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EUROSYSTEM

FINANCIAL STABILITY REVIEW

JUNE 2010

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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, thereby mitigating 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 as inefficiencies in the allocation of financial resources from savers to investors and the mispricing or mismanagement of financial risks. This 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

Many euro area large and complex banking groups (LCBGs) returned to modest profitability in 2009, and their financial performances strengthened further in the first quarter of 2010. This, together with a bolstering of their capital buffers to well above pre-crisis levels, suggests that the bulk of these institutions have made important progress on the road to financial recovery. The broad-based enhancement of shock-absorption capacities during 2009 meant that systemic risks for the financial system dissipated to some extent and risks within the financial sector became more institution-specific in character. Indeed, the dependence of the financial system, especially of large institutions, on government support and the enhanced credit support measures of the Eurosystem tended to wane. That said, the profitability performances of some large financial institutions in receipt of government support remained relatively weak.

Outside the financial system, the progressive intensification of market concerns about sovereign credit risk among the industrialised economies in the early months of 2010 opened up a number of hazardous contagion channels and adverse feed-back loops between financial systems and public finances, in particular in the euro area. By early May, adverse market dynamics had taken hold across a range of asset markets in an environment of diminishing market liquidity. As a result, the prices of some securities tended to become detached from underlying fundamentals, and banks' long-term funding costs were pushed to levels not seen since the time of the failure of Lehman Brothers. Apart from the pass-through of higher sovereign funding costs, this appeared to reflect growing concerns about the possibility of mark-to-market losses on banks' government bond portfolios. Towards the end of the first week of May, the situation deteriorated very abruptly and extensively. On 7 May, the cost of insuring against credit losses on European banks soared to record levels, surpassing the heights reached after the collapse of Lehman Brothers in 2008. Ultimately, the functioning of some markets became so impaired that, for the euro area, it was hampering the monetary policy transmission

mechanism and thereby the effective conduct of a monetary policy oriented towards price stability over the medium term.

To help restore a normal transmission of monetary policy decisions, the Governing Council of the ECB decided on 9 May 2010 on several remedial measures, including the conduct of interventions in secondary markets for euro area public and private debt securities, the reactivation of fixed-rate full-allotment long-term refinancing operations (LTROs) at both three and six-month maturities, as well as the re-establishment of temporary foreign exchange swap lines and the resumption of US dollar liquidity-providing operations. Taking into account that these decisions have not only a European but also a global outreach, the G7 and G20 welcomed the ECB's action in their communiqués. In parallel, the EU Council adopted a regulation establishing a European Financial Stabilisation Mechanism. Subject to strong conditionality, this back-stop device will have funds of up to €500 billion at its disposal. Following the implementation of these measures, market volatility was significantly contained. In the period ahead, it is essential that governments implement fiscal consolidation to ensure the sustainability of public finances.

Considering the financial stability outlook, although the profile of ECB estimates of the potential write-downs on loans confronting the euro area banking system displays a peak in 2010, it is probable that loan losses will remain considerable in 2011 as well. This prospect, combined with continued market and supervisory authority pressure on banks to keep leverage under tight control, suggests that banking sector profitability is likely to remain moderate in the medium term. Notwithstanding plans for fiscal consolidation, the sizeable near-term funding requirements of governments could still crowd out issuance of bonds by banks. The risk that this implies for bank funding costs also raises the possibility of a setback to the recovery in banking sector profitability. In addition, concerns remain about pockets of vulnerability within the banking sector that are

connected with concentrations of exposures towards weakened commercial property markets and fragilities in some central and eastern European (CEE) economies.

The next part of this section reviews the main sources of risk and the vulnerabilities that are present in the macro-financial environment. This is followed by an assessment of the main sources of risk and vulnerability that are endogenous to the euro area financial system. The section concludes with an overall assessment of the outlook for euro area financial stability, followed by some proposals on remedial action that will need to be taken by authorities and financial institutions to address the challenges that lie ahead.

SOURCES OF RISK AND VULNERABILITIES OUTSIDE THE EURO AREA FINANCIAL SYSTEM

Concerns about mature-economy sovereign credit risks progressively intensified over the last six months, also within the euro area, and became acute in early May. In financial markets, worries surfaced first in a progressive widening of intra-euro area government bond and sovereign credit default swap (CDS) spreads of several euro area issuers with large fiscal imbalances. As unease over the broader macro-financial implications of large and persistent fiscal imbalances grew, investors retrenched from risk-taking across a variety of asset classes and contagion channels opened up, impinging on bond, stock, commodity and money markets. The main trigger for the market's reappraisal of sovereign risk appeared to be the fiscal woes of Greece and uncertainty surrounding the prospect of agreeing a credible fiscal consolidation plan. This focused investor attention on the abrupt, marked and widespread deterioration of public sector balance sheets that took place within the euro area and elsewhere after the eruption of the financial crisis.

An important lesson from economic history is that governments and, therefore, ultimately taxpayers have largely borne the direct costs of

banking system crises. Avoidance of these fiscal costs, which have often amounted to sizeable fractions of GDP, is one of the reasons why financial crisis prevention moved high on the public policy agenda over the past decade or more. The principal ways in which euro area governments addressed recent stresses in their banking sectors was to offer guarantees on bank liabilities in exchange for fees and to protect assets against tail risk. While such measures often avoided immediate financial outlays and direct fiscal costs, they created contingent liabilities for the public sector. Investors quickly priced the value of this downside protection into sovereign funding costs, which raised government debt servicing costs. In many cases, governments also bore direct costs and expanded their balance sheets through injections of capital into banks, the extension of loans and the setting up of bad bank schemes. These far-reaching measures, which led to a substantial transfer of risk from financial sectors to the fiscal authorities, also had adverse impacts on the public debt positions of a number of euro area countries. That said, for the euro area as a whole, the government support of financial sectors was not the most important source of enlarged fiscal imbalances.

The main reason for the severe deterioration of public finances was the activation of automatic stabilisers – that is the loss of tax revenue and higher government expenditure outlays that ordinarily results from weaker economic activity – as a consequence of the marked contraction of economic activity that followed the collapse of Lehman Brothers. Because the structural fiscal imbalances of a number of euro area countries were sizeable before the financial crisis erupted, fiscal deficits in those countries expanded to very high levels. Added to this were the discretionary fiscal measures taken by many countries to stimulate their economies following the agreement in December 2008 of the European Economic Recovery Plan. This fiscal stimulus came close to matching the impact on deficits of automatic stabilisers. Eventually, by end-2009 the aggregate euro

area public sector debt-to-GDP ratio had scaled heights not seen in half a century or more, with little near-term prospect of correction.

The ways in which persistently large fiscal imbalances can pose risks for financial stability are manifold, some of which propagate through real economy channels and others through financial markets and institutions. Beginning with some of the more important real economy channels, it is well known that the public sector financing needs created by sizeable fiscal deficits often crowd out private sector financing, both non-financial and financial. This usually occurs through the upward pressure that additional government financing requirements places on medium and long-term real interest rates. The rise of aggregate euro area long-term real interest rates in recent weeks to levels not seen in at least a year suggests that the relevance of this risk and the likelihood of it impinging on the nascent economic recovery and the sizeable funding roll-over requirements of LCBGs was beginning to rise. Looking further ahead, deteriorated public sector balance sheets can create risks for longer-term economic growth by raising precautionary savings to shoulder the risk of future fiscal correction, thereby lowering future investment and productivity growth. The inevitable fiscal contraction can also impinge on the prospects for financial sector profitability and soundness.

As to the principal financial propagation channels, if government indebtedness reaches a level that is sufficiently high to trigger a loss of confidence in fiscal sustainability, investors will require additional risk premia to compensate for having to bear greater sovereign credit risk. The resulting rise in risk premia can be passed through to private sector funding costs, especially if doubt is cast over the ability of the public sector to counter adverse disturbances to non-financial and financial sectors. This became increasingly evident in the euro area over the past six months in the strengthening of correlations between sovereign and bank CDS spreads in those countries facing the greatest fiscal challenges. Ultimately, as witnessed in

early May, the pass-through of higher sovereign credit risk premia to private securities prices can trigger extreme risk aversion, portfolio reallocations into safer assets and a drying-up of market liquidity. Some investors also took on short positions across a range of securities markets, lured by perceptions that asset prices had entered into a downward spiral.

The pattern of correlation within euro area financial markets has shown that the importance of sovereign risk for financial system stability depends on a variety of factors such as the condition of public sector balance sheets in individual countries as well as the extent and nature of exposures to sovereign debt, both direct and indirect. Considering banks' exposures, not only did higher sovereign funding costs raise their own funding costs they also created the risk of triggering losses on leveraged government bond positions such as yield curve carry-trades – that is borrowing at low short-term interest rates and investing the funds in higher-yielding long-term fixed income securities. The greater preference of LCBGs for holding liquid and low-risk assets following the eruption of the financial crisis has raised the relevance of this risk for euro area financial stability. Propagation channels can also open up when the crystallisation of sovereign risk in one country weakens the local banking system and raises the risk of weakening other banking systems, because of direct exposures to the initially afflicted sovereign issuer or banking system. A further concern which began to emerge as financial market conditions deteriorated was the risk of a weakening of the condition of financial institutions feeding back into greater sovereign risk on account of continuing public sector support of financial sectors.

Large fiscal imbalances call for significant fiscal consolidation efforts over the medium term and this will also require that governments ensure timely exits from financial sector support. The legacy for the period ahead is the considerable curtailment of the room for fiscal policy manoeuvre in the future, should another episode of systemic risk materialise.



Turning to the euro area non-financial sectors, the condition of household sector balance sheets has changed little over the past six months. Reflecting this, new ECB estimates for loan losses on banks' exposures to households up to end-2010 have changed little compared to six months ago, with a slight decrease in losses on residential mortgages expected to offset a slight increase in estimated losses on consumer loans. But downside risks for households' income and debt-servicing capacity are likely to persist, so that banks could face losses for a significant period, although there are important differences across countries. The credit risks appear to be greatest in those countries where household indebtedness is high and where unemployment rates have increased the most. At the same time, yardsticks of house price valuation continue to point to risks of further correction. Although the low level of interest rates has been helping households to service their loans, interest rate risks may be also rising, as discussed later. Hence, while risks to households' creditworthiness have not changed much, they still remain material.

For the euro area non-financial corporate sector, balance sheet conditions have slightly improved since the last issue of the FSR and this has translated into a slight lowering of the expected losses facing euro area banks on their corporate loan portfolios by end-2010. That said, similar to the assessment made in the last issue of the FSR, euro area firms continue to face several important challenges. These include very low profitability, high financial leverage and persistently tight bank lending standards which together leave firms vulnerable to adverse disturbances. Conditions in the euro area commercial property markets remain especially challenging and estimates of losses facing banks on their commercial property loan portfolios have been revised upwards by almost 50% over the past six months. In view of this, concerns remain about concentrations of the exposures among some euro area banks.

The last issue of the FSR drew attention to concerns that concentrations of lending

exposures among some euro area banks to CEE countries constitute a vulnerability for euro area financial stability. In the meantime, the economic outlook in the region has improved, large financial imbalances accumulated in the run-up to the financial crisis have partly been unwound and sovereign spreads have declined, benefiting from improved investor risk appetite and a shifting of investors focus towards euro area sovereign risk concerns. That said, new vulnerabilities have emerged, especially a broad-based deterioration in fiscal positions: a number of non-euro area EU countries are currently subject to excessive deficit procedures. Moreover, the stock of outstanding foreign currency loans in these countries, while no longer growing, remains sizeable, making the quality of exposed banks' assets vulnerable to exchange rate risks. At the same time, labour market conditions in many CEE countries are expected to remain weak for some time which is impairing the debt servicing capacity of households. While the overall exposure of the euro area financial system to the region is not particularly large, some euro area-based LCBGs have sizeable exposures to the region, making them vulnerable to the risk of larger-than-expected losses on their loan portfolios.

SOURCES OF RISK AND VULNERABILITIES WITHIN THE EURO AREA FINANCIAL SYSTEM

The intensification of sovereign risks was felt most in the government bond and sovereign credit default swap (CDS) markets. The yields of AAA-rated sovereign issuers were pushed down by risk-averse investors seeking safe havens for their funds. When the tensions first began to surface, investors discriminated between issuers, and this was reflected in the fact that spreads over AAA-rated issuers widened most in countries where fiscal imbalances were the largest. However, as concerns intensified and contagion spread, the degree of discrimination tended to decline. The stresses eventually pushed the spreads of some euro area sovereign issuers to the highest levels recorded since the launch of the euro and liquidity in several sovereign bond markets evaporated. Credit and bank CDS

spreads, too, were driven to very high levels. Against this background, at an extraordinary meeting on 9/10 May, the Council (Ecofin) and the Member States agreed to establish a comprehensive package of measures to preserve financial stability in Europe, including a European Financial Stabilisation Mechanism. Subject to strong conditionality, this back-stop financing arrangement will have up to €500 billion of funds to be provided by euro area Member States at its disposal. The IMF will participate in the financing arrangements and is expected to provide at least half as much as the euro area countries' contributions. Of the EU total amount, €60 billion draws on an existing facility while the remaining €440 billion will be sourced through a special purpose vehicle (SPV). Also on 9 May, the Governing Council decided to conduct interventions in the euro area secondary markets for public and private debt securities in the context of a Securities Markets Programme, to ensure depth and liquidity in those market segments that had become dysfunctional. Following the implementation of these measures, market volatility was significantly contained.

The greater volatility of sovereign bond spreads also sharpened market attention on interest rate risk more generally. Nevertheless, over the past six months interest rate volatility has remained relatively low and this together with a very steep yield curve attracted investors into building-up what are thought to be sizeable yield curve carry-trade positions. The appeal for investors of such leveraged positions is the seemingly reliable revenue flow they produce when market conditions are tranquil. However, these positions are vulnerable to unexpected increases in funding costs or sudden surges in long-term rates. Because they are leveraged, their abrupt unwinding can be disruptive for market functioning. The term structure of interest rate options prices prevailing at the time of writing suggested that investors saw a flattening of the yield curve as the most probable medium-term prospect. This means that they may not be sufficiently prepared for an unexpected further steepening of the yield curve, as occurred in

the US bond market in early 1994, which might leave banks and other investors exposed to risks of large losses on fixed income portfolios and interest rate derivative positions.

Securitisation markets were rendered dysfunctional by the financial crisis for a variety of reasons, both micro and macroeconomic in character. Efforts are being made both by the financial industry and the policy-making community to address the most important micro issues – including lack of transparency, complexity and inappropriate incentives in the originate-to-distribute model. The public policy concern is that a failure to restart securitisation markets may impair the supply of credit to some sectors of the economy, for instance small and medium-sized enterprises. It is important to bear in mind, however, that macro factors have also been important in explaining the paralysis of these markets. Regarding the supply of new asset-backed securities (ABSs), the recent weakness of non-financial sector credit demand reduced loan origination and, therefore, the need for financial institutions to repackage loans into securities. The profit-generating potential of securitisation and, by extension, the supply of ABSs also suffered on account of the persistently high returns required by investors to hold them relative to the cash-flows they produce for banks. On the investor demand side, the pressure on banks, which had been the most important pre-crisis investors, to deleverage their balance sheets eroded the investor base. In recent months, however, there have been some, albeit nascent, signs of improvement in securitisation activity. This has been indicated in responses to the ECB's bank lending surveys and in lower retention rates by banks for newly issued ABSs. While it is difficult to disentangle the weight of micro and macro factors in the improvement, it seems clear that the improved economic outlook has played an important role. The corollary of this, however, is that the risk remains of a setback if macroeconomic outcomes fail to live up to optimistic expectations.

After the sizeable net losses endured by around half of the euro area LCBGs in late 2008, many of

them returned to positions of modest profitability during 2009 with a further and significant strengthening in the first quarter of 2010. The most important driver of euro area LCBGs' net income throughout 2009 and in the first quarter of 2010 continued to be net interest income. By the first quarter of 2010 around two-thirds of LCBGs' total net income was being garnered from this source, a considerable change from pre-crisis revenue patterns when around half of the total came from net interest income. The strength of euro area LCBGs' net interest income can be explained by the still large size of these institutions' loan books and by a notable expansion of net interest margins during 2009. The main explanation for wider interest margins continued to be low short-term funding costs and steep yield curves. The widening was remarkable in view of the fact that the upward pressure on interest margins from tightening lending standards and diminished competition tended to ease throughout 2009 and early 2010. The ability of euro area LCBGs to expand their margins appears to lie partly in their relatively low, by global standards, customer funding gaps – that is the difference between customer loans and deposits – which means they have a greater share of low or zero-cost deposit funding, and this appears to make these euro area institutions less inclined to bid customer deposit rates higher.

The turnaround of LCBG profitability in 2009 was also attributable to a remarkable recovery of net trading revenue in the second quarter of 2009 which was more or less sustained throughout the year and in early 2010, despite a progressive lowering of market volatility, a tightening of bid-ask spreads and a stalling of the recovery in financial markets. The strength of hedge fund investment performances through 2009 and early 2010 would tend to suggest that proprietary trading businesses also produced strong returns for banks, while the recent stability of trading income might also be partly attributable to the growing importance of carry-trades. Fee and commission income, which proved to be a relatively resilient source of income during the financial crisis, continued to produce a stable revenue flow for euro area

LCBGs, even increasing somewhat in late 2009 and early 2010.

Despite a continuous and broad-based rise in loan-loss provisions throughout 2009, to almost 40% of net interest income, the overall strength of revenues, together with continued efforts to cut costs – including headcount reductions, the exploitation of business line synergies and disposals of non-core assets – led to an edging-up of the median return on equity (ROE) among these institutions from 2.4% in 2008 to 4.5% in 2009. Moreover, for the first quarter of 2010, those LCBGs that report on their financial performances on a quarterly basis showed a considerable improvement in their median ROE, to above 11%. At the same time, the distribution of profitability performances for these institutions, which had been narrowing during 2009, became much more compressed, indicating a broad-based improvement. Indeed, for the first time since 2007, no euro area LCBG reported a net loss for the first quarter of 2010.

Regarding shock-absorbing capacities, the capital ratios of euro area LCBGs improved substantially during 2009 and early 2010, with the median Tier 1 ratio among these institutions reaching 10.6% by the first quarter 2010 and the quality of capital improved as well. Even those institutions with the lowest capital ratios managed to enhance their buffers to levels well in excess of minimum regulatory requirements. The contribution of retained earnings to the improvement in capital ratios in 2009 and early 2010 was sizeable while additional support came from public sector capital injections and the efforts made by these institutions to raise capital from private sources. That said, in some cases the improvement of capital ratios benefited from reductions in risk-weighted assets. The enhanced solvency buffers of euro area LCBGs points to an increase in their capacity to absorb further adverse disturbances. At the same time, the capital buffers in some segments of the euro area banking sector may not have improved as quickly as has been the case for LCBGs and will require further strengthening.

Conditions in euro area LCBG funding markets tended to improve for much of the past six months, although the recent rise in sovereign risks did lead to a setback for longer-term debt financing costs. Since late 2008, responses to the ECB's bank lending surveys have pointed to a continuous improvement in the access of banks to wholesale funding across the entire maturity spectrum. This has been mirrored in the normalisation of LCBGs' reliance on Eurosystem refinancing. At the same time, there was a tendency for LCBGs to enhance the stability of their funding bases during 2009 by raising the share of customer deposits in total liabilities, thereby lowering their customer funding gaps. While this generally lowered the reliance of these institutions on wholesale funding, some of them still have sizeable market financing needs. Short-term bank funding costs remained relatively low, thanks to the monetary policy stance and the non-standard measures of the Eurosystem. Notwithstanding the recent rise in longer-term funding costs, debt issuance patterns also confirmed further improvement in LCBGs' access to longer-term funding. Looking ahead, an area of concern is the fact that euro area LCBGs will collectively have to roll-over about half of their longer-term debt outstanding by the end of 2012. With several euro area governments also facing heavy financing requirements over the coming years, on account of widened fiscal deficits, this raises the risk of bank bond issuance being crowded out, thereby heightening roll-over risks, which are sizeable for some institutions. At the same time, continued reliance of some medium-sized banks in some countries on Eurosystem financing continues to be a cause for concern.

Looking ahead, although their financial performances have much improved, the challenges facing euro area LCBGs remain considerable. The central scenario is for subdued banking sector profitability in the short to medium term for a variety of reasons. Although the overall recovery in financial markets has lowered ECB estimates of banks' mark-to-market losses on holdings of securities,

new estimates indicate that loan losses are likely to be higher in 2010 than they were in 2009 and sizeable losses are also expected for 2011. This will constitute a significant and lasting drag on banking sector profitability and it gives rise to the risk that the recent recovery of profits will not prove durable. At the same time, market and supervisory authority pressure on banks to keep leverage under tight control suggests that banking sector profitability will remain moderate, even after the peak of loan losses has been passed. Disengagement from public support of banks' balance sheets will probably raise bank funding costs. Added to this, the net interest margins of some banks may be vulnerable to the prospect of a flattening of the yield curve and are eventually likely to succumb to strengthening competitive forces. That said, the term structure of interest options prices would also tend to suggest that there is a broad base of financial institutions that may not be sufficiently well prepared for the possibility of a yield curve steepening scenario which could be triggered, for instance, by further intensification of sovereign risks. In addition, there are concerns about pockets of vulnerability among some banks with concentrations of exposures towards weakened commercial property markets and fragile CEE economies.

OVERALL ASSESSMENT OF THE EURO AREA FINANCIAL STABILITY OUTLOOK

Although the main risks to euro area financial stability essentially remain the same as those to which attention was drawn in the last issue of the FSR, their relative importance has changed significantly over the past six months. Ultimately, the relevance of risks for financial system stability must be judged by the probability of their materialisation in combination with their likely impact, both on the financial system and on the broader economy, in the event that they do materialise. By this criterion, the two most important risks for euro area financial stability at the current juncture are: the possibility of concerns about the sustainability of public finances persisting or even increasing with an associated crowding-out of private investment;

and the possibility that adverse feedback between the financial sector and public finances continues. Over the past six months, sovereign debt-related risks have been paramount and have clearly shown the dangers of adverse feedback between financial sectors and public finances that can be created by concerns about fiscal sustainability. The measures taken by the ECB to stabilise markets and restore their functioning as well as the establishment of the European Financial Stabilisation Mechanism have considerably lowered tail and contagion risks. However, sizeable fiscal imbalances remain, and the responsibility rests on governments to frontload and accelerate fiscal consolidation so as to ensure the sustainability of public finances, not least to avoid the risk of a crowding-out of private investment while establishing conditions conducive to durable economic growth.

Considering other risks outside the financial system, less material concerns include the possibility of vulnerabilities being revealed in non-financial corporations' balance sheets and of greater-than-expected household sector credit losses, if unemployment remains higher than currently expected. There is also a risk that asset price bubbles might be building up in emerging market economies to which euro area LCBGs may have exposures. Although this is not assessed as posing a material risk for euro area financial stability at the current juncture, it will warrant close monitoring in the period ahead.

Within the financial system, the central scenario is for modest banking sector profitability in the short to medium term, given the prospect of continued loan losses, lasting pressure on the sector to reduce leverage and market expectations of higher funding costs. Given this outlook, the possibility of a setback to the recent recovery of bank profitability and of adverse feedback on the supply of credit to the economy are important risks. Moreover, in view of the considerable near-term funding needs of euro area governments, a particular concern is the risk of bank bond issuance being crowded out, making it challenging to roll-over a sizeable amount of maturing bonds by the end of 2012.

In addition, the vulnerabilities of financial institutions associated with concentrations of lending exposures to commercial property markets and to CEE countries remain. There is also a risk of heightened financial market volatility if macroeconomic outcomes fail to live up to expectations. A key concern is that many of the vulnerabilities highlighted in this FSR could be unearthed by a scenario involving weaker-than-expected growth.

As financial market conditions improved and economic activity started to recover, the Eurosystem initiated a gradual phasing-out of non-standard measures that were designed to ensure the smooth functioning of the money market, improve financing conditions and foster the provision of credit to the economy. These plans were appropriate because they aimed at avoiding market distortions that could result from maintaining such measures for longer than necessary and at providing incentives for banks to restructure and strengthen their balance sheets. The reactivation of fixed-rate full-allotment LTROs at both three and six-month maturities on account of recent market stresses and the plans that were already in place to carry out the main refinancing operations as fixed rate tender procedures with full allotment for as long as needed and, at least, until October this year, should facilitate the provision of credit to the euro area economy and further support its recovery.

With pressure on governments to consolidate their balance sheets, disengagement from financial sector intervention means that banks will need to be especially mindful of the risks that lie ahead. In particular, they should ensure that they have adequate capital and liquidity buffers in place to cushion the risks should they materialise. Against this background, the problems of those financial institutions that remain overly reliant on enhanced credit and government support will have to be tackled decisively. At the same time, fundamental restructuring will be needed when long-term viability is likely to be threatened by the taking away of state support. This could involve the

shrinking of balance sheets through the shedding of unviable businesses with a view to enhancing profit-generating capacities.

For the longer-term, a key objective of the agenda for regulatory reform - including the strengthening of global capital and liquidity regulations - is to ensure a safer financial system that is more robust to adverse disturbances. While more and better capital as well as enhanced liquidity management is clearly required to reinforce financial system resilience, the magnitude of change in key regulatory parameters is presently uncertain. These uncertainties have been impinging on the business planning of banks. Swift completion of the process of calibration and implementation of these necessary reforms should remove these uncertainties and allow banks to optimise their capital planning and, where necessary, adjust their business models.



II THE MACRO-FINANCIAL ENVIRONMENT

I THE EXTERNAL ENVIRONMENT

Despite further improvements in the macroeconomic outlook since the finalisation of the December 2009 Financial Stability Review (FSR), several risks stemming from beyond the euro area remain high. Large fiscal deficits and debt increases, in part due to economic stimulus packages, have 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 to losses on fixed-income securities for banks, globally. At the same time, the materialisation of risks stemming from weaknesses in global household balance sheets has resulted in a rise in delinquency rates and credit-related write-offs. In addition, the broad based improvement in the 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 confronting global financial institutions in relation to above-average write-offs on commercial property loans, more challenging funding conditions and the potential for a reversal of the recovery in financial markets and macro-financial developments also remain high. While the outlook for emerging economies has improved, many have faced unexpectedly high capital inflows, increasing the risk of the emergence of asset price bubbles across the region. In the medium term, the risk remains of a re-emergence of global financial and current account imbalances, which could result in abrupt global capital movements.

I.1 RISKS AND FINANCIAL IMBALANCES IN THE EXTERNAL ENVIRONMENT

GLOBAL FINANCIAL IMBALANCES

After the publication of the December 2009 FSR, the adjustment of global financial and current account imbalances lost some momentum, and some of the main structural factors behind the build-up of large imbalances remained in place. In particular, the cyclical drivers of the unwinding – the contraction of global trade, the temporary decline in oil prices and the severe tensions in capital markets – have eased, while

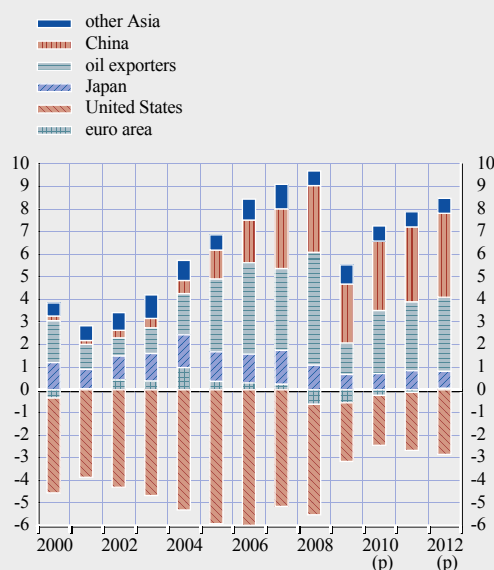
structural factors such as trade imbalances, increasing public sector imbalances and sizeable holdings of foreign exchange reserves – in particular, in some Asian surplus economies – have persisted over the last six months.

The US trade deficit widened towards the end of 2009 and the earlier rise in personal savings rates has come to a halt in recent months, despite still high unemployment and the need for households to repair their balance sheets. In this context, large public sector dis-saving, along with a possible recovery of corporate investment, could contribute to a widening of the US current account deficit in the period ahead (see Chart 1.1).

In emerging Asia, trade imbalances and the sizeable accumulation of foreign exchange reserves contributed to current account surpluses, which are projected by the IMF to increase slightly in 2010. Similarly, the external surpluses of oil-exporting economies could more than double, due to the anticipated rebound in oil prices this year (see Chart 1.1).

Chart 1.1 Current account balances for selected economies

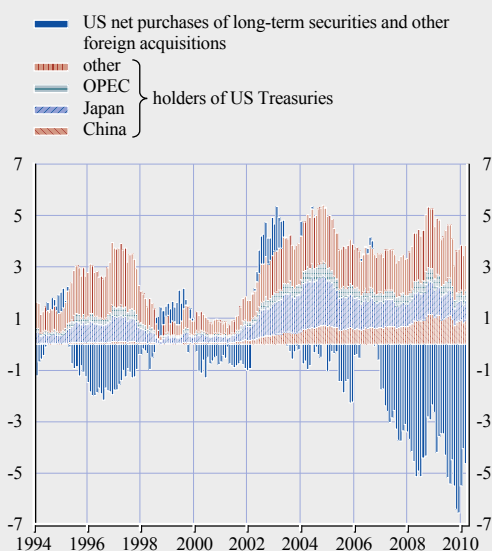
(2000 – 2012; percentage of US GDP)



Source: International Monetary Fund World Economic Outlook.

Chart 1.2 Purchases of US Treasuries and foreign acquisitions by the United States

(Feb. 1994 – Mar. 2010; 12-month moving sum; percentage of US GDP)



Sources: US Treasury International Capital System and ECB calculations.

The resumption of global financial flows from emerging markets to the United States has facilitated the financing of the US current account deficit through an increase of foreign purchases of US Treasury bonds and notes in the last six months. This has resulted in a rise in the accumulated holdings of foreign reserves of surplus economies to well in excess of pre-crisis levels (see Chart 1.2).¹

The resumption of global trade and financial flows has also been accompanied by strong capital flows from the United States to a number of emerging economies (see Chart 1.2). These flows were to a large extent absorbed by further foreign reserves accumulation across emerging markets, which mitigated the risk related to rapidly rising property and equity market valuations in these regions. However, measures taken by authorities to dampen domestic demand and absorb foreign capital inflows could contribute to a further increase in current account surpluses across these economies and thereby increase global imbalances.

Looking ahead, although foreign investors showed continued confidence in the safety of US financial assets in the last six months, there remains a significant risk of abrupt global capital movements. This may result from a re-emergence of global financial and current account imbalances over the medium term, especially if combined with insufficient exchange rate flexibility on the part of some emerging economies.

US SECTOR BALANCES

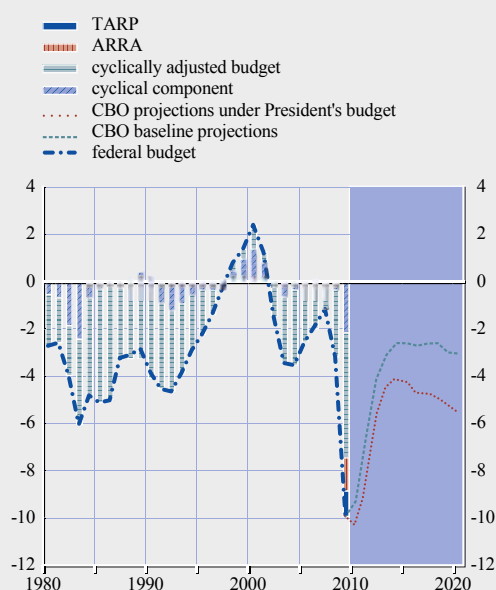
Public sector

In the context of the financial crisis and the subsequent economic downturn, the combined effects of automatic stabilisers, fiscal stimuli and financial rescue packages continued to contribute to a marked deterioration in US

¹ By the end of January 2010, Chinese reserves were 60% higher and Brazilian reserves 13% higher than the pre-crisis peak levels of September 2008.

Chart 1.3 US fiscal deficit

(1980 – 2020; percentage of nominal GDP; fiscal years)



Source: Congressional Budget Office.
Notes: TARP refers to Troubled Asset Relief Program and ARRA to American Recovery and Reinvestment Act.

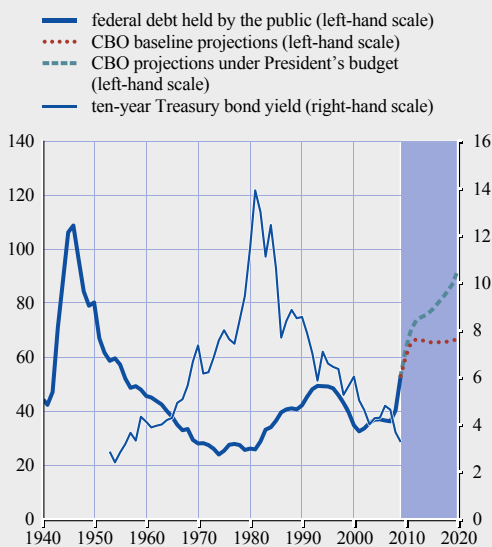
public sector balances after the finalisation of the December 2009 FSR. The federal budget deficit widened to around 10% of GDP in 2009 (see Chart 1.3).

Although the March 2010 projections of the Congressional Budget Office (CBO) point to a gradual improvement of the federal budget deficit, fiscal imbalances are nevertheless expected to persist over the next ten years. The sizeable budget deficit has led to a considerable increase in the ratio of publicly held federal debt to GDP. It increased from 40% to 53% in the course of 2009 and is forecast to rise to between 67% and 90% by the end of the decade (see Chart 1.4).

The prospect of a greater financing needs, and thus of a significant increase in net supply of US Treasuries to the market, raises two major concerns for financial stability in the United States and across the globe. First, in the context of the unwinding of the quantitative easing policies of the Federal Reserve in 2010, if private investor demand were to prove insufficient to take up the additional supply and if flight-to safety investment flows to the US bond market were to reverse, this could trigger an increase in US bond yields. Recent patterns and the low level of US bond yields in recent months suggest that this risk is somewhat remote. However, a sudden increase in long-term bond yields, coupled with an unexpected monetary tightening, could rapidly spill over into global bond yields, lead to increases in the cost of capital, adversely affect banks' funding costs, create large losses on their bond portfolios and spill over to other global financial markets (see Box 1). A second concern is that the higher borrowing requirements of the US government could, over time, also contribute to a possible crowding-out of market funding and private sector investment, including the issuance of corporate bonds and asset-backed securities (ABSs) (see Chart 1.5).

Chart 1.4 US public debt and ten-year Treasury bond yield

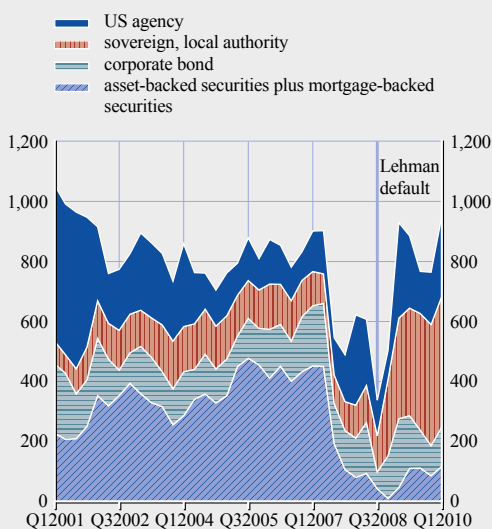
(1940 – 2020; percentage of nominal GDP; fiscal years)



Source: Congressional Budget Office.
Note: Actual data to 2009; projections for the period from 2010 to 2020.

Chart 1.5 US public debt, corporate bond, asset-backed securities and agency debt issuance

(Q1 2001 – Q1 2010; USD billions)



Sources: Haver Analytics and ECB.

INTEREST RATE RISK AND THE FEDERAL RESERVE'S TIGHTENING CYCLE: COMPARISON WITH THE EVENTS OF 1994

Concerns about interest rate risk – the potential for increases in interest rate volatility and subsequent reductions in earnings or the economic value of portfolios – have intensified recently, on account of the significant accumulation of bonds by commercial banks. Current concerns have a historical precedent: in 1994 bond-yield volatility rose significantly as US long-term bond yields increased sharply and global investors liquidated their government bond holdings. Concerns quickly spread to global fixed income markets, resulting in significant capital losses worldwide. This box compares current developments with those in 1994 and explores the risks to financial stability.

In February 1994 the federal funds target rate was low by historical standards. Given the slow recovery from the 1990/91 recession, low inflation and fiscal consolidation, long-term bond yields remained relatively low (see Chart A). A combination of events, however, pushed long-term debt yields significantly higher. With a monetary normalisation on the horizon, market participants were uncertain regarding future trends in long-term yields, which typically rise during a monetary tightening cycle. When the Federal Reserve began to raise the federal funds rate in February, the market was taken by surprise. However, inflation expectations began to rise and some analysts predicted that the federal funds rate could be raised to as much as 8%, which triggered an abrupt and significant increase in long-term interest rates throughout much of 1994, in excess of the increase in official rates (see Chart A). A number of further and larger increases in the federal funds target rate followed the February rate hike, but it was not until a 75 basis point increase was announced in November 1994 that long-term interest rates began to fall. Bond portfolio losses, however, were already extremely high and capital losses mounted worldwide.¹ The 1994 episode of bond market turbulence can be explained, in part, by the communication strategy of the central bank, which resulted in market expectations being unanchored. At the time of the next rate tightening cycle in 2004, a changed communication policy contributed to considerably lower increases in long-term rates (see Chart A).²

There are some similarities between the current situation and the setting of 1994: policy rates have been at historically low levels for almost one-and-a-half years, and the recovery in the US economy has been equally slow. There are also some important differences, however: macro-financial conditions in 2010 more closely resemble those in 2004, as inflationary risks are lower than in 1994. Furthermore, since 1994, the Federal Open Market Committee (FOMC) has communicated its intentions regarding the future path of interest rates more clearly. The anchoring of inflation expectations and the central bank's credibility are significantly higher now, mitigating the risk of a repetition of the 1994 episode.³ Risk factors remain, however.

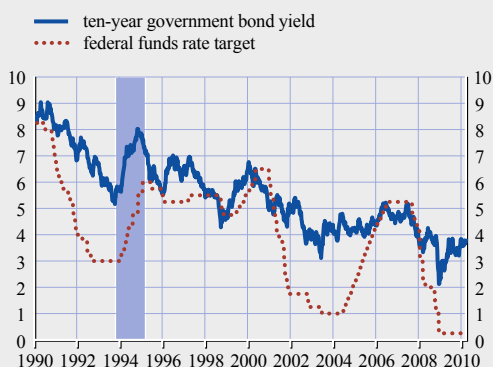
1 The Bank for International Settlements estimated that losses were in the region of USD 1.5 trillion, almost 10% of OECD countries' total GDP at that time (see BIS, *Annual Report*, June 1995).

2 Long-term rates remained low in the 2004 tightening cycle, in large part due to the "global savings glut", which resulted in current account balance surpluses, particularly in emerging countries. A lack of flexibility in foreign exchange regimes and alternative investment opportunities induced central banks in these countries to accumulate reserves in the form of Treasury bonds. Long-term bond yields, therefore, remained at excessively low levels, given the economy's continued strength.

3 In February 2010, expected US inflation over a ten-year horizon was 2.4%, roughly in line with prevailing inflation rates. In 1994, by contrast, long-term inflation expectations stood at 3.5%, almost a full percentage point above the inflation rates observed during the same year.

Chart A US policy interest rates and long-term bond yields

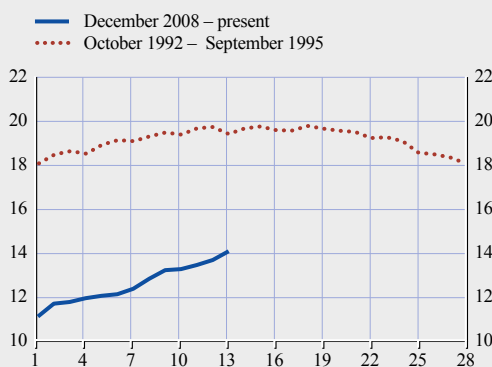
(Jan. 1990 – Apr. 2010; percentage)



Source: Bloomberg.

Chart B US banks government bond holdings at the end of the Federal Reserve's easing cycle

(percentage of total bank assets; months)



Sources: BIS, Haver Analytics and ECB calculations.
Note: "0" denotes the timing of the last cut in the federal funds target rate for the respective cycle.

On the macroeconomic side, the current fiscal situation is clearly less favourable than in 1994. At that time, the Congressional Budget Office (CBO) projected a stable debt-to-GDP ratio of around 50% over the medium term, whereas the CBO currently projects this ratio to increase from 53% to 90% over the next decade.

Financial institutions have accumulated significant amounts of long-term bonds since the onset of the current financial crisis, and – although this is not an abnormal phenomenon during economic downturns, given the strong issuance of government bonds, low short-term funding costs, high loan-loss provisions and a preference of banks for low risk assets – the pace of accumulation has been more marked than in 1994, as pressures to delever remain (although the share of government bonds in total assets is lower; see Chart B). Mitigating the risks associated with these exposures, however, is the increasing degree of sophistication used in managing interest rate risk over the last decade.⁴ Moreover, an additional potentially adverse effect for financial stability is the possibility of a spill-over to non-financial firms' financing costs that could trigger crowding-out effects, raise loan delinquencies and endanger the economic recovery. Finally, higher nominal and real interest rates might also trigger a stock market sell-off and have negative wealth effects, potentially spilling over to other bond markets.⁵

In conclusion, although a repetition of the 1994 bond market turbulence appears unlikely, financial stability risks remain. The impact of higher interest rates on financial systems is likely to depend on the nature of the factors triggering the adjustment and on the prevailing economic environment. In the event of a stronger than anticipated economic recovery, the likely improvements in credit quality should be an important mitigating factor for financial institutions. However, a rise in bond yields – driven, for example, by higher inflation expectations or sovereign debt concerns which endanger price stability – may pose more significant challenges.

4 US financial supervisors have nonetheless identified exposures to rising policy rates, in particular for small and medium-sized banks with less sophisticated risk control mechanisms (see Federal Deposit Insurance Corp., "Supervisory insights," Vol. 6, 2009).

5 The circumstances surrounding the tightening cycle are also important. In 1994 the growth acceleration took place against a background of low corporate indebtedness and led to an improvement in credit quality, as both default rates and credit spreads fell. The impact on banks' profitability was thus cushioned, as lower credit-related losses outweighed those endured on securities holdings.

