECB.

Chart S98 Deposit margins of euro area MFIs

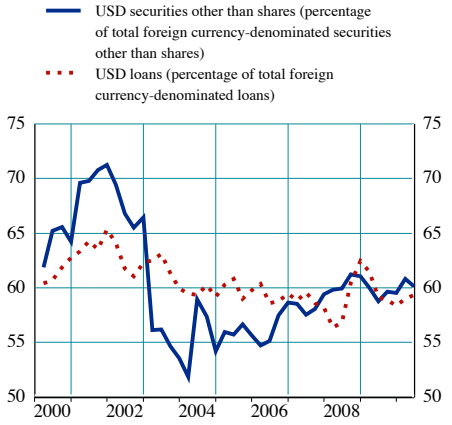
(Jan. 2003 - Sep. 2010; percentage points)



Sources: ECB, Thomson Reuters, Thomson Reuters Datastream and ECB calculations.
Notes: For overnight deposits, margins are derived as the difference between MFI interest rates and the EONIA. For deposits with agreed maturity, margins are derived as the average of the spreads for the relevant breakdowns by maturity, using new business volumes as weights. The individual spreads are the difference between the swap rate and the MFI interest rate for new deposits, where both have corresponding maturities.

Chart S99 Euro area MFI foreign currency-denominated assets, selected balance sheet items

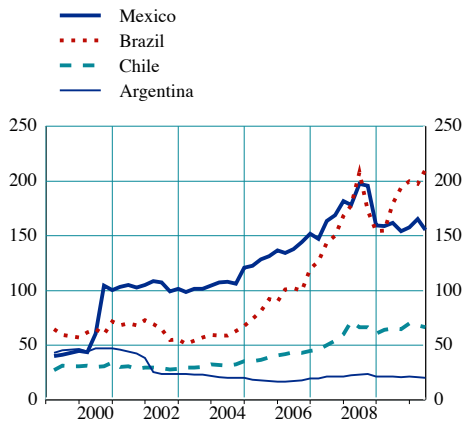
(Q1 2000 - Q2 2010)



Sources: ECB and ECB calculations.

Chart S100 Consolidated foreign claims of domestically owned euro area banks on Latin American countries

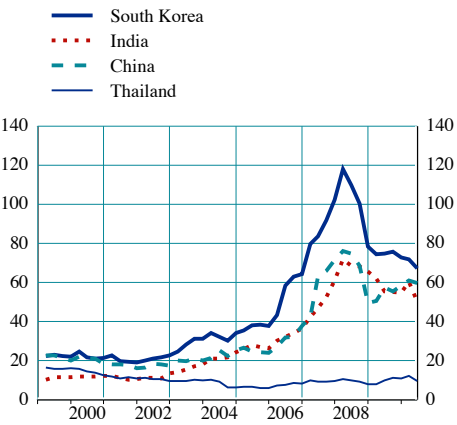
(Q1 1999 - Q2 2010; USD billions)



Sources: BIS and ECB calculations.

Chart S101 Consolidated foreign claims of domestically owned euro area banks on Asian countries

(Q1 1999 - Q2 2010; USD billions)



Sources: BIS and ECB calculations.

Table S6 Consolidated foreign claims of domestically owned euro area banks on individual countries

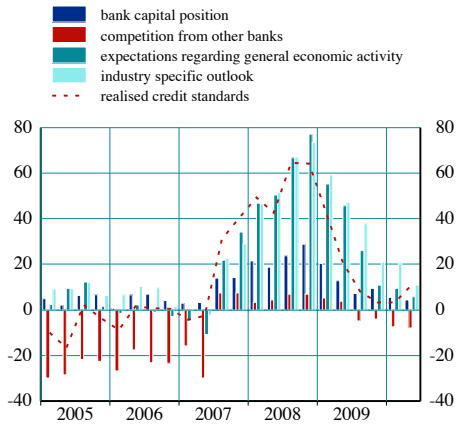
(percentage of total consolidated foreign claims)

	2008 Q1	2008 Q2	2008 Q3	2008 Q4	2009 Q1	2009 Q2	2009 Q3	2009 Q4	2010 Q1	2010 Q2
Total offshore centres	**7.9**	**7.8**	**8.0**	**7.5**	**7.1**	**7.0**	**6.7**	**7.0**	**7.1**	**7.1**
of which										
Hong Kong	0.8	0.7	0.8	0.8	0.7	0.7	0.7	0.7	0.9	0.8
Singapore	0.8	0.9	0.9	0.8	0.9	0.9	0.9	0.9	1.0	0.9
Total Asia and Pacific EMEs	**4.0**	**4.1**	**4.0**	**3.9**	**3.9**	**3.9**	**4.0**	**4.2**	**4.5**	**4.3**
of which										
China	0.8	0.8	0.8	0.6	0.7	0.7	0.7	0.8	0.8	0.9
India	0.7	0.7	0.7	0.8	0.8	0.7	0.7	0.7	0.8	0.7
Indonesia	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2
Malaysia	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Philippines	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
South Korea	1.2	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Taiwan	0.3	0.4	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3
Thailand	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1
Total European EMEs and new EU Member States	**11.4**	**12.3**	**12.6**	**13.5**	**13.1**	**13.5**	**14.0**	**14.5**	**14.5**	**13.9**
of which										
Czech Republic	1.8	2.0	2.0	2.0	2.0	2.2	2.4	2.3	2.3	2.2
Hungary	1.4	1.5	1.5	1.7	1.7	1.8	1.8	1.8	1.8	1.7
Poland	2.4	2.7	2.8	2.9	2.7	2.9	3.1	3.4	3.5	3.2
Russia	1.6	1.8	1.9	2.1	2.0	1.9	1.7	1.7	1.7	1.6
Turkey	1.0	1.1	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3
Total Latin America	**5.2**	**5.8**	**5.9**	**5.9**	**6.2**	**6.4**	**6.4**	**6.9**	**7.0**	**7.4**
of which										
Argentina	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Brazil	1.7	2.1	1.9	1.9	2.0	2.3	2.5	2.7	2.7	3.1
Chile	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.9	0.9	1.0
Colombia	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Ecuador	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mexico	1.8	2.0	2.1	2.0	2.1	2.1	2.0	2.1	2.3	2.3
Peru	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Uruguay	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Venezuela	0.2	0.2	0.3	0.3	0.4	0.4	0.2	0.3	0.2	0.2
Total Middle East and Africa	**2.4**	**2.5**	**2.6**	**2.9**	**3.1**	**3.0**	**3.0**	**3.2**	**3.2**	**3.0**
of which										
Iran	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Morocco	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3
South Africa	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total non-developed countries	**30.8**	**32.5**	**33.1**	**33.6**	**33.5**	**33.9**	**34.1**	**35.8**	**36.4**	**35.8**

Sources: BIS and ECB calculations.
Notes: Aggregates derived as the sum of foreign claims of euro area 12 countries (i.e. euro area excluding Cyprus, Malta, Slovakia and Slovenia) on the specified counterpart areas.

Chart S102 Credit standards applied by euro area banks to loans and credit lines to enterprises, and contributing factors

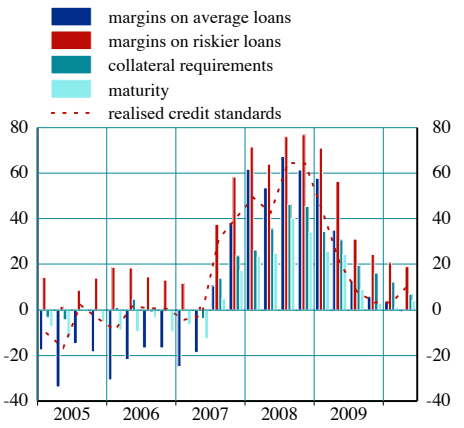
(Q1 2005 - Q2 2010; net percentage)



Sources: ECB and ECB calculations.
Notes: For credit standards, the net percentages refer to the difference between those banks reporting that they have been tightened in comparison with the previous quarter and those reporting that they have been eased. For the contributing factors, the net percentages refer to the difference between those banks reporting that the given factor has contributed to a tightening compared to the previous quarter and those reporting that it contributed to an easing.

Chart S103 Credit standards applied by euro area banks to loans and credit lines to enterprises, and terms and conditions

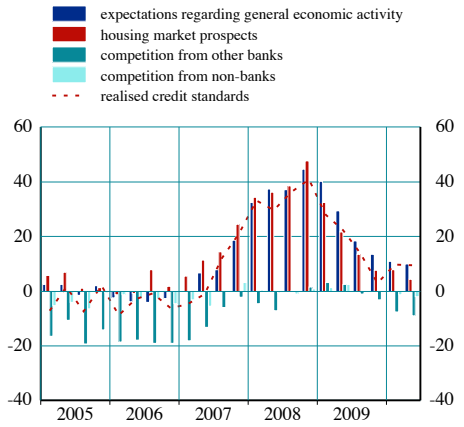
(Q1 2005 - Q2 2010; net percentage)



Sources: ECB and ECB calculations.
Notes: The net percentages refer to the difference between those banks reporting that credit standards, terms and conditions have been tightened in comparison with the previous quarter and those reporting that they have been eased.

Chart S104 Credit standards applied by euro area banks to loans to households for house purchase, and contributing factors

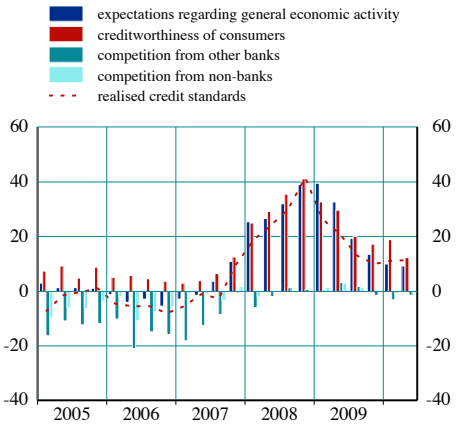
(Q1 2005 - Q2 2010; net percentage)



Sources: ECB and ECB calculations.
Note: See the note of Chart S102.