Corporate sector

The outlook for the US corporate sector has continued to stabilise since the December 2009 FSR was finalised. Corporate profit growth was positive in each of the four quarters of 2009 (see Chart 1.6). The improvements were driven by a turn-around in the profits of domestic financial industries, following the sharp decline in late 2008. Profits of domestic non-financial industries also strengthened in the course of 2009, and are projected to remain positive in 2010. As recent profitability stems largely from cost-cutting measures and as demand is expected to remain relatively weak despite some recent indications of improving sales volumes, there continue to be risks to the outlook for corporate sector profitability.

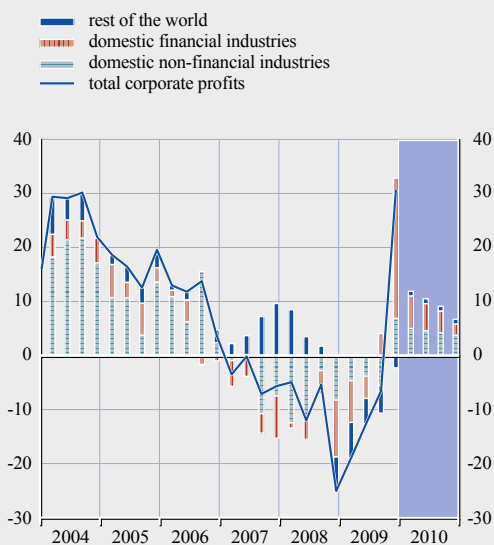
Regarding sources of financing, net funds raised in the market remained positive for the whole of 2009, as the decline in bank loans and commercial paper were more than offset by strong issuance

of corporate bonds. Net issuance of new equity turned negative in the last quarter of 2009, a pattern similar to the net equity buy-backs observed in the years preceding the downturn.

Despite a small decline in credit market debt in the final quarter of 2009, US non-financial corporate balance sheets remain under strain. This is evident from the ratios of debt to net worth and GDP, which remain elevated by historical standards. Weak corporate balance sheets underpinned further increases in delinquency rates for commercial and industrial loans in the final quarter of 2009, although non-financial corporate insolvencies remained broadly unchanged in the same period (see Chart 1.7). On a positive note, speculative-grade corporate default rates appear to have reached a turning point and are projected to decline further in the coming months, reflecting ongoing signs of improvement in financial and economic conditions (see Chart S3).

Chart 1.6 US corporate sector profits and their Consensus Economics expectations for 2010

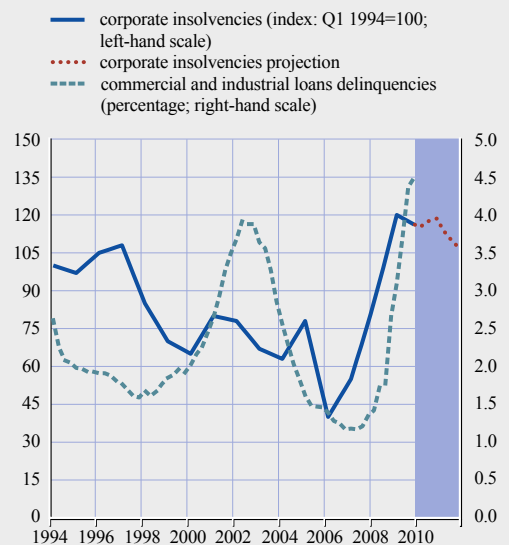
(Q1 2004 – Q4 2011; percentage point contribution to year-on-year growth; seasonally adjusted)



Sources: US Bureau of Economic Analysis and Consensus Economics.
Notes: Corporate profits include inventory valuation and capital consumption adjustments. Profits from the rest of the world (RoW) are receipts from the RoW less payments to the RoW.

Chart 1.7 US delinquency and insolvency rates (with their expectations for 2010-11)

(Q1 1994 – Q4 2010)



Sources: Federal Reserve Board of Governors and Euler Hermes.

Household sector

The financial stability risks stemming from the US household sector have receded somewhat in recent months. The ratio of net wealth to disposable income gradually recovered after bottoming out early in 2009, driven by the rebound in equity prices and the stabilisation in house prices. As the recovery has only partially offset the decline since mid-2007, the ratio of net wealth to disposable income remained below its long-term average level.

The deleveraging that took place in the household sector in 2009 – evident from the annual decline in household debt – probably reflected a combination of both repayments of loans and debt write-downs, arising from the higher rates of default on mortgages and consumer loans (see Chart 1.8).

Low interest rates and the ongoing decline in the ratio of the stock of household debt to income have led to additional improvements

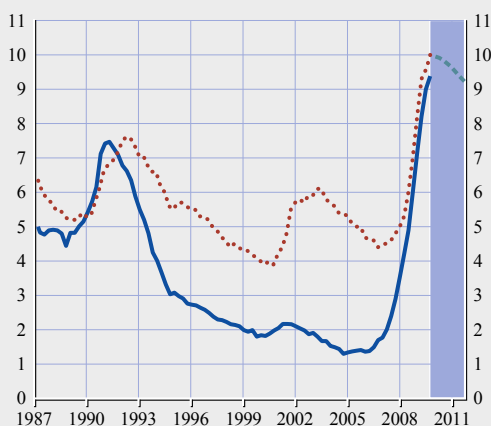
in debt-service ratios (see Charts S5 and S6). Nevertheless, the debt-servicing burden of US households remains elevated by historical standards. This, in conjunction with still high rates of unemployment and the sluggish performance of payroll employment, raises the risk of both a jobless recovery and a possible further rise in delinquencies on loans to households (see Chart 1.8).

Despite the emergence of signs of stabilisation in US housing markets as early as in the second quarter of 2009, the recovery appears to be fragile. Although housing starts have stabilised, albeit at depressed levels, home re-sales have rebounded somewhat in recent months, following sharp declines since 2006 (see Chart 1.9). Regarding house prices, the S&P/Case-Shiller index reached a turning point in June 2009 and posted modest increases thereafter. According to the S&P/Case-Shiller futures price index for ten major US cities, prices will remain broadly flat over the next few years (see Chart 1.9).

Chart 1.8 Delinquency rates on US property loans and the rate of unemployment in the United States

(Q1 1987 – Q4 2011; percentage)

- property loans delinquencies
- unemployment rate
- unemployment rate Consensus Economics expectation

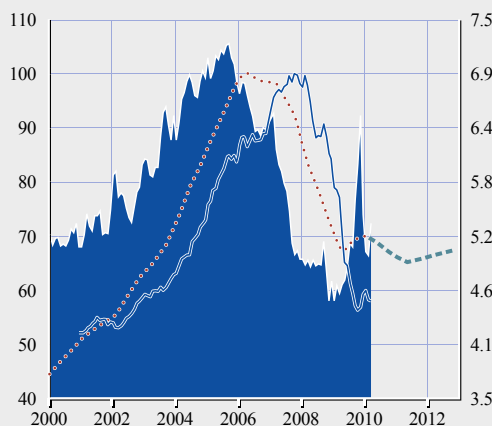


Sources: Federal Reserve, Haver Analytics and Consensus Economics.

Chart 1.9 US residential and commercial property prices, existing US home sales and market expectations

(Jan. 2000 – Sep. 2012)

- total existing US home sales (millions of units, right-hand scale)
- residential property prices (index: April 2006 = 100; left-hand scale)
- residential property price futures, 10 May 2010 (index: April 2006 = 100, left-hand scale)
- commercial property prices (index: October 2007 = 100; left-hand scale)



Sources: S&P/Case-Shiller, National Association of Realtors and Bloomberg.

The durability and self-sustainability of improvements in housing market activity and prices remain uncertain. This is because the stabilisation observed over the course of 2009 was partly driven by policy stimuli, including the first-time homebuyer tax credit programme and the impact of the sizeable purchases of mortgage-related assets by the Federal Reserve. Also, the supply of new and existing homes on the market remains high relative to sales by historical standards. Furthermore, although delinquencies on sub-prime mortgages appear to have peaked, delinquencies and write-downs on mortgages more generally continued to rise in the fourth quarter of 2009 (see Chart 1.8). The resulting supply of distressed homes on the market due to elevated foreclosure rates poses downside risks for house prices and the broader housing market outlook. Finally, the household sector has in the past been a major driver of GDP growth in the early stages of a recovery, both through residential investment and through consumer spending. The likely absence of this source of demand in the current recovery is an important additional factor of risk both for economic growth and for financial stability.

REGION-SPECIFIC IMBALANCES

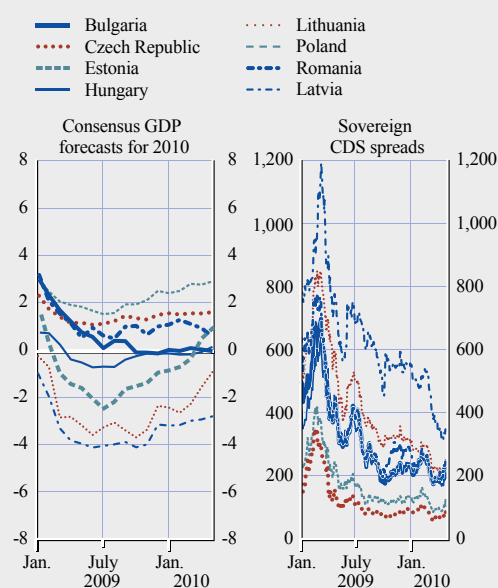
Non-euro area EU countries

Macroeconomic and financial conditions have improved further in the non-euro area EU countries since the finalisation of the December 2009 FSR. This is reflected in improved growth expectations for 2010 and somewhat decreased fiscal vulnerabilities reflected in abating, although still elevated, sovereign CDS spreads (see Chart 1.10).

Rising unemployment in all non-euro area EU countries was a major source of risk from macroeconomic developments to financial stability in recent months, as it had an adverse impact on the debt-servicing ability of households. As labour market adjustment usually follows the economic cycle with a lag, unemployment is expected to remain elevated in 2010, potentially leading to a further

Chart 1.10 Evolution of GDP growth projections for 2010 and CDS spreads for selected non-euro area EU countries

(Jan 2009 – May 2010; percentage change per annum; spreads in basis points; five-year maturity)



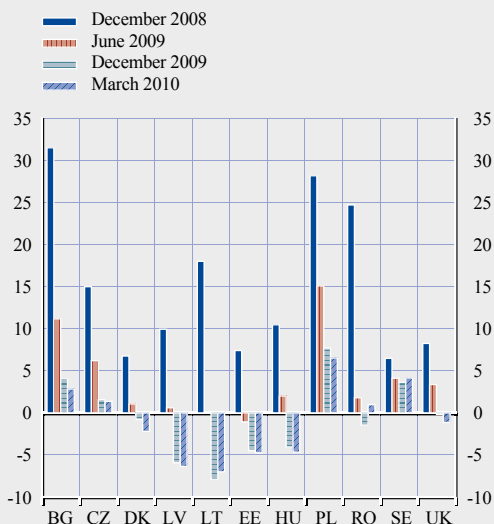
Sources: Consensus Economics and Thomson Reuters Datastream. Note: No sovereign CDS spreads exists for Estonia.

deterioration in loan portfolios. Credit demand by the non-financial corporate sector remained subdued, and banks continued to tighten their credit standards (see Chart 1.11). These two factors were reflected in a further adjustment of private sector balance sheets and contributed to a consolidation in banks' balance sheets, despite an improvement of the capital and liquidity positions of banks.

Capital market activity has improved in most countries, as investors' risk appetite increased in a low interest rate environment, contributing to a strengthening of the prices of a range of assets. To the extent that several asset classes show signs of overvaluation, excessive risk-taking by some market participants could lead to a build-up of macroeconomic imbalances, which may trigger sharp portfolio outflows. This risk has, however, been mitigated by a decrease of net "other investment" flows – largely representing loans from foreign-owned parent banks to their subsidiaries in the region – which have

Chart 1.11 Bank credit to the private sector in selected non-euro area EU countries

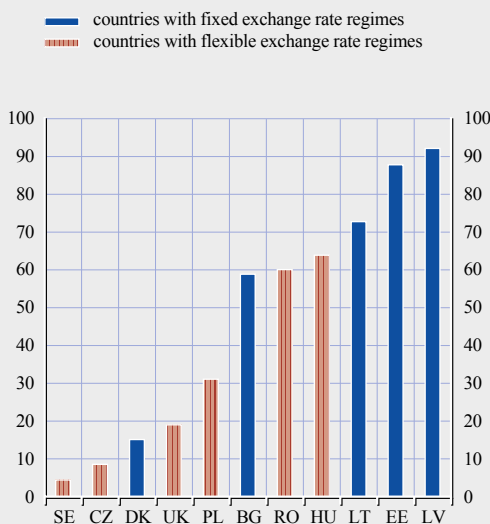
(percentage change per annum)



Source: ECB.

Chart 1.12 Share of foreign currency-denominated loans to the non-financial private sector

(Apr. 2010; percentage of total loans)



Sources: ECB and ECB calculations.
Note: The latest available data for the United Kingdom refer to September 2008.

decreased in a number of countries or have been partly replaced by international and European support programmes.

The fiscal positions of some non-euro area EU countries deteriorated in 2009, with seven of them currently subject to a Council decision on the existence of an excessive deficit. Moreover, the uncertainty surrounding their broader fiscal outlook has increased, which makes countries with sizeable deficits particularly vulnerable, as they rely substantially on external financing. On a positive note, ongoing policy support has contributed to an improvement in the functioning of financial markets in non-euro area EU countries. Looking ahead, although the demand for some support measures has declined in a number of countries, substantial fiscal imbalances in a number of non-euro area EU countries call for fiscal consolidation efforts over the medium term and will require that governments ensure timely exits from financial sector support.

The large share of foreign currency-denominated loans to the (non-financial) private sector in several central and eastern European (CEE) economies

remains a key vulnerability, despite significant differences across countries (see Chart 1.12 and Special Feature E). Given the existing stock of foreign currency-denominated loans, a renewed weakening of the currencies of those countries with flexible exchange rates could contribute to a further deterioration in banks' asset quality. Looking ahead, although credit growth in most countries of the region was rather anaemic and the growth of foreign-currency loans appears to have come to a virtual halt, it cannot be ruled out that a build-up of vulnerabilities related to foreign currency lending could resume once the economic environment becomes more supportive.

Overall, although the large macroeconomic imbalances accumulated in the years before the crisis have partly been unwound, others have emerged and significant vulnerabilities remain. The substantial downside risks surrounding the macroeconomic outlook render the financial stability outlook primarily dependant on the implementation of sound prudential policies, the outlook for banking sectors in the region and their ability to resume the supply of credit to these economies.

Emerging economies

Overall, macroeconomic conditions in emerging economies have continued to improve since the finalisation of the December 2009 FSR, thereby reducing macroeconomic risks. Together with the strengthening of macroeconomic and fiscal conditions, both domestic and international financing conditions for emerging economies have also improved since the finalisation of the December 2009 FSR (see Chart 1.13).

There has, however, been an increase in the financial vulnerabilities in emerging economies that are related to the expected rebound in private capital inflows, coupled with resumed cross-border bank lending to, and investment in, emerging economies. This raises concern about overheating, the potential build-up of asset price bubbles, increased asset-price volatility and increased pressure on exchange rates (see Section 1.2). The risk of asset price bubbles in emerging economies results from the sharp increases in net private inflows to emerging markets, which are projected – after decreasing

markedly in 2009 – to rise by around 66% in 2010, the largest annual increase in more than 15 years (see Chart 1.14).

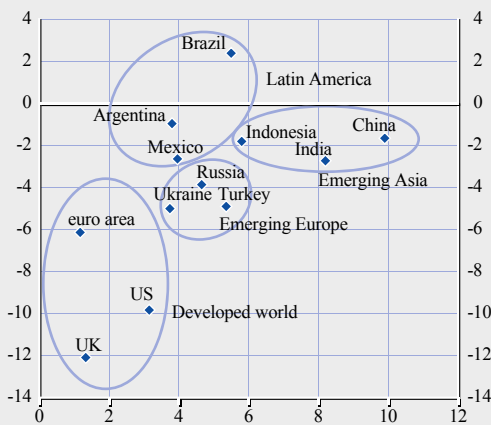
Of these inflows, the most significant changes relate to equity investments, which are expected to increase by around 20% in the coming year, and to net direct investments, which are anticipated to rise by around 33%. In addition, both bank and non-bank net inflows to emerging economies are expected to increase considerably, with the latter expected to triple in 2010.

Cross-border lending to emerging economies decreased further, as a percentage of total assets, in 2009 (see Chart 1.15). Lending patterns diverged significantly across emerging economies, but most notably, the share of claims vis-à-vis emerging Europe continued to increase. As euro area banks play an important role in this region, financial fragilities among euro area financial institutions could have negative repercussions there. In particular, given the relatively small size of the respective economies,

Chart 1.13 Forecasts of real GDP growth and budget deficits in 2010 for selected emerging markets

(April 2010; percentage)

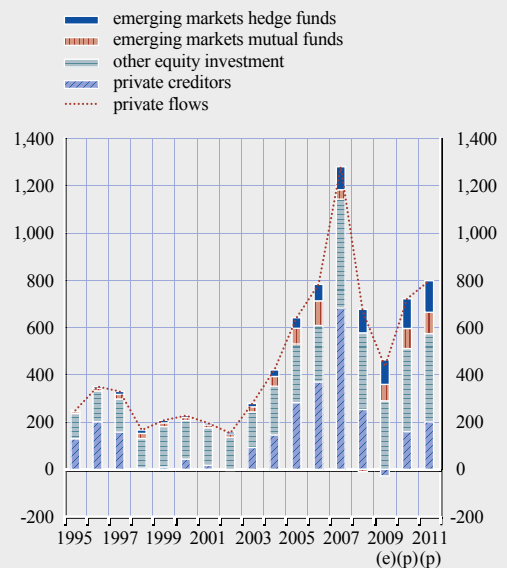
x-axis: GDP growth
y-axis: budget deficit



Sources: Consensus Economics and ECB calculations.
Note: Largest three emerging markets of each region are shown.

Chart 1.14 Net private capital flows to emerging economies

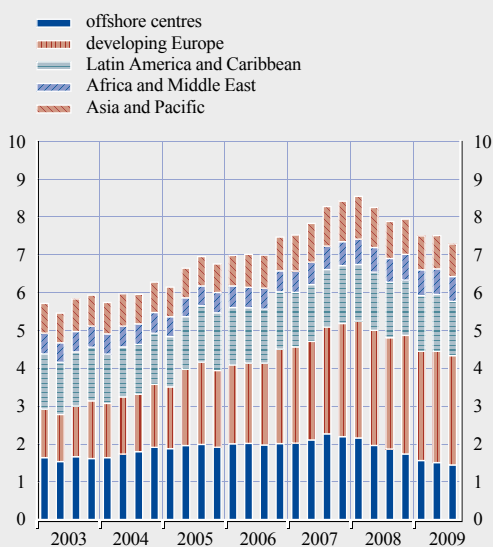
(1995 – 2011; USD billions)



Sources: The International Institute of Finance, TASS Lippert Feri and International Financial Statistics.
Note: (e) stands for estimated and (p) for projected.

Chart 1.15 Consolidated cross-border claims of euro area financial institutions to emerging markets

(Q1 2003 – Q3 2009; percentage of total assets)



Sources: BIS and ECB calculations.

euro area banks that are not systemically relevant in the euro area may be highly relevant for countries with small financial sectors. While euro area banks active in the region have committed to keeping their exposures broadly stable, the need to strengthen their capital bases or to repay

government aid may lead to a slowdown in capital inflows to the region. To the extent that some EU Member States are still perceived by investors to share economic characteristics with non-EU countries in the region and given the close regional, financial and trade links, a sudden stop in capital inflows to non-EU emerging Europe could also trigger a re-assessment of risks among vulnerable EU countries.

Looking ahead, the main risks to financial stability confronting emerging economies currently relate to the expected increases in net private capital inflows. Together with strong domestic demand, stimulated both by fiscal and monetary policies and by the fact that overall domestic credit conditions are still far from normal, this could lead to an excessive credit expansion, a rise in leverage and unsustainable asset price increases. In addition, there are macroeconomic risks related to the timing of exits from monetary and fiscal policy stimulus measures, to the rebalancing of growth from the public to the private sector and to the robustness and speed of the recovery in advanced economies. In addition, increasing inflationary pressures and rising concerns about fiscal positions represent increasing macroeconomic risks in some countries.

Box 2

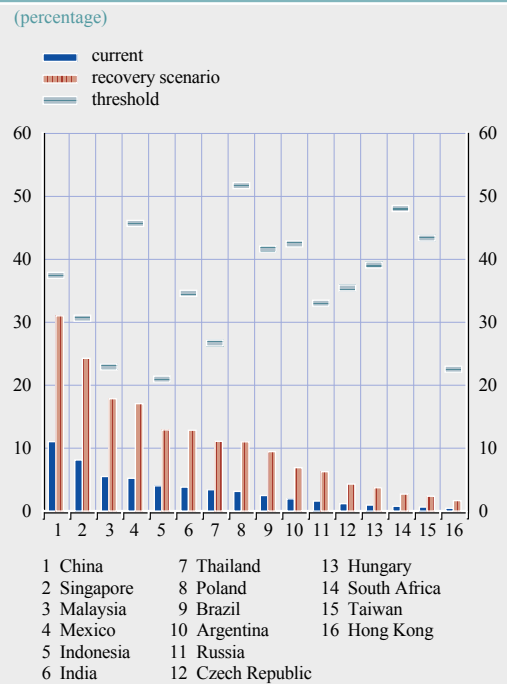
ASSET PRICE BOOMS, CREDIT BUBBLES AND FUTURE FINANCIAL STRESS – ASSESSING SYSTEMIC RISKS IN EMERGING MARKETS

To many observers, the recent increases in equity, bond and property prices in emerging markets appear to be unjustifiably strong, particularly when coupled with credit booms in certain economies such as China. This box explores whether vulnerabilities that could lead to a systemic event – an event involving a high level of financial instability and thus potentially negative real economic consequences – in key emerging economies are currently building up. From a policy perspective, this is important as a systemic event in a key emerging economy could potentially spill over to global financial markets and undermine the recovery of the global economy.

A three-step approach was taken to evaluate systemic risks and identify potential vulnerabilities and asset-price misalignments that have, in the past, led to systemic events. First, a country-specific financial stress index (FSI), including proxies for counterparty and liquidity risks in money markets, negative equity price developments and realised volatilities in foreign exchange,

equity and money markets, was created to capture systemic risk.¹ An indicator variable was then defined to capture episodes of extreme financial stress, or so-called systemic events, with a value of unity when the FSI was above a pre-defined country-specific threshold that has been associated with potentially negative real economy consequences in the past.² Then, a binary choice model was used to estimate the country-specific probability of a systemic event occurring within a time horizon of two to eight quarters, as a function of the growth in domestic asset prices (equity) and bank credit, asset price valuation levels, and the level of leverage in the economy (proxied by the ratio of domestic credit to GDP).³ Finally, to evaluate whether the estimated country-specific probability of a systemic event was high enough to warrant concern, the approach proposed by Bussière and Fratzscher was followed.⁴ Optimal thresholds for the probabilities were designed to take into account the relative preference of policy-makers (or observers) to fail to predict systemic events rather than issue false alarms. More specifically, country-specific thresholds were reported from the point of view of a “neutral” external observer that is equally concerned about issuing false alarms as about missing systemic events.⁵ The predicted probabilities were then evaluated against the country-specific thresholds to determine what the neutral observer would call a systemic event.

Chart A Probability of a systemic event within six quarters, current assessment and recovery scenario



Sources: Bloomberg, Thomson Reuters Datastream, Haver Analytics and ECB calculations.
 Notes: The horizontal lines refer to thresholds at which a “neutral” observer would find it optimal to warn of a potential systemic event occurring within six quarters. Last observation refers to the fourth quarter of 2009; projections up to the second quarter of 2011.

The main results are shown in Chart A, which displays the current estimated probabilities of a systemic event within a time horizon of six quarters, as well as the country-specific thresholds at which a “neutral” observer would call an event systemic. Chart A also gives the estimated probabilities under an alternative recovery scenario. The overall message that emerges from the analysis is that the probability of a systemic event is generally low across key emerging economies. According to these estimates, domestic factors, mainly asset price and credit developments, point

1 See Box 1 in ECB, *Financial Stability Review*, December 2009.
 2 In the benchmark scenario, the threshold is set to 90% of the country-specific distribution of the FSI. In order to avoid selection bias by choosing only cases where extreme financial stress has led to negative real economic consequences, cases where extreme financial stress has not necessarily led to a negative economic outcome were also considered. This controls for policy actions that may have prevented the negative economic outcome.
 3 Domestic macroeconomic conditions, including real GDP growth, CPI inflation, current account and government balances, were controlled for, and the interactions between global asset prices and credit developments, as well as the global macroeconomic environment and domestic conditions, were modelled. The model does not, however, consider property prices due to data limitations. The addition of property prices to the model specification could increase the probability of a systemic event in some countries.
 4 See M. Bussière and M. Fratzscher, “Low probability, high impact: policy making and extreme events”, *Journal of Policy Modelling*, No 30, 2008.
 5 More generally, policy-makers could have different preferences, as the cost of missing crises normally differs from that of issuing false alarms.

towards a build-up of vulnerabilities in certain emerging Asian economies and, in particular, China.⁶ Besides domestic factors, however, global factors, such as the overheating of the macroeconomic environment, asset-price misalignments, and booming credit conditions, are also important determinants of systemic risks in emerging markets.⁷ Currently, the low global macroeconomic risks, i.e. the absence of macroeconomic overheating on account of sizeable output gaps and the low inflation environment, are the main factors that balance the contributions of strong increases in domestic equity prices and credit to the probability of a systemic event in key emerging markets.

To understand how the situation could evolve if the economic recovery in the global economy accelerates, Chart A also shows the probability of a systemic event under the assumption that, *ceteris paribus*, global growth and inflation return

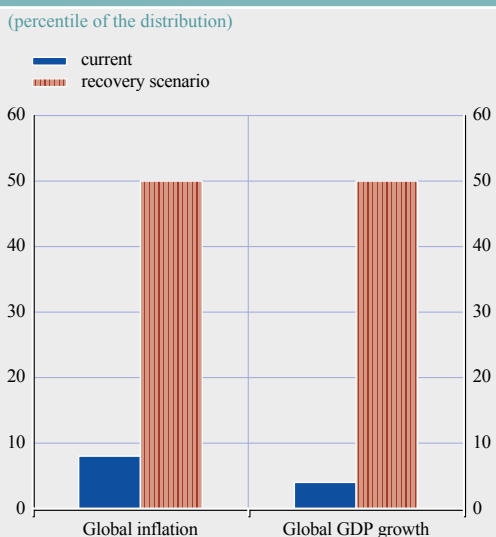
to their median values (see Chart B). Under this scenario, the balancing effect of the currently weak global macroeconomic environment would recede and the probability of a systemic event would increase across emerging markets, especially in emerging Asia.

In conclusion, systemic risks in emerging economies are generally low, but could increase in the medium term. A systemic event in a key emerging economy could increase risks to euro area financial stability through spill-over effects. It is reassuring, therefore, that policy interventions in several emerging economies are already being introduced to counter the over-heating of domestic conditions.

6 In the case of China, potential imbalances may not result in serious financial tensions, as the banking system remains largely state-owned and as authorities maintain sufficient financial resources to cope with adverse developments. Moreover, the domestic financial system is insulated from international events, limiting the scope for spill-overs

7 It is often mentioned that in the build up to the 2008/09 financial crisis, the favourable macro-financial environment contributed to excessive risk-taking, and thus also to a rise in fragilities.

Chart B Global macro variables, current values and recovery scenario



Sources: Bloomberg, Thomson Reuters Datastream, Haver Analytics and ECB calculations.
Note: Last observation refers to the fourth quarter of 2009.

1.2 KEY DEVELOPMENTS IN INTERNATIONAL FINANCIAL MARKETS

US FINANCIAL MARKETS

The money market

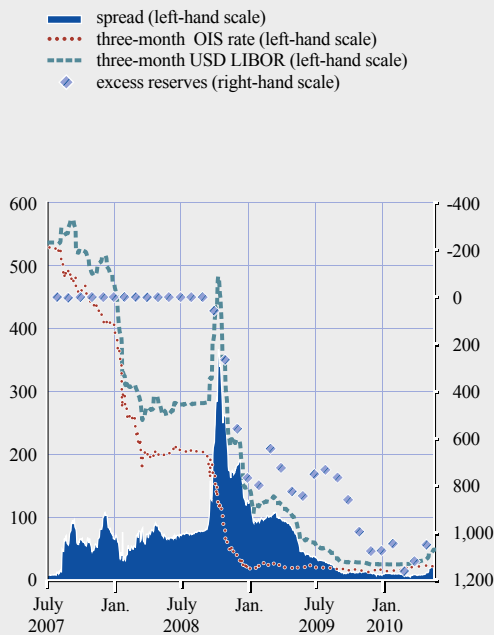
Conditions in the US money market continued to improve after the finalisation of the December 2009 FSR. This was reflected in a further tightening of the spreads between the three-month US dollar London interbank offered rate (LIBOR) and the overnight index swap (OIS)

rate, and the decreasing use of the various Federal Reserve temporary liquidity facilities (see Chart 1.16).

Money market rates declined along the yield curve, as the market environment became more favourable and sentiment towards financial institutions improved. In addition, the various liquidity schemes and credit-easing measures implemented by the Federal Reserve brought considerable liquidity to the money market and resulted in record excess reserves in March 2010

Chart 1.16 Spread between the three-month USD LIBOR, the OIS rate and excess reserves

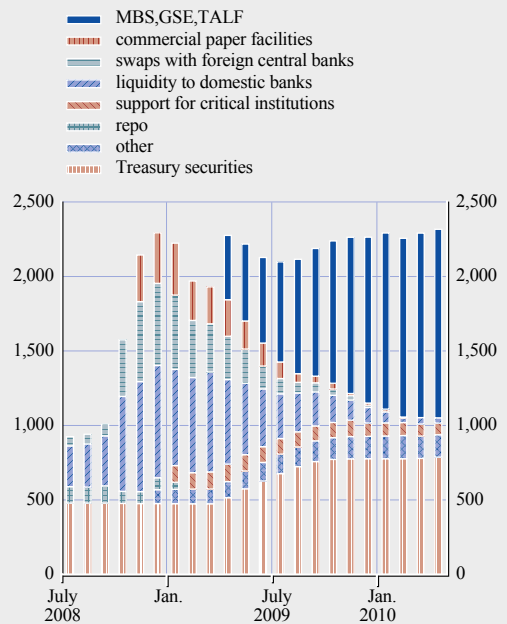
(July 2007 – May 2010; basis points and USD billions)



Sources: Bloomberg and ECB calculations.

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

(July 2008 – Apr. 2010; USD billions)



Sources: Bloomberg and ECB calculations.

(see Chart 1.16). In May 2010, however, excess liquidity in the banking system decreased while spreads increased slightly, as tensions re-emerged in some market segments.

In light of the improved functioning of financial markets, the Federal Reserve terminated several liquidity support facilities which were established to counter pressures in global funding markets. In January 2010 the Federal Reserve also announced the expiration of its temporary liquidity swap arrangements with the European Central Bank, the Bank of England, the Bank of Japan and the Swiss National Bank. In May 2010, however, the Federal Reserve re-opened the temporary foreign exchange swap lines and resumed US dollar liquidity-providing operations, as tensions re-emerged in some financial market segments.

Since the finalisation of the December 2009 FSR, the Federal Reserve has continued to initiate gradually some of its exit strategy

procedures, further replacing its liquidity facilities with asset purchases (see Chart 1.17). In December 2009 it conducted test operations to drain bank reserves through reverse repurchase transactions and announced in March 2010 that it would expand the number of counterparties with which it makes transactions in this regard. In February 2010 an increase of 25 basis points in the discount rate was announced, interpreted by market participants as a significant step towards normalisation. As this announcement came somewhat earlier than expected, it triggered some volatility in financial markets and a temporary decline in the price of some risky assets.²

Looking ahead, US money markets may continue to be vulnerable to a further rise in risk aversion and negative news from the banking sector. In addition, many market participants

² At the same time, the US Treasury reintroduced the Supplementary Financing Program, with the aim of draining USD 200 billion of excess reserves over two months.

reported that changes in the regulation of money market funds and upcoming changes in banking regulation may have a significant impact on money market liquidity conditions and term lending activity. Finally, the withdrawal of credit-easing programmes and the excess liquidity in the banking system by the Federal Reserve is not without risk, as shown by the market reaction to the February increase in the discount rate.

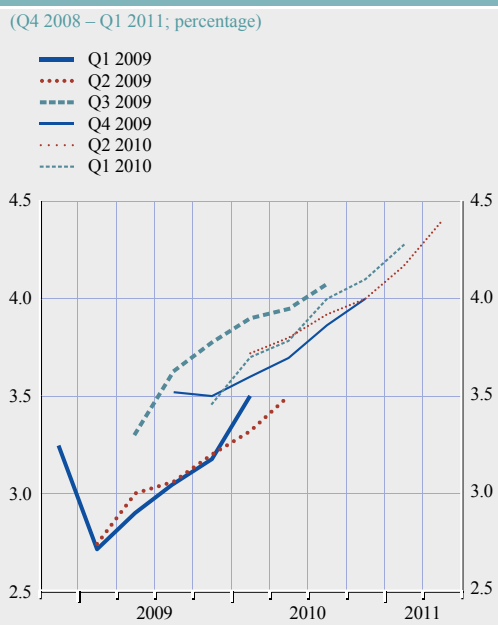
Government bond markets

Long-term government bond yields in the United States have remained relatively volatile since the finalisation of the December 2009 FSR (see Chart S24). At the end of 2009, long-term Treasury bond yields rose slightly, on account of positive news on economic activity. More generally, however, swings in market sentiment concerning the stability of US financial institutions, uncertainties about potential changes in regulation, and fears of sovereign defaults in peripheral euro area sovereign markets contributed to further flight-to-safety flows into US Treasuries. This kept ten-year bond yields well below 4%. In April and May 2010 US government bond yields declined further, largely as a result of increased tensions in sovereign bond markets in other countries with fiscal woes.

Looking beyond temporary market volatility, US long-term government bond yields are expected to rise moderately over the coming quarters, on account of higher sovereign risks and the more challenging fiscal outlook (see Chart 1.18). The expected increase is, however, lower compared with expectations for other global sovereign bond markets.

Looking ahead, strong bond issuance, coupled with greater uncertainty surrounding demand, is likely to place upward pressure on long-term government bond yields. In addition, the long end of the US yield curve is vulnerable to the possibility of an increase in inflation expectations and to a cycle of policy-rate tightening starting earlier than expected, against the background of a strengthening of the

Chart 1.18 Revisions to the expected level of US ten-year bond yields (median forecasts)



Sources: Survey of Professional Forecasters and Federal Reserve Bank of Philadelphia (last six survey rounds).

ongoing economic recovery. Indeed, similarities to the setting prior to the 1994 episode of bond market turbulence has fostered references to bond market movements ahead of the cycle of policy-rate tightening, despite the clarity of the Federal Reserve's communication on the path of interest rates and the relatively modest increase in inflation expectations to date (see Box 1).

Credit markets

Against a backdrop of improved macroeconomic fundamentals, increased investor confidence and stronger corporate sector balance sheets, credit spreads generally continued to tighten after the publication of the last FSR, although developments were not uniform over the period or across all market segments. Spreads on corporate bonds tightened, despite record issuance by the corporate sector in 2009 (see Chart S34). This increase resulted from corporates' attempts to secure their liquidity positions after the market dislocation in late 2008 and early 2009 and as bank funding became scarcer.

However, issuance and liquidity in the secondary markets for mortgage-backed securities (MBSs) and commercial mortgage-backed securities (CMBSs) remained constrained in the first quarter of 2010, on account of subdued property prices and high and rising delinquencies on MBSs and CMBSs respectively (see Chart 1.19).

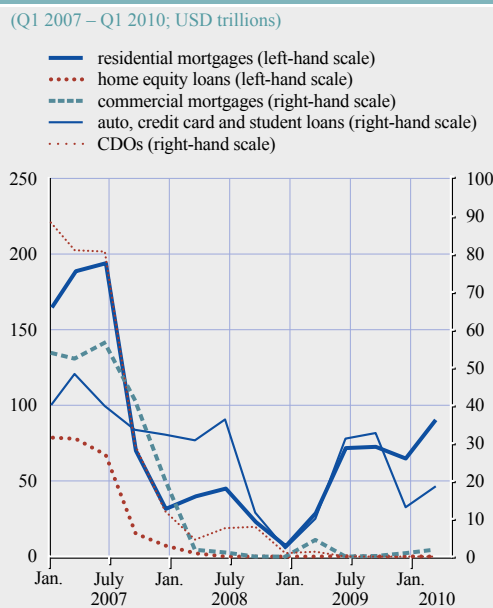
On the demand side, the Federal Reserve continued to play a significant role in the US credit market, most notably in the MBS market. Much of the credit market was also supported by strong investor inflows to corporate bond funds – mostly from money market funds – as investors shifted out of safe-haven assets into more risky assets, in line with the general recovery in risk appetite during the period.

Since the data cut-off date for the December 2009 FSR, lower-rated corporate bonds have outperformed higher-rated bonds. Among investment-grade credits, the financial sector again substantially outperformed industrial sectors. The overall tightening of spreads,

which began at the end of the summer of 2009, was partly reversed, but they rapidly resumed their downward path by mid-February, and as a result, remained substantially tighter than at the end of August last year (see Chart 1.20).

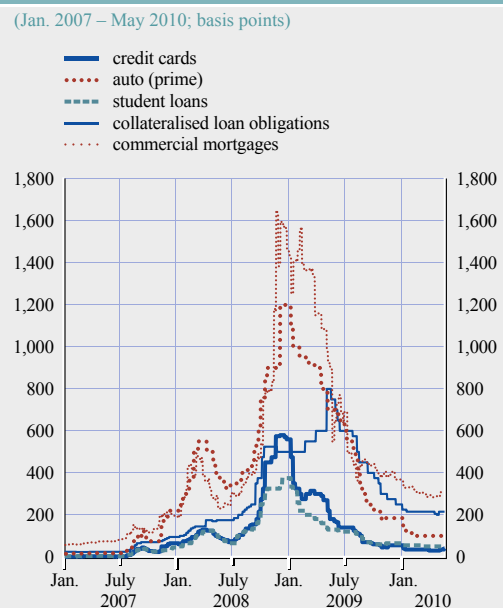
Looking ahead, although most market participants remain positive about the outlook for credit, the challenges ahead include a potential deterioration in the economic environment, a tightening of liquidity conditions by central banks and uncertainties concerning regulatory changes. Some segments of the credit market, notably CMBSs, may still face headwinds as long as the resilience of the US economic recovery and developments in property prices remain in question. In addition, some uncertainty remains regarding the impact of the end of some Federal Reserve credit-easing programmes – notably the MBS purchase programme – on credit spreads, and on primary and secondary credit market liquidity. When asset purchase programmes are wound down, US banks, households and foreign investors will have to absorb the full

Chart 1.19 US issuance of asset-backed securities and collateralised debt obligations by type of collateral



Source: Dealogic.

Chart 1.20 Credit default swap spreads on various US AAA-rated asset-backed securities and collateralised loan obligations in US dollars



Source: JP Morgan Chase & Co.

supply of the credit market, which could create downward pressure on volumes and result in elevated spreads.

Equity markets

Volatility in the US equity market has remained at levels prevailing prior to the collapse of Lehman Brothers since the finalisation of the December 2009 FSR, with improvements in the macroeconomic outlook and positive news on corporate earnings counteracted by swings in investors' risk appetite (see Charts S18 and S27). Equity market volatility increased markedly in May 2010, amid concerns related to an increase in sovereign risks in some countries with fiscal woes, which led to a moderation of the strong upward trend in stock prices observed after late winter 2009. Nonetheless, robust profits in 2010 helped US listed equities, including US banks as well as most non-financials, to cope relatively well with the higher market volatility in May 2010.

Investor uncertainty on near-term stock market movements continued to follow a downward trend up to end-April 2010, from the peaks reached at the height of the financial crisis, despite some swings in early 2010 (see Chart 1.21).

Looking ahead, the risk of a stock market correction remains, on account of a possible slowdown in the expected pace of economic recovery. In such a scenario, financial stocks in particular appear to be vulnerable to downside corrections. Although financial sector price/earnings (P/E) ratios based on near-term earnings remain well above historical averages, current stock prices seem to be more in line with long-term average earnings, somewhat downplaying overvaluation concerns (see Chart S29). The effect of a further strengthening of regulatory measures and the potential exposure to interest rate movements, given the large holdings of Treasury bonds among banks, also constitute potential risks for financial stock prices.

Chart 1.21 S&P 500 equity index, equity volatility and US economic surprise index

(Jan. 2006 – Apr. 2010)



Sources: Citigroup, Bloomberg and ECB calculations.
Note: The Citigroup economic surprise sentiment index is a cumulative index: Jan. 2003 = 1,280.

EMERGING FINANCIAL MARKETS

Several factors, such as better economic growth prospects, expectations of a widening of interest rate differentials and sounder fiscal positions compared with advanced economies, together with a revival of risk appetite, have led to an increase in demand, both from domestic and from international investors, for emerging financial assets. Consequently, emerging market asset prices have continued to increase. Since the finalisation of the December 2009 FSR, emerging market equity valuations have improved (see Chart S39), while yield spreads on sovereign bonds in foreign and domestic currency have narrowed (see Charts S37 and S38).

With rapid asset price changes, valuation levels have also increased sharply across all emerging asset classes: P/E ratios for emerging equity markets – at just below 20 by the end of April 2010 – were already higher than

before the onset of the current financial crisis (see Chart 1.22). There were no indications, however, of asset price bubbles in this segment: from a longer-term perspective P/E ratios remain below their historical peaks and equity valuation levels prevailing at the time of writing remain in line with historical norms, if equity prices are compared with future rather than current earnings. A similar situation prevailed for emerging market bond prices. By contrast, property valuation levels, particularly in some emerging Asian countries, seemed elevated, even by historical standards, when measured by price-income ratios.

As highlighted in Section 1.1, the main financial stability risks facing emerging economies stem from the expected increases in net private capital inflows that, together with strong domestic demand, could lead to an excessive credit expansion, a rise in leverage and unsustainable asset price increases (see Box 2). A further issue related to capital inflows is the potential for appreciation pressures on local exchange rates, and the role of foreign exchange interventions

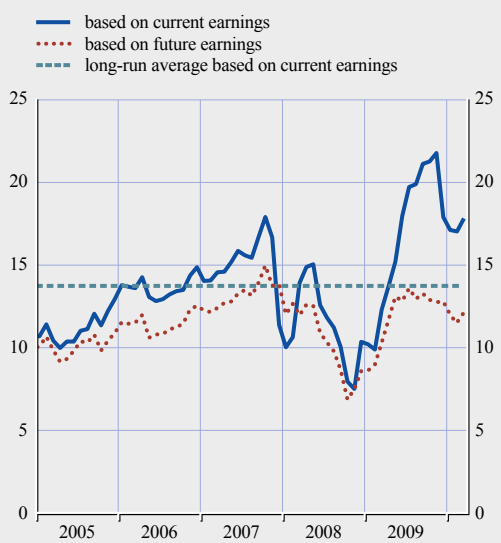
and sterilisation policies. A surge in capital inflows could lead to a further acceleration of reserve accumulation by emerging economies and could potentially speed up the re-emergence of the pre-crisis constellation of global imbalances.