Chart S105 Credit standards applied by euro area banks to consumer credit, and contributing factors

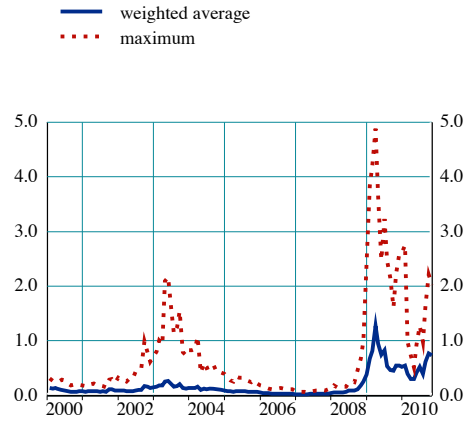
(Q1 2005 - Q2 2010; net percentage)



Sources: ECB and ECB calculations.
Note: See the note of Chart S102.

Chart S106 Expected default frequency (EDF) for large and complex banking groups in the euro area

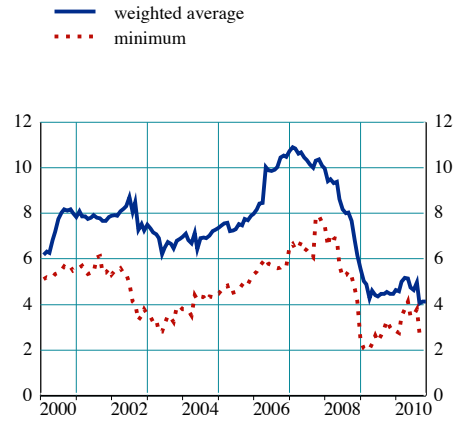
(Jan. 2000 - Oct. 2010; percentage probability)



Sources: Moody's KMV and ECB calculations.
Notes: The EDF provides an estimate of the probability of default over the following year. Due to measurement considerations, the EDF values are restricted by Moody's KMV to the interval between 0.01% and 35%. The weighted average is based on the amounts of non-equity liabilities outstanding.

Chart S107 Distance-to-default for large and complex banking groups in the euro area

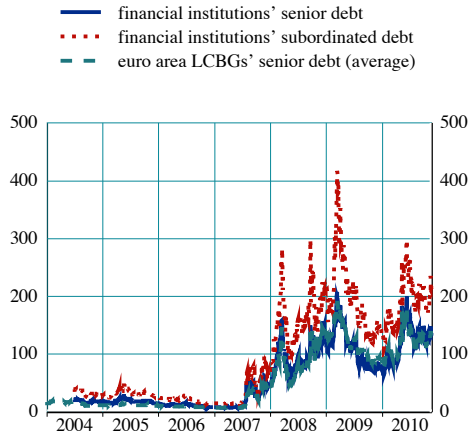
(Jan. 2000 - Oct. 2010)



Sources: Moody's KMV and ECB calculations.
Notes: An increase in the distance-to-default reflects an improving assessment. The weighted average is based on the amounts of non-equity liabilities outstanding.

Chart S108 Credit default swap spreads for European financial institutions and euro area large and complex banking groups

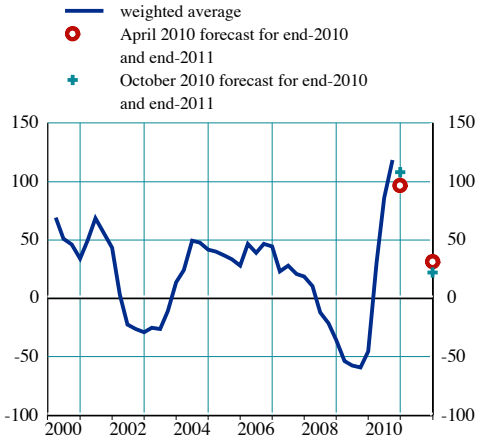
(Jan. 2004 - Nov. 2010; basis points; five-year maturity)



Sources: Bloomberg and ECB calculations.

Chart S109 Earnings and earnings forecasts for large and complex banking groups in the euro area

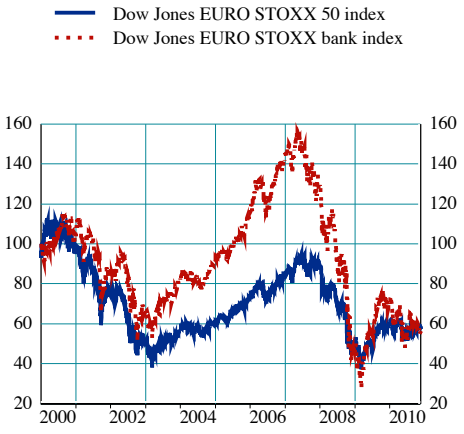
(Q1 2000 - Q4 2011; percentage change per annum; weighted average)



Sources: Thomson Reuters Datastream, I/B/E/S and ECB calculations.
Notes: Growth rates of weighted average earnings for euro area large and complex banking groups, using their market capitalisations at September 2010 as weights. Actual earnings are derived on the basis of historical net income; forecasts are derived from IBES estimates of earnings per share.