In order to discourage inflows of so-called “hot” money and to limit credit and housing price developments, some emerging economies have already introduced macro-prudential policy measures and capital controls. Addressing the policy challenges posed by capital inflows and the timing of exits from monetary and fiscal stimuli remains, however, a challenging task.

Further risks regarding emerging financial markets stem from the potential risks to government borrowing in countries with weaker fundamentals. These countries could suffer from international spill-overs and contagion. Furthermore, the sizeable sovereign borrowing needs of advanced economies could crowd out emerging market bond issuances and lead to higher borrowing costs for emerging markets.

Chart 1.22 Price/earnings ratios for equity markets in emerging market economies

(Jan. 2005 – Apr. 2010; ratio)



Sources: Bloomberg and MSCI.

1.3 CONDITION OF GLOBAL FINANCIAL INSTITUTIONS

GLOBAL LARGE AND COMPLEX BANKING GROUPS³

Financial performance of global large and complex banking groups

The financial condition of global large and complex banking groups (LCBGs) changed little in the latter half of 2009, as both positive and negative factors acted to offset each other, although there were signs of improvement in the first quarter of 2010. Incomes remained high for some institutions and profitability, which

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, JP Morgan Chase & Co., Lloyds Banking Group, Morgan Stanley, Royal Bank of Scotland, State Street and UBS. However, not all figures were available for all companies.

remained subdued in 2009, rose sharply in the first quarter of this year among most banks.⁴

In the euro area, net interest income continued to be one of the key drivers of profitability for LCBGs over the past six months, as steep yield curves, favourable funding conditions and low policy interest rates supported high net interest margins resulted (see Section 4.1). It was much the same for global LCBGs, with average net interest income, which had fallen slightly in 2009 from 2008 levels, rising in the first quarter of 2010, as interest margins remained wide and in some cases even widened further, owing to steep yield curves and low policy interest rates. Expressed as a ratio to assets, quarterly average and median net interest income remained largely unchanged over the latter half of 2009 (see Chart 1.23). However, the emergence of a sizeable gap between the average and median net interest income ratios – measures that had generally moved relatively closely together in previous years – during 2009 highlighted the divergence among global LCBGs. This gap

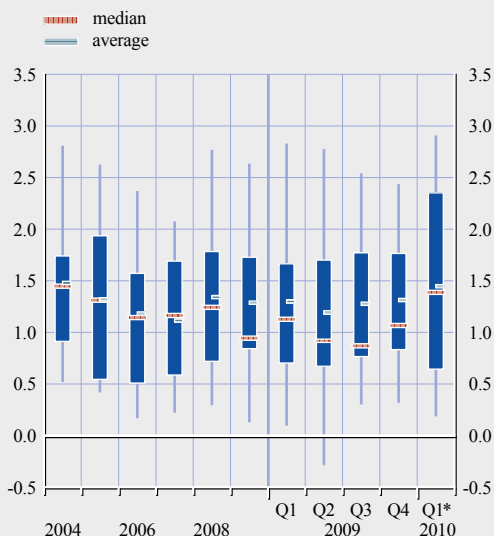
closed in 2010, albeit for a sub-sample of the set of global LCBGs.

Among the global LCBGs, US-based universal banks in particular appeared to skew the distribution. From a historical perspective, however, these banks maintained their net interest income, and saw it jump significantly in the most recent quarter. The driver of the emergent gap in previous quarters appears to stem from a weakening of other banks, and their exclusion from the first quarter 2010 data, since they do not report quarterly, may explain the recent closure of the gap. Recent patterns in income streams can be attributed, to some extent, to a base effect arising from changes in total assets, as almost all institutions in the sample reduced their asset bases in the closing quarters of 2009. The same cannot be said for the first quarter of 2010, however, as many institutions saw asset growth over the first quarter, by substantial amounts in some cases.

Expressed as a ratio of total assets, the fee and commission incomes of global LCBGs remained largely unchanged in 2009 and 2010. This revenue stream has held up remarkably well over recent years. Mean fee and commission income over the period from 2004 to 2010 was 1.75%, and over that period, the maximum deviation from this figure on an annual basis was just 0.1 percentage points. More recently, the continued high level of activity in capital markets was an important source of support for this revenue stream. While the upper extremes of the distribution have fallen somewhat since the highs of 2006 – in spite of the surging activity in capital markets – the lower part of the distribution has seen a far greater adjustment: minimum values fell by more than 50% from 2004 to 2009, but recovered substantially in the first quarter of 2010.

Chart 1.23 Net interest income of global large and complex banking groups

(2004 – Q1 2010; percentage of total assets; maximum, minimum and inter-quartile distribution)



Sources: Individual institutions' financial reports, Bloomberg and ECB calculations.
Note: Quarterly income based on available data.

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 2009 are imputed. No data were available for these banks for 2010, as they report at a semi-annual frequency.

Trading incomes remained positive over the latter half of 2009, notwithstanding some volatility, and improved significantly in early 2010 (see Chart 1.24).⁵ Median trading income, expressed as a percentage of total assets, remained at around 0.5% throughout 2009, but jumped to above 1% in 2010. Trading revenues were particularly high for some institutions, and although several recorded losses in the fourth quarter of 2009, all banks in the sub-sample recorded trading profits in 2010. Broad-based improvements in sales and trading activity, buoyed by growth in fixed income currencies and commodities operations, appear to be behind this development, supported by robust client flows, an increase in risk appetite and improvements in market conditions. There were, however, some signs of a decline in investment banking activity, with underwriting and advisory revenues falling in many cases. These declines were more than offset by increasing sales and trading revenues, however. The robust results from trading activity were

underlined by the fact that most US-based LCBGs reported very few trading day losses in the first three months of the year.

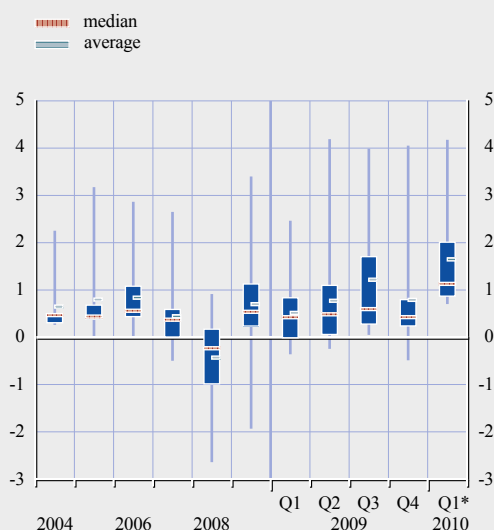
The profitability of global LCBGs, as measured by median return on shareholder equity (ROE), also improved markedly in early 2010, after having been broadly flat in 2009 (see Chart 1.25).⁶ Having averaged around 6% that year, the median ROE jumped to above 12% in the first quarter of 2010, albeit for a sub-sample of the full set of global LCBGs. Even more dramatically, the degree of dispersion of profitability performances narrowed considerably and all banks in the sample reported positive returns for the first time since 2006. The improvement was largely driven

5 The results presented in Chart 1.24 are based on the identification and exclusion of one significant outlier in the third quarter.

6 The results presented in Chart 1.25 are based on the identification and exclusion of one significant outlier in both the second and the third quarter. Results for the complete sample can be found in Table S2 of the Statistical Annex.

Chart 1.24 Trading revenues of global large and complex banking groups

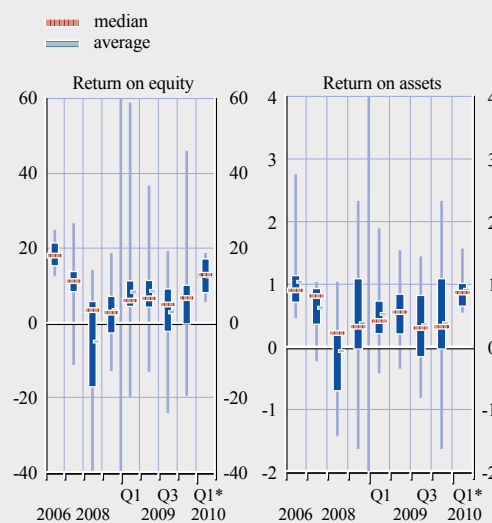
(2004 – Q1 2010; percentage of total assets; maximum, minimum and inter-quartile distribution)



Sources: Individual institutions' financial reports, Bloomberg and ECB calculations.
Note: Quarterly revenues based on available data. This chart excludes one identified outlier in the third quarter of 2009.

Chart 1.25 Return on shareholders' equity and return on assets for global large and complex banking groups

(2006 – Q1 2010; percentage; maximum, minimum and inter-quartile distribution)



Sources: Individual institutions' financial reports, Bloomberg and ECB calculations.
Notes: Quarterly revenues based on available data. The ROA chart excludes one identified outlier in each of the second and third quarters of 2009.

by the improving fortunes of some US and Swiss universal banks, although the limited sample of data available for the first quarter may also have been a factor.⁷ Profitability has also been boosted by generally lower rates of provisioning for loan losses, as many institutions saw improvements in their credit quality in the first quarter of 2010. In the United States, the apparent improvement in profitability may also reflect a rebound from a relatively subdued fourth quarter in 2009, which was partially attributed to a particularly steep seasonal slowdown.

The return on assets (ROA), an alternative measure of profitability that strips out the effect of changes in leverage, followed a broadly similar path: the median ROA increased from 0.3% in the fourth quarter of 2009 to almost 0.9% in the first quarter of 2010. The dispersion of this profitability measure also fell markedly, and notwithstanding sample considerations, the ROA was positive for all banks.

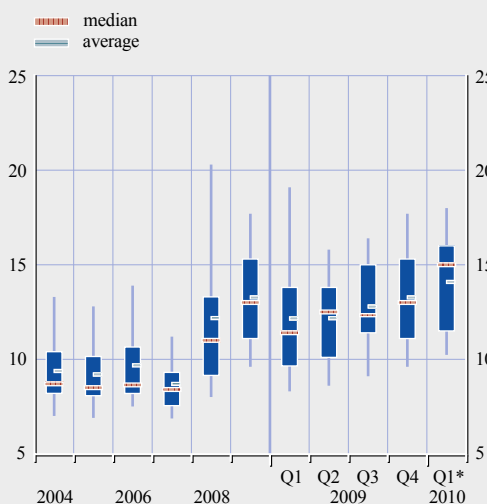
Solvency positions of global large and complex banking groups

Leverage among global LCBGs, as measured by the ratio of shareholder equity to total assets, decreased slightly, on average, in all quarters of 2009, although median leverage multiples increased slightly. In the first quarter of 2010, the degree of leverage, measured both by median and by average leverage multiples, decreased further, at a seemingly accelerating rate. Developments were most notable for banks with the largest leverage multiples: over the period, the ratio of shareholder equity to total asset values for these banks increased from around 2% to almost 4%.⁸

Average Tier 1 capital ratios of global LCBGs remained well in excess of regulatory minima and increased significantly in 2010 (see Chart 1.26). The median Tier 1 ratio for these institutions was 15% at the end of the first quarter of 2010, up from 13% in 2009. The inter-quartile range for the sample increased in the latter half of 2009 and early 2010, after having contracted in the second quarter.

Chart 1.26 Tier 1 capital ratios for global large and complex banking groups

(2004 – Q1 2010; percentage; maximum, minimum and inter-quartile distribution)



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

Minimum values for the sample continued to hover around 10%, a notable improvement on 2008 levels, while maximum values remain below the very high levels seen in that year, despite recent increases. The emergent gap between the median and average Tier 1 ratio in the first quarter of 2010 highlights the broad-based increase in the ratio throughout the sample.⁹

Recourse to government support measures continued to decline in the latter half of 2009 and the first quarter of 2010, but the amount of support outstanding nonetheless remained significant for some global LCBGs,

⁷ These developments must be seen in the context of an increase in shareholders' equity by some institutions within the sample, which had the effect of reducing the ROE.

⁸ Given the differences in accounting standards in Europe and the United States, which typically result in European banks reporting higher leverage multiples, these developments related to banks in the United Kingdom and Switzerland. In the United States, leverage was largely unchanged over the year.

⁹ It should be noted that the unavailability of data for banks from the United Kingdom for the first quarter of 2010 impacts the distribution of the Tier 1 capital ratio significantly, as these banks have in the past had some of the lowest Tier 1 ratios in the sample.

and continued to bolster their shock-absorbing capacities through a period of re-organisation. A further shock in financial markets or a reassessment of the likely recovery path of the global economy could, however, reveal vulnerabilities in those institutions that have hurriedly reduced their reliance on sovereign support. Furthermore, given the heterogeneous nature of the financial condition of global LCBGs, notwithstanding recent improvements, plans to unwind support measures must give serious consideration to the condition of those banks that are most reliant on them.

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

The share prices of global LCBGs generally rose over much of the period after the finalisation of the December 2009 FSR, although developments were disparate (see Chart 1.27 and S12). The strengthening of financial markets, the continued support of government measures and stimulus packages, and positive news regarding financial sector performance all supported stock prices in

the first quarter of the year. For some institutions, however, the impact of revelations regarding the size of losses yet to be realised and enforced re-organisations impacted stock prices in late 2009. The share prices that performed most poorly during the period were typically those of banks in receipt of significant state aid. Growing concerns about sovereign risk in early 2010 and re-emergent financial market tensions impacted the share prices of most financials in the second quarter of 2010.

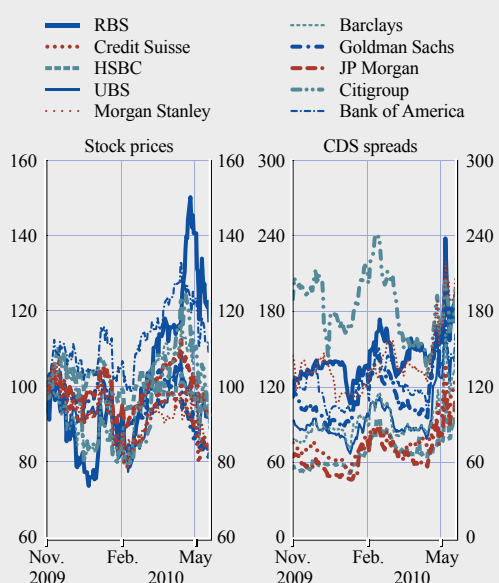
The same patterns were largely in evidence for credit default swap (CDS) spreads, which remained largely unchanged over the early months of the year for many of the global LCBGs, before rising sharply on concerns surrounding sovereign risks (see Charts 1.27 and S13). Generally, the spreads for banks receiving the most significant amount of government financial support remained relatively high, despite significant drops from the levels reached in 2008. Over the course of the first quarter of 2010, spreads for all global LCBGs increased: the median increase for the sample was 13 basis points, although the median spread had returned to end-2009 levels by mid-April. These developments were generally mirrored in measures of default probability and distance to default (see Charts S10 and S11). After mid-April, however, as concerns over fiscal sustainability in a number of European countries increased and tensions in some market segments re-emerged, the median spread almost doubled.

Outlook and risks for global large and complex banking groups

Despite the generally positive developments in financial performances in the first quarter of the year and the positive expectations these created for the profitability outlook for global LCBGs for the remainder of 2010, considerable challenges remain for mature economy banking sectors. Notwithstanding ongoing efforts to mitigate stresses related to sovereign risk, these strains may still spill over to banking sectors through various channels, including concerns for the viability of guarantee and other support

Chart 1.27 Stock prices and CDS spreads of a sample of global large and complex banking groups

(Nov. 2009 – May 2010; stock price index: Nov. 2009 = 100; spreads in basis points; senior debt, five-year maturity)



Sources: Bloomberg and ECB calculations.

programmes, the impetus for a more hurried exit from such measures and the direct exposures of banking sectors to sovereign debt. The impact of such a shock in one region, should it occur, may spill over to affect the global financial system, at a time when the banking sector still remains fragile. In addition, the planned global regulatory reform with a view to achieving greater financial system resilience is also contributing to the uncertainty surrounding the future outlook with respect to global LCBGs' business planning.

The funding challenges to be met by the global banking sector are also a cause for concern. It has been estimated that mature economy banking systems will face significant near-to-medium-term roll-overs, with about 70% of banks' bond funding maturing by the end of 2012. The risk of crowding out in the debt markets, owing to competition from sovereign issuers and

other financials, may impact profitability and capital adequacy through higher funding costs.

In the United States and, to a lesser extent, in the United Kingdom, the financial stability risks stemming from the commercial property sector remain considerable, and have the potential to spill over globally. Against the background of heavily indebted consumers and persistently high unemployment rates, the challenging conditions facing the US commercial banking sector could be exacerbated by additional, possibly concurrent losses stemming from the commercial property sector. The risk of the potential insolvency of a large number of small and medium-sized regional US banks, which together and in combination with write-downs related to the exposures of US LCBGs in the field of commercial mortgage-backed securities (CMBSs), could have systemic consequences (see Box 3).

Box 3

RISKS STEMMING FROM THE US COMMERCIAL PROPERTY SECTOR

The risks to financial stability stemming from US property markets have been well documented in previous issues of the Financial Stability Review (FSR) and elsewhere. While risks from the residential property sector have abated somewhat amid signs of a stabilisation in the market, conditions in the commercial property sector have continued to deteriorate. Rising delinquencies on commercial property loans and related securities may result in substantial further losses for US, and possibly, European banks in the near term. This box highlights the exposure of medium-sized US banks to the commercial property sector, and describes the channels through which a downturn in the sector may drag on the US economic recovery and spill over to the euro area.

After early 2007, delinquencies on commercial property loans had risen to almost 9% by the end of 2009, from close to 1% in the years preceding the crisis.¹ According to estimates published by the Congressional Oversight Panel, about USD 1.4 trillion in commercial property loans will reach the end of their terms between 2010 and 2014.² The primary focus of concern is on loans that were originated at the peak of the market and which will mature in the coming years. Sharp falls in property values over past years – Moody's commercial property price index had at the time of writing fallen by more than 40% from its peak in October 2007 – imply that as loans reach maturity, refinancing difficulties may emerge, since the value of the collateral may in many cases no longer be sufficient to cover the outstanding loan amount. This could

1 End-2009 data is the latest available. Such delinquencies can occur either during the term of a loan or at its maturity.

2 See Congressional Oversight Panel, "February Oversight Report – Commercial real estate losses and the risk to financial stability", February 2010.

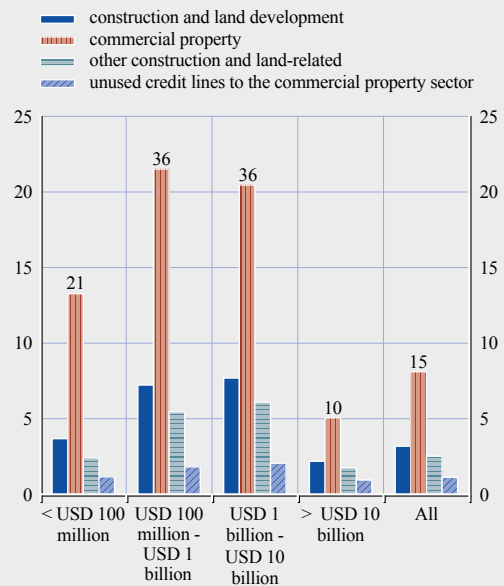
lead to a wave of further defaults. Refinancing is particularly problematic as the functioning of the market for commercial mortgage backed securities (CMBSs) remains impaired; the issuance of CMBSs has remained very weak since 2008. As a result, banks will face difficulties in managing the risks contained in their commercial property loan portfolios via securitisation. Further increases in the defaults on commercial property loans may lead to additional foreclosures on commercial properties, thus adding to the supply of properties on the market, which could, in turn, continue to exert downward pressure on commercial property values.

Loans to the commercial property sector, including loans related to construction and land development, are distributed disproportionately across the balance sheets of small and medium-sized banks. For smaller banks, commercial property loans as a percentage of total assets are significantly greater than for their larger peers, although large banks have greater holdings of CMBSs (see the chart). Exposure to the commercial property sector, however, generally decreased, as a percentage of total assets, over the first quarter of 2010. Write-downs on commercial property remained low, but those relating to construction and land development (CLD) loans were considerably higher, given their more speculative nature. Commercial property and CLD loans constitute more than 50% of total loans extended by medium-sized banks. This has serious implications for the banks in question, should the difficulties facing the commercial property sector persist or worsen. The impact of stresses in the commercial property sector is compounded by the poor diversification of banks' loan books. Furthermore, the capital adequacy of those commercial banks with assets between USD 100 million and USD 10 billion may become compromised, as commercial property loans exceed their Tier 1 core risk-weighted capital, in aggregate terms, by more than 350%.

While the direct systemic risks from medium-sized institutions may not be so material, disproportionately large exposures to commercial property could weaken their ability to provide credit to the economy.³ This could have consequences for small businesses that are less likely than large firms to have access to capital markets and that, instead, rely more heavily on bank financing.⁴ In March 2010, according to Federal Deposit Insurance Corporation data, banks with assets below USD 1 billion accounted for more than 40% of small business loans.⁵ Restrictions on small firms' access to finance may hold back the economic recovery as these firms are very

Outstanding commercial property and development loans at US commercial banks

(as at 31 Mar. 2010; percentage of total assets)



Source: Federal Deposit Insurance Corp.
Note: Individual figures refer to total exposure.

³ Furthermore, while not systemically relevant as individual institutions, a wave of correlated bankruptcies among small and medium-sized banks may have systemic consequences. Such bankruptcies would coincide with impaired cash-flows underlying CMBSs, which may have adverse consequences for the capital charges of larger banks holding these assets.

⁴ See G. Udell, "How will a credit crunch affect small business finance?", *Federal Reserve Bank of San Francisco Economic Letter*, No 2009-09, March 2009.

⁵ Total loans secured by non-farm non-residential properties of USD 1 million or less.

important for job creation.⁶ In this recession, almost 40% of the net job losses to date have resulted from labour shedding by small businesses (with fewer than 50 employees). Continued weakness in labour market prospects could contribute to, for example, rising office vacancy rates, as the need for commercial space falls, which may further suppress property values and reinforce the negative feedback loop between real economic activity and bank credit.

Aside from the negative consequences for the US and global economic recovery, there are also direct channels through which risks from commercial property could spill over to the euro area or other regions. It has been estimated that European banks exposure to US-originated CMBs and commercial property loans is in excess of €100 billion; given the rise in delinquencies and losses for this sector, this represents a risk to the euro area financial system and is a source of concern.

6 For example, during the recovery that followed the 2001 recession, employment by small firms (with fewer than 50 employees) recovered earlier than employment by larger businesses and accounted for a significant share of job growth in the first years of the upturn.

HEDGE FUNDS

Investment performance

The final months of 2009 did not mar the otherwise very successful average investment performance of single-manager hedge funds in 2009 (see Chart 1.28). Moreover, except for the short-selling investment strategy, all other investment return indices of single-manager hedge fund investment strategies also pointed to positive year-to-date investment returns in the early months of 2010, in some cases in excess of those achieved in 2009.

Taking a slightly longer-term perspective, except in the case of multi-strategy, equity market-neutral and emerging markets investment strategies, investment return indices of all other investment strategies suggested that, by April 2010, single-manager hedge funds had recouped all of the losses they had suffered after the end of 2007. That said, analysis of the fund-level information in one commercially available hedge fund database indicated that at the end of April 2010, more than half of the hedge funds were still below their high watermarks (i.e. their previous investment performance peaks) (see Chart 1.29), and were thus unable to charge incentive fees.

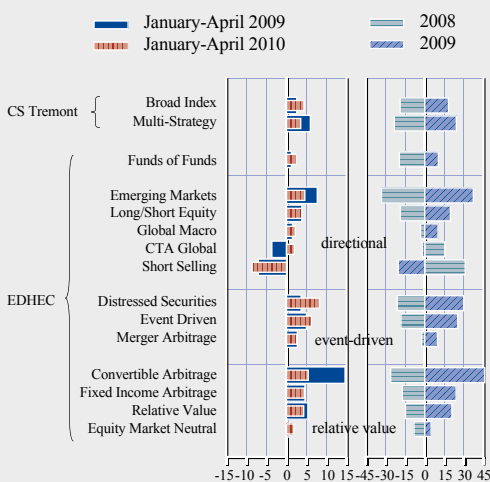
Some researchers argue that average fund of hedge funds (FOHF) returns, adjusted for the second layer of fees charged by these funds, may provide a better gauge of average

single-manager hedge fund investment performance than the indices of single-manager investment returns.¹⁰ Average FOHF returns should be less exposed to various hedge fund data biases, i.e. they should also capture the

10 See W. Fung and D.A. Hsieh, "Performance characteristics of hedge funds and commodity funds: natural vs. spurious biases", *The Journal of Financial and Quantitative Analysis*, Vol. 35, No 3, September 2000.

Chart 1.28 Global hedge fund returns

(Jan. 2008 – Apr. 2010; percentage cumulative returns, net of all fees, in USD)

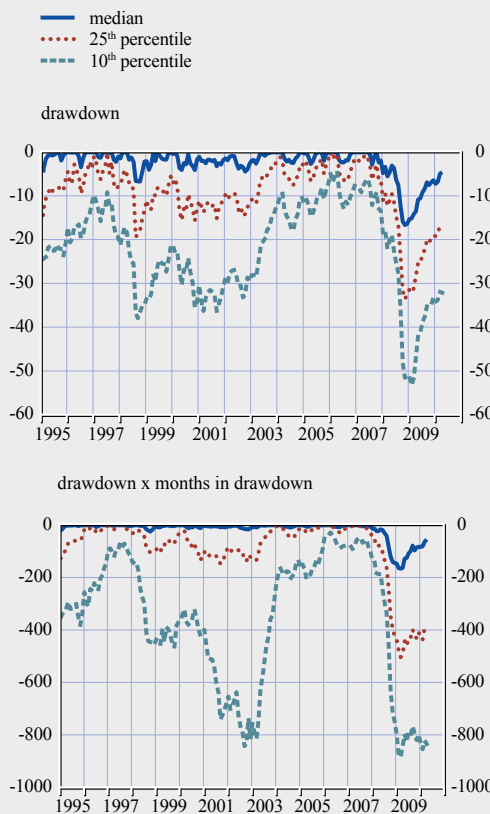


Sources: Bloomberg and EDHEC Risk and Asset Management Research Centre.

Notes: 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"; this investment strategy is also often referred to as managed futures.

Chart 1.29 Distribution of single-manager hedge fund drawdowns globally

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



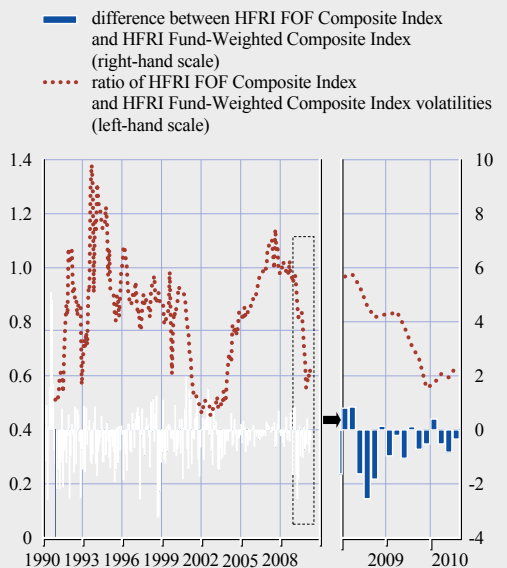
Sources: Lipper TASS database and ECB calculations.
Notes: The drawdown indicator refers to the cumulative percentage decline from the latest historical performance peak of a hedge fund, as measured by the net asset value per participation unit. The most recent data are subject to incomplete reporting.

performances of funds that either do not report or have stopped reporting to any databases on which indices are built. In this regard, it is noteworthy that at the end of April 2010, average investment returns of FOHFs were pointing to cumulative investment losses of about 9% since the end of 2007. Moreover, in 2009 average FOHF returns were almost half those of single-manager hedge funds and have, since March 2009, tended to lag behind the latter (see Chart 1.30).

According to market observers, one of explanations for FOHF underperformance might be that in late 2008 and early 2009

Chart 1.30 Comparison of returns of single-manager hedge funds and funds of hedge funds

(Jan. 1990 – Apr. 2010; ratio of 12-month moving volatilities; percentage difference of monthly net-of-all-fees returns in USD)



Sources: Bloomberg and ECB calculations.
Note: Single-manager hedge funds included and their weighting in HFRI Fund-Weighted Composite Index may differ from the composition of underlying single-manager hedge fund portfolios of FOHFs included in the HFRI FOF Composite Index.

FOHFs rushed out of those strategies that posted the largest losses in 2008 and, therefore, missed the subsequent reversal of investment performances in 2009. Another possible reason could be that FOHFs, amid large investor withdrawals, deleveraged and hoarded cash for fear of further redemptions, thereby also being late to benefit from the strength of hedge fund returns observed after March 2009. As shown in Chart 1.30, the ratio of volatilities of FOHF and single-manager hedge fund returns has been on a downward trend since the collapse of Lehman Brothers, and thus provides some further support to the deleveraging argument.

Investor flows

Despite somewhat conflicting evidence on the average investment performance of single-manager hedge funds, investment returns have generally been positive recently and some data providers had reported investors' net inflows into single-manager hedge funds

already for the third quarter of 2009 (see also Chart S15). Low nominal interest rates, as well as a recovery of investors' risk appetite, were supportive of risky assets more generally and hedge funds in particular. Reflective of this recovering demand, the number of hedge fund launches has also reportedly picked up.

Nonetheless, many investors were still unable to access their hedge fund investments and such remaining pent-up redemptions translated into still large discounts on funds' net asset value per share in the secondary market for hedge fund stakes. According to the findings of the first hedge fund manager survey conducted by the UK's Financial Services Authority, around 8% of the surveyed funds' capital under management at the end of October 2009 was subject to special arrangements regarding redemptions and/or fees.¹¹

Leverage and exposures

The limited data available on hedge funds' leverage points to a gradual re-leveraging

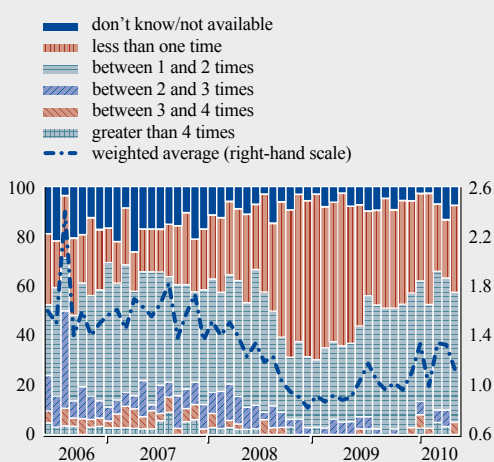
of the hedge fund sector (see Chart 1.31). In May 2010, the levels of leverage, however, still appeared to be relatively low, especially when compared with the levels that prevailed in the first half of 2007. At the same time, hedge funds were increasingly opting to keep their balances with several, rather than just one, prime broker. This may strengthen their negotiating power and pave the way for an increase in the leverage limits set by prime brokers (see also the sub-section on counterparty risk in Section 4.2).

Higher levels of leverage generally increase the risks associated with abrupt collective exits from crowded trades, which could be triggered, for example, by funding liquidity pressures. However, the similarity of hedge funds' investment positioning, as gauged by moving median pair-wise correlation coefficients of the returns of hedge funds within broadly defined investment strategies, has increased only slightly

¹¹ See Financial Services Authority, "Assessing possible sources of systemic risk from hedge funds", February 2010.

Chart 1.31 Hedge fund leverage

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

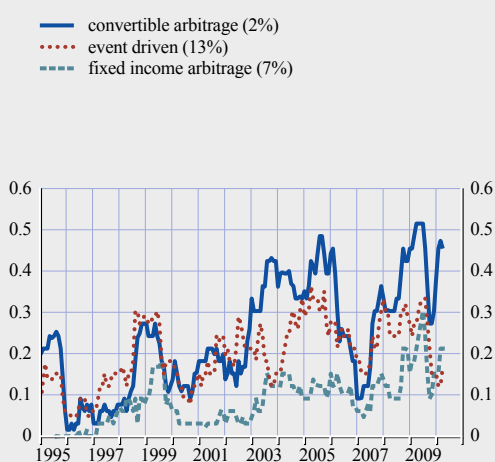


Source: Bank of America Merrill Lynch, *Global Fund Manager Survey*.

Notes: Leverage is defined as a ratio of gross assets to capital. In 2009 and 2010, the number of responses varied from 30 to 43.

Chart 1.32 Medians of pair-wise correlation coefficients of monthly global hedge fund returns within strategies

(Jan. 1995 – Apr. 2010; Kendall's τ_b correlation coefficient; monthly returns, net of all fees, in USD; moving 12-month window)



Sources: Lipper TASS database, Lipper TASS and ECB calculations.

Note: The numbers in brackets after strategy names indicate the share of total capital under management (excluding funds of hedge funds) at the end of December 2009, as reported by Lipper TASS.

since the finalisation of the December 2009 issue of the FSR. Chart 1.32 shows developments in this indicator for a few selected investment strategies that tend to be associated with higher levels of leverage.

In the period ahead, the hedge fund sector is likely to continue to recover. This, however, may also lead to higher levels of leverage and concomitant higher vulnerability to various leverage-related risks (see also Box 4).

Box 4

ASSET SALES BY HEDGE FUNDS AND CONVENTIONAL OPEN-END INVESTMENT FUNDS AT THE HEIGHT OF THE CRISIS

There is a fairly widespread consensus that the trading activities of hedge funds were not one of the direct causes of the recent financial crisis. Nonetheless, it is difficult to argue that these investors were innocent bystanders, not least because both forced and voluntary deleveraging of their portfolios contributed to, and amplified, the adverse asset price dynamics witnessed in many financial markets during the financial market turmoil. Thus, it can be argued that hedge funds were not simply “caught” by the crisis, but that they had also contributed to it. To shed more light on this contribution, this box provides estimates of net asset sales by hedge funds at the nadir of the crisis, and it compares these sales with the forced sales of conventional open-end investment funds.

Through the various stages of the crisis, hedge funds had to liquidate their investments as a result of both investors’ demands for redemptions and the tightening of lending standards by prime brokers. Conventional open-end investment funds, by contrast, had been forced to sell asset holdings primarily because of investor redemptions as they usually do not employ financial leverage. By having to meet investors’ redemption requests at short, usually one-day, notice, traditional open-end investment funds may appear to be far more vulnerable to the volatility of investors’ behaviour than hedge funds. However, it must be borne in mind that these investment funds typically invest largely in liquid assets that should usually not be difficult to dispose of in stressed market conditions. Hedge funds, by contrast, are much more likely to invest in less liquid assets, but, at the same time, this tends to be offset by defensive and infrequent investor redemption possibilities. Hedge funds can spread investment portfolio unwinding over the entire redemption notice period, which can vary from a few days to more than three months. Dynamic use and forced reductions of leverage, however, expose hedge funds to leverage-related risks and, through voluntary or forced deleveraging, this introduces another channel through which hedge funds might have an adverse impact on financial markets.

In the period from 2007 to 2009, the quarterly net flows by investors into and out of hedge funds exhibited very similar patterns and, in absolute terms, closely tracked net flows into traditional open-end investment funds (see Chart A). This occurred despite the fact that, irrespective of the chosen data source, the amount of investors’ capital entrusted to hedge funds globally was at most a fifth of that of the capital under management of conventional open-end investment funds. This means that, in relative terms, investors’ net flows into hedge funds were far more volatile.

According to data reported by a few widely used hedge fund data providers, the largest investor withdrawals from single-manager hedge funds occurred during the third and fourth quarters

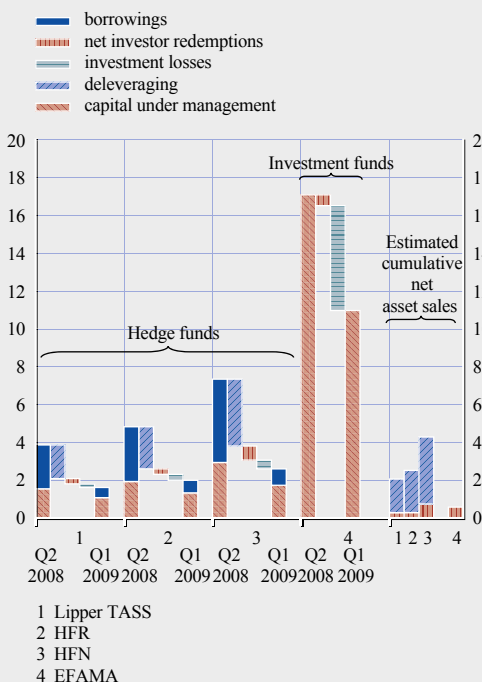
Chart A Global net flows into single-manager hedge funds and conventional open-end investment funds

(Q1 2007 – Q4 2009; USD trillions)



Chart B Estimated net asset sales by hedge funds and open-end investment funds at the height of the crisis

(Q2 2008 – Q1 2009; USD trillions)



Sources: Lipper TASS, Hedge Fund Research (HFR), HedgeFund.net (HFN), European Fund and Asset Management Association (EFAMA) and ECB calculations.
 Notes: Data on net flows into open-end investment funds refer to all reporting countries, the number of which increased during the analysis period, and includes equity, bond and balanced/mixed funds. Money market, other (including funds of funds) and unclassified funds were excluded from the analysis.

Sources: Lipper TASS, Hedge Fund Research (HFR), HedgeFund.net (HFN), European Fund and Asset Management Association (EFAMA) and ECB calculations.
 Notes: It was assumed that conventional open-end investment funds had no leverage, whereas the average leverage supporting net long positions of single-manager hedge funds declined from 2.5 to 1.5, as measured by (borrowings + capital)/capital ratio.² Data on open-end investment funds refer to all reporting countries, the number of which increased during the analysis period, and includes equity, bond and balanced/mixed funds. Money market, other (including funds of funds) and unclassified funds were excluded from the analysis.

of 2008, following the bankruptcy of Lehman Brothers in September 2008, and in the first quarter of 2009. The same was essentially true for conventional open-end investment funds.¹ Thus, these three quarters marked the peak of the crisis both in terms of the amounts of investor redemptions and in terms of the intensity of forced and voluntary deleveraging.

One way of estimating the amounts of net sales by various types of investment funds is to decompose declines in gross (leveraged) assets into net investor redemptions, investment losses and reductions in borrowings (deleveraging), assuming that the average leverage supporting net long positions of single-manager hedge funds declined from 2.5 to 1.5, as measured by the (borrowings + capital)/capital ratio.² With the available information on total capital under management (net assets) and net investor redemptions, an estimate of investment (valuation) losses can be computed by subtracting net investor redemptions from changes in net assets,

1 An important exception was the net inflows into bond funds in the first quarter of 2009 when investors regained their appetite for high-grade corporate bonds.
 2 The focus here is on net long positions since the unwinding of short positions would be associated with the buying of shorted assets. It was also assumed that conventional open-end investment funds had no leverage.

whereas the total amount of deleveraging was simply a residual decline in gross assets. With this, total cumulative net asset liquidations were computed as the sum of net investor redemptions and the amount of deleveraging. It should also be noted that the analysis may still underestimate net asset sales because it does not take into account likely increases in liquidity reserves as a result of both the higher risk aversion and funding liquidity risk associated with prime brokers' margin calls and anticipated further investor redemptions. That said, the findings from this analysis suggest that over the three-quarter period from the end of the second quarter of 2008 to the end of the first quarter of 2009, on a net basis, hedge funds may have sold as much as around USD 2.1 to USD 4.3 trillion of assets, whereas for traditional open-end investment funds, the equivalent amount was only about USD 0.6 trillion of securities (see Chart B).³

Overall, the crisis confirmed that certain features of the hedge fund model, namely the combination of leverage and unstable funding sources, may result in substantial position unwinding pressures in times of stress and thereby exacerbate vicious cycles of liquidation and deleveraging. In this respect, the analysis conducted here provides some evidence that at the peak of the recent crisis, the amount of forced and voluntary asset sales by hedge funds may have been sufficiently large to have a non-negligible negative impact on market prices. However, the relative contributions of hedge funds and conventional open-end investment funds to adverse market dynamics remain unclear, since the contributions of banks and other market participants would also need to be taken into account for a comprehensive assessment.

³ Similar estimates, albeit using different data sources, leverage measures and time periods, were also obtained by Charles River Associates, "Impact of the proposed AIFM directive across Europe", October 2009.

2 THE EURO AREA ENVIRONMENT

The overall macroeconomic environment in the euro area continued to improve moderately in early 2010, albeit with pronounced heterogeneity at the country level. This, as well as high prevailing uncertainty regarding future growth prospects, still implies heightened vulnerabilities for corporate and household sectors in the euro area. Nevertheless, the risks to financial stability stemming from the non-financial corporate sector have declined somewhat, on account of a slight improvement in balance-sheet conditions, even if this improvement is not yet as widespread within the small and medium-sized business sector. Risks stemming from the household sector are assessed to have remained unchanged over the last six months. This is because the deterioration in the outlook for the labour market and household income in recent months was in line with expectations and, therefore, to a large extent anticipated. Risks stemming from the sustainability of public finances and potential adverse interactions between fiscal developments and prospects for growth are considered relevant. Concerns about sovereign credit risks within the euro area intensified progressively over the last six months, requiring non-standard policy reactions to address the severe tensions in certain market segments.

2.1 ECONOMIC OUTLOOK AND RISKS

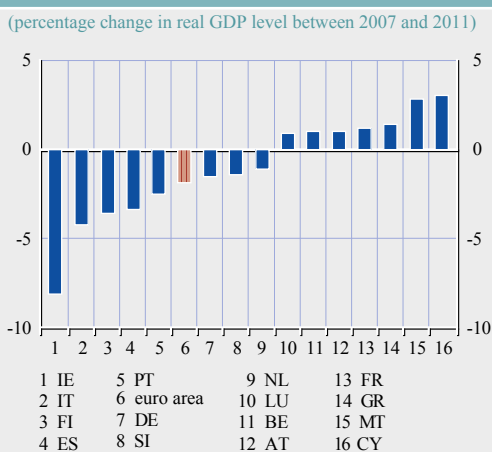
The euro area macroeconomic environment continued to improve in early 2010 following the deep trough in activity reached in the most recent recession. During the economic recovery process, the euro area economy has benefited notably from the significant macroeconomic stimulus provided and the measures adopted to restore the functioning of the banking system, as well as from the ongoing recovery in the world economy.

Economic growth is nonetheless likely to remain moderate in the near term. The March 2010 Eurosystem staff macroeconomic projections for the euro area place annual real GDP growth in a range of 0.4% to 1.2% in 2010 and 0.5%

to 2.5% in 2011. Economic activity is expected to be supported by the recovery in exports and by gradually rising domestic demand. However, relative to previous cycles, the recovery is projected to remain rather moderate, owing to the need for balance sheet repair in various sectors and the fact that private consumption is somewhat dampened by precautionary savings and modest prospects for labour income growth.

At the country level within the euro area, economic developments have remained heterogeneous, and disparity in the relative economic performance of the euro area countries is likely to have increased with respect to six months ago. This stems not only from differences in the severity of the latest recession, but also from an uneven economic recovery process across euro area countries. Forecasts by the European Commission indicate that by next year, only a few euro area countries will have recouped all of the losses in GDP incurred during the latest recession (see Chart 2.1). Going forward, the evolution of macroeconomic policies at the country level will also have a bearing on the respective economic performance. Beyond a general need for structural reforms to improve economic performance, fiscal policies will

Chart 2.1 Cumulative change in real GDP between 2007 and 2011



Source: European Commission's spring 2010 forecasts.

also involve balancing the need for an orderly unwinding of short-term stimulus measures with the need for long-term budgetary sustainability (see Section 2.5).

Uncertainty regarding the economic outlook for the euro area as a whole continues to remain elevated, despite an improvement in prospects for economic activity in the euro area as a whole since the December 2009 Financial Stability Review (FSR). Professional forecasters continue to have a wide range of views regarding the outlook for the euro area for next year compared with historical norms – though these views have become somewhat more homogenous over recent months (see Box 5). Notwithstanding this heightened uncertainty, risks to the macroeconomic outlook appear to remain broadly balanced. On the upside, confidence may improve more than expected, and both the global economy and foreign trade may recover more soundly than foreseen. On the downside, concerns remain relating to a stronger or more protracted than expected negative feedback loop between the real economy and the financial sector, renewed increases in oil and other commodity prices, the intensification of protectionist pressures and renewed tensions in

some financial market segments, as well as the possibility of a disorderly correction of global imbalances.

The continued recovery in the euro area macroeconomic environment should help to attenuate some risks to financial stability in the euro area. However, several risks to financial stability stemming from the macroeconomic environment remain, notably those stemming from the adverse macro-financial feedback loops which continue to shape developments despite the significant length of time that has elapsed since the onset of financial turmoil in the euro area nearly three years ago. In particular, should the economic recovery prove to be disappointing, renewed strains could be more intensely felt in the corporate sector and could possibly translate into higher corporate default rates (see Section 2.2). Beyond the high prevailing uncertainty regarding future prospects, other factors on the economic side such as the composition of economic growth as well as country heterogeneity in the euro area still imply heightened vulnerabilities for households, corporations and governments in the euro area going forward.

Box 5

MACROECONOMIC AND FINANCIAL SYSTEM UNCERTAINTY DURING THE LATEST RECESSION

During the recent crisis, the sharp rise in uncertainty following the exceptional events in the financial sector seems to have been an important feature shaping developments in the real economy. Uncertainty influences financial institutions' willingness to lend and finance economic needs, can put pressure on balance sheets or wealth, and curtails the ability of households and businesses to finance their investment plans. It is also relevant for the real economy because it can push households and firms to postpone expenditure and increase precautionary savings. Finally, it can impair the ability of financial institutions to intermediate credit or provide liquidity. This box looks at measures of uncertainty for financial markets and the macroeconomic outlook and discusses how the continued heightened uncertainty may be affecting the prospects for the real economy, possibly feeding back to financial stability.

There are a variety of means for measuring the degree of uncertainty. For financial markets, a common method is to look at measures of volatility. For example, the variation of equity indices provides one indication of current volatility in financial markets, while implied volatility from options contracts provides an insight into market participants' views of future volatility. For

the real economy, while it is possible to look at the historical volatility in macroeconomic series, a more forward-looking assessment may be better provided by examining the dispersion in forecasters' projections.

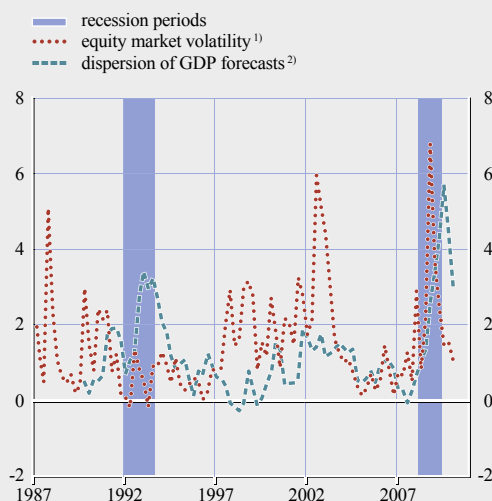
Chart A illustrates two such measures of uncertainty. The indicator of macroeconomic uncertainty based on forecasts appears to be counter-cyclical, rising during downturns such as the 1992-93 episode and the latest recession, and declining during upturns. While financial market volatility also rose sharply during the latest recession, the link between financial market and macroeconomic uncertainty is not straightforward. The indicator suggests that during this episode, financial market volatility led to macroeconomic uncertainty. However, there have been other notable spikes in financial market volatility that did not coincide with similar increases in the indicator of uncertainty regarding the macroeconomic outlook: for example, the stock market crash in 1987 and the Russian and LTCM defaults of 1997-98. This may indicate that the initial event triggering the spike in uncertainty occurs in the financial sector or in the real economy, impacting differently across the whole economy.

A key question for the current outlook is the extent to which the recent heightened uncertainty is affecting the economy and whether inference can be drawn from similar past episodes. Doing so necessitates isolating the specific component of uncertainty from the spillover of events or shocks not primarily occurring in the financial sector. This identification must be tackled in a multivariate system.

As an illustration, a small VAR model is estimated, consisting of a composite measure of uncertainty,¹ a measure of real financial costs, and real GDP. The structural shocks affecting the series are then identified by applying a Choleski decomposition.² In this framework, the link between uncertainty and activity appears: following an increase in uncertainty, the GDP level falls relative to trend and only begins to recover after four quarters, so that the effects are estimated to be relatively persistent (Chart B).

Chart A Equity market volatility and dispersion of growth projections

(Q1 1987 – Q1 2010; indices; standardised to one in non-recession periods)



Sources: ECB and Consensus Economics.

1) Quarterly average of daily percentage price changes in the Dow Jones EURO STOXX.

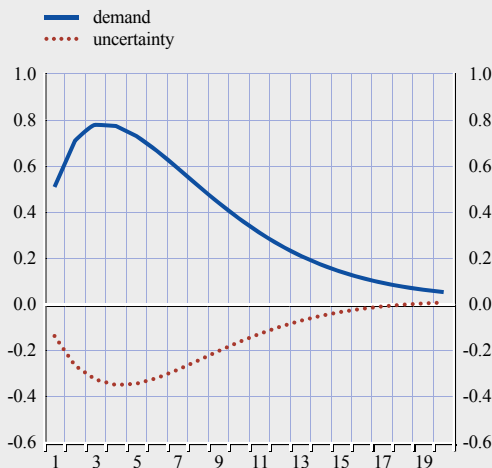
2) Standard deviation of Consensus Economics' projections for annual GDP growth in the next calendar year in Germany, France and Italy (simple average, seasonally adjusted).

1 The summary measure of uncertainty is a simple average of five measures of uncertainty, two of which are shown in Chart A. The measures include: the standard deviation of projections for GDP growth; Consensus forecasts for the current and next calendar year; the volatility in equity markets; two statistical measures of conditional volatility based on GARCH models for GDP; and industrial production.

2 The model is estimated using quarterly data for the euro area between 1985 and 2009. GDP is de-trended. The order of lags is chosen by minimising an AIC selection. In the Choleski decomposition, the ordering of the variables is important for identifying the shocks. In this illustration, the uncertainty indicator is first, the real cost of financing is second and real GDP is the third variable. Hence, the uncertainty index is explained by current and past confidence shocks, as well as past financing and demand shocks. GDP is explained by current and past confidence, financing and demand shocks. The results are relatively robust to changes in the ordering of variables.

Chart B Response of GDP growth to “uncertainty” and “demand” shocks

(deviation from baseline in percentages)



Sources: Eurostat, ECB, Consensus Economics and ECB calculations.

Notes: Responses to a one standard deviation uncertainty and demand shock. The x-axis indicates the number of quarters after the shock. For more details on the estimated VAR and the identification of the shocks, see footnotes 1 and 2 in this chapter.

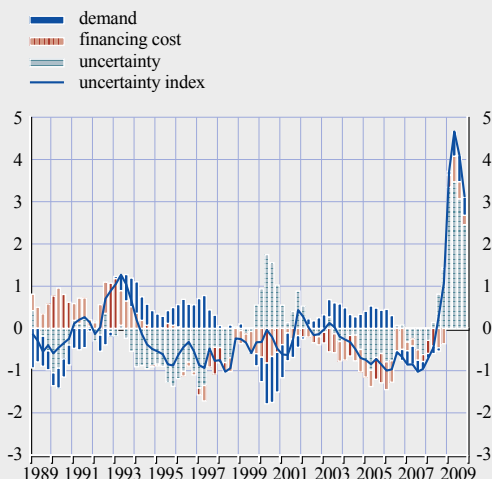
The simple model can also be used to illustrate the impact of the different shocks on the composite measure of uncertainty and euro area GDP growth (see Charts C and D). A large part of the recent spike in the composite measure of uncertainty, since the middle of 2008, appears to be explained by confidence shocks, possibly linked to the financial market turbulence during the crisis. These also account for a large part of the recent decline in GDP growth and are continuing to have a depressing impact. This contrasts with the 1992-93 recession where it was not confidence shocks, but rather financing costs and demand that played a role in explaining the rise in the uncertainty index and the fall in real GDP growth.

To sum up, sharply heightened uncertainty about the macroeconomic outlook has been a prominent feature of the recent crisis. The increase in uncertainty appears to have been one channel through which turbulence in the financial sector has affected activity during the

recession and has remained an important factor behind the developments in the macroeconomic environment since then. Looking ahead, concerns appear to have faded in recent months, but the effects of the initial events still warrant a close analysis of the stability of the financial system.

Chart C Contribution to the composite measure of uncertainty

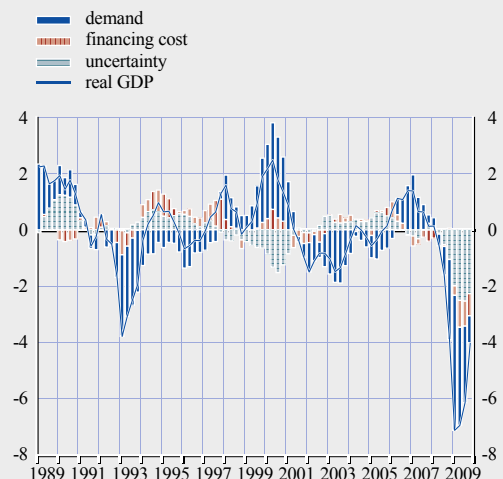
(Q1 1989 – Q4 2009; index averaging zero over the period Q4 1981 – Q4 2009)



Sources: Eurostat, ECB, Consensus Economics and ECB calculations.
Note: See footnotes 1 and 2 in this chapter.

Chart D Contribution to annual GDP growth

(Q1 1989 – Q4 2009; percentage; annual GDP growth and contributions; deviation from sample average)



Sources: Eurostat, ECB, Consensus Economics and ECB calculations.
Note: The series is de-meanned.

2.2 BALANCE SHEET CONDITION OF NON-FINANCIAL CORPORATIONS

Since the finalisation of the December 2009 FSR, balance sheet conditions of the euro area corporate sector have improved slightly. The overall environment has, however, remained challenging on account of firms' improving but still very low profitability, high financial leverage and the persistently tight lending standards applied by banks. In particular, small and medium-sized enterprises (SMEs), still heavily affected by the crisis and more dependent on bank finance, continue to face more difficulties than larger companies. The modest improvement in corporate sector balance sheet conditions over the last six months has only marginally helped to enhance firms' resilience with respect to these latent weaknesses.

EARNINGS OUTLOOK

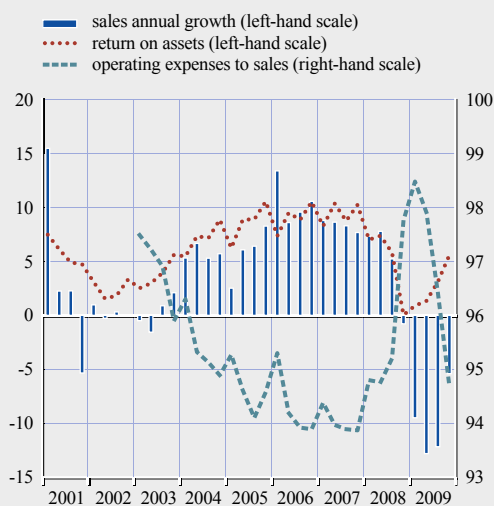
Latest evidence shows that the profitability of the euro area corporate sector is stabilising, after having deteriorated sharply in the first half of 2009. There are indications that large firms have reached a turning point, while SMEs seem to be affected by the crisis in a more protracted manner.

Data on listed companies, which mainly reflect large companies, show that the profitability of non-financial corporations (gauged by return on assets) improved steadily throughout 2009, although from very low levels (see Chart 2.2). The rebound in profitability resulted from intensive cost-cutting measures, while annual sales growth was negative throughout 2009. Firms' cash flow also declined in 2009. As indicated by the ratio of operating expenses to sales in Chart 2.2, firms managed to cut costs only some quarters after the drop in sales, since labour costs can generally be adjusted only with some time lag.

By contrast, the profit situation for the euro area corporate sector as a whole seems to be worse than that of large companies. Gross operating surplus, a profit indicator available from euro area accounts, continued to decrease in the third

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

(Q1 2001 – Q4 2009; percentage)



Sources: Thomson Reuters Datastream and ECB calculations.
Note: The chart shows the median development of each variable.

and fourth quarters of 2009 (on an annual basis), although the pace of contraction was considerably slower than in the first half of 2009. Moreover, according to the most recent SME survey conducted by the ECB and the European Commission, the profitability of firms of all size classes was very weak throughout 2009. The survey also indicates that SMEs, which account for the majority of companies in the EU,¹ exhibit a lower profitability than large firms. Overall, the different data sources suggest that large companies are further ahead on the road to recovery. The differences between large and small firms may be related to the fact that large firms are generally more internationally active than small ones. Given the remarkable increase in foreign demand in the last two quarters of 2009, large firms may have been able to partly offset the weak domestic demand by stronger exports.

¹ See ECB, "ECB survey on access to finance for small and medium-sized enterprises in the euro area", February 2010. In the EU, SMEs contribute 58% of the value added and employ 67% of total private labour force (2007 figures); see EIM Business & Policy Research, "Annual report on EU small and medium-sized enterprises", January 2009.

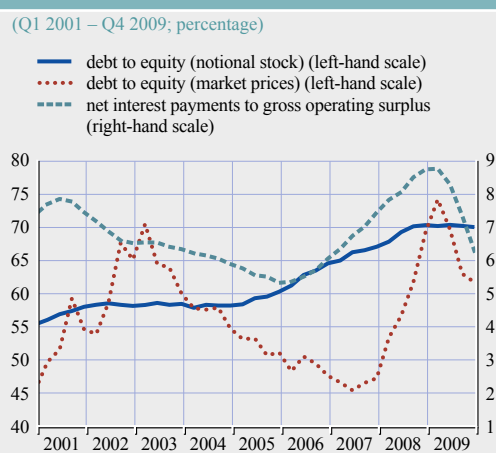
Going forward, the recovery of firms' earnings is likely to become more broad-based in the course of 2010, hand in hand with the improvement in macroeconomic conditions. Given the already relatively low cost-to-sales ratios (see Chart 2.2), the recovery in earnings is likely to be based more strongly on a pick-up of sales volumes than on further cost savings. However, the overall earnings growth is expected to remain moderate in 2010 and to accelerate only over the coming years. By contrast, earnings of large listed companies are likely to improve considerably (though from a very low base), as suggested by the forecasts of financial analysts, who expect above-average earnings per share (EPS) growth rates for non-financial companies included in the Dow Jones EURO STOXX index over a one-year horizon (see Chart S52). EPS levels are also expected to increase substantially in absolute terms over the same time horizon.

There is, however, a downside risk to this outlook should the economic recovery prove to be weaker than expected. Profit growth at the aggregate level may then stagnate or even remain in negative territory, increasing the vulnerability of firms in terms of the risks stemming from high leverage (see below) and also leading to an increase in the number of defaults. At the current juncture, the impact of aggregate demand on profit developments is particularly pronounced. This is because the latest improvements in profitability have resulted primarily from cost savings, and the potential for further savings is also likely to be moderate.

RISKS FROM LEVERAGE

Over recent quarters, firms have managed to stabilise their leverage ratios overall, or to even decrease them somewhat, as illustrated by Chart 2.3 and Chart S51 for different measures. However, it should be taken into account that, from a long-term perspective, leverage ratios remain very high. In particular, measured by the debt-to-GDP ratio, leverage is at its highest levels since the beginning of euro area accounts statistics in 1999 (see Chart S51). As indicated by the SME survey of the ECB and the European

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



Sources: ECB and ECB calculations.

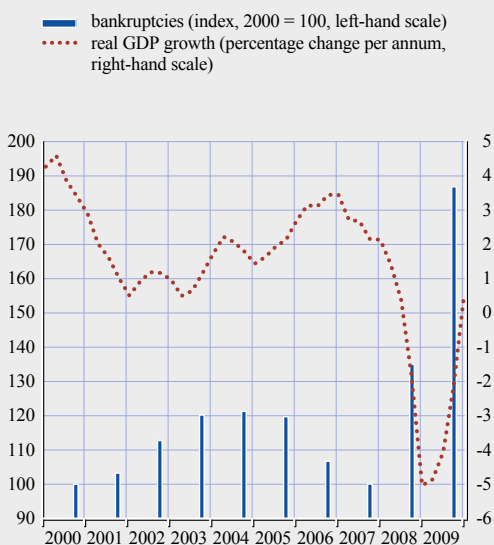
Commission, the moderation of non-financial companies' leverage seems to be stronger for large companies than for SMEs.

For an assessment of non-financial firms' vulnerability stemming from their leverage position, the ratio of net interest payments to gross operating surplus provides favourable information (see Chart 2.3). The indicator shows the fraction of current income that has to be used to serve interest payments. The interest burden of non-financial companies has declined considerably since the end of 2008, to 6.3% in the fourth quarter of 2009, which is slightly less than the long-term average since 2000 (6.8%). This development follows the remarkable decline of non-financial firms' cost of financing in a context of exceptionally accommodative monetary policy since the fourth quarter of 2008. At the same time, the high leverage implies that firms will be in a highly vulnerable position once their cost of financing increases again. This could pose, in particular, risks to SMEs, which tend to be more leveraged than large companies.

The high leverage of non-financial corporations, coupled with their low profitability, translated into high default rates for firms in 2009 and 2010. Default rates for the euro area speculative-grade

Chart 2.4 Bankruptcies and real GDP growth in the euro area

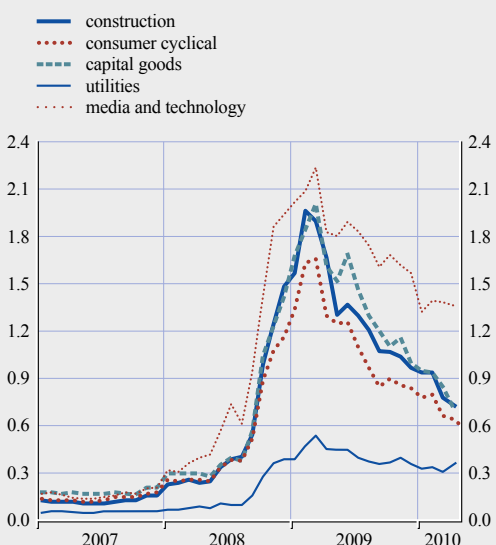
(Q1 2000 – Q1 2010)



Sources: National central banks, national statistical offices, Euler Hermes (“Insolvency Outlook”, 2/2009) and ECB calculations. Notes: GDP growth refers to total euro area, while data for bankruptcies only refers to 12 euro area countries (Cyprus, Malta, Slovakia and Slovenia not included). The index is weighted by GDP. Bankruptcies in 2009 are partly estimated.

Chart 2.5 Expected default frequencies (EDFs) for selected non-financial sectors in the euro area

(Jan. 2007 – April 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 0.01% and 35%. The “capital goods” sector covers the production of industrial machinery and equipment.

sector (which mostly reflects large companies) peaked in November 2009, reaching 10.8%. They fell considerably to 6.7% by the end of April and are expected to fall substantially in the course of 2010 (see Chart S53).

Information on bankruptcies for firms of all size classes shows a less benign picture (see Chart 2.4). In 2009, bankruptcies among euro area firms reached historically high values. There is, however, a large degree of cross-country heterogeneity, with some euro area countries at the upper end facing an increase of more than 70% in insolvencies in 2009, in comparison with the previous year.

Chart 2.4 also reveals a high persistence of insolvencies after the last economic downturn (2002-03), when bankruptcies remained at high levels, even after GDP had already picked up. Should the current crisis follow the same pattern

as the last downturn, a large number of insolvencies could be expected to emerge throughout 2010.²

This is also reflected in the euro area corporate sector expected default frequencies (EDFs) – a measure of the probability of default. Chart 2.5 shows that EDFs peaked in March 2009 among the construction, consumer cyclical, media and technology, and utilities sectors. There was a relatively broad-based decline in this measure of credit risk after April 2009 but it still remained at relatively high levels until early 2010 for most sectors.

FINANCING RESTRICTIONS

In addition to risks resulting from their weak balance sheet conditions, firms face funding risks

2 This is in line with industry predictions (see Euler Hermes, “Insolvency Outlook”, 2/2009).

emanating from banks' lingering fragilities. The most recent results of the ECB's bank lending survey of April 2010 suggest that non-financial corporations face very tight financing conditions when applying for bank loans. In particular, in the first quarter of 2010, banks' credit standards became slightly more restrictive, despite their already being at high levels. Banks' tight credit standards may put particular strains on SMEs that are especially dependent on bank finance. Lending standards are likely to become less restrictive in the course of 2010.³

In contrast to bank finance, conditions for market-based finance and internal funding capabilities have developed more favourably. Throughout 2009, investment-grade firms to some extent replaced bank loans with market-based debt. Access to market-based debt has also improved significantly for non-investment grade firms since mid-2009, after issuance of high-yield bonds had been close to zero for roughly two years. Issuance volumes returned to pre-crisis levels in the second half of 2009 and have stabilised since then. Moreover, the rebound of profits, even if modest and not broadly based, enabled some firms to increase their retained earnings in the second half of 2009. Retained earnings are likely to increase further in the course of 2010 since tax deductions on the basis of losses accumulated during the crisis allow companies to save tax.

OVERALL ASSESSMENT OF RISKS IN THE CORPORATE SECTOR

Since the December 2009 FSR, the condition of the balance sheets of the euro area corporate sector has improved slightly. There are indications that large firms have already reached a turning point, while SMEs seem to have been more affected by the crisis primarily on account of feedback effects on the real economy.

Over the next six months, the recovery in firms' profits is likely to become more broad-based across firm size classes and may contribute to

a slight decrease in firms' high indebtedness. In addition, financing restrictions resulting from banks' fragilities are likely to ease. Nevertheless, corporate default rates are expected to remain at very high levels throughout 2010 and may decline only gradually over a medium-term horizon.

Major risk factors for the euro area corporate sector have remained broadly unchanged over the last six months. A more prolonged period of moderate economic activity in the euro area than currently projected could pose material risks to financial system stability via its impact on corporate sector balance sheets. Strains in the corporate sector could also emerge from financing needs, which are expected to rise should firms be confronted with constraints on their access to credit. This would affect, in particular, SMEs on account of their dependency on bank finance.

2.3 COMMERCIAL PROPERTY MARKETS

DEVELOPMENTS IN COMMERCIAL PROPERTY MARKETS

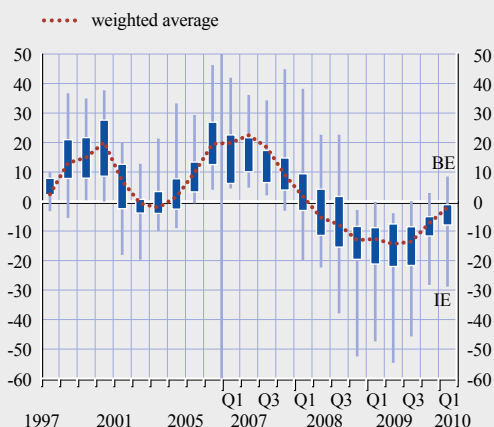
Developments in commercial property markets during the past six months have been in line with the expectations outlined in the December 2009 FSR. Conditions have remained fragile in many countries, but there have been some signs of a stabilisation or, in some cases, of modest improvements in recent quarters. Capital values for prime property – i.e. commercial property prices adjusted downwards for capital expenditure, maintenance and depreciation – continued to decline on a year-on-year basis, by some 2% in the first quarter of 2010. However, the pace of the decline levelled off and most countries recorded slightly positive quarter-on-quarter growth rates (see Chart 2.6).

A continued but modest recovery in commercial property investment volumes in the euro area supported the quarterly capital value increases

3 This is suggested, for example, by the development of credit standards over recent quarters, according to survey respondents.

Chart 2.6 Changes in capital value of prime commercial property in euro area countries

(1997 – Q1 2010; percentage change per annum; maximum, minimum, interquartile distribution and weighted average)



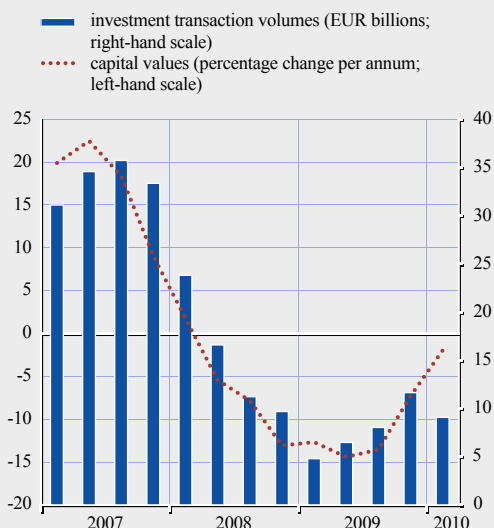
Source: Jones Lang LaSalle.

Note: Data for Cyprus, Malta, Slovakia and Slovenia are not available.

seen in many countries despite still negative growth rates on an annual basis (see Chart 2.7). Investment volumes increased by 10%, year on year, and 36%, quarter on quarter, in the fourth quarter of 2009 and reached €10.5 billion.

Chart 2.7 Commercial property investment transaction volumes and changes in capital value of prime commercial property in the euro area

(Q1 2007 – Q1 2010)



Sources: DTZ Research and Jones Lang LaSalle.

Nevertheless, investment activity fell back slightly to €9.1 billion in the first quarter of 2010 and remained well below the levels seen in previous years. In addition, in some countries investment activity was dominated by property sale and leaseback activity (see Box 6).

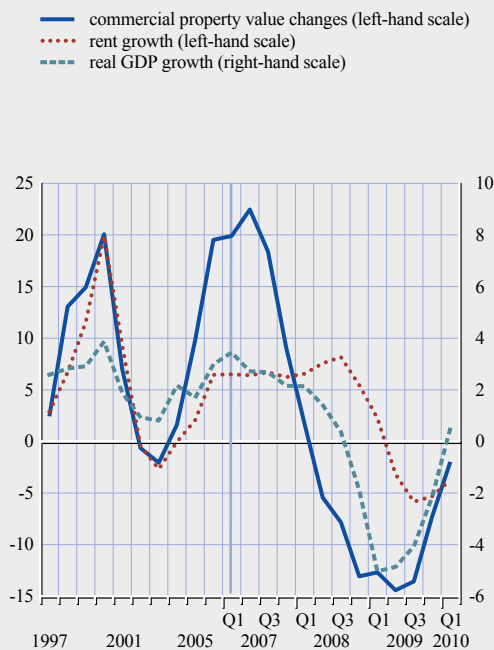
RISKS FACED BY COMMERCIAL PROPERTY INVESTORS

The income risks for commercial property investors identified in the December 2009 FSR largely remain. As discussed above, capital values remain well below the levels seen in most countries in previous years. In addition, commercial property rents in the euro area continued to decline by about 7%, year on year, for office space and they remained flat for retail space in the first quarter of 2010. However, developments across countries were heterogeneous, with rents in some countries falling by over 30%, year on year. At the same time, office vacancy rates rose slightly to an average of 11% in the first quarter of 2010.

Funding costs and risks for commercial property investors have also remained relatively high over the past six months. Although commercial property investors have, to some extent, benefited from continued low interest rates (see also Section 2.2), banks continue to apply more conservative lending standards – including lower loan-to-value ratios – and higher margins for commercial property loans. This is mainly a concern for loan-financed property investors that purchased property during the past five or so years when prices were often significantly higher than their current levels. Many of the commercial property loans and commercial mortgage-backed securities (CMBSs) issued in recent years were often granted with high loan-to-value ratios (often 75-85%), and are due to be refinanced in the coming months and years. The drops in commercial property prices might lead to a situation where property investors find themselves with an insufficient cushion of collateral for refinancing debt which may require them to raise capital, for example by selling properties, to increase the equity share in investments.

Chart 2.8 Changes in euro area capital value of prime commercial property, commercial property rent growth and euro area real GDP growth

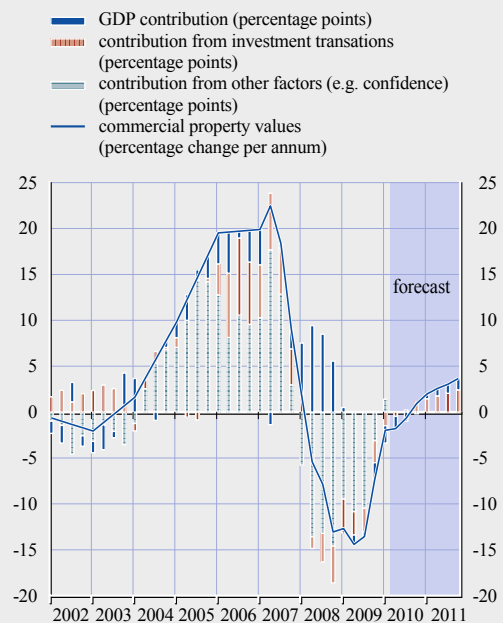
(1997 – Q1 2010; percentage change per annum)



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

Chart 2.9 Forecast for 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 forecast for euro area GDP was used in the projection.

As mentioned in previous issues of the FSR, 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 2.8).

Commercial property prices in the euro area are projected to recover only gradually during 2010 and to rise rather modestly throughout 2011 (see Chart 2.9). However, there is high uncertainty surrounding this forecast, since it is heavily reliant on the macroeconomic outlook, which continues to be characterised by high uncertainty.

OVERALL ASSESSMENT OF RISKS IN COMMERCIAL PROPERTY MARKETS

Conditions in commercial property markets remain challenging, although there have been some signs of a stabilisation and modest improvements in some euro area markets over the past six months. Looking ahead, commercial property prices are likely to remain below the highs seen in previous years for some time to come. This poses significant risks for many loan-financed property investors and CMBS deals with loans due for refinancing in the coming months and years. Continued losses for banks are therefore likely in the period ahead, as a result of their exposure to commercial property lending and investment (see Section 4).

Box 6

FINANCIAL STABILITY IMPLICATIONS OF THE INCREASE IN PROPERTY SALE AND LEASEBACK ACTIVITY

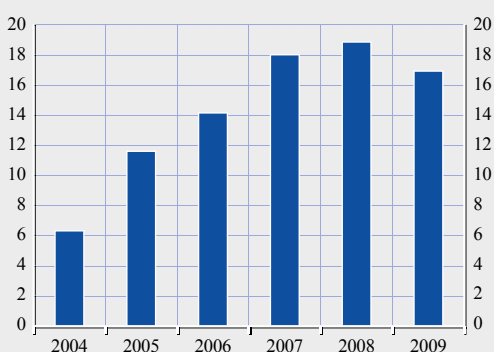
Over the past decade, an increasing number of companies have engaged in the “sale and leaseback” of their property, such as office buildings or retail space. Under a sale and leaseback agreement, a company sells a property to a professional property investor and leases it back, with the aim of raising capital. In the past, companies often saw ownership of their own property as a sign of strength. However, in the last decade, the stigma attached to selling off “the family silver” lessened, and sale and leaseback activity became increasingly popular. The market was also fuelled by some prominent examples of sale and leaseback activity in Europe in recent years.

Occupier sales in Europe grew from €7 billion in 2004 to €46 billion in 2007, before declining again in 2008 and 2009, together with total investment activity. At the same time, the share of occupier sales in total commercial property investment volumes increased from about 6% in 2004 to around 18% in recent years (see Chart A). However, the share in total investment activity varied widely across countries. In 2008 and 2009, when investment volumes in commercial property markets were comparatively low, some large corporate disposals in Italy and Spain accounted for a large share of overall commercial property investment activity (see Chart B).

Sale and leaseback can be an effective and cheap way for companies to raise capital, especially during periods when property prices are high and other sources of finance expensive. For financial stability analysis of the commercial property sector, it is important to understand and monitor sale and leaseback activity since it now accounts for, on average, almost 20% of total

Chart A Commercial property occupier sales in Europe as a share of total investment

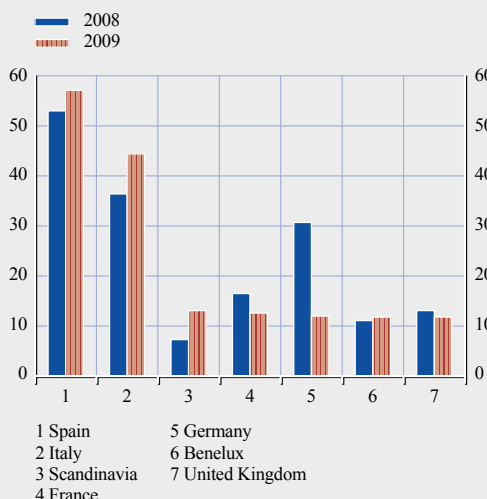
(2004 – 2009; percentage of total investment volumes)



Source: CB Richard Ellis.

Chart B Commercial property occupier sales in selected European countries and regions

(2008 – 2009; percentage of total investment volumes)



Source: CB Richard Ellis.

investment volumes and is much higher in some countries. It is likely that the number of sale and leaseback deals by companies will continue in the period ahead, owing to the relatively high cost of issuing debt for many corporations.

Spreading commercial property risks to professional property investors via sale and leaseback deals can contribute to financial stability by providing a good source of finance for the sellers and an attractive investment, with often longer leases, for the buyer. This is, nevertheless, likely to depend on the extent to which transactions are fuelled by leverage and it also creates linkages between property investors and the selling companies, through which financial difficulties can then spread.

2.4 BALANCE SHEET CONDITION OF THE HOUSEHOLD SECTOR

The overall assessment of household sector balance sheets as a potential source of risk from a financial stability perspective has remained broadly unchanged in the six months after the finalisation of the December 2009 FSR. The central scenario is still one of continued sustainability.

The outlook for both the labour market and household income has deteriorated further in recent months, but remains in line with what was anticipated in the December 2009 FSR. At the same time, however, there were positive signs from a slight decline in the debt-servicing ratio. Looking forward, the macroeconomic environment is expected to continue to have a negative effect on household sector balance sheets, but to a lesser extent than in previous quarters.

HOUSEHOLD SECTOR LEVERAGE

The annual rate of growth of total loans to the household sector (which, for the most part, are extended by monetary financial institutions – MFIs) stood at 1.7% in the fourth quarter of 2009, unchanged in comparison with the previous quarter. However, information on loans to households granted by MFIs confirms a change in trend at the turn of the year, with annual growth increasing by 1.7% in the first quarter of 2010, after 0.3% in the previous quarter. However, when account is taken of the impact of the derecognition of loans in the context of securitisation activity, the recovery in

the annual growth rate of loans to households is more limited. The change in the pace of growth was confirmed by the March 2010 data, as the annual growth rate of MFI loans to households increased to 2.2%. This was attributable to the slight resumption of borrowing for house purchase, while consumer credit remained subdued (see Chart S61).

The recent pattern of loan growth appears to be consistent with longer-term stylised facts, such as household borrowing tending to improve early in the economic cycle. At the same time, the fact that recent developments are still modest may be related to the considerable uncertainty that surrounds housing markets and income, and the relatively high level of household indebtedness.

According to the results of the ECB's bank lending survey of April 2010, households' demand for housing loans, decreased in the first quarter of 2010, on account of modest housing market prospects and a setback in consumer confidence, inverting the trend of the previous three quarters. Looking forward, mortgage lending is expected to improve somewhat, but to remain weak. At the same time, net demand for consumer credit and other lending could remain subdued as no major improvements in spending on durable goods or household savings are anticipated.

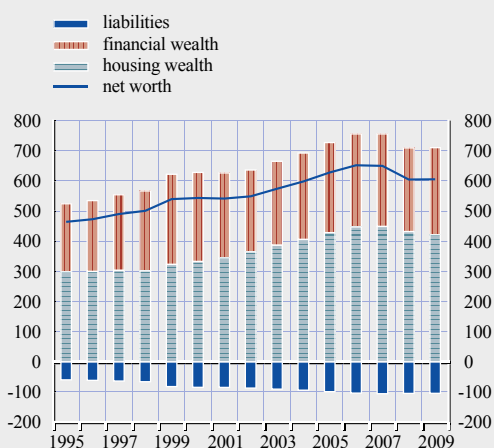
Reflecting the sustained past deceleration of household sector borrowing in the euro area and the relatively subdued current levels, the debt-to-disposable income ratio is estimated to have remained broadly stable at around 95% in

the fourth quarter of 2009. On the other hand, households' debt-to-GDP ratio is estimated to have increased somewhat in the fourth quarter, on account of overall economic activity displaying a stronger cyclical decline than household income (see Chart S63).

Turning to the holding of assets by households, which provides an indication of their ability to repay debt at an aggregate level, the value of households' assets is estimated to have remained largely unchanged in 2009, as compared with 2008. In 2009, a slight decline in housing wealth appears to have been compensated for by a slight improvement in financial wealth. At the same time, the value of debt is also anticipated to have remained broadly stable. As a result, the net wealth of households in 2009 is estimated to have stood at the same level than in 2008 (see Chart 2.10), well below the levels observed from 2005 to 2007. Overall, considering the potential ability of households to repay debt, the ratio of debt to total wealth is estimated to have increased somewhat in 2008, as compared with previous years (see Chart S64), and to have increased slightly further in 2009.

Chart 2.10 Household sector net worth in the euro area

(1995 – 2009; percentage of gross disposable income)



Sources: ECB and ECB calculations.

Notes: Data for housing wealth after 2003 are based on ECB estimates. 2009 figures are based on information available until the third quarter.

RISKS FACED BY THE HOUSEHOLD SECTOR

Developments in interest rates and income are the two main sources of risk that can affect the ability of households to service their debt. Negative household income developments clearly remain the prime source of risk – albeit in line with the assessment in the December issue of the FSR – while risks stemming from interest rate developments have even declined somewhat in recent months.

Interest rate risks of households

Over the last six months, the ECB has kept key interest rates unchanged, with a cumulative decline of 325 basis points since October 2008. Lending interest rates to households have continued to decline in the course 2009, due to an ongoing pass-through from official to market rates. Together with subdued developments in household borrowing, this has led to a slight decline in households' overall debt servicing burden in the second half of 2009. In particular, interest payments are estimated to have declined further in the fourth quarter of 2009, to 2.3% of disposable income (see Chart S65).

It is worth stressing that the risks affecting the most financially vulnerable segments of the population cannot be properly addressed by looking at aggregate data. In particular, indebted households at the lower level of the income distribution face a higher risk.⁴

Overall, the interest rate risk faced by households has declined after the finalisation of the December 2009 FSR, and is expected to remain subdued looking forward.

Risks to household income

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

4 For more details, see Box 6 in ECB, *Financial Stability Review*, June 2009.

Although the macroeconomic environment improved in terms of economic growth and, to a lesser extent, also employment growth in some countries in the second half of 2009, income-related risks for households are still present. The average euro area unemployment rate continued to rise and reached 10.0% in March 2010, up from 9.7% in the third quarter of 2009 (see Chart S45). The deterioration in labour market conditions is not, however, broadly based across euro area countries. In particular, significant increases in the unemployment rate were recorded in Ireland, Spain and Slovakia between 2008 and 2009, while the increases were far less acute in others (see Chart 2.11). Moreover, the combination of negative labour market developments and high levels of indebtedness may lead to higher income-related risks at the euro area level. In particular, the percentage of households that are facing difficulties in servicing their debt is expected to have increased further in 2009 (for more details on late payments and their relationship with unemployment, see Box 7).

Looking forward, a broadly based increase of the unemployment rate across euro area countries is

still expected in the course of 2010, although it is likely to be far lower than that recorded in the previous year. At the same time, real income is expected to remain subdued in the next few quarters.

Risks to residential property prices

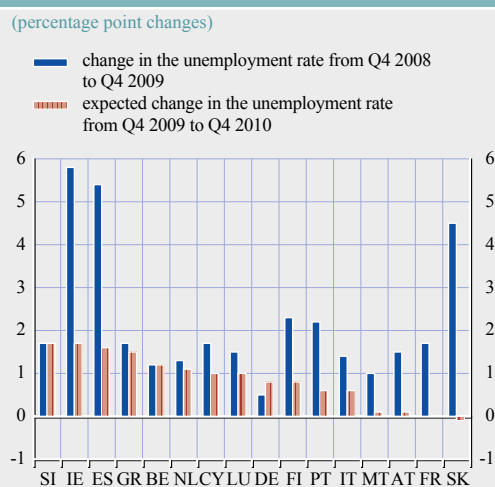
Euro area residential property prices fell in 2009, the first contraction on record (i.e. since at least 1982).⁵ The decline appears to form part of an ongoing correction in house prices after the high price increases recorded between 1999 and 2005. That said, the pace of decline appears to have abated somewhat at the end of 2009, possibly an early (and tentative) signal of some impending stabilisation.

The fall in euro area house prices was widespread geographically, with residential property prices falling in almost all euro area countries in 2009 (see Table S4). In 2009 as a whole, house price declines in excess of 7% were observed for Ireland, Slovakia, Slovenia, Spain and France. While still generally contracting, it is possible that a trough may have been reached in house price levels in some countries during the third quarter of last year. Generally, the countries experiencing the most pronounced corrections are those that exhibited the strongest house price increases in the period to 2005.

Of the several metrics available to gauge the valuation of house prices in terms of the underlying fundamentals, two measures that tend to receive widespread attention – affordability and house prices in an asset pricing framework related to rents – suggest that the ongoing house price correction will continue in the near term.