Chart S110 Dow Jones EURO STOXX total market and bank indices

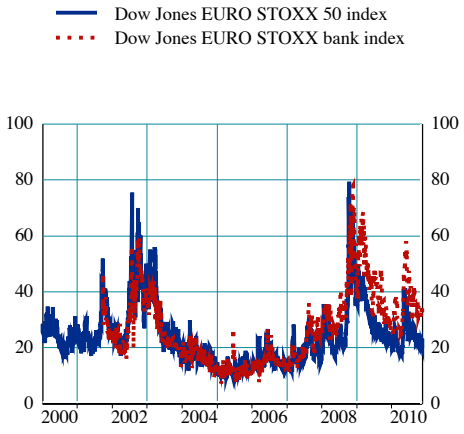
(Jan. 2000 - Nov. 2010; index: Jan. 2000 = 100)



Sources: Bloomberg and ECB calculations.

Chart S111 Implied volatility for Dow Jones EURO STOXX total market and bank indices

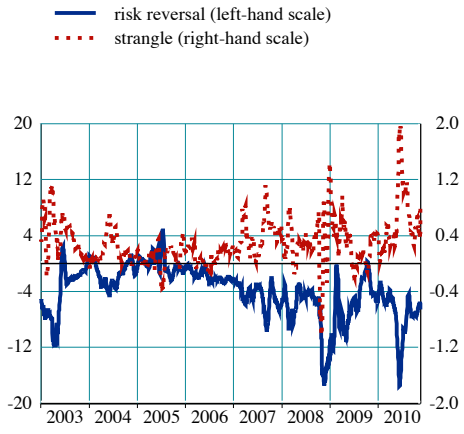
(Jan. 2000 - Nov. 2010; percentage)



Sources: Bloomberg and ECB calculations.
Note: Weighted average of the volatility of the two closest options.

Chart S112 Risk reversal and strangle of the Dow Jones EURO STOXX bank index

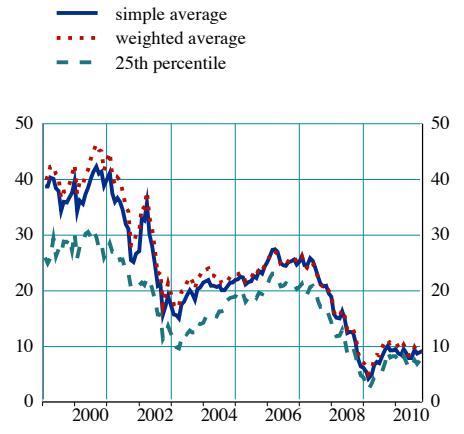
(Jan. 2003 - Nov. 2010; percentage; implied volatility; 20-day moving average)



Sources: Bloomberg and ECB calculations.
Notes: The risk-reversal indicator is calculated as the difference between the implied volatility of an out-of-the-money (OTM) call with 25 delta and the implied volatility of an OTM put with 25 delta. The strangle is calculated as the difference between the average implied volatility of OTM calls and puts, both with 25 delta, and the at-the-money volatility of calls and puts with 50 delta.

Chart S113 Price/earnings (P/E) ratios for large and complex banking groups in the euro area

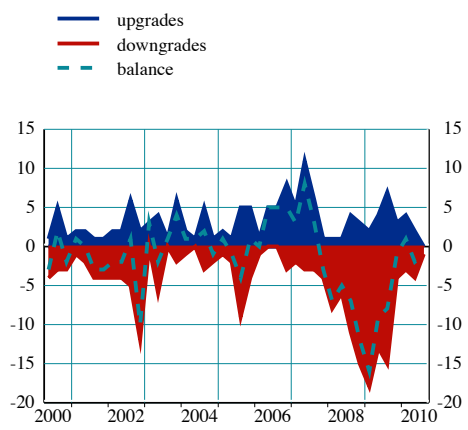
(Jan. 1999 - Oct. 2010; ten-year trailing earnings)



Sources: Thomson Reuters Datastream, I/B/E/S and ECB calculations.
Notes: The P/E ratio is based on prevailing stock prices relative to an average of the previous ten years of earnings. The weighted average is based on the market capitalisation in October 2010.

Chart S114 Changes in the ratings of large and complex banking groups in the euro area

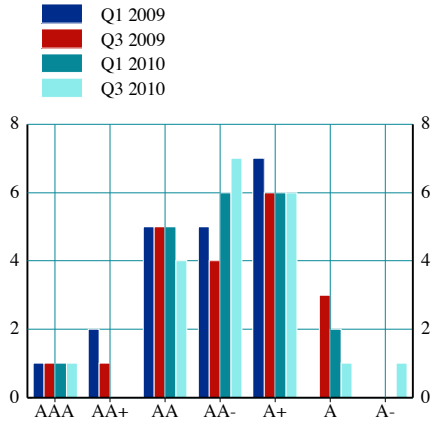
(Q2 2000 - Q3 2010; number)



Sources: Bloomberg and ECB calculations.
Note: These include both outlook and rating changes.

Chart S115 Distribution of ratings for large and complex banking groups in the euro area

(number of banks)



Sources: Moody's, Fitch Ratings, Standard and Poor's and ECB calculations.