A basic measure of housing affordability – defined as the ratio of households' nominal disposable income to the nominal house price index – has continued the upward movement initiated at the end of 2007 (see Chart S66). Notwithstanding this improvement, which

Chart 2.11 Unemployment rate developments in euro area countries



Sources: Eurostat and ECB calculations.
Note: Data refer to changes in average quarterly figures, except in the case of Ireland, Greece, Cyprus and Slovenia where they refer to changes in average annual figures.

5 It should be noted that there is a high degree of uncertainty in the data used to assess house price developments that stems from, in particular, issues related to coverage, quality control and representativeness.

stems mainly from lower house price inflation, this measure of housing affordability remained about 10% lower than it was a decade earlier. The improvement to date has, however, been reinforced by a concurrent improvement in borrowing conditions, given the decrease in nominal interest rates on loans to households for house purchase over the past year. At the same time, the correction in the housing supply has remained strong in the context of the ongoing house price moderation, even though the marked rate of contraction in real housing investment eased off somewhat at the end of 2009 (see Chart S46).

The developments in housing affordability are broadly consistent with indications from an asset pricing approach applied to housing. That said, under this approach, the ratio of the euro area house price index relative to the euro area rent component of the HICP remains elevated, even though it has fallen since 2007 (See Chart S68).

While several caveats underlie these two (as well as other) assessments of house price valuation, both measures support the expectation of a continued correction in euro area house prices in the near term. In particular, forecasts drawn from a recently estimated euro area house price model based on standard demand and supply fundamentals suggest a bottoming-out of

euro area house price levels in 2010.⁶ A key downside risk underpinning the outlook for the housing market relates to remaining weaknesses in economic fundamentals, most notably those related to the labour market, which could exacerbate the ongoing correction. Moreover, historical experience suggests that, in the short term, house prices may sometimes overshoot or undershoot their long-term trend as lags in the adjustment of the housing supply imply a dominant role for potentially volatile housing demand.

OVERALL ASSESSMENT OF RISKS IN THE HOUSEHOLD SECTOR

Overall, the risks to the euro area financial sector originating from the household sector have remained broadly unchanged over the last six months and are, therefore, contained. While the debt servicing burden is expected to decline only marginally, following the subdued development of loans to households and the low interest rate environment, a further slight deterioration in the labour market, as a lagged reaction to the past economic slowdown, still implies considerable vulnerabilities to euro area financial stability stemming from household income.

⁶ See L. Gattini and P. Hiebert, "Forecasting and assessing euro area house prices through the lens of key fundamentals", *Working Paper Series*, ECB, forthcoming.

Box 7

HOUSEHOLDS' FINANCIAL DISTRESS AND UNEMPLOYMENT

The capacity of households to repay their debts has been hampered by the economic downturn that took place in the course of 2008 and the first half of 2009. Indeed, with some lag with respect to the economic cycle, delinquency rates are still increasing markedly in some euro area countries, forcing banks to provision funds to cover for possible losses and, in some cases, leading to write-offs on loans on their balance sheets.

This box addresses households' financial stress at its earliest stage, i.e. when households start to face problems in servicing their debts. It focuses on the answers provided by households holding mortgage debt on "whether the household has been in arrears on mortgage payments in

the last 12 months”, as polled in the EU Survey on Income and Living Conditions (EU-SILC). The indicator is defined as the percentage of households with late payments (on mortgage debt) in the total number of households holding mortgage debt. As the EU-SILC started to be conducted only in 2004, the indicator has been prolonged with the answers to the same question collected in the European Community Household Panel (ECHP) between 1995 and 2001 in order to cover a longer time span.¹

The chart below indicates that arrears have shown a cyclical pattern between 1995 and 2007. Indeed, the indicator has been subject to some downward and upward movements, reaching peaks in 1996 and 2004, and troughs in 2000 and 2006. The most recent developments point to a slight increase in 2007 in comparison with the year before, to around 4%, which can be seen as close to the average historical level (available country-specific information indicates that it may have increased to 4.5% in 2008). It is also noteworthy that the overall euro area picture hides a high dispersion across countries. In particular, in 2007 the range moved between a minimum of 0.8% and a maximum of 18.3% (see table below).

The chart also illustrates the close link between the indicator of arrears and the overall unemployment rate (lagged by one year) – the correlation between both indicators being 0.76 (and 0.66 in first differences). This close and direct link can be expected, as the labour market situation is a key determinant of household income. An increase (decrease) in the unemployment rate implies an increase (decrease) in the proportion of households seeing a reduction in their income levels and, given a level of debt commitments, an increase (decrease) in the proportion of those facing problems in servicing their debt payments. This direct link between arrears and unemployment is confirmed by a micro-data approach, according to which households in which the head is unemployed are those showing a higher probability of facing debt servicing problems. Indeed, it is estimated that the probability of reporting late payments is more than 40 percentage points higher when the head of household is unemployed than in the case of heads of household with a permanent employment contract.²

Percentage of households holding a mortgage facing problems in servicing their mortgage debt and the overall unemployment rate

(1995 – 2010; percentage of households and percentage of the labour force)



Country variation	1995	1997	1999	2001	2004	2005	2007	2008
Average	4.5	4.4	3.7	3.1	4.1	3.7	3.9	4.5
Min.	0.9	0.5	0.2	0.5	0.3	0.4	0.8	0.7
Max.	23.7	20.7	20.0	17.3	15.1	18.3	18.3	13.7

Sources: Eurostat and ECB calculations.
Notes: Arrears on mortgage debt based on micro-information derived from the European Community Household Panel (ECHP) up to 2001, and from the EU Survey on Income and Living Conditions (EU-SILC) from 2004; 2002 and 2003 are obtained by simple interpolation. Unemployment rate lagged one year; green dots indicate forecasts derived from Consensus Forecast. The figure for 2008 is an estimate based on available country-specific information.

1 Estimates for the years 2002 and 2003 were obtained by simple interpolation. Euro area figures are based on country estimates obtained by means of household cross-sectional weights reported at the survey, which are then weighted by using country GDP at purchasing power parity (PPP) exchange rates.
2 This results from a probit estimate of late payments on working status, controlling for income, age, education level, household size, marital status, gender, migration status, durable goods own, employment rate in the region and country dummies, for the year 2007.

Looking at the level of the indicator together with the unemployment rate indicates that in 2007 it may be assessed as having been relatively high in historical terms, as it coincided with a record low in the unemployment rate. In fact, a similar level of this indicator was observed in 1998 when the unemployment rate was more than 2 percentage points higher. Nonetheless, long-term developments in arrears are also linked with other trends. In particular, new financial instruments offered to the general public and changes in consumer habits have led to a trend increase in the level of households' indebtedness, taking together mortgage and consumer debt. At the same time, there is evidence that such an increase has translated, in recent years, into a higher debt burden for households at the lowest income levels, which should have fostered debt servicing problems. On the other hand, there are also some offsetting factors in place. For instance, lending institutions – sometimes supported by government programmes – have developed tools to introduce flexibility in mortgage contracts, such as the possibility of delaying part of or all debt service payments temporarily in the case of spells of unemployment.

Looking forward, the ongoing downward adjustment in labour markets is expected to lead to a further increase in the number of unemployed and, as a result, it could extend and prolong its negative impact on households' income. In that respect, assuming a broadly unchanged institutional framework, the possibility of a further increase in the proportion of late payments close to or above the maximum reached in 1996 cannot be ruled out.

2.5 ECONOMIC SITUATION OF THE GOVERNMENT SECTOR

The recent financial and economic crisis resulted in a sharp deterioration of fiscal positions in euro area countries. As the sustainability of public finances over different time horizons represents a necessary precondition for the stability and smooth functioning of the economy, the fiscal situation and outlook in the euro area countries needs to be taken into account when assessing potential risks to financial stability (see Box 8 for more details).

In 2010 the euro area fiscal position is expected to reach a record low on account of the sharp fiscal deterioration in most countries that began in 2008. Concerns about sovereign credit risks progressively intensified within the euro area over the last six months, becoming acute in early May and leading to stresses in some financial market segments.

While, over the past six months, overall fiscal prospects for the euro area as a whole have improved modestly, owing to the better macroeconomic outlook and the fact that many countries have spelled out their consolidation

strategies, the fiscal situation in a number of countries with high deficits and high and rising government debt-to-GDP ratios has continued to deteriorate. Most importantly, market conditions for government refinancing have tightened considerably for some countries over this time period, requiring non-standard policy reactions to address the severe tensions in certain market segments.

FISCAL STANCE AND SUSTAINABILITY

The unfavourable fiscal developments over the last two years can be explained by three main factors. First, the financial and economic crisis brought about a declining revenue-to-GDP ratio and a rising expenditure-to-GDP ratio through the operation of automatic stabilisers, revenue shortfalls and persistent structural spending growth. The resulting budget deficits are particularly high also because the fiscal starting in structural terms were far from being close to balance or in surplus in many countries. Second, following the European Economic Recovery Plan which was agreed in December 2008, most euro area governments adopted significant fiscal stimulus measures, which further increased deficits and debt. Third, several countries have taken measures

Table 2.1 Change in general government debt in the euro area

(percentage of GDP; percentage points)				
	2008	2009	2010	
1 General government gross debt	69.4	78.7	84.7	
2 Change in debt ratio (2=3+4+5)	3.4	9.3	6.0	
<i>of which contribution of:</i>				
3 Nominal GDP growth	-1.8	2.2	-1.2	
4 General government deficit	2.0	6.3	6.6	
4a Automatic stabilisers	-0.9	1.5	1.5	
4b Fiscal stimulus measures	-	1.1	1.1	
4c Other	2.9	3.7	4.0	
5 Deficit-debt adjustment	3.3	0.8	0.7	
5a Financial sector support	1.9	0.5	:	
5b Other deficit-debt adjustment	1.4	0.3	:	
6 Change in contingent liabilities on account of the financial sector support	5.5	3.1	:	

Sources: European Commission's spring 2010 economic forecast and Eurostat, April 2010 notification.

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.

to stabilise the financial sector, some of which have had an impact on the debt position or could constitute a risk of higher deficits and/or debt in the future.

As a result, in the period 2008-10, the euro area has seen the worst budget balance deterioration and rise in government debt in its history, of

which around one-quarter to one-third was due to fiscal stimulus measures and government support for the financial sector (see Table 2.1). Country level developments illustrate a serious deterioration in fiscal positions in a number of euro area countries (see Table 2.2). The current high deficit and debt levels risk fuelling other economic imbalances like current account deficits or inflationary pressures. Furthermore, increasing government borrowing needs and weakened confidence in fiscal sustainability have triggered increases in sovereign bond yields and spreads for some countries in the euro area (see Section 3.2 for the latest developments in intra-euro area sovereign yield spreads), leading to higher borrowing costs, adding to overall interest rate risk in the financial system and potentially crowding out growth-enhancing government spending, as well as private investment. Such developments are likely to have an adverse impact on the recovery and on the potential growth rate of the economy, which may subsequently also dampen the performance of the financial system.

Moreover, market perceptions of fiscal sustainability may not be driven only by officially recorded government debt. Market participants

Table 2.2 General government balance and gross debt

(2007 - 2011; percentage of GDP)

	General government budget balance					General government gross debt				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
Belgium	-0.2	-1.2	-6.0	-5.0	-5.0	84.2	89.8	96.7	99.0	100.9
Germany	0.2	0.0	-3.3	-5.0	-4.7	65.0	66.0	73.2	78.8	81.6
Ireland	0.1	-7.3	-14.3	-11.7	-12.1	25.0	43.9	64.0	77.3	87.3
Greece	-5.1	-7.7	-13.6	-9.3	-9.9	95.7	99.2	115.1	124.9	133.9
Spain	1.9	-4.1	-11.2	-9.8	-8.8	36.2	39.7	53.2	64.9	72.5
France	-2.7	-3.3	-7.5	-8.0	-7.4	63.8	67.5	77.6	83.6	88.6
Italy	-1.5	-2.7	-5.3	-5.3	-5.0	103.5	106.1	115.8	118.2	118.9
Cyprus	3.4	0.9	-6.1	-7.1	-7.7	58.3	48.4	56.2	62.3	67.6
Luxembourg	3.6	2.9	-0.7	-3.5	-3.9	6.7	13.7	14.5	19.0	23.6
Malta	-2.2	-4.5	-3.8	-4.3	-3.6	61.9	63.7	69.1	71.5	72.5
Netherlands	0.2	0.7	-5.3	-6.3	-5.1	45.5	58.2	60.9	66.3	69.6
Austria	-0.4	-0.4	-3.4	-4.7	-4.6	59.5	62.6	66.5	70.2	72.9
Portugal	-2.6	-2.8	-9.4	-8.5	-7.9	63.6	66.3	76.8	85.8	91.1
Slovenia	0.0	-1.7	-5.5	-6.1	-5.2	23.4	22.6	35.9	41.6	45.4
Slovakia	-1.9	-2.3	-6.8	-6.0	-5.4	29.3	27.7	35.7	40.8	44.0
Finland	5.2	4.2	-2.2	-3.8	-2.9	35.2	34.2	44.0	50.5	54.9
Euro area	-0.6	-2.0	-6.3	-6.6	-6.1	66.0	69.4	78.7	84.7	88.5

Source: European Commission's spring 2010 economic forecast.

Note: The forecast does not take account of measures taken since then to speed up fiscal consolidation in some countries.

often also take into account contingent or implicit government liabilities stemming, for example, from government guarantees, long-term fiscal pressures from population ageing, or (non-government) public enterprises.

GOVERNMENT DEBT MANAGEMENT

Government borrowing needs in the financial markets represent the most extensive direct interaction between fiscal policies and the financial system. As shown in Chart 2.12, the share of government debt held by (domestic) financial institutions in the euro area⁷ constitutes a large proportion of total government debt, with marked cross-country differences.

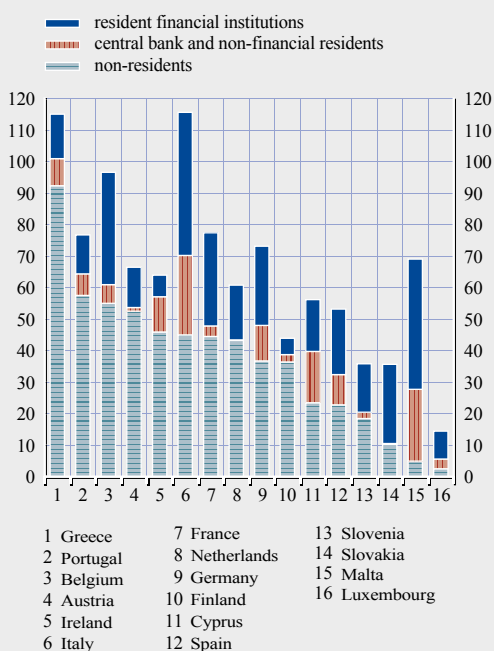
The credit risks that banks (and other financial institutions) face with respect to governments are usually considered to be minimal. However, government securities and loans to government are not, in reality, risk-free financial assets,

as clearly demonstrated by the recent surge in sovereign bond spreads in the euro area. Banks' exposure to these assets may represent a balance sheet risk if government's liquidity and solvency is in jeopardy. A perceived or actual decline in the quality of government bonds in a financial institution's portfolio, which is often used as collateral for covered interbank loans, may have an adverse effect on its access to financial resources and may ultimately reduce the interbank market's liquidity. Downgrades of sovereign ratings may also lead to a potential increase in capital risk weights on banks' holdings of government bonds, thereby increasing capital requirements.

Information from Chart 2.12, when combined with country level information displayed in Table 2.2, also points to the increased vulnerability of countries with a material deterioration in fiscal positions, in which a significant share of government debt is held by a foreign investor base.

Chart 2.12 Government debt in euro area countries by holder

(2009; percentage of GDP)



Sources: ESCB and Eurostat.
Notes: Data on debt held by non-resident financial institutions in the euro area are not available. In the case of Italy, the percentage of debt held by other residents refers to the 2008 figure.

OVERALL ASSESSMENT OF RISKS IN THE GOVERNMENT SECTOR

Since the December 2009 FSR, the fiscal prospects for the euro area government sector as a whole have remained broadly unchanged, after having deteriorated significantly over the previous two years. However, fiscal positions differ substantially across countries. Concerns about sovereign credit risks have transpired to financial markets first in a progressive widening of government bond and sovereign credit default swap (CDS) spreads of those euro area issuers with large fiscal imbalances. Adverse feedback subsequently impinged on financial markets more widely, requiring non-standard policy reactions to address financial market tensions as they became more acute in early May.

Overall, better macroeconomic prospects had a small positive influence on the fiscal outlook. The fiscal outlook is expected to improve in earnest on account of euro area governments'

7 It can be assumed that financial institutions in the euro area also represent a large part of non-resident holders.

restated commitments to meet fiscal targets in 2010 and the years ahead, in line with excessive deficit procedures, and of the precise additional commitments entered into by some euro area governments to accelerate fiscal consolidation and ensure the sustainability of their public finances. A credible implementation of these

fiscal consolidation strategies will represent a key element influencing confidence in the sustainability of public finances in the euro area countries. The situation in those countries with very high deficit and debt ratios remains particularly challenging and therefore requires swift and decisive policy action.

Box 8

FISCAL POLICIES AND FINANCIAL STABILITY: ANALYTICAL FRAMEWORK

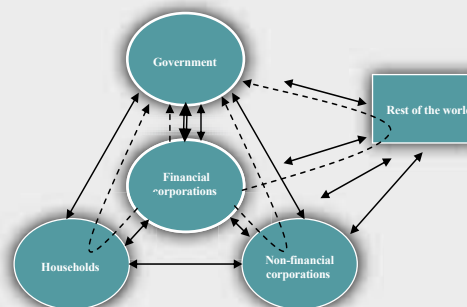
This box aims to provide an overview of economic and financial linkages between the government and financial sectors. Acknowledging that financial market stability may influence public finances, the box focuses on potential channels through which fiscal policies may support or represent a risk for financial stability. These linkages are wide-ranging and rather heterogeneous in nature; therefore, it may be useful to distinguish between several types of relationships (see the figure below).

First, governments and their fiscal policies may interact *directly* with the financial system as market participants when financing their fiscal deficits and managing debt. In this context, parameters like the amount and maturity of public debt held by financial institutions, (changes to) sovereign credit ratings, the proportion of government debt insured via the credit default swap markets and the share of intrabank lending covered by government securities as collateral might be taken into account when assessing the relationship between fiscal policies and financial stability. In addition, the government plays a key role as tax authority, thus affecting the behaviour of financial sector participants via tax structures.

Second, the *indirect* linkages between fiscal policies and the financial sector, via non-financial corporations or households, are extensive, and thus of high relevance. They may have even more important consequences for financial stability than direct links, also in view of the potential implications for a country's national balance sheet. Moreover, there may be cross-border contagion effects coming from, or having an impact on, the rest of the world. Such spillover effects are of

The relationship between fiscal policies and the financial system

- ⇒ Direct interaction between the government (including central, state and local governments and social security funds) and the financial sector (excluding the central bank):
 - government as a participant in the financial markets (borrower and investor);
 - government providing incentives via tax and expenditure structures; and
 - government intervening in the financial system and acting as an owner of financial institutions.
- Direct and indirect standard economic and financial relations, including those relating to the government's macroeconomic role:
 - fiscal revenue and expenditures; and
 - fiscal policy stance and sustainability.
- - - Feedback loops between the government sector and the financial system:
 - influence from financial sector performance on public finances – direct and indirect via other real economy sectors and via international spillovers/contagion.



particular importance in a monetary union such as the euro area. In principle, fiscal policies may represent a risk to financial stability if they pose a risk for the functioning of the real economy. By contrast, they contribute to financial stability as long as they support sound overall economic developments.

Third, the perception of financial system stability may be dependent on the financial strength of the government standing behind it, which is in turn influenced by the size of recognised and contingent government support already provided to the financial system. Therefore, fiscal and financial risks may not be fully separable. When assessing financial stability risks, the sustainability of public finances needs to be taken into account in order to assess the governments' ability to cut potential adverse feedback loops that could develop into a self-reinforcing downward spiral.

Finally, although contributing to financial stability has not gained much attention as a standard fiscal policy objective so far, appropriate fiscal policies may contribute to financial stability in several respects, which may include: (i) contributing to a high level of public and market confidence through a responsible and sustainable conduct of fiscal policy; (ii) creating fiscal room for manoeuvre in order to have a strong capacity for intervention in crisis times; (iii) providing sound incentives to financial institutions' owners and managers, as well as to the economy at large, in connection with tax and expenditure structures; and (iv) creating restrictive rules for providing financial assistance to financial institutions in order to limit "moral hazard" behaviour.

Overall, the various channels through which fiscal policies may support or pose risks to financial stability in the euro area merit a regular examination of the euro area fiscal position for financial stability assessments.



III THE EURO AREA FINANCIAL SYSTEM

3 EURO AREA FINANCIAL MARKETS

After the finalisation of the December 2009 FSR, euro area financial markets experienced a number of episodes of heightened volatility driven by progressively intensifying concerns about sovereign credit risk. In early May 2010, these concerns reached very high levels and the functioning of some financial markets became so impaired that it was hampering the monetary policy transmission mechanism. Tensions were, however, eased by the creation of the European Financial Stabilisation Mechanism and the implementation of the Securities Markets Programme. Nevertheless, the risk that higher sovereign credit risk might crowd out and increase funding costs for private sector issuers has increased over the past six months. In the euro money market, improvements in the redistribution of liquidity were also affected by sovereign credit risk concerns and this led to amendments to the gradual phasing-out of the Eurosystem's enhanced credit support measures.

3.1 KEY DEVELOPMENTS IN THE MONEY MARKET

After the finalisation of the December 2009 FSR, amid declining tensions in the euro money market, the ECB started a gradual withdrawal from its enhanced credit support measures. The ECB conducted its last one-year longer-term refinancing operation (LTRO) in mid-December 2009. In January 2010, the ECB discontinued its US dollar and Swiss franc liquidity-providing operations, and in March 2010 it decided to change the procedure used for its regular three-month refinancing operations from a fixed to a variable rate tender. Nonetheless, it was also decided that the main refinancing operations (MROs) and the special-term refinancing operations with a maturity of one maintenance period would continue to follow the fixed rate full-allotment policy for as long as necessary, and at least until 12 October 2010.

However, in early May 2010 the adverse developments in euro area financial markets driven by intense sovereign credit risk concerns

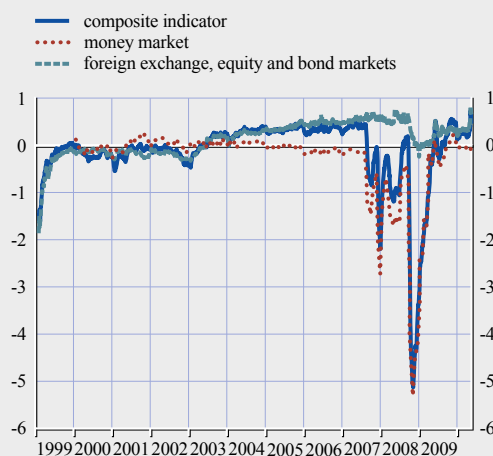
induced the Governing Council to modify the phasing-out of liquidity support measures. On 10 May 2010, the ECB announced that the next two three-month LTROs would be conducted using a fixed, rather than a variable rate full-allotment procedure and that there would be an additional six-month LTRO on 12 May 2010. Furthermore, it was decided to reactivate temporary foreign exchange swap lines and resume US dollar liquidity-providing operations.

Despite sovereign credit risk-driven tensions, ample liquidity provided by the Eurosystem continued to provide strong support to the euro money market. In mid-May 2010, the value of the money market component of the ECB's financial market liquidity indicator, however, suggested that liquidity conditions in the euro money market had deteriorated somewhat after the finalisation of the December 2009 FSR (see Chart 3.1 and Chart S69).

The conditions of excess liquidity resulting from the high allotment volumes in three

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

(Jan. 1999 – May 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.

one-year LTROs conducted in 2009 ensured that the traditional seasonal liquidity tensions seen at the end of each calendar year were largely insignificant in 2009. In the last one-year LTRO in December 2009, the number of bidders more than halved in comparison with the second one-year LTRO in September 2009 and was the lowest of all three one-year LTROs, pointing to an easing of money market strains.

Since the last one-year LTRO in mid-December 2009, the distribution of the ECB's total liquidity-providing operations outstanding has changed markedly. In mid-May 2010, three one-year LTROs accounted for around 80% of all outstanding refinancing. Meanwhile, the amounts bid at regular weekly MROs have remained relatively high and persistent, despite the fact that these operations were conducted at rates that were well above both the one-week EURIBOR and general collateral repo rates, thereby pointing to ongoing difficulties for some banks to fund themselves at prevailing money market rates.

Three-month EURIBOR/EONIA overnight index swap (OIS) spreads remained broadly

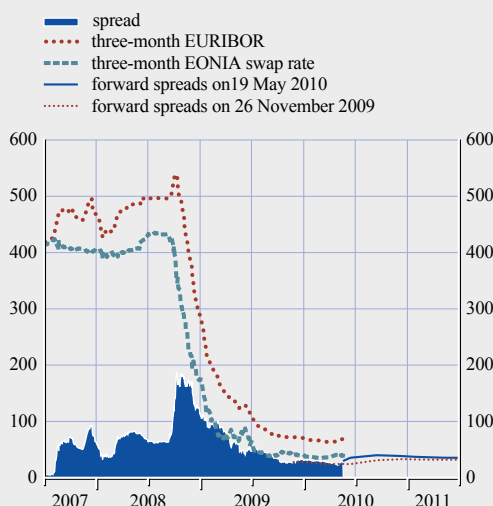
stable after late November 2009 (see Chart 3.2). However, forward EURIBOR/OIS spreads tended to widen somewhat in periods of higher risk aversion related to concerns about fiscal imbalances – for example, after 23 April 2010 when Greece officially requested aid from the EU and the IMF, or in early May 2010 on account of an increased perception that sovereign credit risk might spill over to some other euro area countries with excessive fiscal deficits. The three-month EURIBOR/OIS spread also remained above the equivalent spreads for the US dollar and the pound sterling.

Despite the surplus liquidity environment, the redistribution of interbank liquidity has been far from normal. Ongoing concerns about counterparty credit risk (see also Chart S70) and the increased intermediation role of the Eurosystem continued to hamper interbank lending activity (see Chart 3.3).

Some banks in some of the euro area countries affected by heightened sovereign credit risk concerns reportedly faced difficulties in using the government bonds of their respective home country in the private repo markets (see also the

Chart 3.2 Contemporaneous and forward spreads between the EURIBOR and EONIA swap rates

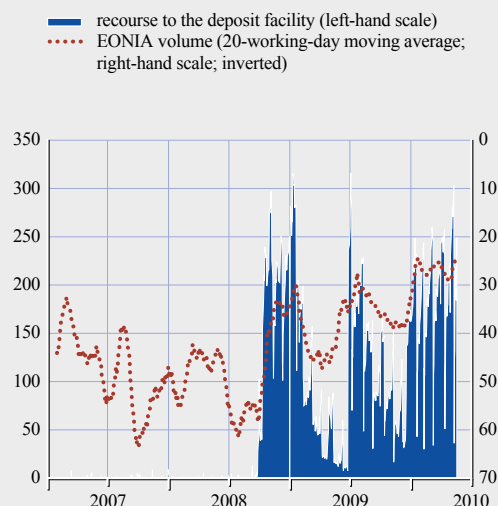
(July 2007 – June 2011; basis points)



Source: Bloomberg.

Chart 3.3 EONIA volume and recourse to the ECB's deposit facility

(Jan. 2007 – May 2010; EUR billions)



Source: ECB.

sub-section on counterparty risk in Section 4.2). As a result, certain affected segments of term repo markets largely dried up.

The volume of euro commercial paper (ECP) outstanding continued to decline in the first quarter of 2010 and reached the lowest level recorded since the fourth quarter of 2005. In the first quarter of 2010, commercial paper issues with maturities greater than three months accounted for 41% of the ECP market, compared with 33% in November 2009. By April 2010, the outstanding amount of short-term debt securities issued through the segment referred to as the short-term European paper (STEP) market, which had grown throughout most of the financial crisis, had stopped rising and stabilised at around €408 billion – an average monthly level since November 2009.

On 4 March 2010, the ECB announced specific measures to smooth liquidity conditions when €442 billion from its first one-year LTRO matures on 1 July 2010. Banks themselves will, to a large extent, still be able, on 1 July 2010 and afterwards, to decide how much excess liquidity the Eurosystem makes available. Although the ECB will retain its policy of full allotment in some of its short-term operations until at least 12 October 2010, banks will increasingly need at some point to compete with other banks to obtain longer-term funding from the ECB and the interbank market. Hence, there is also a possibility that this competition could place upward pressure on money market rates, and thus increase the funding pressures for some banks. However, should the adverse effects of increased fiscal sustainability concerns on the euro money market persist, they might further affect the gradual phasing-out of the enhanced credit support measures.

3.2 KEY DEVELOPMENTS IN CAPITAL MARKETS

GOVERNMENT BOND MARKETS

After the finalisation of the December 2009 FSR in late November 2009, euro area government bond markets experienced several bouts of volatility driven by sovereign credit

risk concerns. The turbulence reached a peak in early May 2010 when liquidity in several euro area government bond markets almost vanished amid concerns about tail and contagion risks. Ultimately, the functioning of some markets became so impaired that it was hampering the monetary policy transmission mechanism and thereby the effective conduct of a monetary policy oriented towards price stability in the medium term.

In view of these developments, on 9 May 2010, the Governing Council of the ECB decided to conduct interventions in the euro area secondary markets for public and private debt securities in the context of a Securities Markets Programme, to ensure depth and liquidity in those market segments that were dysfunctional. In parallel, the EU Council (Ecofin) and the Member States agreed to establish a comprehensive package of measures, including a European Financial Stabilisation Mechanism, which will be also supplemented by financing provided by the IMF. These measures considerably lowered tail and contagion risks. However, it remains crucial that euro area governments strengthen their efforts to implement the necessary fiscal consolidation, not least to avoid the risk of a crowding-out of private investment.

By mid-May 2010, the yields on AAA-rated long-term euro area government bonds had declined from the levels that prevailed in late November 2009, albeit amid mixed news on the prospects for macroeconomic activity and swings in risk appetite among bond market investors. Despite some flattening of the euro yield curve after the end of 2009, the term spread remained high in comparison with historical values recorded since the launch of the euro in 1999 (see Chart S73).

Developments in euro area government bond markets, however, varied significantly across countries. Concerns about fiscal deficits in several euro area countries were the main driver of abrupt changes in sovereign credit default swap (CDS) and intra-euro area government bond yield spreads (see Chart 3.4).

Investors' discrimination between sovereign euro area issuers increased and led to several episodes of flight-to-safety flows into the highest-rated sovereign bonds. However, as concerns intensified and contagion spread, the degree of discrimination among countries with high fiscal imbalances tended to decline. After mid-January 2010, the term structure of Greek sovereign CDS premia became downward-sloping, which is a typical profile for a borrower with a high risk of an expected credit event in the near term. This risk, however, decreased after the implementation of the stabilisation programme for Greece adopted by the European Commission, the ECB and the IMF on 3 May 2010.

After the finalisation of the December 2009 FSR, market liquidity in some smaller euro area sovereign bond markets progressively declined and this also contributed to a widening of intra-euro area government bond yield spreads. Market makers were reportedly less willing to live up to their obligations and tended to quote only for small amounts and at wide bid-ask

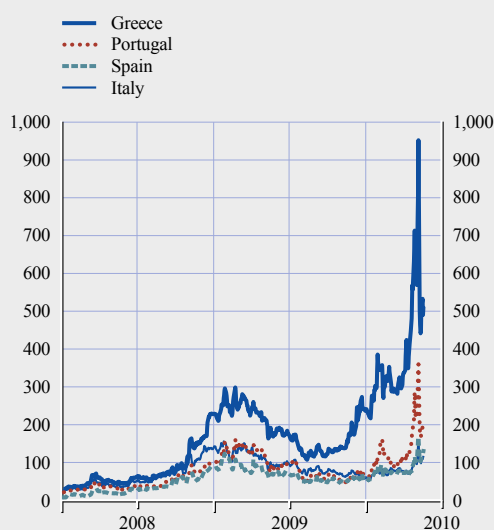
spreads. In addition, some banks reportedly reviewed their credit lines and exposures to some euro area countries, which further limited market liquidity.

Net issuance of euro area government debt securities continued to be strong in the first quarter of 2010, and the share of short-term debt in the total amount outstanding remained rather high. At the same time, the high yields paid by some euro area sovereign issuers may increasingly have attracted investors who normally focus on emerging markets and investment-grade corporate bonds, thereby crowding out corporate bond issuance and exposing sovereign issuers to potentially volatile investor behaviour.

Despite triggering a significant widening of intra-euro area yield spreads (see Chart 3.4), fiscal sustainability concerns have not had a substantial effect on the GDP-weighted euro area average of ten-year government bond yields. Nonetheless, the average remained above the level suggested by nominal GDP growth expectations, which seem to play a key role in

Chart 3.4 Intra-euro area yield spreads on ten-year government bonds

(Jan. 2008 – May 2010; basis points)



Sources: Thomson Financial Datastream and ECB calculations. Note: The chart shows ten-year yield spreads relative to Germany.

Chart 3.5 Euro area long-term government bond yields and nominal GDP growth expectations

(Jan. 1999 – Apr. 2010; percentages)



Sources: Reuters, Consensus Economics and ECB calculations.

determining the long-term equilibrium level for bond yields both theoretically and empirically (see Chart 3.5).¹ In order to stabilise the debt-to-GDP ratio, the effective interest rate on the existing stock of government debt should not exceed nominal GDP growth, provided that the primary fiscal balance before interest payments remains zero. Given this fact, some investors remained concerned about the credibility of the medium-term fiscal consolidation plans of euro area countries with the largest fiscal imbalances.

Following a long period of low nominal interest rates, their expected eventual increase may expose financial institutions to significant interest rate risk over the short-to-medium term. Indeed, financial market participants have been pricing in increases in both short-term and long-term interest rates (see Chart 3.6), as well as a flattening of the yield curve. However, changes in the slope of the yield curve are very hard to predict and past episodes provide only mixed guidance

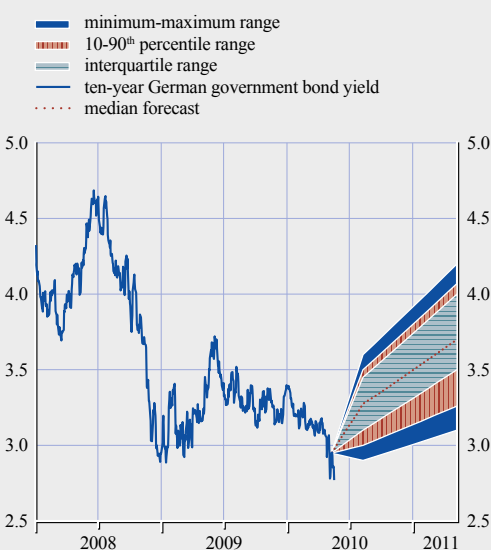
(see also Box 1 in Section 1.1). The fact that market participants see a yield curve flattening scenario as most probable leaves them vulnerable to a surprise steepening of the yield curve.

Moreover, in the euro area, as well as in the United States, government bond yield curves remained very steep, spurring interest among market participants in carry trades which involve funding longer-term investments with short-term financing. The ratio between the interest rate differential, or carry, and its implied volatility – a gauge of the risk-return trade-off in such carry trades – has been increasing since late 2008 and, despite a recent sharp decline, still remained high in mid-May 2010 (see Chart 3.7). The build-up of such trades has contributed to raising the risk of their abrupt unwinding which, if it were to occur, would most likely raise the risk of higher interest rate volatility more generally in the period ahead.

1 See ECB, “Extracting information from financial asset prices”, *Monthly Bulletin*, November 2004.

Chart 3.6 Ten-year government bond yield and Consensus Economics forecasts for Germany

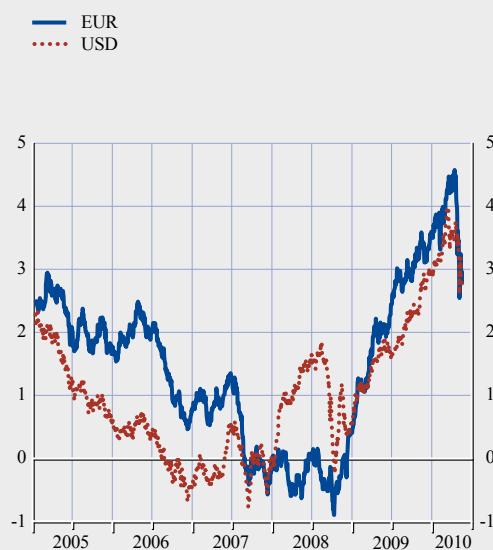
(Jan. 2008 – May 2011; percentages)



Sources: Reuters, Consensus Economics and ECB calculations. Note: Consensus Economics forecasts refer to yields that were expected in three and 12 months on 10 May 2010.

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

(Jan. 2005 – May 2010)



Sources: Bloomberg and ECB calculations. Note: 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.

Looking ahead, the prospects for euro area government bonds continue to be surrounded by persistent uncertainty about macro-financial developments and especially by concerns about the sustainability of public finances. Measures implemented by the EU Council, IMF and the ECB helped to contain hazardous contagion channels and adverse feedback

loops between financial systems and public finances that seemed to have been opening up in early May 2010 (see also Box 9 on possible spillover channels from sovereign to corporate bond markets). Nevertheless, further efforts of euro area governments in frontloading and accelerating fiscal consolidation are essential in mitigating sovereign credit risk.

Box 9

PUBLIC DEBT, SOVEREIGN RISK AND CORPORATE FINANCING COSTS: POSSIBLE SPILLOVER CHANNELS

Concerns about the adverse consequences of the deterioration of public finances in euro area countries have driven euro area credit markets since the publication of the December 2009 FSR. This box describes potential channels for a possible spillover of sovereign credit risk to corporate financing costs.

There are several channels through which the risks may spread from sovereign debt markets to corporate bond markets. First, deteriorating fiscal positions on account of rising public debt imply higher financing needs by sovereigns, and thus increase the risk of a crowding-out of financing for financial and non-financial firms.

Second, excessive fiscal deficits increase risks for inflation and inflation expectations, which could potentially lead to an increase in risk premia and long-term interest rates, resulting in higher funding costs.¹ In addition, some structural asset-pricing models of credit spreads predict higher credit spreads after periods of lower interest rates.²

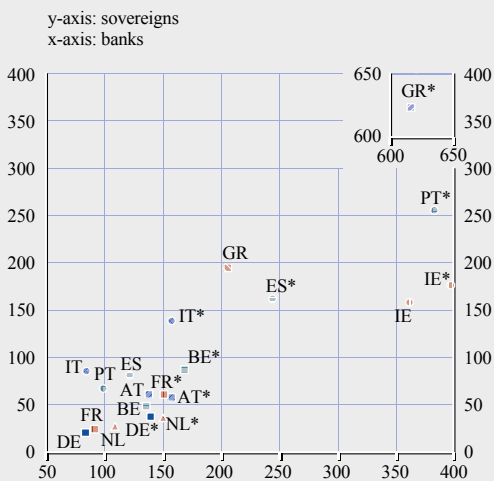
Third, corporate bonds and credit default swap (CDS) contracts are priced using a “risk-free” rate as a benchmark, and this “risk-free” rate is typically derived from a sovereign debt security with a corresponding maturity. Aside from some firm-specific cases, government bond yields would generally set a floor for corporate bond yields in the same country, in particular if the operations of this corporate are concentrated in this country. Hence, there could be a direct link between higher sovereign bond yields and potentially higher risk premia embedded in corporate funding costs. This risk premium should compensate investors both for increased credit risks and for other non-credit factors that may affect corporate bonds, such as, for example, relative illiquidity, the risk of higher corporate taxes or a more limited acceptance of corporate bonds than government bonds as collateral. Results of individual country regressions suggest that a widening of intra-euro area sovereign spreads by 100 basis points could lead to a further increase of, on average, about 10-20 basis points in corporate bond yields in the euro area as a whole, while estimates for countries that are potentially more prone to higher increases in sovereign bond yields lie well above that range.

¹ This, however, is of less concern to a fiscally distressed country in a currency union than to a country with its own currency.

² See F.A. Longstaff and E. Schwartz, “A Simple Approach to Valuing Risky Fixed and Floating Rate Debt”, *Journal of Finance*, Vol. 50, 1995; and P.C. Dufresne, R. Goldstein and J.S. Martin, “The Determinants of Credit Spread Changes,” *Journal of Finance*, Vol. 56, 2001.

Sovereign and bank CDS spreads

(first snapshot: 26 Nov. 2009; second snapshot (*):
19 May 2010; basis points)



Sources: Bloomberg and ECB calculations.

Notes: For each country, the CDS spreads of the five largest banks for which CDS quotes were available were used to calculate the average CDS spread of banks in that country. For some countries there were less than five banks with quoted CDSs.

yields implied in the CDS and cash bond markets tend to be closely linked, higher levels of banks' CDS spreads would, therefore, imply higher costs of funding for these banks (see the adjacent chart).

Fifth, another possible channel of sovereign-to-corporate linkages is the credit rating spillover channel. Rising sovereign risks in some fiscally troubled countries and the challenging macroeconomic environment associated therewith could induce rating agencies to review the ratings of corporations with major operations in these countries. Moreover, credit rating agencies have recently been using CDS patterns to derive market-implied credit ratings, i.e. ratings implied by the probability of default derived from CDS spreads. For some rating agencies, a marked discrepancy between current ratings and market-implied ratings serves as an early warning for detecting companies that may warrant a review of their credit rating.³ While this is not necessarily a sign of a subsequent actual rating change, keeping in mind the high correlation between sovereign and corporate CDSs, this indicates that the likelihood of downgrades of corporations increases with rising sovereign risks.

All in all, excessive public deficits and rising debt-to-GDP ratios may pose upside risks for sovereign and corporate bond yields in the euro area. All of the channels described above have the potential to reinforce negative feedback loops between the financial and real sectors, with an adverse impact on economic growth and the stability of financial systems.

³ See ECB, "Credit default swaps and counterparty risk", August 2009.

Fourth, financial corporations, in particular banks, from countries with excessive deficits are typically large holders of government debt securities (see also Box 1 in Section 1.1). A fall in the value of government bonds would have an adverse marking-to-market impact on the banks' held-for-trading and available-for-sale securities portfolios. To put this into perspective, around 50% of the stock of long-term debt securities issued by euro area governments is held by euro area banks, some of which also have sizeable lending exposures to governments.

Worsening sovereign financial problems would thus have a potentially large adverse impact on the euro area banking sector, and would thereby also imply further adverse consequences for the real economy. Moreover, the banking sector support by euro area governments (which effectively transferred risks from the banking sectors to governments) led to bank and sovereign CDS spreads in the euro area becoming increasingly correlated. Since the

yields implied in the CDS and cash bond markets tend to be closely linked, higher levels of banks' CDS spreads would, therefore, imply higher costs of funding for these banks (see the adjacent chart).

CREDIT MARKETS

Debt security issuance

After the finalisation of the December 2009 FSR, corporate bond issuance moderated

further, mainly on account of a continued weakening of issuance at short-term maturities. Issuers showed a preference for long-term debt securities in order to lock in a favourable pricing of long-term financing. In terms of the

sectoral composition, the decline in the growth rate of corporate debt issuance was broad-based, but stronger for financial than for non-financial corporations.

Despite some improvements, euro area securitisation markets remained dysfunctional for both supply and demand-related reasons. On the supply side, the profit-generating potential of securitisation has not been sufficient yet, since spreads over LIBOR for various asset-backed securities (ABSs) still exceeded levels that would ensure that a transaction would at least break-even from the issuer's perspective. Despite a marked narrowing throughout 2009 and in early 2010, in most cases in mid-May 2010, ABS spreads remained significantly above the level where securitisation would provide a cheaper source of funding than the money market (see Chart 3.10).

Regarding the demand side, there seemed, nevertheless, to be some tentative signs of a recovery. In March and April 2010, most new ABS issues were placed with private investors. Moreover, the volume of such

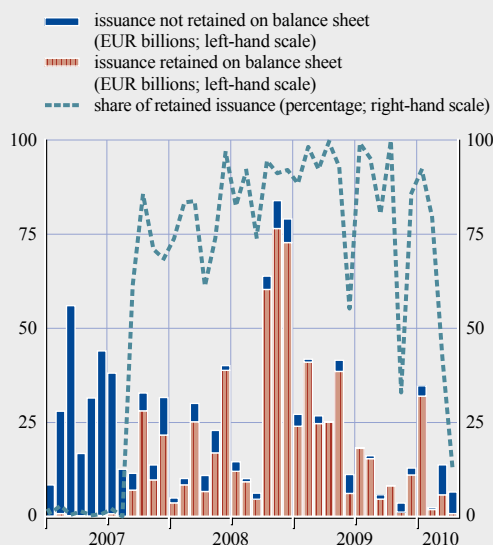
issuance in March 2010 (€7.6 billion) was the highest privately placed volume recorded since December 2007. This may indicate that demand for ABSs is re-emerging, although this still needs to be confirmed by future data. Having said that, in early 2010 banks still used securitisation mainly to create additional collateral for refinancing operations with the Eurosystem (see Chart 3.8).

In 2010 most new ABS issues by euro area banks were residential mortgage-backed securities (RMBSs) or ABSs collateralised either by auto loans or lease receivables, while there was no issuance of commercial property mortgage-backed securities (CMBSs), largely on account of the weak fundamentals of the underlying property markets (see also Section 2.3 on commercial property markets).

By contrast, the issuance volume of covered bonds remained strong in the first four months of 2010 (see Chart 3.9), not least because of the Eurosystem's covered bond purchase programme, and by far exceeded the issuance volumes recorded a year ago. By mid-May 2010,

Chart 3.8 Asset-backed security issuance by euro area banks

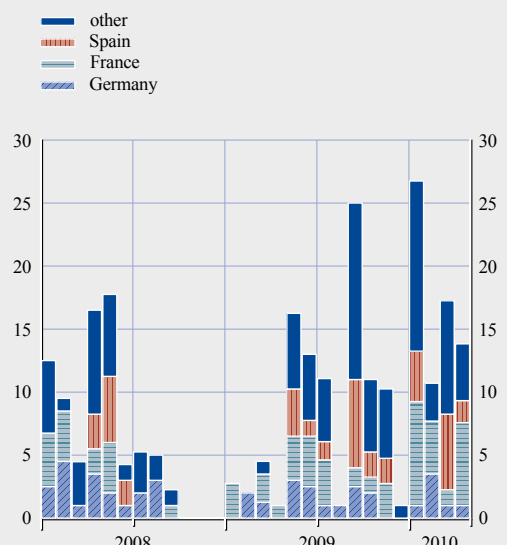
(Jan. 2007 – Apr. 2010)



Sources: Dealogic and ECB calculations.

Chart 3.9 Issuance of Jumbo covered bonds

(Jan. 2008 – Apr. 2010; EUR billions)



Sources: Dealogic and ECB calculations.

€53 billion of the planned €60 billion covered bonds had been purchased.

After November 2009, the average maturity of newly issued covered bonds lengthened, reflecting improved financing conditions for banks at the long end of the yield curve. However, it remains to be seen whether the achievements and momentum will be sustained after the end of the Eurosystem's covered bond purchase programme in June 2010.

Looking ahead, in addition to lower ABS spreads over LIBOR, a sustainable rebound of the ABS market may also require fundamental changes in terms of transparency and product simplicity. In this respect, it is noteworthy that after the finalisation of the December 2009 FSR, both the ECB and the Bank of England had launched public consultations on enhanced transparency, foremost loan-level data, for ABSs. Both central banks expressed their intentions to use higher product transparency requirements as part of the eligibility criteria for ABSs accepted in their refinancing operations.

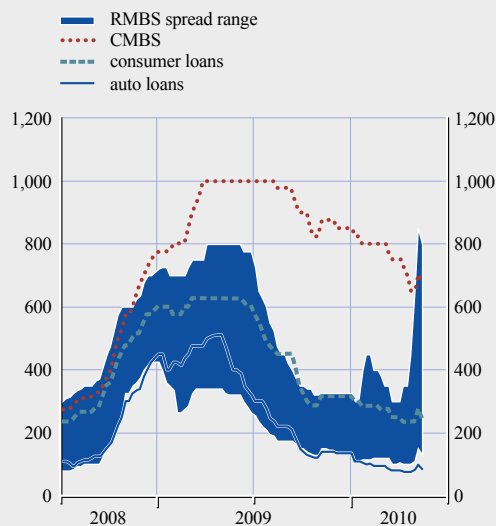
Credit spreads

After the publication of the December 2009 FSR, corporate bond and CDS spreads continued the gradual narrowing from the peaks reached in the aftermath of the Lehman Brothers collapse (see Chart S83). Moreover, the tightening was broad-based: bond spreads narrowed for both financial and non-financial corporations, and across all ratings. Although these spreads increased on account of rising concerns about sovereign credit risk in early May 2010, they nevertheless remained at levels that were substantially lower than in the aftermath of the Lehman Brothers default.

The dynamics and the levels of the sectoral sub-indices of the main iTraxx index seemed to suggest that the main source of tension in the corporate CDS market was associated with the financial sector (see Chart S85), largely on account of increased concerns that higher sovereign credit risk might spill over to the corporate bond market, thereby

Chart 3.10 Spreads over LIBOR of euro area AAA-rated asset-backed securities

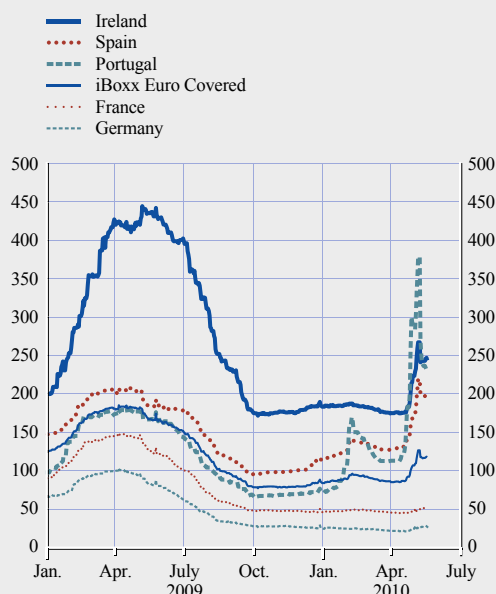
(June 2008 – May 2010; basis points)



Source: JP Morgan Chase & Co.
Notes: "RMBS" stands for "residential mortgage-backed security" and "CMBS" stands for "commercial mortgage-backed security". The RMBS spread range is the range of individual country index spreads in Greece, Ireland, Italy, the Netherlands, Portugal and Spain.

Chart 3.11 Spreads between covered bond yields and euro interest rate swap rates

(Jan. 2009 – May 2010; basis points)



Source: iBoxx.

having an adverse impact on funding conditions for corporates, in particular banks (see also Box 9).

Amid renewed interest in ABSs, spreads of euro area ABSs tightened further after the finalisation of the December 2009 FSR (see Chart 3.10). By mid-May 2010, some indices were below the levels that prevailed before the demise of Lehman Brothers, although spreads on European CMBSs remained at quite elevated levels on account of concerns about the conditions in some euro area commercial property markets. Similar developments were also observed in the standardised CDO market (see Box 10). In early May 2010, however, spreads of RMBSs of some

euro area countries increased substantially as a result of market participants' concerns about adverse effects of a possible materialisation of sovereign debt-related risks.

In contrast to the dynamics in the secondary ABS market, the average spread between the average covered bond yield, as measured by iBoxx Euro Covered index, and euro interest rate swap rates hovered between 90 and 100 basis points from the finalisation of the December 2009 FSR to end-April 2010. Nevertheless, in early May 2010, spreads of covered bonds widened considerably in some euro area countries, owing to concerns about fiscal imbalances (see Chart 3.11).

Box 10

ARE CONDITIONS IN THE MARKET FOR EURO CREDIT PORTFOLIO RISK BACK TO NORMAL?

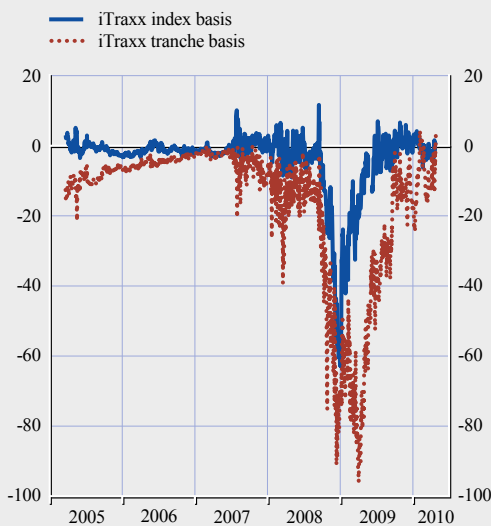
The credit market has been at the epicentre of the global financial crisis since its outbreak in summer 2007. Of great importance for euro area banks is the market for European portfolio credit risk, as it provides instruments for hedging corporate loan exposures. In this market, indicators based on market prices of standardised contracts can illustrate arbitrage opportunities, which should typically be very small if markets function normally. This box summarises how price-based indicators derived from two commonly used arbitrage strategies can provide insights into market conditions for the trading of credit portfolio risk.

Indicators obtained from combining several market prices can provide insights into potential dysfunctions in credit markets. In particular, the variety of different but related products allows investors to combine some instruments in such a way that the resulting arbitrage positions would allow them to directly profit from potential price differences. If investors had unimpeded access to sufficient funding (e.g. lending from prime brokers), then these arbitrage strategies should, over time, lead to declining pricing differentials.

For the European corporate credit market, the most relevant index is the iTraxx, which has, since its launch in summer 2004, provided a benchmark for market pricing of the credit risk of European investment-grade firms. In order to replicate a representative and diversified portfolio, the iTraxx index represents the credit default swap (CDS) premium on the equally-weighted basket of the 125 index members covering the energy sector, industrials, consumer cyclicals and non-cyclicals, insurers, banks and telecommunication companies, as well as automobile firms. Standardised credit indices such as the iTraxx index transfer the risk in an entire portfolio. The CDS premium on the index, therefore, represents the price of credit protection on the entire pool of firms, i.e. a portfolio CDS covering all 125 firms in the index. Index CDSs essentially trade like CDSs on a single firm.

Two iTraxx basis measures

(Mar. 2005 – May 2010; basis points)



Sources: JP Morgan Chase & Co. and ECB calculations.
Note: Because of data unavailability, the sample ends on 11 May 2010.

In practice, there is a small difference between the CDS premium on the portfolio and the average across the 125 firms' CDS. This difference is known as the *index basis* and is illustrated in the chart. Depending on its sign, the index basis could be arbitrated away by buying the cheaper instrument and selling the more expensive one in such a way that the resulting position has a zero initial cost and contains no default risk. Until summer 2008, this index basis was close to zero, oscillating slightly between positive and negative territory. With the dramatic flight from risk after September 2008, the CDS index market came under severe stress, which was reflected in unusually large negative levels of the index basis. The index basis did not return to levels witnessed before the collapse of Lehman Brothers until the second half of 2009.

standardised CDOs comprise six tranches with varying exposures to the cash flows from the underlying portfolio of the iTraxx index. These tranches range from “equity” tranches with a very high risk exposure to the underlying pool to “super-senior” tranches, where expected losses are much smaller. All tranches have the same maturity of typically five years.

Based on the iTraxx index as the underlying asset, there is also a market for collateralised debt obligations (CDOs).¹ Specifically, these

Similar to the basis between the index contract and the individual members, the prices of index tranches also provide a basis measure. In total, the six tranches cover all the possible losses arising from defaults in the CDS index portfolio. In parallel, all cash flows from the CDS index portfolio are paid out, starting with the senior tranches and ending with the equity tranche. As all six tranches together cover 100% of the loss distribution, the difference between the (weighted) tranches and the underlying index should be zero. Hence, any deviations could again be arbitrated away. This difference is known as the *tranche basis* and is also illustrated in the chart above.

In this case, changes at the height of the crisis were very similar to those of the index basis and indicated sizable problems in the tranche market. Overall, the chart indicates that the problems in market conditions were more pronounced in the tranche market than in the index CDS market, since the volatility of the tranche basis was more than twice as high and since its absolute magnitude was also larger. The index basis recorded a minimum of -62 basis points around the year-end of 2008, whereas that for the tranche basis was -95 basis points at the beginning of April 2009.

In the first half of 2009, the two basis measures tightened significantly and the index basis approached levels close to zero, indicating – at least temporary – improvements in credit

¹ For more details, see M. Scheicher, “How has CDO market pricing changed during the turmoil? Evidence from CDS index tranches”, *Working Paper Series*, No 910, ECB, June 2008.

market conditions. However, the tranche basis still gives some cause for concern as it remains volatile. This relatively high variability, which has also again materialised in mid-May 2010, indicates ongoing dysfunctions in standardised CDO markets, which point to the existence of continuing liquidity premia, as well as funding constraints.

EQUITY MARKETS

Amid higher uncertainty about the macroeconomic outlook and increased concerns about the fiscal situation in some euro area countries, episodes of intense volatility of euro area equity prices were observed after around mid-January and again in early May 2010. This was also reflected in higher implied stock market volatility derived from stock option prices (see Chart S76).

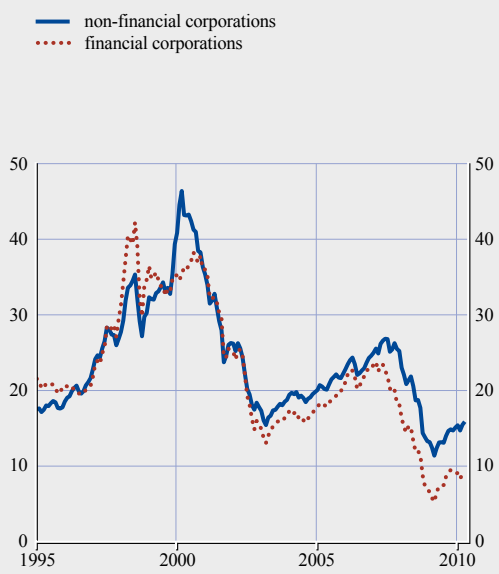
By mid-May 2010, euro area equity price indices declined below the levels that prevailed at the time of the finalisation of the previous FSR (see Chart S75), largely on account of severe turbulences related to concerns about the possibility of spillover of sovereign credit risk

to broader financial markets in early May 2010. Nevertheless, from March 2010 onwards, the upward momentum that had started in March 2009 was supported by improved (realised and expected) earnings of listed companies. Furthermore, equity prices continued to benefit from a reversal of net outflows from equity investment funds that focused on euro area equities after the second quarter of 2009.

The prices of financial stocks, especially those of banks, performed less well than the overall indices, but still recorded large gains after March 2009. Share prices of banks from euro area countries facing the greatest fiscal challenges were particularly affected by the financial turbulences. Bank share prices could also have suffered from the flurry of regulatory initiatives.

Chart 3.12 P/E ratios of financial and non-financial corporations in the euro area

(Jan. 1995 – Apr 2010)



Sources: Thomson Reuters Datastream, I/B/E/S and ECB calculations.
Note: Ratios based on average earnings per share over last ten years.

At the end of April 2010, a cyclically adjusted price/earnings (P/E) ratio that relates equity prices to average long-term earnings suggested that the shares of neither financial nor non-financial euro area companies appear to have been overvalued (see Chart 3.12). Consequently, the same P/E ratio did not point to an overvaluation of stock prices for the stock market as a whole either (see Chart S78). A decomposition of stock price developments based on a standard three-stage dividend discount model nonetheless suggested that stock prices were adversely influenced by a higher equity risk premium after the finalisation of the previous issue of the FSR.

In the near term, the main risk for euro area stock markets seems to be the possibility that a delayed or slower than currently expected economic recovery might hit growth-sensitive earnings of listed firms and put downward pressure on euro area stock prices.

4 THE EURO AREA BANKING SECTOR

Many euro area large and complex banking groups (LCBGs) returned to modest profitability in 2009, and their financial performance strengthened further in the first quarter of 2010. The capital positions of these institutions strengthened further, to above pre-crisis levels, their dependence on government support and the enhanced credit support measures of the Eurosystem had generally waned and market indicators improved broadly. This notwithstanding, many challenges remain, and new sources of risk have emerged. Despite the measures taken by governments and central banks in May 2010, sovereign credit risks continued to pose funding and crowding-out risks for euro area LCBGs. Should these risks materialise, this could increase the risk of an adverse feedback on the supply of credit to the economy. In addition, the recovery of LCBGs' profitability may be vulnerable to a set-back, given a prospect of continued loan losses and lasting pressure on banks to keep leverage under tight control. In addition, with markets pricing-in a flattening of the euro area yield curve over the medium term, this is likely to weigh on banks' interest margins in the period ahead. Vulnerabilities related to concentrations of LCBGs' lending exposures to commercial property and to central and eastern European countries also remain, which could underpin larger-than-expected loan losses. In the longer term, a key objective on the agenda for regulatory reform is ensuring a safer financial system that is more robust to adverse disturbances. The swift completion of the process of calibration and the implementation of these necessary reforms should remove uncertainties and allow banks to optimise their capital planning and, where necessary, adjust their business models.

4.1 FINANCIAL CONDITION OF LARGE AND COMPLEX BANKING GROUPS¹

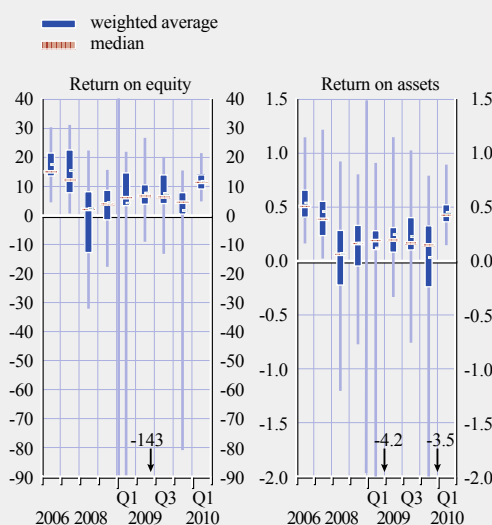
The financial condition of euro area LCBGs generally improved in late 2009 and early 2010. Their profitability continued to improve in the first quarter of the year, building on the recovery

in 2009 from the lows experienced in 2008. The weighted average return on equity (ROE) for euro area LCBGs increased from 2.4% in 2008 to 4.5% in 2009 and rose to above 11% in the first quarter of 2010, albeit only for a sub-sample of those institutions which had reported their financial performance in the first quarter of 2010 at the time of writing. (see Chart 4.1). There are some grounds for caution in assessing the strength of profitability in the first quarter of 2010, not least because historical patterns show that the first quarter of the year is typically the strongest. That said, the width of the inter-quartile distribution of the ROE across euro area LCBGs narrowed considerably, from around 15 to 20 percentage points in

1 The sample used for the majority of the analysis carried out in this section includes 19 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. In some charts in the section, where noted, outliers have been identified and excluded.

Chart 4.1 Euro area large and complex banking groups' return on equity and return on assets

(2006 – Q1 2010; percentage; maximum, minimum and inter-quartile distribution)



Sources: Individual institutions' financial reports and ECB calculations.
Notes: Based on available figures for 19 LCBGs. Quarterly returns have been annualised. Tier 1 capital is used as the equity measure.

2007 and 2008 to around 10 percentage points in 2009, and it diminished even further to 5 percentage points in the first quarter of 2010 (see Chart 4.1). It was also notable that the entire distributions for both the ROE and ROA lay in positive territory.

Concerns about the weakest performing euro area LCBGs also appear to have abated on the basis of the financial results for the first quarter of 2010, although the fact that these results are based on a sub-sample of data may underlie this development. The ROE of LCBGs in the lowest quartile of the group was negative in 2009 and a set back for some LCBGs in the forthcoming quarters cannot be excluded.

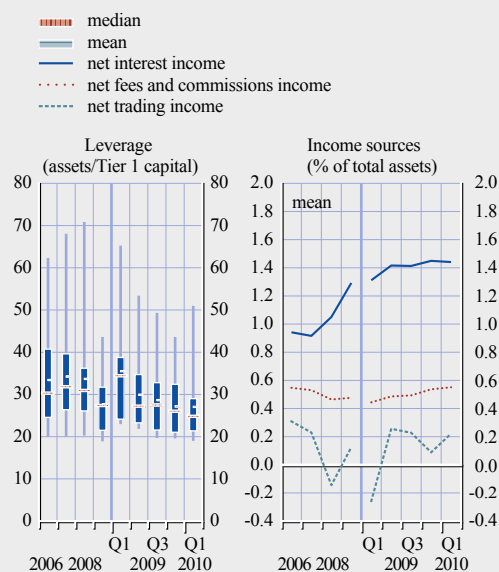
The ROA, another measure of bank performance, paints a picture of euro area LCBGs that is broadly similar to that of the ROE performance measure (see Chart 4.1). The average ROA improved significantly to reach 0.45% in the first quarter of 2010, up from 0.17% in 2009 and 0.07% in 2008. Similarly, the width of the inter-quartile range narrowed to 15 basis points from 50 and 40 basis points, respectively, over the same period.

An accounting decomposition of the ROE reveals that higher asset turnover was the main contributing factor behind the recent improvement in financial performance.² The median asset turnover, defined as the ratio of operating income to assets, increased from 1.86% in 2009 to 2.3% in the first quarter of 2010. At the same time, leverage multiples remained flat in the first quarter of the year, after having declined throughout 2009 (see Chart 4.2). This suggests that the efforts made by these institutions to limit balance sheet growth may be nearing an end. The median profit margins for euro area LCBGs also jumped considerably in the first quarter of the year, reaching levels last recorded in 2007.

Regarding sources of income, the main driver of euro area LCBGs' revenue continued to be net interest income. Average LCBG net interest income, expressed as a percentage of assets,

Chart 4.2 Euro area large and complex banking groups' leverage and breakdown of income sources

(2006 – Q1 2010; maximum, minimum and inter-quartile distribution)



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

amounted to 1.3% and 1.4% in 2009 and in the first quarter of 2010 respectively, up from 1.05% in 2008 (see Chart 4.2). The strength of euro area LCBGs' net interest income can be explained by the still large size of these institutions' loan books and by a notable expansion of net interest margins during recent quarters.³ On the basis of available data, there are signs that net interest margins peaked for some institutions in 2009 and early 2010, although developments across countries and institutions were somewhat disparate.

Euro area LCBGs also benefited from an improvement in net trading income in the first quarter of 2010, which had declined in the latter quarters of 2009, as market volatility

2 See the FSR of December 2009, where the ROE is decomposed as a product of profit margins, turnover and leverage multiples.
3 Interest margins remained wide on account of low short-term funding costs and a steep yield curve in 2009, and appear to have been unaffected by an easing of pressures from tight lending standards and some signs of increasing competition throughout the year.

progressively declined, bid-ask spreads tightened and the recovery in financial markets stalled. Similar to global LCBGs, the improvement in sales and trading activity in the first quarter of 2010 resulted from improved client activity in fixed income trading and commodity operations. Fee and commissions income, expressed as a percentage of assets, continued to produce a relatively stable revenue flow, even edging up somewhat. In more general terms, euro area LCBGs' revenues were also boosted by a reduced rate of write-downs on legacy assets and, in relative terms, by income derived from acquisitions and re-organisations, which had been a drag on profits for several institutions in 2009.

Cost control also contributed to the improvement in LCBGs' financial performance, albeit to a limited extent. The cost-to-income ratios of euro area LCBGs fell across the board in 2009 and this was maintained in 2010 (see Chart 4.3). The weighted average cost-to-income ratio was close to 60% for the first quarter of 2010 and

for 2009 as a whole, down from 70% in 2008 when income performance was very weak. At the same time, the inter-quartile dispersion across LCBGs also became more condensed in 2009 and 2010.

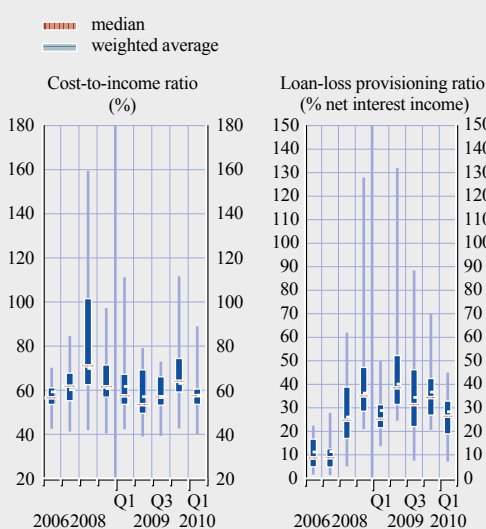
The loan-loss provisions of most euro area LCBGs fell considerably in the first quarter of 2010, providing a further boost to profitability. Nevertheless, concerns for increasing losses related to commercial property remain high (see also Section 4.2). As a percentage of net interest income, provisions decreased, on average, to 28% in 2010, from a high of more than 40% in the second quarter of 2009. The level prevailing at the time of writing, however, remained almost three times higher than the average level in the period from 2006 to 2007.

Notwithstanding the risks of further rises in provisioning rates, and recognising the lag with which provisioning typically follows an economic recovery, a continued decline in provisioning rates in the period ahead could lead to a recovery of lending by euro area LCBGs to the private non-financial sector, albeit contingent upon loan demand conditions and a further easing of credit standards (see Section 4.2).

The capital ratios of euro area LCBGs improved substantially over recent quarters. The median euro area LCBG Tier 1 capital ratio, for instance, increased to 10.6% at the end of the first quarter of 2010, from 10.1% in 2009 (see Chart 4.4). The increase in capital ratios was supported predominantly by retained earnings and by euro area banks' efforts to raise capital from private and public sources, but, in some cases, it also reflected a reduction in risk-weighted assets. The higher solvency buffers of euro area LCBGs point to an increase in their capacity to absorb further adverse shocks, as was also evident from stress tests undertaken by the Committee of European Banking Supervisors in mid-2009. However, the capital buffers in some segments of the euro area banking sector may not have improved as quickly as those of the LCBGs and will require further strengthening. Another justification for

Chart 4.3 Euro area large and complex banking groups' cost-to-income and loan-loss provisioning ratios

(2006 – Q1 2010; maximum, minimum and inter-quartile distribution)

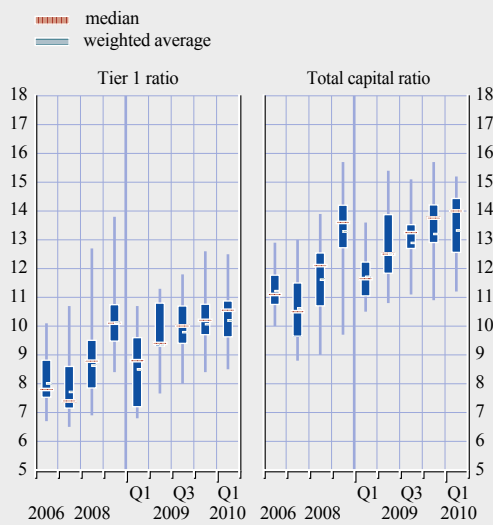


Sources: Individual institutions' financial reports and ECB calculations.

Notes: See also notes to Chart 4.1. Outliers were removed from the charts.

Chart 4.4 Euro area large and complex banking groups' Tier 1 and total capital ratios

(2006 – Q1 2010; percentage; maximum, minimum and inter-quartile distribution)



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

the increase in capital levels could be that banks are acting in anticipation of stricter capital rules, in light of the latest proposals by the Basel Committee on Banking Supervision, which are aimed at restoring confidence in the banking system worldwide. Improved clarity about the direction of regulatory reforms and their consistent implementation across countries and economic areas in the period ahead will allow banks to optimise their capital planning and, where necessary, adjust their business models.

4.2 BANKING SECTOR OUTLOOK AND RISKS

INCOME OUTLOOK AND RISKS

As discussed above, net interest income has been the key source of revenue supporting the improvement of LCBGs' profitability. Looking forward, the growth rates of new credit extended to the private sector are expected to remain moderate in the euro area, as the economic recovery is projected to proceed along an uneven path. Against this background and given that competition for depositors' funds is expected to remain fierce in most banking sectors, enabling

many LCBGs to sustain their recent earnings performance might require keeping lending margins wide to compensate for a combination of low credit volumes and high funding costs. In addition, for any given level of volumes and margins, a flattening of the yield curves in the euro area, which market participants are pricing-in over the medium term, is likely to lower the operating revenues of those institutions that lend at longer maturities.

The importance of interest rate risks for LCBGs' future earnings is stressed further by the fact that many LCBGs have reaped large returns from debt securities they had recently purchased at below par values. However, insofar as the banks hold these bonds in their held-for-trading portfolios, the securities would be subject to marking-to-market valuation changes, which could at least partially offset these returns. Given the recent volatility in government bond markets in several euro area countries, the risk of such valuation fluctuations may be sizeable for some LCBGs. That said, the particular income risks for this source of revenue are likely to be institution-specific, depending on portfolio compositions and business models.

For those LCBGs that took advantage of the amendment in IASB accounting standards in October 2008, allowing them to reclassify large amounts of available-for-sale securities as held-to-maturity assets, additional income risks may materialise if the recent gains in these securities prices are reversed or if there were to be defaults in the underlying assets before the maturity date. Possible losses in these reclassified assets, which include complex structured credit instruments, are measured at amortised cost and would affect both net income and prudential capital buffers.

As regards the risks to the other main sources of LCBG income, increasing financial market volatility and the recent stalling of the recovery in the major stock markets suggest that further trading revenue gains may be limited in the near term. For fees and commissions, another important income source for many LCBGs, debt

refinancing and new issuance schedules among euro area firms and governments in 2010 and in 2011 suggest that the stream of underwriting fees earned by LCBGs' is likely to remain relatively steady in the period ahead.

Looking forward, deleveraging in the euro area banking sector over the past few years has had a negative impact on the future income generation capacity of many LCBGs. In particular for those institutions that have seen their balance sheets shrink by more than their peers, profit-generating capacities will

depend upon their ability to further trim their cost bases. Given the magnitude of cost-cutting by many LCBGs over the past two years, the prospects for additional future reductions may be more limited, at least in the absence of further consolidation in the euro area banking sectors.

Finally, as discussed in detail in Section 4.1, loan-loss provisions constituted a major drag on profits and earnings for most LCBGs in 2009. Box 11 provides a detailed outlook for euro area banks' loan losses in 2010 and 2011.

Box 11

ESTIMATE OF POTENTIAL FUTURE WRITE-DOWNS ON SECURITIES AND LOANS FACING THE EURO AREA BANKING SECTOR

This box provides an update of the estimate of potential write-downs for the euro area banking system, applying the same methodology that was used in past issues of the FSR.¹ After the finalisation of the December 2009 FSR, securities prices continued to rise and CDS spreads on structured credit securities continued to tighten, contributing to a lowering of the marked-to-market loss rates implied by the prices and spreads of these securities. Against this background, compared with the figures presented in the December 2009 FSR, the estimate of total potential write-downs on securities for the period from 2007 to 2010 has been reduced by €43 billion to €155 billion (see Table A). Furthermore, since the write-downs on securities that had been reported by euro area banks at the time of writing exceeded the write-downs implied by prevailing market prices, it cannot be excluded that some write-backs on securities classified as "available-for-sale" or "held-for-trading" may be recorded by some banks in the period ahead. These potential write-backs could be as high as €32 billion and this would be reflected in higher profits on securities classified as "held-for-trading", or in lower reserves for securities held in the "available-for-sale" category. In both cases, it could generate capital relief for the banks who benefit.

Considering the outlook for loan losses, although the euro area macroeconomic environment improved somewhat after the finalisation of the December 2009 FSR, it continued to be clouded by uncertainty. In particular, unemployment rates remained at elevated levels in some countries and are expected to rise further in some cases. Moreover, as indicated in Section 2.3, conditions in commercial property markets remain challenging. Against this background, compared with the figures published in the December 2009 FSR, the estimated write-downs on residential mortgages and corporate loans have decreased slightly, while potential write-downs on consumer loans and commercial property loans have increased. Overall, the total estimate of potential write-downs on loans for the period from 2007 to 2010 has been increased by €5 billion to €360 billion.

¹ See Box 14, entitled "Estimating potential write-downs confronting the euro area banking sector as a result of the financial market turmoil", in ECB, *Financial Stability Review*, June 2009, and Box 10, entitled "Estimate of potential future write-downs on securities and loans facing the euro area banking sector", in ECB, *Financial Stability Review*, December 2009.

Table A Potential write-downs on securities and loans for the euro area banking sector over the period from 2007 to 2010

(EUR billions)

	Cumulative implied write-downs		Estimated loss rate (%)	
	December 2009 FSR	June 2010 FSR	December 2009 FSR	June 2010 FSR
Cash and synthetic structured credit securities				
Residential mortgage backed securities (RMBSs)	55.7	56.0	12.5	11.5
Asset-backed securities (ABSs)	3.6	2.6	1.9	1.4
Collateralised debt obligations (CDOs) backed by ABSs/RMBSs (all tranches)	83.6	68.2	57.7	54.3
Commercial mortgage-backed securities (CMBSs)	20.2	13.1	25.6	17.3
Collateralised loan obligations (CLOs)	5.7	0.0	2.5	0.0
Asset-backed commercial papers (ABCP)	0.2	0.2	1.7	1.7
Corporate CDOs	0.3	0.3	1.7	1.7
Total for cash and synthetic structured credit securities	169	140	15.1	13.4
Other security holdings				
Corporate debt securities	6.2	0.0	2.4	0.0
Covered bonds	0.0	0.0	0.0	0.0
Bank bonds	0.0	0.0	0.0	0.0
Equity holdings	3.8	0.0	2.4	0.0
Securities issued in central, eastern and south-eastern Europe	12.8	10.5	4.9	4.0
Other securities	5.6	3.9	2.4	2.5
Total for other security holdings	28	14	1.6	0.8
Total for all securities	198	155	7.0	5.5
Loans to non-financial customers				
Residential mortgages	44.3	37.2	1.2	1.2
Consumer loans	63.8	70.1	4.3	5.6
Commercial property mortgages	37.7	55.3	4.8	5.8
Corporate loans	193.5	190.1	3.8	3.2
Syndicated loans	15.7	7.5	4.4	2.9
Total for all loans	355	360	3.1	3.2
Total potential write-downs on securities and loans	553	515	3.9	3.6
Write-downs reported to end-October 2009 (December 2009 FSR) and end-April 2010 (June 2010 FSR)	180	187		
Possible write-backs due on securities	-	-32		
Loan loss provisions 2007-H1 2009 (December 2009 FSR) and 2007-end-2009 (June 2010 FSR)	186	238		
Potential further write-downs on loans in 2010	-	123		
Potential further net write-downs on securities and loans	187	90		

Sources: Association for Financial Markets in Europe, Banking Supervision Committee, national central banks, ECB and ECB calculations.

According to the consolidated banking statistics and an estimate based on figures reported by a sample of euro area LCBGs between 2007 and 2009, euro area banks made provisions of €238 billion for the deterioration in the quality of their loan exposures. This means that euro area banks may need to provision for an additional €123 billion in loan losses in 2010.

Overall, taking the outlook for possible future write-downs on loans together with an outlook for possible write-backs on securities, potential further net write-downs of around €90 billion on loans and securities could be suffered by euro area banks in 2010. Should core earnings and net profitability before provisioning remain at the levels observed over the past few years, the assessment is that euro area banks should not be confronted with major problems in absorbing these additional write-downs.

Table B Potential write-downs on loans for the euro area banking sector in 2011

(EUR billions)

Loans to non-financial customers	Cumulative implied write-downs	Estimated loss rate (%)
Residential mortgages	13.6	0.4
Consumer loans	25.7	1.7
Commercial property mortgages	16.1	2.1
Corporate loans	48.5	0.9
Syndicated Loans	1.5	0.4
Total for all loans	105	0.9

Sources: Association for Financial Markets in Europe, Banking Supervision Committee, national central banks, ECB and ECB calculations.

Applying the same methodology as in previous assessments and using forecasts for macroeconomic variables in 2011, an estimate of the potential further write-downs on loans to be recorded by euro area banking sector in 2011 can also be made.²

According to this estimate, euro area banks would need to make additional loan-loss provisions of around €105 billion in 2011

(see Table B). Given the uncertainties related to the modelling approach and the underlying assumptions, however, some caution is warranted when interpreting this figure.³ Moreover, heightened sovereign risks and possible second-round effects of the fiscal consolidation that is necessary in most euro area countries could pose some downside risks to economic growth in the euro area. Should these risks materialise, loan-loss provisions would most likely be higher in the period ahead. Also, the assumption made in the analysis that there would be no further write-downs on securities exposures is conditional on the sustainability of the past recovery in securities prices. All in all, the upside risks to the estimate of potential future write-downs seem to exceed the downside risks.

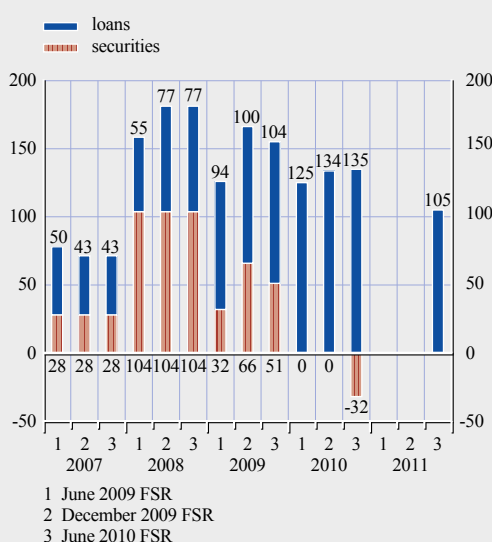
Regarding the distribution of losses by type of exposure over time, write-downs on securities exposures contributed significantly to losses and capital drains in 2008 and 2009. Going forward, while the recovery in securities prices makes valuation write-backs likely in 2010, write-downs on loans are expected to remain relatively high (see the chart above). However, banks should largely be able to forecast the loan losses using their internal models, and the scope for unexpected capital shortages is therefore rather limited.

² Given that securities prices indicate that no further write-downs on banks' securities portfolios are imminent, potential write-downs on securities in 2011 are not considered in the analysis.

³ These uncertainties are related, among other things, to the scope and distribution of banks' exposures to securities, the accuracy of model forecasts, differences in accounting rules in some euro area countries and the adequacy of assumptions about the economic environment.

Potential write-downs on securities and loans facing the euro area banking sector

(EUR billions)



Sources: Association for Financial Markets in Europe, Banking Supervision Committee, national central banks, ECB and ECB calculations.

CREDIT RISKS

Household and corporate sector credit risks

As discussed in Section 2.4, risks stemming from the household sector have remained broadly unchanged over the last six months, despite a further deterioration in the outlook for both the labour market and household income in recent months, since the deterioration was, to a large extent, anticipated.

The ongoing deterioration in labour market conditions, however, is characterised by pronounced heterogeneity at the country level. As such, the impact on credit risks for those LCBGs with large mortgage or consumer credit portfolios in euro area countries in which levels of household indebtedness are high and in which unemployment rates have increased the most could be significantly more adverse than in others.

Credit risks originating from the non-financial corporate sector seem to have eased (see Section 2.2), on account of somewhat reduced balance sheet leverage and a modest improvement in the profitability of large firms in the second half of 2009, which is expected to become more broad-based in 2010. Nevertheless, corporate default rates are expected to remain at elevated levels throughout 2010. The cautiously positive outlook also remains vulnerable to the possibility of economic growth falling short of expectations, both in the euro area and in the main export markets, and possible renewed strains emerging in the financial sector. Vulnerabilities in the small and medium-sized enterprise (SME) sector, in particular, continue to be high on account of low profitability and broadly unchanged leverage levels. This might have a negative impact on overall credit risks of LCBGs with significant SME portfolios.

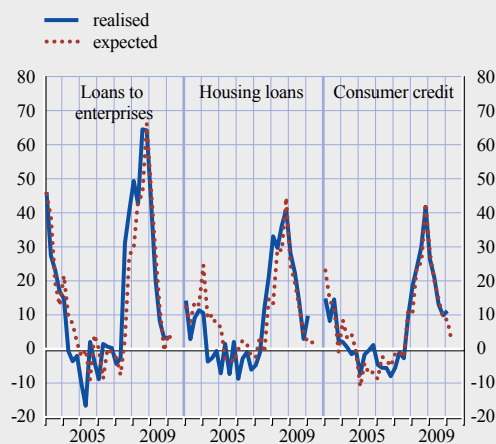
Among exposures to specific industries, risks continue to be particularly high in commercial property lending, which can represent a large proportion of total loans to the non-financial corporate sector. More importantly, from a financial stability perspective, the largest drops

in commercial property values in general took place in countries where banks had the highest exposures to this sector. The extent of decline in commercial property values in 2009 (see Section 2.3) suggests both substantial falls in the value of collateral held by banks and scope for substantial credit losses in the event of commercial property firms defaulting on their loans (see also Box 11 above).

As regards banks' reactions to the changing risk environment, the results from the ECB's April 2010 bank lending survey point to a further net tightening of credit standards on loans to both households and enterprises in the first quarter of 2010, in particular in lending to households (see Chart 4.5). According to the banks surveyed, factors contributing to the further tightening of credit standards were risks related to expectations about the industry-specific outlook, housing market prospects and the general development of economic activity. Where corporate lending is concerned, banks' liquidity position continued to contribute to an easing of credit standards in the first quarter of 2010, while survey replies indicated that costs related to banks' capital position and their access to market financing

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

(Q1 2003 – Q2 2010; net percentages of banks contributing to tightening standards)



Source: ECB.

worked in the opposite direction, contributing to an increase in the tightening of credit standards. Looking forward, euro area banks expect the level of net tightening on loans to enterprises to remain unchanged in the second quarter of 2010, but expect the situation to improve with respect to lending to households.