Table S7 Rating averages and outlook for large and complex banking groups in the euro area

(October 2010)

	Moody's	S&P	Fitch	Total
Ratings available out of sample	19	16	20	55
Outlook available	19	19	20	58
Rating average	Aa2	AA-	AA-	4.4
Outlook average	-0.5	-0.4	-0.2	-0.3
Number of positive outlooks	0	0	1	1
Number of negative outlooks	10	7	4	21

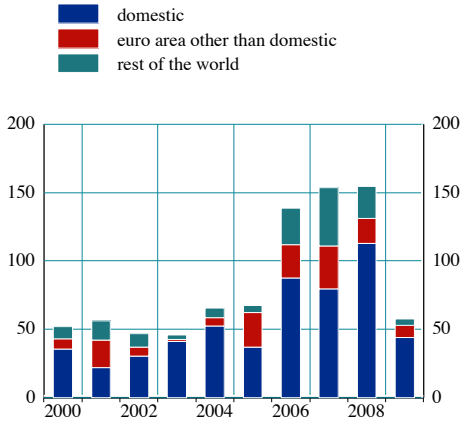
Rating codes	Moody's	S&P	Fitch	Numerical equivalent
	Aaa	AAA	AAA	1
	Aa1	AA+	AA+	2
	Aa2	AA	AA	3
	Aa3	AA-	AA-	4
	A1	A+	A+	5
	A2	A	A	6
	A3	A-	A-	7

Outlook	Stable	Positive	Negative
Numerical equivalent	0	1	-1

Sources: Moody's, Fitch Ratings, Standard and Poor's and ECB calculations.

Chart S116 Value of mergers and acquisitions by euro area banks

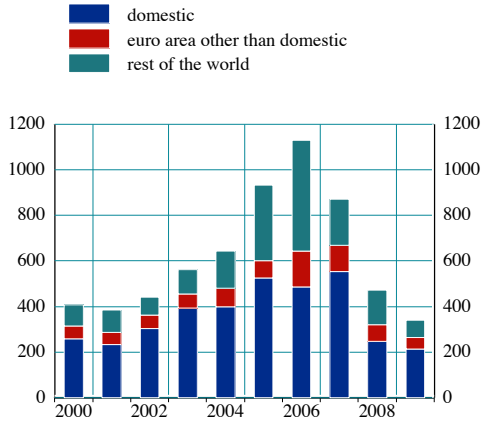
(2000 - 2009; EUR billions)



Sources: Bureau van Dijk (ZEPHIR database) and ECB calculations.
Note: All completed mergers and acquisitions (including institutional buyouts, joint ventures, management buyout/ins, demergers, minority stakes and share buybacks) where a bank is the acquirer.

Chart S117 Number of mergers and acquisitions by euro area banks

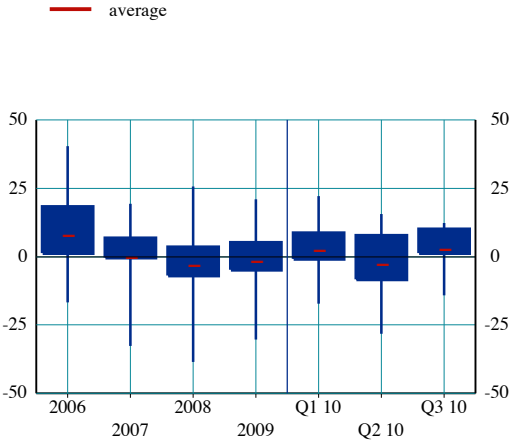
(2000 - 2009; total number of transactions)



Sources: Bureau van Dijk (ZEPHIR database) and ECB calculations.
Note: All completed mergers and acquisitions (including institutional buyouts, joint ventures, management buyout/ins, demergers, minority stakes and share buybacks) where a bank is the acquirer.

Chart S118 Distribution of gross-premium-written growth for a sample of large euro area primary insurers

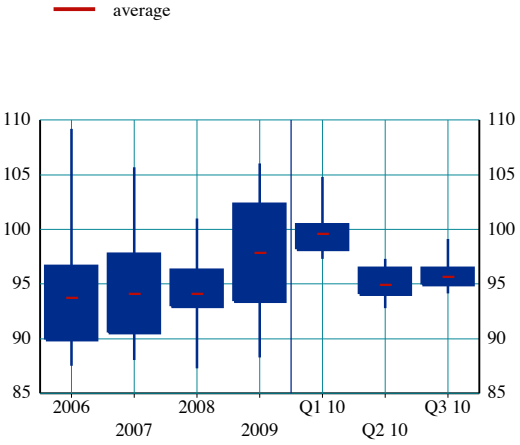
(2006 - Q3 2010; percentage change per annum; nominal values; maximum, minimum, interquantile distribution)



Sources: Bloomberg, individual institutions' financial reports and ECB calculations.
Note: Based on the figures for 20 large euro area insurers.