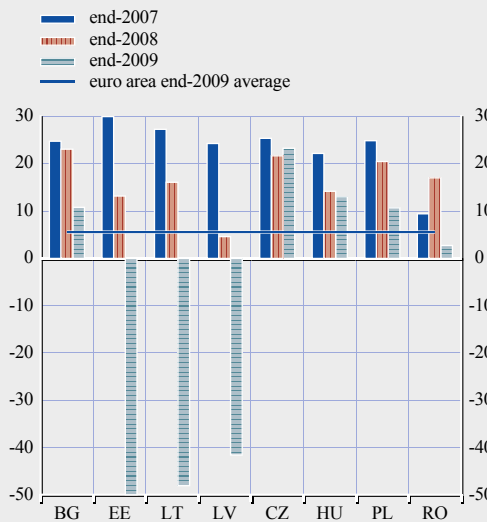
Risks emanating from emerging markets and new EU Member States

Since the publication of the December 2009 FSR, although remaining elevated, risks to LCBGs related to their exposures to emerging market economies and the new EU Member States decreased, mainly on account of the continued recovery of investor confidence, which eased funding conditions somewhat.

In the period ahead, the main risks for euro area LCBGs' exposures to these regions include the likelihood of continued asset quality deterioration related to a worse-than-anticipated macroeconomic slowdown in these regions,

Chart 4.7 Return on equity in selected central and eastern European countries versus euro area LCBGs

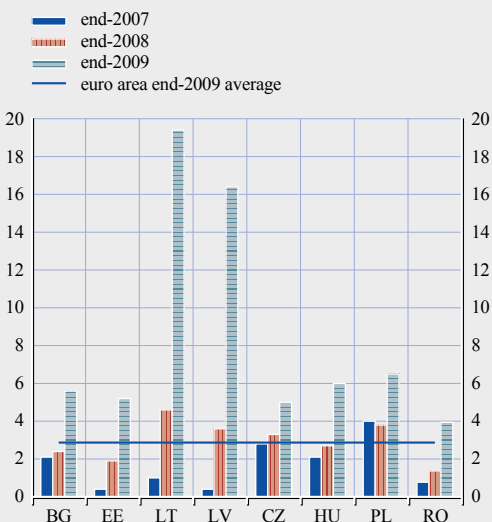
(2007 – 2009; percentage)



Sources: IMF, individual institutions' financial reports and ECB calculations.
Note: For some countries, data for 2009 extend only to the third quarter of 2009.

Chart 4.6 Non-performing loan ratios in selected central and eastern European countries and the euro area average

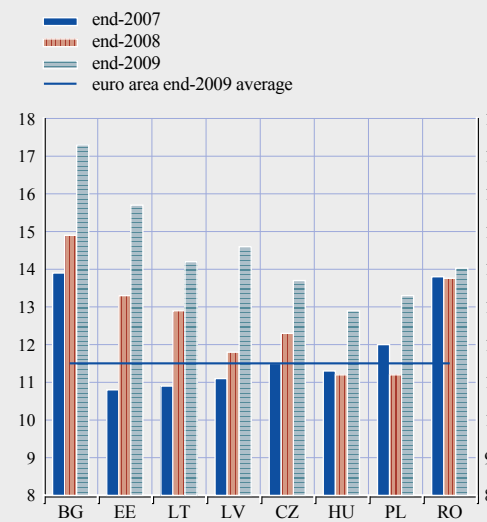
(2007 – 2009; percentage of total loans)



Sources: Bank for International Settlements and ECB calculations.
Notes: NPL ratios are not comparable across countries due to differences in definitions. For some countries, data for 2009 only extend to the third quarter of 2009.

Chart 4.8 Capital adequacy ratios in selected central and eastern European countries versus euro area LCBGs

(2007 – 2009; percentage)



Sources: IMF, individual institutions' financial reports and ECB calculations.
Note: For some countries, data for 2009 extend only to the third quarter of 2009.

together with a possible further correction of property prices. This was already reflected in increases in non-performing loan (NPL) ratios, which could continue also in 2010, although at a slower pace (see Chart 4.6). Stress tests performed by national authorities indicate that NPL ratios would increase under adverse scenarios, but that local banks could absorb these losses in view of their relatively high capital buffers. Additional risks include the possible revelation of hitherto unknown portfolio concentration risks and insufficient differentiation across sectors, currencies and geographical entities.

Although the rise of NPL ratios in the new EU Member States has adversely affected several euro area LCBGs, the profitability of banking

systems in many central and eastern European (CEE) countries remained relatively strong in the first half of 2009, well above the median ROE of euro area LCBGs over the same period (see Chart 4.7).

Wide interest margins and capital gains on fixed income portfolios, due to falling long-term yields, have ensured strong core income-generating capacities among these banking systems, while the capital positions of subsidiaries have generally been sufficient to absorb increasing loan losses (see Chart 4.8). Against this background, euro area banks have emphasised their commitment to support their subsidiaries in selected CEE countries (new EU Member States), and significant injections of capital have taken place in this context.

Box 12

GOVERNMENT MEASURES TO SUPPORT BANKING SYSTEMS IN THE EURO AREA

In response to the intensification of the financial crisis in autumn 2008, euro area governments implemented coordinated measures in support of financial sectors. These measures consisted mainly of guarantees for bank liabilities, capital injections and asset support schemes. These measures, together with the sizeable macroeconomic policy stimuli and the extensive liquidity support provided by the ECB, were successful in restoring confidence in the euro area financial system and in improving its resilience. This box describes the state of the government support measures and the progress that has been made in exiting from these measures.¹ It should be added that the progressive intensification of market concerns about sovereign credit risks within the euro area in April and early May 2010 also put pressure on the operating environment of banks. In some countries, these developments led to an increase in government support rather than to its withdrawal.²

Given the highly integrated financial system, there is agreement among EU Member States to coordinate their exit strategies from financial sector support. A coordinated approach would help to avoid adverse cross-border spillover effects and preserve a level playing field. However, this does not necessarily entail a synchronised implementation of exits. The EU's coordinated strategy is based on: (i) adequate incentives to return to a competitive market; (ii) ex ante exchanges of information between governments on the intentions to phase out; (iii) transparency towards the public and the financial sector; and (iv) an assessment of the stability of the financial system.

- 1 The European Financial Stabilisation Mechanism, announced on 9 May 2010 and directed to provide support to euro area governments rather than financial sectors, is not covered in this box.
- 2 For instance, as part of the economic stabilisation programme in Greece, a Financial Stability Fund will be established with the task to provide capital support to banks. In addition, the Greek government increased the volume of its government guarantee scheme from €15 billion to €30 billion.

The EU Member States also agreed to start the exit by ceasing to grant government guarantees. Banks in most countries have indeed relied less on government-guaranteed bond issues, and the issuance of long-term debt without such guarantees has picked up (see Chart A). Some countries have already closed their guarantee schemes for bank debt.³ So far, the closure has not put visible strains on the sector. Furthermore, the potential for a market-based exit is built into the remaining schemes with a fixed price for the government guarantee: improving market conditions raise the relative cost of issuing government-guaranteed bonds in comparison with issuing non-guaranteed bonds. The incentive to exit may be increased further by raising the guarantee fee.

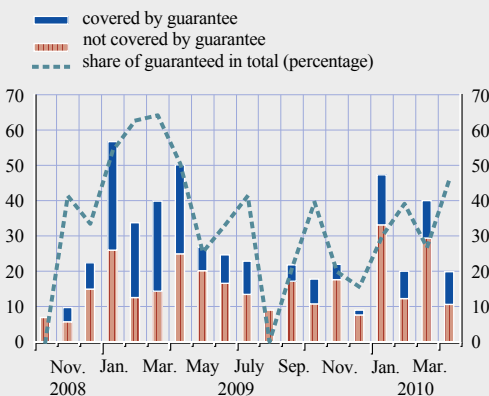
Where the exit from capital assistance is concerned, some banks have already paid back government capital, indicating that the incentives set by governments to induce early repayment have been effective.⁴ There are several alternative and generally complementary options available for banks to raise equity in order to return capital to the government. The main strategy is to raise capital in private markets. This strategy has been complemented by retaining earnings, selling business units, deleveraging and converting Tier 2-type capital of private investors into ordinary shares. Other banks will find it harder to reimburse the government. In fact, the incentive to repay early may prove largely ineffective in the case of banks that cannot raise capital in private markets or retain earnings. For these banks, the options to achieve repayment are more limited and repayment will need considerably more time. It should also be noted that banks that finance repayment by deleveraging may reduce their lending activities, thereby contributing to possible credit constraints for the real economy. In addition, governments can also pursue exits proactively through the sale of their stakes. However, this requires a sufficient increase in stock prices to protect the taxpayers' interests, and markets that are capable of absorbing the large government stakes.

3 In the euro area, Italy and France have terminated their schemes, and the Netherlands has increased the pricing as of 1 January 2010. Currently, eleven schemes are still open.

4 Banks typically pay a significant coupon on their preferred shares. The expensive pricing should encourage an early exit by the banks. This incentive is often further strengthened by step-up and redemption clauses.

Chart A Gross issuance of senior bank bonds in the euro area

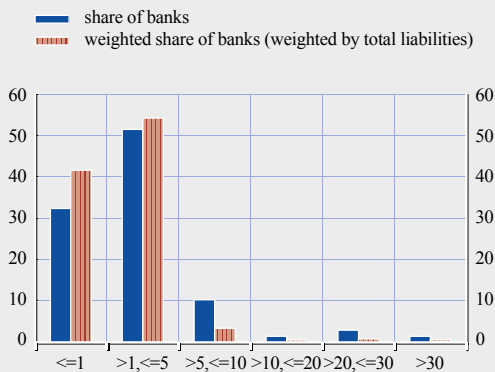
(Oct. 2008 – Apr. 2010; EUR billions)



Sources: Dealogic and ECB calculations.

Chart B Euro area banks' dependence on government-guaranteed debt

(Mar. 2010; percentage)



Sources: Bloomberg, Bankscope, European Commission and ECB calculations.

Notes: The sample consists of euro area banks which have outstanding government-guaranteed debt as of March 2010, but which are not under restructuring by the European Commission. The x-axis refers to the share of government-guaranteed debt in total liabilities.

Asset support measures have been used heterogeneously across countries, and have only recently been implemented in a number of cases. For instance, the Irish National Asset Management Agency (NAMA) bought a first tranche of loans with a nominal value of €16 billion in spring 2010.⁵ NAMA plans to purchase a total of €81 billion of loans by the end of 2010. As asset support is granted for the life of the underlying assets, asset support measures are generally self-liquidating. It should be noted, however, that owing to the long maturity of the underlying assets, asset support measures will be in place for a considerable period of time.⁶

Apart from heterogeneity across countries, the picture within the banking sector is also differentiated, and the overall picture of improved access to funding by the euro area banking sector disguises the emergence of polarisation in the banking sector. On the one hand, as mentioned above, many banks have recovered well after the financial crisis and have already exited from government support or will, in all likelihood, (soon) be able to manage without public support. On the other hand, some banks could have become “chronically” dependent on government support (see Chart B) and some may also be disproportionately reliant on central bank funding. For this group of banks, fundamental restructuring, derisking and, where necessary, downsizing of balance sheets will be needed in order to confirm their long-term viability when public support is no longer available. Restructuring is already underway for some large banks in the euro area, in some cases forcing banks to shrink their balance sheets by as much as 40% or more from their peak size.

5 NAMA paid €8.5 billion for the loans, representing an average discount of 47%.

6 In principle, asset support measures can be terminated prior to the maturity of the underlying assets. In the case of asset removal measures, the asset manager – be it a private investor (e.g. under the Public-Private Investment Program in the United States) or a public agency (e.g. the NAMA in Ireland) – can sell the assets when market prices improve. In the case of asset insurance measures, where the assets are ring-fenced and stay on the financial institution’s balance sheet, the financial institution can terminate the guarantee arrangement.

FUNDING LIQUIDITY RISKS

Euro area LCBGs have continued to reduce their reliance on wholesale funding, as is indicated by a further decline in banks’ customer funding gaps in the second half of 2009. Changes in LCBGs’ liability structure suggests that banks have increased the share of more stable funding sources in total liabilities in 2009, as is indicated by an increase of median shares of customer deposits and equity last year.⁴ Nevertheless, reliance on wholesale funding remains significant for a number of LCBGs, with the share of debt securities and interbank liabilities varying from 10% to 37% and from 4% to 31% respectively (see Chart 4.9). Looking at the maturity structure of debt securities, it is worth noting that, based on end-2009 data, the majority of most LCBGs’ debt securities have a remaining maturity of at least one year (median share: 66%).

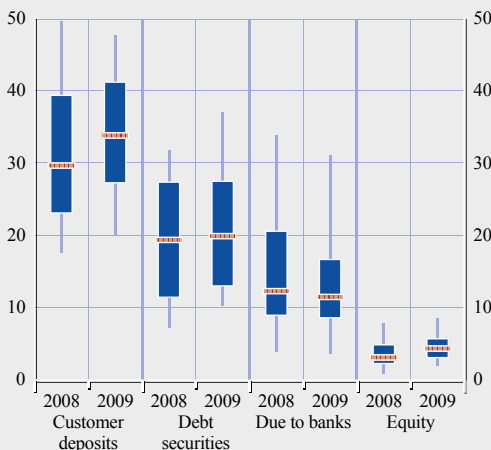
Short-term bank funding costs have remained low since November 2009, but there are signs that the situation in euro area money markets remains far from normal and that some smaller banks with weakened balance sheets continue to face uncertainties regarding their access to money market funding (see Section 3.1). In early May 2010, improvements in the redistribution of liquidity in the euro money market have also been adversely affected by the intensification of sovereign credit risk concerns, which induced the ECB to modify its plans for phasing out liquidity support measures.

As already highlighted in previous issues of the FSR, euro area banks need to roll over a large amount of debt over the next few years. In early May 2010, euro area LCBGs had about

4 Similar to developments observed at the level of LCBGs, the share of customer deposits in euro area MFIs’ total liabilities increased in 2009 (from 30% to 32%).

Chart 4.9 The share of selected liability items in euro area LCBGs' total liabilities

(2008 – 2009; percentage of total liabilities; minimum, maximum, inter-quartile range and median)



Sources: Individual institutions' financial reports and ECB calculations.
 Note: Other liabilities not shown in the chart include, among other items, trading liabilities, insurance companies' technical reserves and subordinated debt.

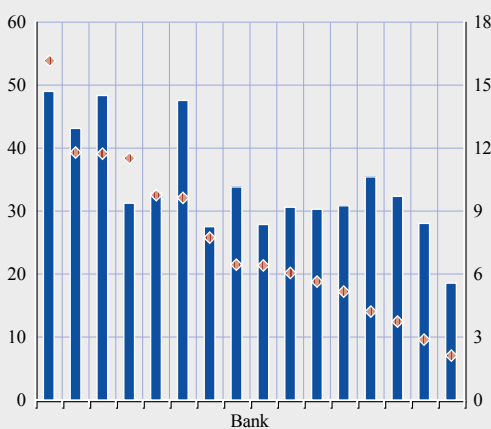
€800 billion of long-term debt outstanding that will have to be refinanced in the period between May 2010 and end-2012. For euro area LCBGs as a group, this represents almost half of the outstanding debt with a maturity of over one year. Furthermore, for some banks, this represents a significant part of total debt securities and a non-negligible part of total liabilities as well (see Chart 4.10).

The need for banks to issue medium to long-term debt is likely to be accentuated by new regulatory requirements on stable funding ratios that would come into force at the end of 2012. In particular, banks that rely on short-term wholesale funding and/or less stable sources of deposit funding (e.g. some parts of corporate deposits) will have to close the gap between required and available stable funding over the next few years. For these institutions, the impact on funding costs of increasing the share of stable funding (i.e. longer-term debt and/or deposits) could be substantial.

Chart 4.10 Share of euro area LCBGs' bonds maturing in 2010-2012

(percentages)

- share of long-term debt maturing in 2010-2012 (percentage of debt securities; left-hand scale)
- ◆ share of long-term debt maturing in 2010-2012 (percentage of total liabilities; right-hand scale)



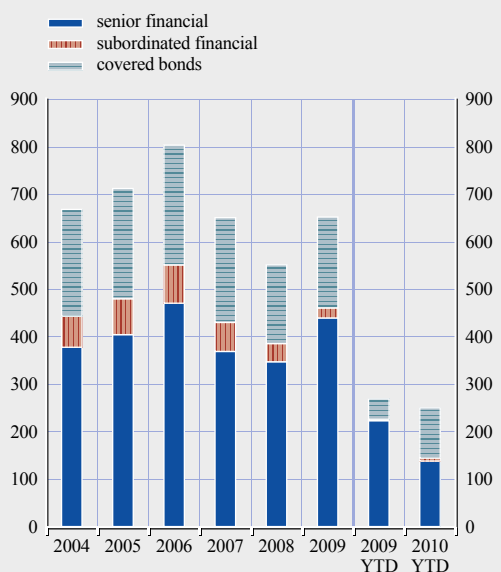
Sources: Individual institutions' financial reports, Dealogic and ECB calculations.
 Note: Banks' long-term debt includes bonds, medium-term notes, covered bonds and other debt securities with a minimum maturity of 12 months.

In addition, the debt maturing over the next few years also includes government-guaranteed debt that is likely to be refinanced at a significantly higher cost. Furthermore, the risk of bank bond issuance being crowded out as a result of the significant increase in financing requirements by several euro area governments could also contribute to higher rollover risk and funding costs for banks in the period ahead.

Banks' access to capital markets has continued to improve and primary market issuance of both senior unsecured debt and covered bonds has remained strong for much of the past six months (see Chart 4.11). However, the primary market issuance of bank bonds came to a near halt in May, amid intensifying market concerns about sovereign risk within the euro area. Despite tentative signs of improvement in securitisation activity in recent months, the issuance of asset-backed securities (ABSs) that have not been retained in banks' balance sheets remained low (see Section 3.2).

Chart 4.11 Euro-denominated bond issuance by banks and other financial issuers

(2004 – 2010; EUR billions)



Source: Dealogic.
Note: Year-to-date (YTD) figures for 2009 and 2010 refer to the period between 1 January and 11 May.

The average cost of euro area banks' capital market funding, for both unsecured debt and covered bonds, continued to decrease until November 2009, and remained relatively stable until late April 2010. However, in early May, secondary market spreads on banks' senior unsecured debt and covered bonds, as measured by swap spreads on the respective iBoxx indices, widened markedly on account of intensifying market concerns about sovereign credit risk within the euro area. The increase in spreads on covered bonds was most pronounced in countries that were the most affected by market participants' worsening perception of sovereign credit risk (see Section 3.2.). This highlighted that increases in sovereign risk premia can quickly spill over to banks' funding costs and could ultimately make the issuance of longer-term debt prohibitively expensive for issuers from the most affected countries. Looking forward, it is likely that differentiation could increase among euro area banks with respect to funding costs. Banks with weaker balance sheets, in particular, may face higher funding costs, which could put

some constraints on their lending activity in the period ahead.

Furthermore, looking at the broader euro area banking system, the fact that some institutions remain dependent on public sector support measures, including central bank liquidity schemes and government guarantees on bond issuance (see Box 12) continues to be a cause for concern.

As highlighted above, euro area banks increased their efforts to raise the share of deposit funding over total liabilities, and competition for retail deposits is expected to remain intense in the period ahead. This in turn could put upward pressure on the cost of deposit funding, which is already evidenced by negative deposit margins of euro area MFIs on most deposit instruments (see Chart S98). While this can partly be attributed to the environment of low interest rates, competitive pressures, should they persist for longer, could also contribute to higher funding costs in the future.

Overall, funding conditions tended to improve in most segments of the funding markets for much of the past six months, although the cost and availability of long-term bank funding was adversely affected by the intensification of market concerns about sovereign risks in the euro area in May 2010. Looking forward, one area of concern is the risk of bank bond issuance being crowded out due to the large increase in financing needs of several euro area governments in the period ahead. In addition, banks may also face the prospect of higher funding costs due to the need to term out their funding as well as to increasing competitive pressures in markets for retail deposits. Furthermore, the continued reliance of some smaller or medium-sized euro area banks on central bank refinancing continues to be a cause for concern.

MARKET-RELATED RISKS

The share of assets in the trading books of MFIs in countries where LCBGs are located has decreased further and has, on average, remained below 20% of total assets since the publication

of the December 2009 FSR (see Chart 4.12). This decrease was in part compensated for by an increase in the share of loans to MFIs and cross-border holdings, so that, broadly speaking, risks moved from trading to domestic and cross-border lending.

Within the trading books, the share of both MFI and non-MFI debt holdings has decreased to clearly below long-term averages, which was in part compensated for by above-average increases in holdings of government debt. Hence, risks seem to have also shifted from equity-related risks to interest rate, foreign exchange and sovereign-related risks in the last few months.

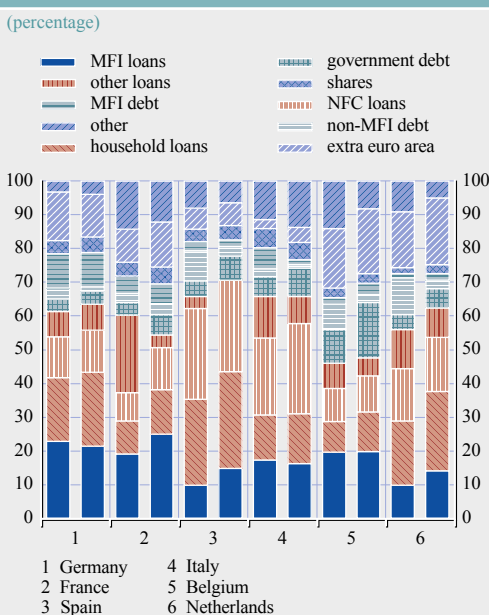
Interest rate risks

LCBGs' interest rate risks increased after the publication of the December 2009 FSR. This was due to higher risk perceptions at both the short and the long end of the euro area yield curve up to April 2010 and to the adverse market movements related to tensions in government

bond markets in May 2010. In particular, despite the further easing of stresses in the euro area interbank market up to May 2010 (see Section 3.1), the implied volatility of euro area short-term interest rates still remained relatively high (see Chart S71). In addition, although there was a moderate decrease in the implied volatility on euro area government bonds at the long end of the yield curve up to May 2010, turmoil in some euro area countries' government bond markets pushed the volatilities to high levels in May 2010 (see Chart S74).

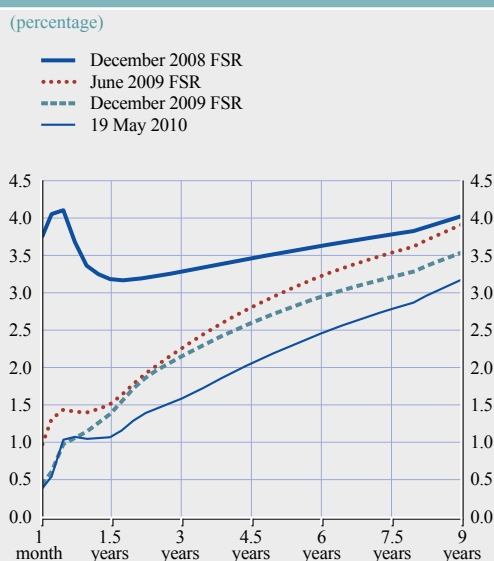
Overall, the yield curve remained steep in the euro area (see Chart 4.13), supporting the revenues from banks' maturity transformation activities. It could also have spurred interest among market participants to enter into carry trades. The carry-trade activity, stimulated by low funding costs and volatile but still wide sovereign spreads, involves building up long-term investments funded with short-term financing. High volatilities in sovereign spreads

Chart 4.12 Asset side of balance sheets of MFIs in countries where LCBGs are located



Source: ECB.
Notes: For each country, the left-hand column gives the long-term average (Jan. 1997-Nov. 2008), while the right-hand column indicates the situation in Mar. 2010.

Chart 4.13 Euro area yield curve developments (based on euro area swap rates)



Source: ECB.

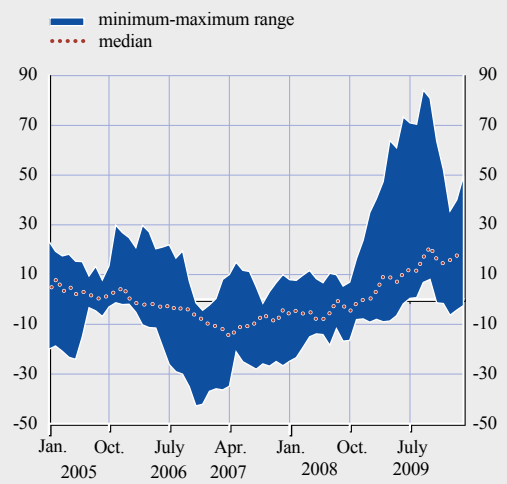
could, however, have a significant impact on capital if these transactions – as seems to be the case – are classified in available-for-sale accounting portfolios. The build-up of such trades creates exposure to the possibility of unexpected changes either in funding costs or in the market value of the long positions. An abrupt unwinding of such trades in the case of large losses could contribute to heightened interest rate volatility.

As signs of economic recovery have become more entrenched, questions about the extent to which banks are hedging their interest rate risk exposures have started to surface. At the time of writing, options markets were pricing in a greater likelihood of large upward changes in short-term rates than of downward changes (see also Section 3.1). Moreover, as concerns about sovereign credit risks have been intensifying, there is also a risk of an abrupt increase in long-term rates (see Chart 3.6 in Section 3.2). As discussed earlier in the case of income risks, in such a scenario, the possible impact on LCBGs' profits is uncertain as higher lending rates would be offset by mark-to-market losses on government bond holdings, which increased markedly in the post-Lehman period (see Chart 4.14). With markets pricing-in a flattening of the yield curve as the most probable prospect, this means that financial institutions might not be sufficiently prepared for an unexpected further steepening of the yield curve, as occurred in the US bond market in 1994.

Regarding exposures, market value-at-risk (VaR) figures for the first quarter of 2010 are not yet available for euro area LCBGs. Assuming that the composition of their market-sensitive portfolios remained broadly unchanged at end-2009 levels, then the higher levels of interest rate volatility seen up to and including May 2010 should have translated into increases in their market VaRs, especially in the case of those institutions with large exposures towards equity instruments.

Chart 4.14 Annual growth rates of government bond holdings by MFI in countries where LCBGs are located

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



Sources: ECB and ECB calculations.

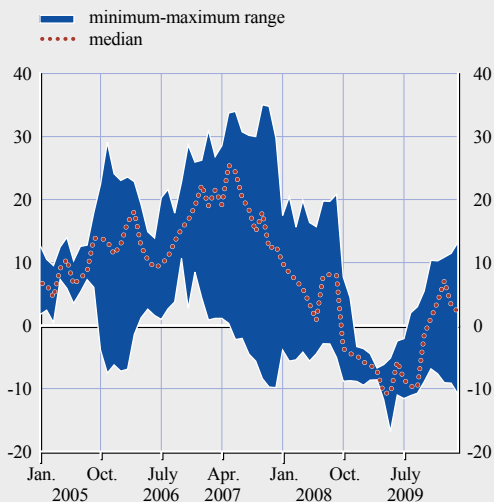
Looking ahead, unexpected increases in interest rates could raise challenges for euro area LCBGs. As assets and liabilities are repriced, net interest margins may decrease, denting banks' earnings. In addition, as positions are prone to be unwound rapidly in response to more volatile conditions, broader-based adjustments in LCBGs' bond portfolios can accelerate the size and speed of any initial change in interest rates.

Exchange rate and equity market risks

Equity market risks for LCBGs remained moderate in the second half of 2009 on account of continued low volatility. Expectations on the future volatility of euro area equity markets – approximated by the implied volatility derived from options on the Dow Jones EURO STOXX 50 equity index (see Chart S111) – declined below 30% in the first months of 2010 before jumping to around 40% in May, which was still below the levels seen in late 2008 and in early 2009, however. Renewed confidence in equity market holdings up to May 2010 was mirrored in increases in the sizes of euro area banks' equity portfolios towards the end of 2009 and in the first quarter of 2010 (see Chart 4.15).

Chart 4.15 Annual growth rates of share holdings by MFIs in those countries where LCBGs are located

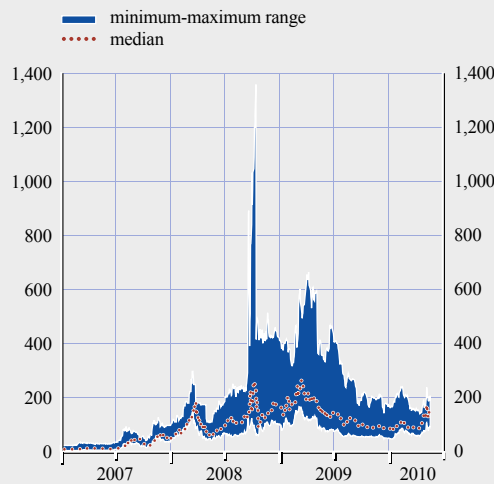
(Jan. 2005 – Mar. 2010; percentage change per annum)



Sources: ECB and ECB calculations.

Chart 4.16 Dispersion of CDS spreads of selected major European and US dealers in OTC derivatives markets

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



Sources: Bloomberg and ECB calculations.

Note: The dispersion analysis includes 12 major dealers.

Similar to equity market volatility measures, implied volatility measures for foreign exchange, which approximate foreign exchange-related risks, stabilised at levels just above 10 % in early 2010 and jumped to 15 % in early May 2010, which is still lower than the levels recorded in the period after the default of Lehman Brothers (when volatility temporarily exceeded 20%, see Chart S22).

Changes in foreign exchange and equity market volatilities in May 2010 should have translated into increases in LCBGs market VaRs. If these volatility levels persist, the approximated changes in market VaRs would, in turn, correspond to moderate increases in the amount of capital needed to cover market risk exposures in 2010.

Counterparty risks

Information on hedging costs confirms that concerns about counterparty credit risk appear to have increased since the finalisation of the December 2009 FSR. The median cost of protection against the default of a major dealer in over-the-counter (OTC) derivatives markets,

as reflected by dealers' credit default swap (CDS) spreads, increased temporarily after mid-January and then again in late April 2010 (see Chart 4.16). These changes took place against the backdrop of, and have been influenced by, concerns about fiscal sustainability in some indebted economies.

Such concerns have spurred counterparty risk managers to hedge or reduce their exposures to banks and governments of affected countries. Banks domiciled in some euro area countries affected by heightened sovereign credit risk concerns have reportedly faced difficulties in using the government bonds of their home countries in the private repo markets, not least because of wrong-way correlation risk between the creditworthiness of the borrowing bank and its country's government, which is the issuer of the repo collateral offered.⁵

⁵ In broad terms, wrong-way correlation risk refers to a positive correlation between the counterparty's credit risk and the (net-of-collateral) exposure at default to this particular counterparty.

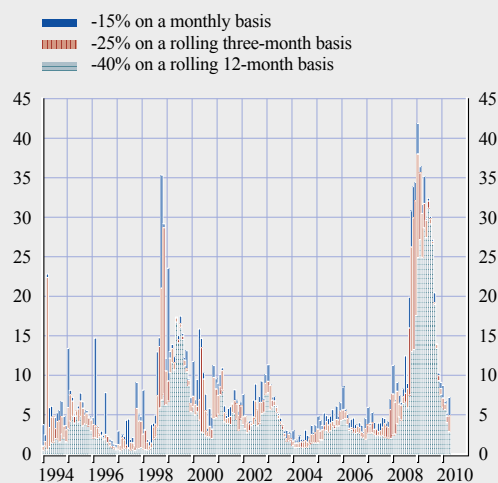
Domestic banks are the natural holders of domestic government debt securities, but recent developments have highlighted the repo funding availability risk for banks that have concentrated portfolios of debt securities subject to wrong-way correlation risk. Moreover, these developments, should they persist, may further increase some banks' reliance on Eurosystem liquidity support. Banks in countries where secured interbank lending is settled on a bilateral basis remain somewhat more vulnerable to such dislocations than those in countries with existing central counterparty clearing systems.

Banks adjust their counterparty credit risk perceptions in a number of ways (e.g. through changes in haircuts, financing maturities or counterparty credit limits) and tend to do so in a pro-cyclical manner.⁶ However, some of their decisions are of a binary nature (e.g. changes to eligible collateral assets or refusal to trade with specific counterparties) and this may further exacerbate market dislocations.⁷

Despite some remaining challenges, the situation in the hedge fund sector has continued to improve recently (see also Section 1.3). This should have led to generally lower counterparty credit risk for exposed banks, since hedge funds are important and usually very active leveraged non-bank counterparties in both securities financing transactions and trades in OTC derivatives. Better conditions in the hedge fund sector have also been mirrored in the declining estimated proportion of hedge funds breaching triggers of cumulative total decline in net asset value (NAV)⁸ (see Chart 4.17), although for each point in time, estimated proportions are based only on hedge funds which reported respective NAV data and for which the NAV change could thus be computed.

Chart 4.17 Estimated proportions of hedge funds breaching triggers of cumulative total NAV decline

(Jan. 1994 – Apr. 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.

Nonetheless, leverage levels among hedge fund clients and banks' willingness to compete for hedge fund financing business seem to have been rising and this may lead to higher counterparty credit risk in the period ahead.

6 See Committee on the Global Financial System, "The role of margin requirements and haircuts in pro-cyclicality", March 2010.

7 See also Credit, "The Credit/Fitch Solutions counterparty risk survey 2009", December 2009.

8 NAV triggers can be based on a cumulative decline in either total NAV or in 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.

Box 13

MEASURING THE CONTRIBUTION OF INDIVIDUAL SECTORS TO SYSTEMATIC RISK DURING THE RECENT FINANCIAL CRISIS

With a focus on the recent financial crisis, this box proposes an indicator that measures the degree of interlinkage between different economic sectors in the euro area. In particular, the box studies the extent to which the overall risk of banks, non-financial firms, households or other economic sectors is driven by systematic risk factors that are common to the entire economy, as is, for instance, the interest rate environment, and what is the relative contribution of an individual sector to the overall systematic risk in the economy. The indicator is constructed in three steps.

The first step is to construct financial risk measures of seven economic sectors in the euro area, based on a Merton-type structural credit risk model.¹ Combining market data on volatilities, interest rates and the market price of risk with sector-level balance sheet data on leveraged exposures in the Merton framework allows implied asset values to be estimated for each sector in the economy.²

In the second step, time-varying changes in the asset values of each individual sector and the entire economy³ are regressed against a set of lagged systematic risk factors using quantile regression techniques.⁴ All factors were constructed using data on financial instruments that are highly liquid and easily tradable.

In the third step, by using the coefficient estimates of the sector-specific quantile regressions, value at risk (VaR) and so-called “CoVaR” measures are constructed for each sector in the economy and the economy as a whole.⁵ Importantly, the VaR in this context captures all forms of risk, i.e. credit, funding, liquidity and market risk. A CoVaR for each sector in the economy is constructed as the VaR of the entire economy conditional on the respective sector being in distress. Finally, the marginal contribution of a specific sector to the VaR of the entire economy is created by subtracting the VaR of the entire economy from the sector-specific CoVaR. This is called “delta CoVaR”.

1 The Merton framework assesses the credit risk of a company by characterising the company’s equity as a call option on its assets. Put-call parity is then used to price the value of a put, which is treated as an analogous representation of the firm’s credit risk. For more details see R. Merton, “On the Pricing of Corporate Debt: The Risk Structure of Interest Rates”, *Journal of Finance*, Vol. 29, No 2, 1974.

2 See ECB, “Balance sheet contagion and the transmission of risk in the euro area financial system”, *Financial Stability Review*, June 2009. The following economic sectors are covered in this analysis: banks, government, households, insurance, non-financial corporations, other financial and the rest of the world. The latter is a residual sector to close the accounting-based system of contingent claims analysis, which has been applied in this context. To match the weekly frequency of market data with the sector-level balance sheet data, which are available in a quarterly frequency, the latter has been interpolated to a weekly frequency using the cubic spline interpolation technique. The time horizon of analysis was from the first quarter of 1999 to the third quarter of 2009 for all sectors except in the case of banks (sample begins in the third quarter of 2001), insurance (sample begins in the first quarter of 2002) and government (sample begins in the first quarter of 2003).

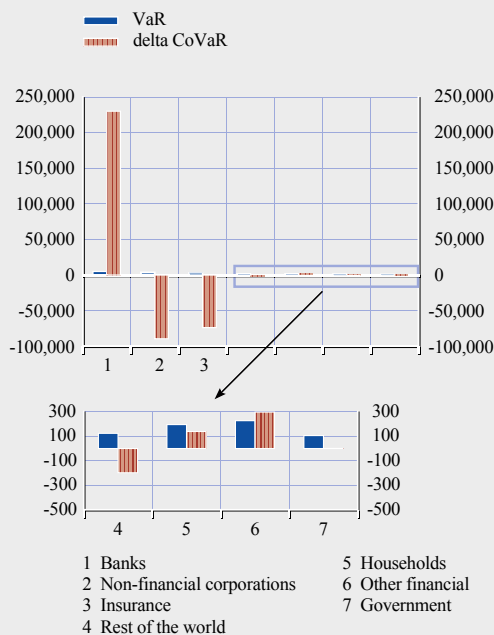
3 The asset value changes of the entire economy are constructed by the period-wise cross-sector sum of asset values.

4 The following systematic risk factors, capturing various sources of risk, were included in the analysis: the euro area yield curve; the three-month EONIA swap rate; the spread between the three-month EONIA swap rate and the three-month EURIBOR; the median euro area sovereign CDS spread; the implied volatility of the Dow Jones EURO STOXX 50, bank and insurance index; and the euro area speculative-grade corporate bond spread. Among the first using quantile regressions in this context were R. Engle and S. Manganelli, see “CAViaR: Conditional Autoregressive Value at Risk by Regression Quantiles.” *Journal of Business & Economic Statistics*, Vol. 22, 2004. Quantile regressions capture the co-movement in the tails of the distributions or the co-movement between “extreme values”. The regressions are performed on the first quantile of the response variables. A lag structure of three month has been applied.

5 See T. Adrian and M. Brunnermeier, “CoVaR”, *Federal Reserve Bank of New York Working Paper Series*, 2009. However, the analysis in the latter focuses only on individual financial institutions, while this box looks at all sectors of the euro area economy using aggregate data.

Chart A Median VaR and delta CoVaR by sector

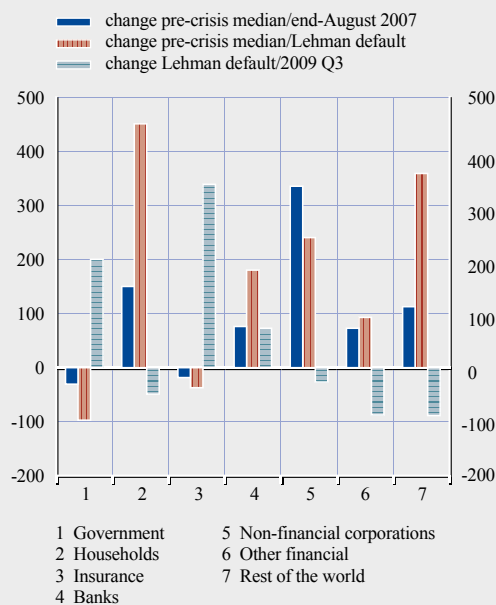
(Q1 2003 – Q2 2007; EUR; VaR figures are scaled down by a factor of 10^7 and delta CoVaR by a factor of 10^{11})



Sources: ECB, Bloomberg and ECB calculations.
Note: The insurance sector includes pension funds.

Chart B Changes in delta CoVaR for different points in time during the financial crisis, by sector

(percentage points)



Sources: ECB, Bloomberg and ECB calculations.
Notes: The pre-crisis median is shown in Chart A. The insurance sector includes pension funds.

Chart A plots the estimated median sector-level VaR readings and the median of the sector-specific delta CoVaRs for the period between the first quarter of 2003 and the second quarter of 2007. The banking sector indicated the highest VaR value just before the eruption of the sub-prime crisis, primarily on account of the relatively high leverage in this sector. The positive delta CoVaR of the banking, household, other financial intermediaries and government sectors point to a positive marginal contribution of these sectors to overall systematic risk before the beginning of the sub-prime crisis. However, as expected, the delta CoVaR of the banking sector outweighs the contribution of the other sectors substantially. Negative delta CoVaR measures for the non-financial corporation, the insurance and the rest-of-the-world (RoW) sectors indicate that these sectors did not contribute to the overall systematic risk in the economy.

Chart B compares the pre-crisis median delta CoVaR figures with delta CoVaR measures obtained using data from the recent episode of financial turmoil, i.e. the beginning of the sub-prime crisis (end-August 2007), the default of Lehman Brothers (end-September 2008) and the last available data point in the euro area accounts database (third quarter of 2009).⁶ It reveals that soon after the eruption of the crisis, the marginal contribution to the overall systematic risk had increased for non-financial corporations, households, banks, other financials and the RoW sector (in order of significance). Roughly one year later, using the same base for the calculation of changes, the same picture prevailed while the ordering in terms of contribution to systematic

⁶ The timing of the Lehman Brother default was chosen as a reference point due to the fact that since this period government intervention and also a downturn of the real economy took place, with adverse consequences on risk measures for several sectors in this analysis.

risk had changed. At that time, the household and the RoW sectors outweighed the non-financial corporations sector and banks. Moreover, the marginal contribution of the government and insurance sectors had decreased until this point in time. However, looking at the change between the period of the Lehman Brothers default and the third quarter of 2009 shows that, particularly for the government, insurance and banking sectors, the marginal contribution to overall systematic risk increased, while it decreased for all remaining sectors. This reflected increases in sovereign risk for several euro area countries and its contribution to overall systemic risk.

The sequencing of the affected sectors throughout the various phases of the crisis reflects the different composition of the balance sheets of the different sectors. For example, the sectors which hold large amounts of money market instruments reacted more strongly to the jump in volatility in this asset class that characterised the early stages of the financial turmoil. By contrast, market volatility in later phases of the crisis was dominated by volatility in government bond markets, which explains the increased systematic risk contribution of those sectors whose balance sheets show large exposures to government debt securities.