Chart S119 Distribution of combined ratios in non-life business for a sample of large euro area primary insurers

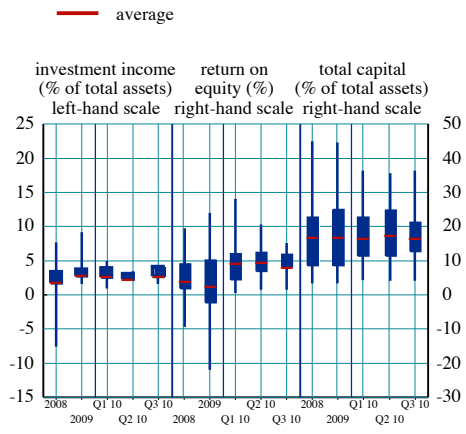
(2006 - Q3 2010; percentage of premiums earned; maximum, minimum, interquantile distribution)



Sources: Bloomberg, individual institutions' financial reports and ECB calculations.
Note: Based on the figures for 20 large euro area insurers.

Chart S120 Distribution of investment income, return on equity and capital for a sample of large euro area primary insurers

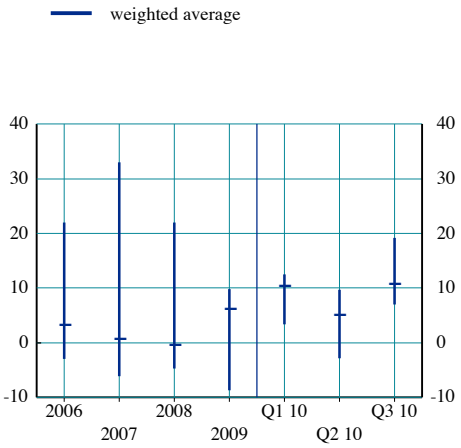
(2008 - Q3 2010; maximum, minimum, interquantile distribution)



Sources: Bloomberg, individual institutions' financial reports and ECB calculations.
Note: Based on the figures for 20 large euro area insurers.

Chart S121 Distribution of gross-premium-written growth for a sample of large euro area reinsurers

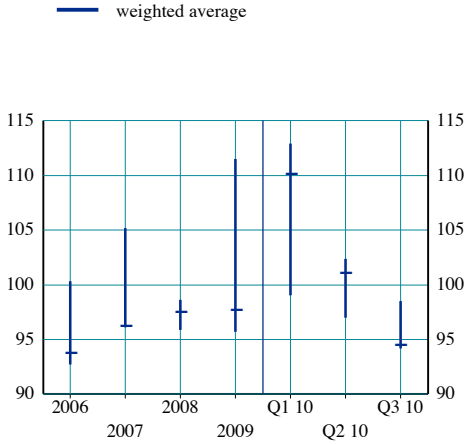
(2006 - Q3 2010; percentage change per annum; maximum-minimum distribution)



Sources: Bloomberg, individual institutions' financial reports and ECB calculations.
Notes: Based on the figures for four large euro area reinsurers. The weighted average is based on the amounts of total assets outstanding.

Chart S122 Distribution of combined ratios for a sample of large euro area reinsurers

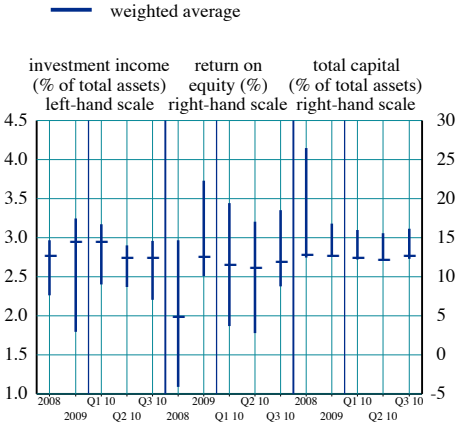
(2006 - Q3 2010; percentage change per annum; nominal values; maximum-minimum distribution)



Sources: Bloomberg, individual institutions' financial reports and ECB calculations.
Notes: Based on the figures for four large euro area reinsurers. The weighted average is based on the amounts of total assets outstanding.

Chart S123 Distribution of investment income, return on equity and capital for a sample of large euro area reinsurers

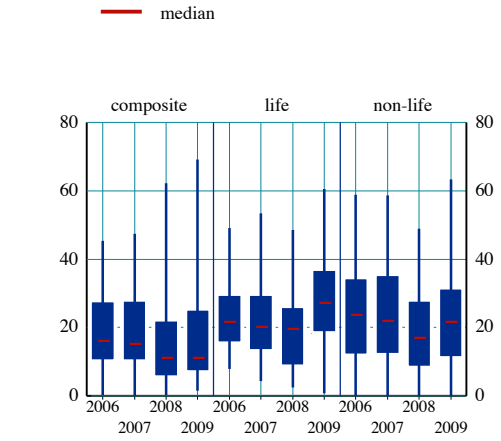
(2008 - Q3 2010; percentage of premiums earned; maximum-minimum distribution)



Sources: Bloomberg, individual institutions' financial reports and ECB calculations.
Notes: Based on the figures for four large euro area reinsurers. The weighted average is based on the amounts of total assets outstanding.

Chart S124 Distribution of equity asset shares of euro area insurers

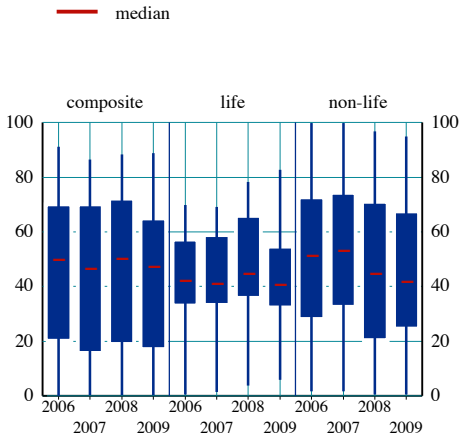
(2006 - 2009; percentage of total investment; maximum, minimum, interquantile distribution)



Source: Standard and Poor's (Eurothesys database).

Chart S125 Distribution of bond asset shares of euro area insurers

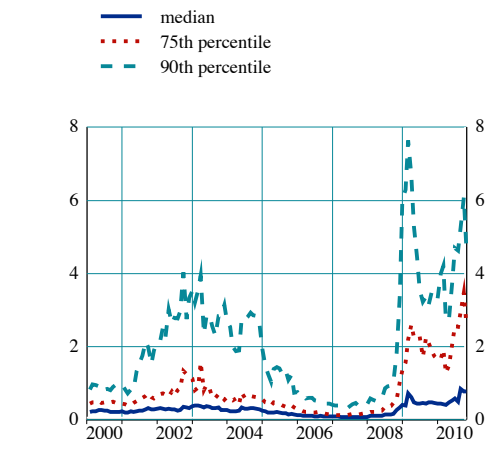
(2006 - 2009; percentage of total investment; maximum, minimum, interquantile distribution)



Source: Standard and Poor's (Eurothesys database).

Chart S126 Expected default frequency (EDF) for the euro area insurance sector

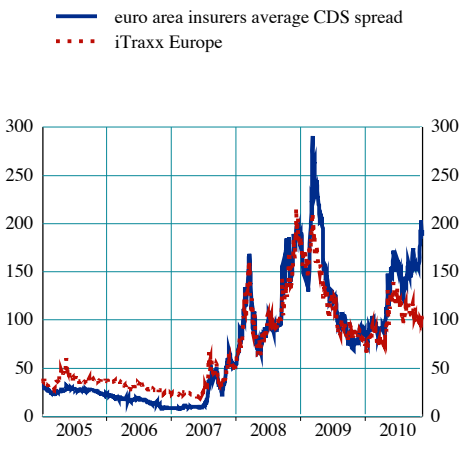
(Jan. 2000 - Oct. 2010; percentage probability)



Source: Moody's KMV.
Note: The EDF provides an estimate of the probability of default over the following year. Due to measurement considerations, the EDF values are restricted by Moody's KMV to the interval between 0.01% and 35%.

Chart S127 Credit default swap spreads for a sample of large euro area insurers and the iTraxx Europe main index

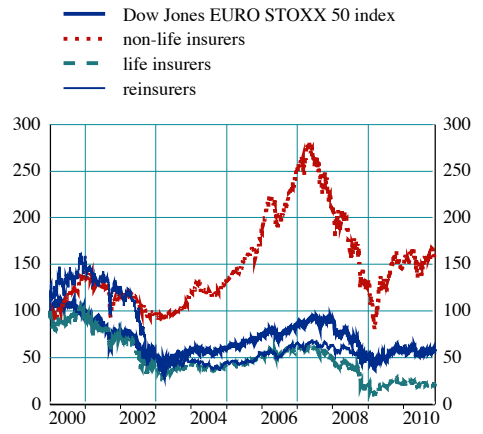
(Jan. 2005 - Nov. 2010; basis points; five-year maturity)



Sources: Bloomberg and ECB calculations.

Chart S128 Dow-Jones EURO STOXX total market and insurance indices

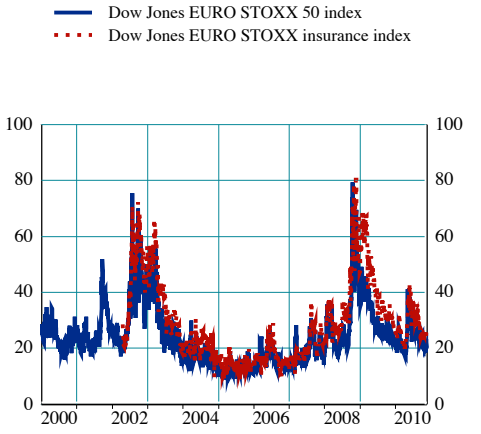
(Jan. 2000 - Nov. 2010; index: Jan. 2000 = 100)



Source: Thomson Reuters Datastream.

Chart S129 Implied volatility for Dow Jones EURO STOXX total market and insurance indices

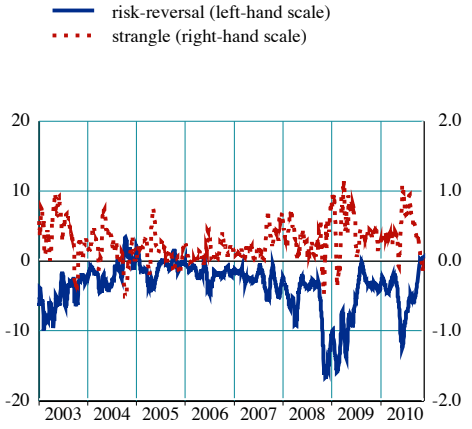
(Jan. 2000 - Nov. 2010; percentage)



Sources: Bloomberg and ECB calculations.
Note: Weighted average of the volatility of the two closest options.

Chart S130 Risk reversal and strangle of the Dow Jones EURO STOXX insurance index

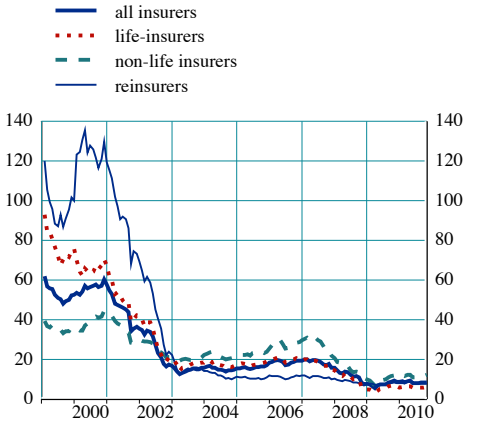
(Jan. 2003 - Nov. 2010; ten-years trailing earnings)



Sources: Bloomberg and ECB calculations.
Notes: The risk-reversal indicator is calculated as the difference between the implied volatility of an out-of-the-money (OTM) call with 25 delta and the implied volatility of an OTM put with 25 delta. The strangle is calculated as the difference between the average implied volatility of OTM calls and puts, both with 25 delta, and the at-the-money volatility of calls and puts with 50 delta.

Chart S131 Price/earnings (P/E) ratios for euro area insurers

(Jan. 1999 - Oct. 2010; ten-years trailing earnings)

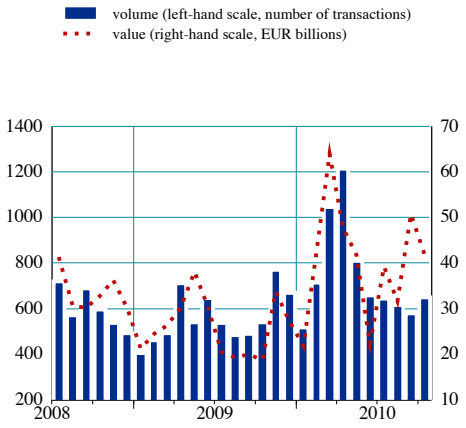


Sources: Thomson Reuters Datastream and ECB calculations.
Note: The P/E ratio is based on prevailing stock prices relative to an average of the previous ten years of earnings.

6 EURO AREA FINANCIAL SYSTEM INFRASTRUCTURES

Chart S132 Non-settled payments on the Single Shared Platform (SSP) of TARGET2

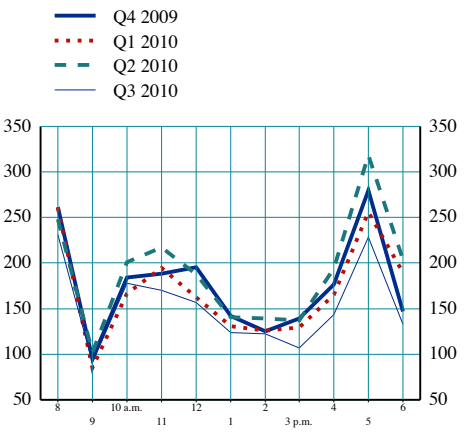
(July 2008 - Oct. 2010)



Source: ECB.
Note: Monthly averages of daily observations.

Chart S133 Value of transactions settled in TARGET2 per time band

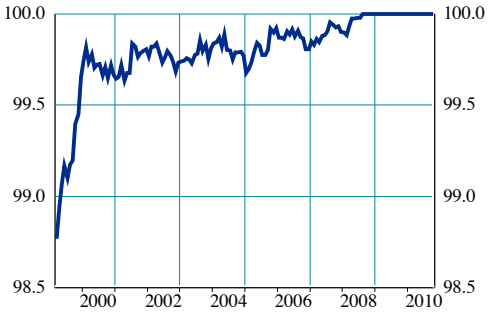
(Q4 2009 - Q3 2010; EUR billions)



Source: ECB.
Note: Averages based on TARGET2 operating days.

Chart S134 TARGET and TARGET2 availability

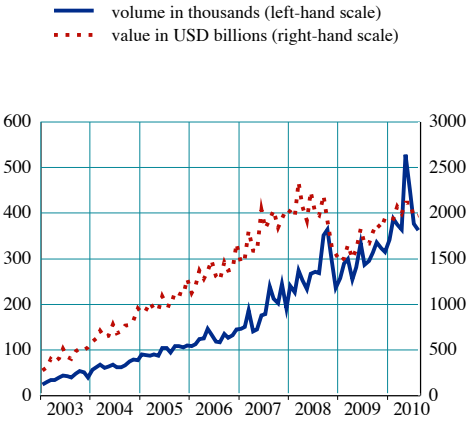
(Mar. 1999 - Oct. 2010; percentage; three-month moving average)



Source: ECB.

Chart S135 Volumes and values of foreign exchange trades settled via Continuous Linked Settlement (CLS)

(Jan. 2003 - Aug. 2010)



Source: ECB.

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