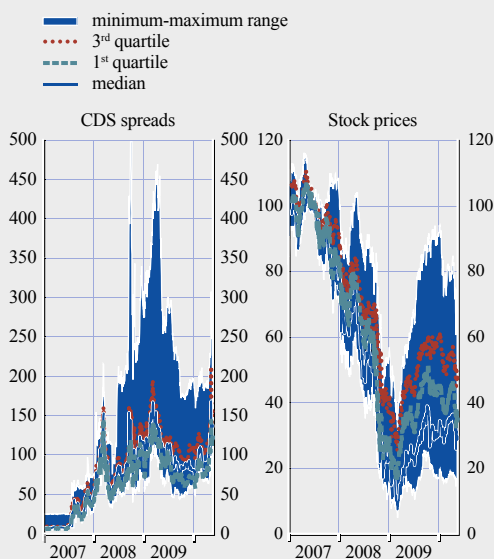
Overall, the sector-level delta CoVaR measure provides a useful addition to the tools for monitoring financial system stability. An increase in this measure in an individual sector, which can be explained by the composition of its balance sheet, suggests that its contribution to the overall credit risk in the economy is growing. In addition, a simultaneous increase of the indicator in several sectors would tend to indicate a stronger joint dependence of these sectors on overall changes in systematic risk. This would provide an early warning of a growing risk of contagion, should the system be confronted with adverse developments in any of these individual sectors.

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

Between the finalisation of the December 2009 FSR and the cut-off date of this issue of the FSR, some market indicators based on euro area LCBGs' securities prices had stabilised, while others pointed to increased risks. The latter was primarily due to sovereign credit risks which progressively intensified over the last six months, becoming acute in early May. By mid-May, the CDS spreads of these institutions widened substantially in tandem with rising sovereign CDS spreads in the countries where they are domiciled, approaching the record high levels reached at the beginning of 2009, while LCBGs' stock prices dropped abruptly (see Chart 4.18). These movements in CDS spreads and equity prices of LCBGs were offset to some extent by the positive impact on broad financial markets of the decision of the EU Council to establish a European Financial Stabilisation Mechanism and the announcement by the ECB to conduct

Chart 4.18 Euro area LCBGs' equity prices and five-year senior credit default swap spreads

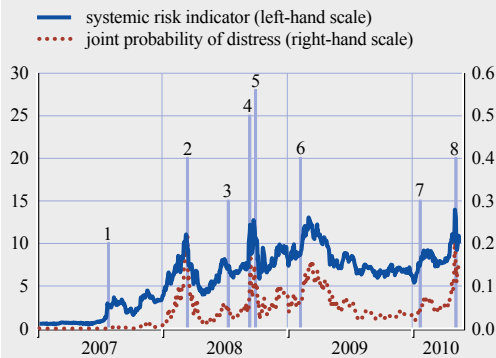
(Jan. 2007 – May 2010; spreads in basis points; senior debt; five-year maturity; stock prices (index: July 2007 = 100))



Sources: Bloomberg and ECB calculations.

Chart 4.19 Systemic risk indicator and joint probability of distress of euro area LCBGs

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



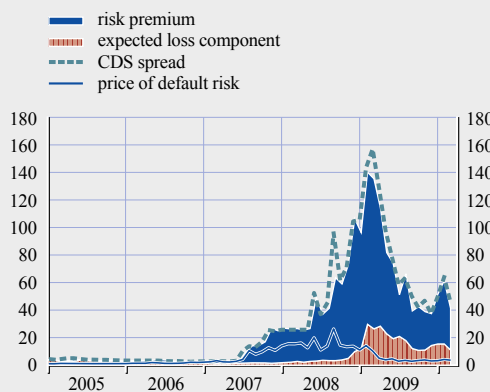
- 1 turmoil begins
- 2 Bear Stearns rescue take-over
- 3 rescue plan of US Fannie Mae and Freddie Mac announced
- 4 Lehman Brothers defaults
- 5 US Senate approves Paulson plan
- 6 T. Geithner announces Financial Stability Plan
- 7 Greek fiscal problems gain media attention
- 8 Establishing a European Financial Stabilisation Mechanism

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 “Measuring the time-varying risk to banking sector stability” in ECB, *Financial Stability Review*, December 2008, and the box “A market-based indicator of the probability of adverse systemic events involving large and complex banking groups” in ECB, *Financial Stability Review*, December 2007, for details.

Chart 4.20 Decomposition of one-year senior credit default swap (CDS) spreads of euro area LCBGs and the price of default risk

(Jan. 2005 – Mar. 2010; basis points)



Sources: Bloomberg, Moody’s KMV and ECB calculations.

Note: 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.

interventions in the euro area secondary markets for public and private debt securities in the context of a Securities Markets Programme. The elevated CDS spreads coincided with persistently high implied volatility of banks’ equity prices and expected default frequencies for LCBGs, which stabilised at relatively high levels (see Charts S106 and S111).

As discussed in the December 2009 FSR, an abatement of tail risk, thanks to the implementation of various public sector support measures for the financial sectors across euro area countries, contributed to a substantial reduction of systemic risk in the course of 2009. However, fears about the growing fiscal imbalances in some euro area countries and the adverse impact of higher sovereign credit risk on euro area banks’ balance sheets and funding costs led, in the eyes of market participants, to a renewed increase in systemic risk. While a market-based indicator of a systemic risk, which measures the probability of at least two LCBGs defaulting simultaneously in the next two years, decreased considerably in 2009, it quickly reversed after January 2010, reaching its all-time high on 7 May when market participants’ fears about sovereign credit risks became particularly acute (see Chart 4.19). Increasing systemic risk is also reflected in the joint probability of distress, another indicator providing a forward-looking measure of market participants’ perceptions of the likelihood of a systemic event, which looks at the probability of joint failure of all euro area LCBGs. The recent increases in these indicators reflects both the widening of CDS spreads of euro area LCBGs and the increasing default correlation within the euro area banking sector. This was captured by a decrease in the dispersion among the individual LCBGs’ stock prices.

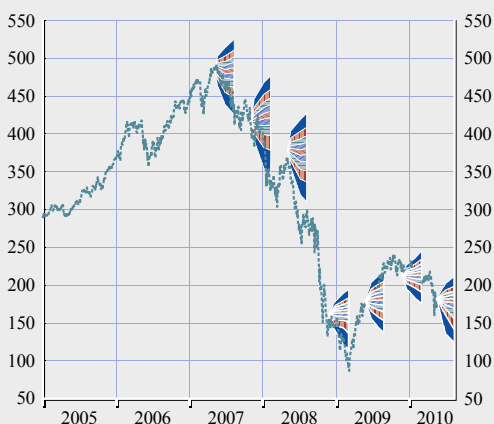
Further insight into the recent increase in indicators of systemic risk in the euro area banking sector can be obtained by decomposing the movements of the CDS spreads of euro area LCBGs (see Chart 4.20). After it had receded materially in 2009, the expected-loss component, which represents the part of

the CDS spread that is driven by pure default risk, increased slightly and still remained at relatively high levels until end-March 2010. Similarly, the risk premium component, which represents the part of the CDS spread that is driven by factors other than pure default risk, including the liquidity premium, increased slightly in early 2010, while the price of default risk, i.e. the amount paid by protection buyers to protection sellers for bearing default risk, remained low and broadly unchanged. Of note is the fact that, although end-March 2010 CDS spreads remained at substantially higher levels than before the eruption of the financial turmoil in August 2007, the price of default risk was close to levels seen prior the crisis. All in all, these patterns tend to suggest that CDS market participants consider the likelihood of a default of individual LCBGs to remain at relatively high levels, while the price they demand for selling protection against default of these institutions fairly reflects the risks.

To put the recent declines in bank stock prices into perspective, it is worth assessing recent stock price levels against ten-year trailing earnings, which smoothens the cyclicalities of earnings.

Chart 4.21 Dow Jones EURO STOXX bank index and option-implied risk-neutral density bands

(Jan. 2005 – Aug. 2010; 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 of 11 May 2007, 8 Nov. 2007, 6 May 2008, 27 Nov. 2008, 28 May 2009, 27 Nov. 2009 and 20 May 2010.

By end-March 2009, this measure of the value of banks' stock prices remained at very low levels by historical standards (see Chart S113). This suggests that in the euro area, the prevailing level of bank stock prices at the time of writing did not seem to be particularly overvalued when taking into account the long-term earnings potential. However, one has to take into account the composition of earnings, which might vary over time.

In view of rising funding costs for LCBGs on account of increasing sovereign credit risks (see Box 9 for a description of possible spillover channels), uncertainty about the outlook for euro area banks' earnings and solvency has increased in the short term, which has been mirrored by recent movements in two indicators based on option prices of the euro area bank stock prices index. In particular, after the finalisation of the December 2009 FSR the risk reversal decreased further to below zero and the strangle increased (see Chart S112). These movements suggest that, in the view of market participants, further large declines of euro area bank stock prices are more likely in the near term than increases and that the probability of substantial movements in stock prices in both directions has also increased. Nevertheless, although the short-term uncertainty about further movements of euro area bank stock prices had thus increased, it remained far below the levels observed after the collapse of Lehman Brothers in September 2008.

Increased uncertainty about the short-term outlook for euro area banks' stock prices has also been evident in the distribution of option-implied risk-neutral density bands. Recently, this distribution has widened substantially, and the lowest confidence intervals became markedly skewed downwards (see Chart 4.21). As in the case of the risk reversal, this suggests that, by mid-May, option market participants were assigning a higher probability to the likelihood of further substantial declines in banks' stock prices over a horizon of the next three months than they were to sizeable increases.

Thanks to the improved macroeconomic outlook and the government support measures extended to the euro banking sector, the ratings of most euro area LCBGs remained broadly stable over the past six months. Although there were some downgrades and upgrades between the AA+ and A+ rating levels, the balance of rating changes was zero, for the first time since the eruption of the financial turmoil in autumn 2007 when the number of downgrades started to exceed the number of upgrades (see Charts S114 and S115). Looking ahead, the credit rating outlook for euro area LCBGs remained unfavourable by April 2010, as almost 40% of the available ratings were on negative outlooks, compared with only one positive outlook (see Table S7).

All in all, credit risk indicators for euro area LCBGs remained elevated and some had increased materially by mid-May 2010. At the same time, indicators of systemic risk in the euro area banking sector increased to the record high levels last seen in the aftermath of the default of Lehman Brothers in September 2008, which implies that, in the view of market participants, the likelihood of a systemic event in the euro area banking sector had increased markedly. This can be linked primarily to fears

among market participants about sovereign risks, which re-emerged at the beginning of 2010 and which became acute in early May-2010, and about the potential for a spillover of these risks to the banking sectors of euro area countries. To some extent, it could also reflect the uncertainty associated with the exits from the public support measures for the financial sector, which have now started and are expected to continue throughout 2010. Announcements of the decisions to establish the European Financial Stabilisation Mechanism by the EU Council and to introduce a Securities Market Programme by the ECB on 10 May 2010 seemed to have a positive impact on lowering the risk of contagion of sovereign credit risks which was mirrored by a retreat in all market based indicators. Looking ahead further movements in these indicators will depend on the extent to which euro area governments strengthen their efforts to implement the necessary fiscal consolidation programmes. Nevertheless, as discussed in Section 4.1, as a consequence both of the recapitalisation efforts undertaken by many euro area LCBGs and the government support schemes implemented in most euro area countries, LCBGs' resilience to possible further shocks has improved.

Box 14

SEPARATING BANKING AND SECURITIES BUSINESS: GLASS-STEAGALL REVISITED

On 21 January, 2010, the US Administration proposed a new set of broad regulatory initiatives for the banking sector. Among these, there was support for the proposal put forward by Paul Volcker, the former Chairman of the Federal Reserve Board, which, in practice, recommends restrictions on banks' business models. The so-called "Volcker rule" aims to prevent banks that have access to central bank and deposit insurance facilities from trading on their own account, as well as from owning and investing in hedge funds and private equity. In a way, the initiative brings back to the regulatory landscape a modified version of the Glass-Steagall restrictions on banks' securities business. This box takes a mainly academic view and is limited to offering an overview of the main arguments and analytical results – including its limitations – surrounding the original Glass-Steagall Act in the light of the recent crisis from a European perspective.

The separation of commercial banking and investment banking (also called "securities business") activities was the norm in US law and custom until the turn of the 20th century, when securities

affiliates of deposit-taking institutions were allowed to operate in the securities business.¹ A famous example of such legislation is the Banking Act of 1933, commonly known as the Glass-Steagall Act. The Act banned securities affiliates of commercial banks and imposed a separation, or “firewall”, between commercial banking and securities-related activities. At the time, the passing of the Glass-Steagall Act was largely motivated by concerns about the role of banks in the run-up to the Great Depression and, in particular, about conflicts of interest between the lending, underwriting and proprietary trading functions. A prime example of the possible conflicts of interest when marrying securities and commercial banking business, as provided at the time, was the possibility that universal banks might underwrite and push low-quality securities to investors.

Another major argument for the separation of activities was related to financial stability considerations, namely to keeping deposit-taking institutions with access to deposit insurance out of activities that might lead to higher risk-taking. The other major argument considered during the period stressed the potential incompatibility of bringing commercial banking and investment banking activities together on account of differences in the type of business conducted. Investment banking is based mainly on fee-seeking brokerage activities that could, at times, be oriented to the short term. Commercial banking activities, on the other hand, mostly hinge on the maturity transformation of assets based on long-term credit screening and the monitoring of borrowers.

After many years of a full enforcement of the Act, its restrictions were progressively relaxed.² In April 1987, the Federal Reserve allowed US commercial bank holding companies to establish affiliates authorised to underwrite corporate securities. Two years later, these affiliates were allowed to underwrite commercial paper and corporate debt. Finally, in 1999, the Gramm-Leach-Bliley Financial Services Modernization Act repealed the remaining legal barriers related to the separation of commercial banks from investment houses’ business.

The dismantling of the Act was based on three main arguments. First, it would allow banks to attain favourable economies of scale, meaning that, in the case of banks, certain fixed costs of collecting, processing and assessing information or distributing financial services could be used across a range of financial services.³ Second, the dismantling of the Act was expected to allow banks to achieve lower levels of risk in view of the greater opportunities for diversification derived from different business lines with different revenue cycles. Third, the disappearance of the constraints introduced by the Glass-Steagall Act was expected to enhance the ability of US financial institutions to compete with foreign universal banks.

However, the repeal was also supported by increasingly persuasive evidence from academic studies of the impact of broad banking on the pre-Glass-Steagall era.⁴ This evidence was based on data from periods prior to the adoption of the Glass-Steagall Act. It consistently showed that securities underwritten by commercial banks’ subsidiaries did not have a higher probability of

1 A. Gerschenkron, *Economic Backwardness in Historical Perspective*, Cambridge, Mass: Harvard University Press, 1962.

2 The Act impacted substantially on the state of the banking sector and its future evolution. For example, in the aftermath of its enactment, JP Morgan was split into the Morgan Bank and what later became Morgan Stanley.

3 Kanatas and Qi demonstrate that a bank’s desire to maintain its reputation may be sufficient to eliminate the potential conflicts of interest and thus minimise the need for regulation (see G. Kanatas and J. Qi, “Underwriting by Commercial Banks: Incentive Conflicts, Scope Economies, and Project Quality”, *Journal of Money, Credit, and Banking*, No 30(1), 1998).

4 See J.R. Barth, R.D. Brumbaugh and J.A. Wilcox, “The repeal of Glass-Steagall and the advent of broad banking”, *Journal of Economic Perspectives*, No 14, 2000.

default than those underwritten by investment banks.⁵ The results also showed that commercial banks tended to underwrite smaller issues, offering a further indication of their greater ability to acquire and process information.

Recent international evidence from different markets and countries is tentative and does not show clear support for the separation of commercial banking and investment banking activities. Hebb and Fraser provide evidence of a certification effect of commercial banks when studying the Canadian corporate bond market. Consistent with earlier US results, they show that yields on issues underwritten by Canadian commercial bank affiliates are lower than those on issues originated by independent investment banks. In the same vein, Konishi finds no differences in the initial yields on bonds underwritten by commercial banks and those underwritten by investment houses in Japan, but finds lower default rates for the former.⁶ Along similar line, Focarelli et al. compare actual defaults for an extensive sample of corporate debt securities underwritten in the United States during the 1990s (i.e. the period of the de facto softening of the Act's restrictions).⁷ Their evidence suggests that looser credit screening seems to be related to the lower initial ability of banks to correctly evaluate default risk, rather than to conflicts of interest between the lending and the underwriting functions. Overall then, the empirical evidence on the separation between commercial and investment banking activities remains partial.

In Europe, the introduction of a Volcker rule-style of regulation would raise a number of complex issues. First, it would run counter to the established model of universal banking. Second, it could hinder the smooth provision of financial services in the European Union, thus hampering the objective of further financial integration in the Single Market. Third and more generally, it might trigger unintended effects such as the migration of riskier activities to less regulated (and often less capitalised) areas of the financial system. Against this background the functional separation does not seem the most promising way forward in the European context. Overall, it appears more fruitful to enhance and enlarge the perimeter of both supervision and, wherever warranted, regulation to a wider range of potentially riskier activities.

5 M. Puri, "Universal banks as underwriters: Implications for the going public process", *Journal of Financial Economics*, No 54, 1999; and R.S. Kroszner and R.G. Rajan, "Is the Glass Steagall Act Justified? A study of the US experience with universal banking before 1933", *American Economic Review*, No 84, 1994.

6 See G.M. Hebb and D.R. Fraser, "Conflict of interest in commercial bank security underwritings: Canadian evidence", *Journal of Banking and Finance*, No 26, 2002; and M. Konishi, "Bond underwriting by banks and conflicts of interest: Evidence from Japan during the pre-war Period", *Journal of Banking and Finance*, No 26, 2002.

7 See D. Focarelli, D. Marques-Ibanez and A.F. Pozzolo, "Are universal banks better underwriters? Evidence from the last days of the Glass-Steagall Act", paper presented at a joint workshop hosted by the Basel Committee on Banking Supervision, the Centre for Economic Policy Research (CEPR) and the Journal of Financial Intermediation in Basel, 20–21 May 2010.

4.4 OVERALL ASSESSMENT

The shock-absorbing capacities of euro area LCBGs have improved over the past six months, thanks to the modest improvement in their profitability in 2009 and in the first quarter of 2010, and a strengthening of their capital buffers to well above their pre-crisis levels. This means that systemic risks for the euro area financial system have dissipated to some extent and that

risks within the financial sector have become more institution-specific in character.

While most LCBGs have been increasingly operating independently of public sector support, there is a risk that the recent recovery in profitability will not prove to be durable. This is because loan losses are expected to remain high for some time to come, while pressure on banks to keep leverage under tight control is expected

to continue. In addition, with markets pricing-in a flattening of the euro area yield curve over the medium term, this is likely to weigh on banks' interest margins in the period ahead, thereby partially eroding the most important source of the recent strength of their profitability.

Moreover, the growth of government debt security portfolios in 2009 may have left many LCBGs vulnerable to a scenario involving higher funding costs and greater market volatility. In addition, if long-term yields were to rise abruptly, this could mean that some of these institutions would be faced with marking-to-market losses on these holdings. However, the particular risks associated with interest income are likely to be institution-specific, depending on portfolio compositions, maturity structures and business models. Other vulnerabilities relate to persistently high unemployment rates in some countries, as well as to concentrations of some LCBGs' lending exposures to commercial property and to CEE countries, which could underpin larger-than-expected loan losses in the period ahead.

Conditions in euro area LCBGs' funding markets tended to improve for much of the past six months, although the recent rise in sovereign risks did mean a setback with respect to longer-term debt financing costs. Against this background, the risk that LCBGs will be confronted with higher funding costs in the period ahead may have increased, albeit to varying degrees across individual institutions. Pressure on funding costs may also come from a concentration of bond refinancing over the next few years, and also because of a need for banks to term out their funding in anticipation of a new regulation on stable funding ratios.

All in all, the central scenario is for modest banking sector profitability in the short to medium term, given the prospect of continued loan losses, lasting pressure on the sector to reduce leverage and market expectations of higher funding costs. In view of this outlook, the possibility both of a setback in the recent recovery of bank profitability and of an adverse

feedback on the supply of credit to the economy are important risks. In relation to the agenda for regulatory reform, a swift completion of the process of calibration and the implementation of these necessary reforms should remove uncertainties and allow banks to optimise their capital planning and, where necessary, adjust their business models.

5 THE EURO AREA INSURANCE SECTOR

Euro area insurers' financial performance improved, on average, in the fourth quarter of 2009 and the first quarter of 2010, although results varied across institutions and although the moderate economic activity continued to weigh on underwriting performance. However, 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 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 INSURERS¹

The financial performance of large primary insurers in the euro area continued to improve in the fourth quarter of 2009 and the first quarter of 2010, which was in line with the expectations

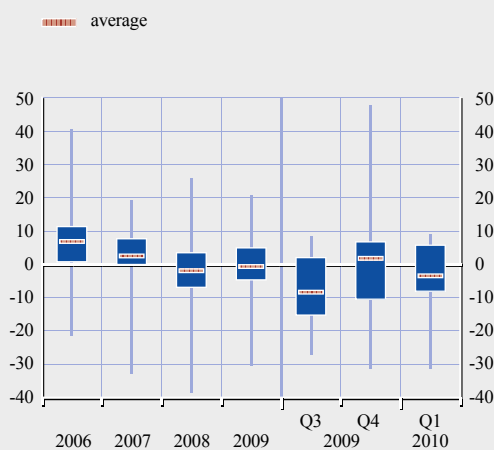
in the December 2009 Financial Stability Review (FSR). However, the performance across insurers was diverse and the moderate economic activity continued to weigh on underwriting performance (see Chart 5.1). In addition, above-average losses from catastrophic events in the first quarter of 2010, in particular those caused by windstorm Xynthia in western Europe and the earthquake in Chile in February, pushed average combined ratios above 100% in the first quarter of 2010 (see Chart S119; a combined ratio of more than 100% indicates an underwriting loss).

Nevertheless, investment income in the fourth quarter of 2009 and the first quarter of 2010 remained rather stable and all the insurers considered avoided investment losses (see Chart 5.2).

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 €4.1 trillion. This represents 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. For an analysis of the whole insurance sectors in all EU countries see, Committee of European Insurance and Pensions Supervisors, *Financial Stability Report 2010*, forthcoming.

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

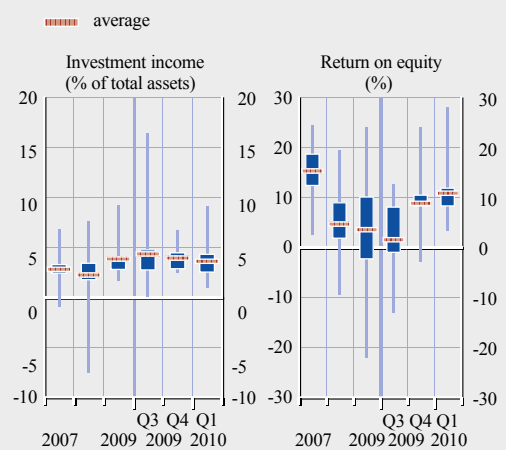
(2006 – Q1 2010; percentage change per annum; maximum, minimum and interquartile distribution)



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

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

(2007 – Q1 2010; maximum, minimum and interquartile distribution)



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

All in all, there was a broad-based increase in profitability in the fourth quarter of 2009 and the first quarter of 2010 (see Chart 5.2). The average return on equity reached 10.8% in the first quarter of 2010, up from 1.5% in the third quarter of 2009.

FINANCIAL PERFORMANCE OF MAJOR REINSURERS²

Euro area reinsurers continued to perform somewhat better than primary insurers in the fourth quarter of 2009 and the first quarter of 2010. Year-on-year growth in premiums written remained positive for all reinsurers considered (see Chart 5.3). This was achieved in an environment where global reinsurance prices fell by some 6%, on average, during the January 2010 reinsurance renewals.³

Reinsurers' financial performance was, however, negatively affected by above-average losses from catastrophic events in the first quarter of

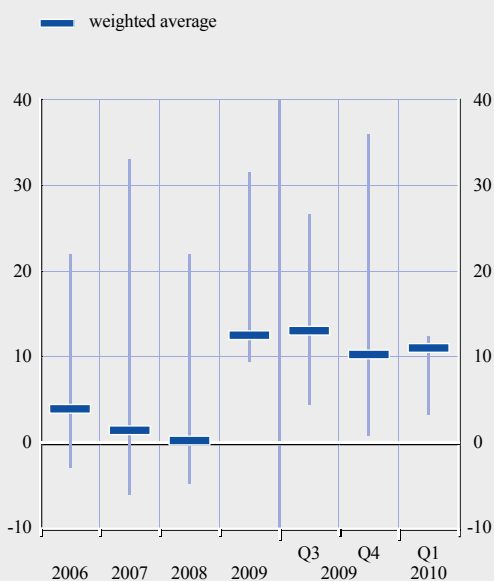
2010, in particular the earthquake in Chile in February. As a result, combined ratios increased to above 100%, on average (see Chart S122).

Reinsurers' investment income remained rather stable in fourth quarter of 2009 and the first quarter of 2010, which supported overall profitability (see Chart 5.4). The average return on equity stood at around 11.9% in the first quarter of 2010, compared with 10.6% in the third quarter of 2009 (see Chart 5.4).

- 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 €290 billion, representing about 30% of total global reinsurance premiums. However, not all figures were available for all companies.
- 3 See Guy Carpenter, "Rates Retreat as Capital Rebounds", January 2010.

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

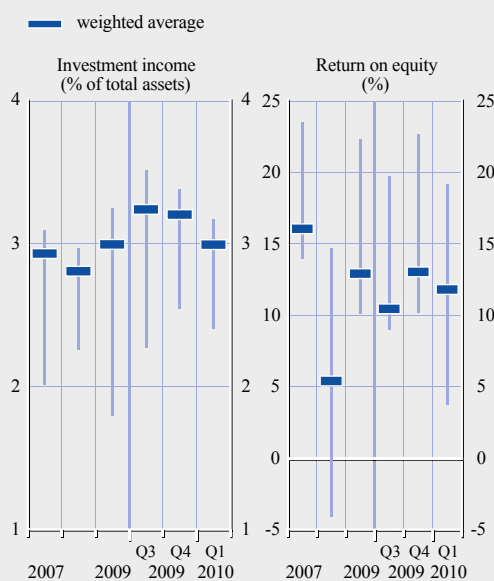
(2006 – Q1 2010; percentage change per annum; maximum-minimum distribution)



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

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

(2007 – Q1 2010; maximum-minimum distribution)



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

SOLVENCY POSITIONS OF LARGE PRIMARY INSURERS AND REINSURERS

Primary insurers' and reinsurers' capital positions improved somewhat in the fourth quarter of 2009 and remained broadly stable in the first quarter of 2010 (see Chart 5.5). The improvement towards the end of 2009 was mainly due to the fact that unrealised losses, which had weighed on shareholders' equity in 2008 and early 2009, were largely reversed during the last three quarters of 2009.

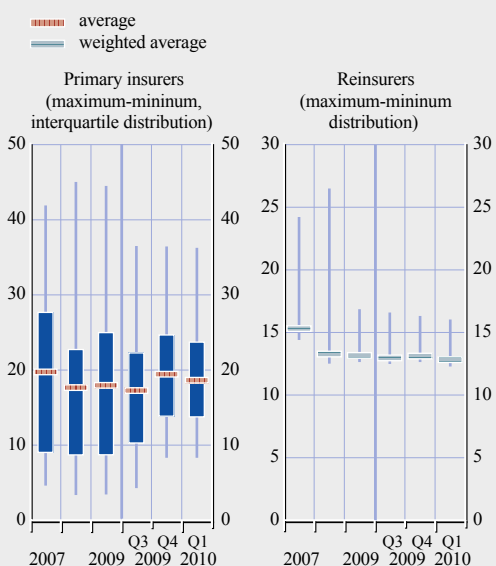
All in all, capital positions in the first quarter of 2010 appeared, on average, to include a reasonable amount of shock-absorption capacity. This was in part due to insurers often keeping their capital levels in excess of regulatory requirements, with the objective of obtaining a targeted credit rating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

In addition, the capital structure differs substantially across euro area insurers (see Chart 5.6). In particular, the share of Tier 1 capital (equity and senior hybrid bonds) varies significantly across institutions. Some insurers might have to restructure their capital positions if the current Solvency II proposals, which provide for Tier 1 capital to account for at least 50% of the total, are agreed upon. In addition, the current Solvency II proposal foresees a 15% ceiling on the share of Tier 3 capital, which some insurers exceed. Some insurers may therefore need to raise the share of core equity by retaining earnings, disposing assets or raising equity capital in the period ahead.⁴

⁴ See, Bank of America Merrill Lynch, "Solvency II: welcome to the casino", January 2010; and JP Morgan, "Solvency II: a potential game changer", January 2010.

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

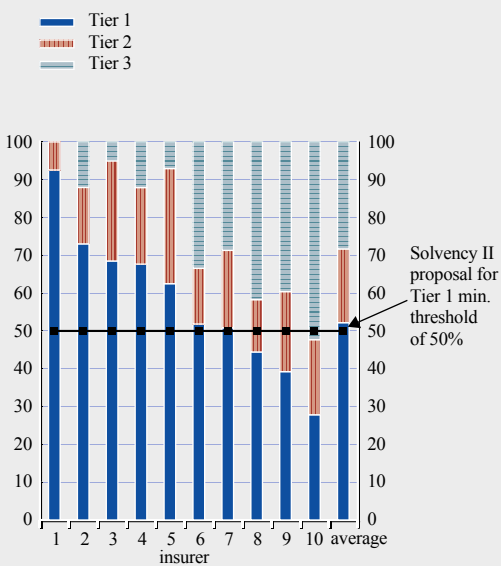
(2007 – Q1 2010; percentage of total assets)



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 Capital structure of a sample of large euro area insurers

(2009; percentage of total capital)



Sources: Bank of America Merrill Lynch and ECB calculations.
 Notes: Tier 1 capital mainly includes equity and senior hybrid bonds. Tier 2 capital mainly includes hybrid bonds and senior and subordinated debt. Tier 3 capital is any shareholder owned resources that do not fall under Tier 1 and 2 capital.

5.2 INSURANCE SECTOR OUTLOOK AND RISKS

OUTLOOK

The outlook for euro area insurers improved during the past six months, which was in line with the expectations in the December 2009 FSR. There are some signs that the earnings cycle reached a turning point in the last quarters of 2009 (see Chart 5.7).

Although insurers were severely affected by the recent recession and financial market volatility, large euro area insurers withstood the testing period better than the period after the bursting of the dot-com bubble in the first half of the last decade (see Chart 5.7). Looking ahead, analysts expect a significant rebound in euro area insurers' earnings in 2010 and 2011 (see Chart 5.7). It should be noted, however, that there is uncertainty surrounding the outlook since economic growth is likely to remain moderate in the near term and the uncertainty about the economic outlook remains elevated (see Chart 5.7 and Section 2.1). In addition, earnings in the last three quarters of 2009 were to a significant extent supported by high investment income, thanks to the favourable

developments in financial markets. With the rebound in financial markets slowing down, the contribution of investment income to insurers' performance is likely to be more modest in the period ahead.

All in all, the conditions in the euro area insurance sector are likely to improve in the period ahead, although there are a number of risks confronting insurers that could affect this development 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 remain at low levels;
- credit investment risks;
- risks associated with the moderate recovery in economic activity;
- the risk of losses from catastrophic events exceeding projected losses; and
- contagion risks from banking activities or via links to banks and other financial institutions.

These risks are discussed below. It should be noted that these risks 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 are confronted with.

At end-2009 large euro area insurers continued to be most exposed to government and corporate bonds, and they continued to shift their investment strategies away from equities and structured credit, also towards the end of

Chart 5.7 Earnings per share (EPS) for a sample of large euro area insurers, and euro area real GDP growth

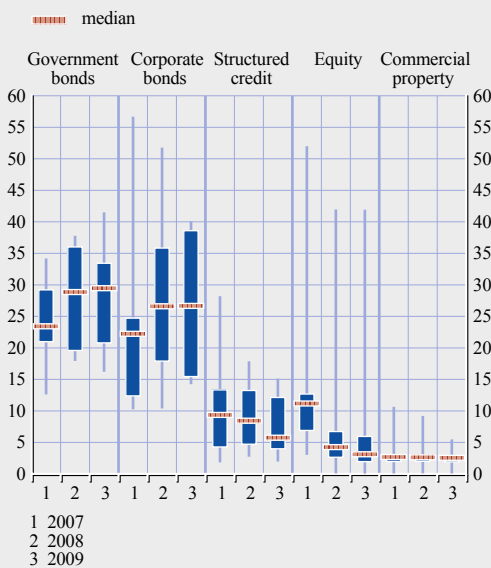
(Q1 2002 – Q4 2011)



Sources: ECB, Thomson Reuters Datastream and ECB calculations.

Chart 5.8 Distribution of bond, structured credit, equity and commercial property investment for a sample of large euro area insurers

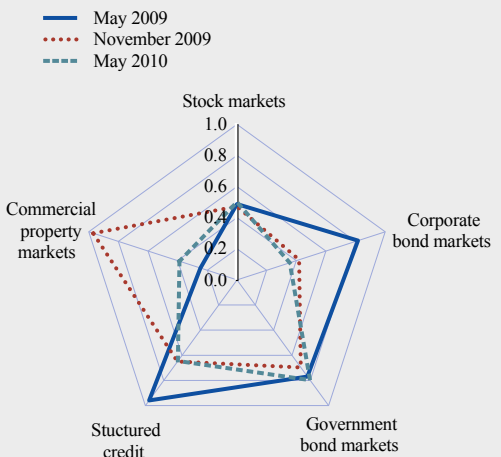
(2007 – 2009; percentage of total investments; maximum, minimum and interquartile distribution)



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

Chart 5.9 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.
Note: For details on how the uncertainty map is created, see Box 13 in ECB, *Financial Stability Review*, December 2009.

2009, in an attempt to de-risk their investment exposures (see Chart 5.8 and Box 15).

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 finalisation of the December 2009 FSR (see Chart 5.9). The uncertainty about future developments in some of the markets in which insurers invest contributes to continued relatively high investment risks.

Box 15

USING PROVISIONAL ECB STATISTICS FOR INSURERS AND PENSION FUNDS TO ANALYSE THEIR INVESTMENT RISKS AND LINKAGES

Investment risks are one of the most prominent risks that insurers and pensions funds are confronted with, and the analysis of insurers' and pension funds' financial asset positions is therefore an important element in financial stability analysis. From a broader financial stability perspective, it is also important to analyse the investment of insurers and pension funds, since portfolio reallocation of insurers, or the unwinding of positions, has the potential to affect financial stability by destabilising asset prices.¹ In addition, the investment of insurers and pension funds create important financial links to, in particular, governments and banks.

¹ See ECB, "The importance of insurance companies for financial stability", *Financial Stability Review*, December 2009.

Such analyses of insurers' and pension funds' financial assets are, however, often hampered by the lack of harmonised and timely data. The financial accounts published by insurers and pension funds often fail to contain information in sufficient detail to analyse investment links with other types of institutions and firms. However, new provisional ECB statistics for the euro area insurance corporations and (autonomous) pension funds (ICPF) sector make such analyses possible on an aggregate basis.²

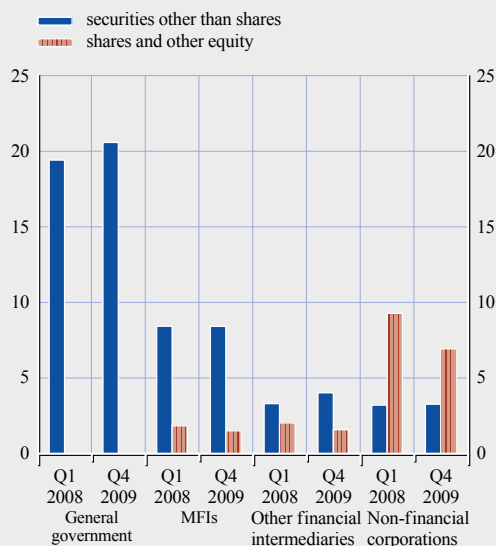
This new dataset follows the concepts and definitions of the European System of Accounts 1995 (ESA 95). It comprises quarterly stock data for the ICPF sector as a whole, available three months after the end of the reference quarter. Assets and liabilities are valued at market prices, with the exception of deposits and loans that are recorded at nominal value. The data are broken down by type of instrument, by regional (euro area and non-euro area) and sectoral counterparts, as well as, where applicable, by original maturity. The data are compiled on a host approach covering, therefore, all businesses in the euro area, either by domestically or foreign-owned entities and on a non-consolidated basis.

The statistics, which are still experimental, show that the most important asset class in which euro area insurers and pension funds invest is “securities other than shares”, which mainly comprises bonds issued by governments and monetary financial institutions (MFIs). Nearly half of the securities of this class held by insurers and pension funds are issued by euro area governments (see the table below), which represent around 20% of the total euro area financial assets of the ICPF sector. The share of holdings of government bonds increased during the financial crisis when many insurers and pension funds shifted their investment strategies away from, in particular, equities to government bonds (see the chart). As a result of the increased exposures, insurers and pension funds now account for around 20% of the debt securities issued by euro area governments, which make an important provision for governments' funding.

Euro area ICPFs are also providing funding to other sectors. After governments, the euro area ICPF sector has its second biggest debt securities exposure to euro area MFIs, a sector that consists, in particular, of credit institutions (see the table and chart). Euro area insurance corporations and pension funds hold about

Financial assets of euro area insurance companies and pension funds

(percentage of total financial assets)



Sources: ECB.

² So far, data on the ICPF sector were part of the euro area accounts (see Table 3.5 in the ECB's Monthly Bulletin and the ECB Statistical Data Warehouse (SDW)). The new provisional data are derived from an ongoing ECB project to develop more detailed regular statistics on the assets and liabilities of insurers and pension funds. Apart from insurers (insurance and reinsurance), the statistics cover autonomous pension funds, i.e. funds that have autonomy of decision-making and keep a complete set of accounts. Non-autonomous pension funds set up by, for example, credit institutions or non-financial corporations are not covered since they are not separate institutional units.

Financial assets of euro area insurance companies and pension funds

(Q4 2009; EUR billions)

	Total	MFIs	Non-MFIs					Rest of the world	Not allocated
			General government	Other residents			Households		
				Other financial intermediaries	ICPF	Non-financial corporations			
Total financial assets	6,482	1,387	1,227	1,669	416	631	190	796	166
Currency	8	0	0	0	0	0	0	0	8
Deposits	813	738	0	0	0	0	0	75	0
Securities other than shares, excl. financial derivatives	2,416	465	1,136	222	17	180	0	396	0
<i>Up to 1 year</i>	42	19	11	1	0	2	0	9	0
<i>Over 1 year</i>	2,374	446	1,125	221	17	178	0	387	0
Financial derivatives	44	11	0	7	0	0	0	26	0
Loans	440	9	90	18	87	56	143	38	0
Shares and other equity	746	84	0	88	30	383	0	162	0
<i>Quoted shares</i>	351	53	0	27	21	160	0	90	0
<i>Unquoted shares and other equity</i>	395	30	0	61	8	224	0	72	0
Mutual funds shares/units	1,486	81	0	1,334	0	0	0	71	0
Prepayments of insurance premiums	296	0	0	0	268	0	0	29	0
Other accounts receivable/payable	232	0	1	0	15	12	46	1	158

Source: ECB.

€465 billion of debt securities issued by euro area MFIs, which represents around 10% of the total debt securities issued by euro area MFIs.

With a total value of €1.5 trillion, mutual fund shares take second place to debt securities as an asset class in which euro area insurers and pension funds invest (see the table). Estimates show that ICPFs have about one-third of their mutual fund investment in bond funds, followed by investments in mixed funds and equity funds (about one-quarter each). The share of investments in real estate funds, hedge funds and other funds together amounted about 10% of the total, and money market funds account for the remaining 5%.

As highlighted in previous FSRs, insurers and pension funds suffered from a significant decline in the value of their equity holdings during the financial crisis, and many also sold equities in an attempt to de-risk their investment exposures. As a result, the importance of shares and other equity declined from around 14% to 11% of total financial assets (see the chart and table). ICPFs have invested mainly in shares issued by non-financial corporations, but they also hold €53 billion of quoted shares issued by euro area MFIs. This represents around 9% of MFIs' total quoted shares and highlights the size and importance of the links between the ICPF and MFI sectors.

Finally, ICPF investments in the rest of the world represented 12% of their total financial investments; around half of these investments are in debt securities (mainly with a maturity of over one year) and 20% in shares and other equities.

To sum up, the ECB's new, more detailed statistics on insurance companies and pension funds will make an important contribution to the analysis of the sector's financial condition and risks, and of financial asset linkages with other sectors of the economy and, in particular, other financial sectors. Aggregate data for the ICPF sector are valuable to study trends in the sector as a whole.

It is also important to analyse such aggregate data from a broader financial stability perspective as it is often the ICPF sector as a whole, or clusters of insurers and pension funds, that has the potential to affect financial stability, in particular via the investment behaviour. Nevertheless, aggregate data can hide important differences across institutions. Sector-wide assessments therefore need be complemented with an analysis of a set of large and important insurers to allow a more timely and detailed analysis.

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

Because of the large government bond exposures (see Chart 5.8 and Box 15), insurers continue to face the risk of government bond yields remaining at low levels. 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 Box 16). At the same time, lower government bond yields have had a negative effect on the value of insurers' liabilities because government bond yields are often used to discount future liabilities (see Box 16).

Average ten-year government bond yields in the euro area were 40 basis points lower in mid-May than they were at the time of the finalisation of the December 2009 FSR, and the level of uncertainty in the markets has increased somewhat (see Chart 5.9). This, together with continued strong demand from insurers in investing in highly rated government bonds,

leads to the conclusion that insurers continue to face the associated risk.

Credit investment risks

Although corporate bond exposures remain high (see Chart 5.8), the improvements in the markets after the finalisation of the December 2009 FSR imply that the investment risks for insurers have continued to decline somewhat (see Chart 5.9). Nevertheless, corporate spreads remain wide by historical standards and bankruptcies are expected not to have reached their peaks as 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 losses for insurers, although the related higher yields would also have positive effects as it would allow insurers to invest new funds in higher-yielding assets and lower the net present value of future liabilities (see previous sub-section and Box 16).

Box 16

ARE LOW RISK-FREE INTEREST RATES GOOD OR BAD FOR INSURANCE COMPANIES?

Large and increasing investment exposures to government bonds have left insurers more vulnerable to changes in long-term risk-free interest rates and their levels. However, changes in risk-free interest rates affect both the asset and the liability side of insurers' balance sheets. This box discusses the various ways in which interest rate levels and changes impact insurers, with the aim of shedding some light on whether low-risk free interest rates are good or bad for insurers.

Euro area insurers and pension funds increased their investment exposures to government bonds during the financial crisis (see Chart A). These increases reflect not only valuation changes, as euro area government bond prices have been rising since mid-2008, but also outright portfolio

shifts, mainly away from equities into government bonds. The share of government bonds in their total financial assets, however, has decreased somewhat in recent quarters, although exposures still remain high. In the fourth quarter of 2009, euro area insurers and pension funds had about €1.1 trillion invested in securities issued by euro area governments, which represented more than 20% of the total euro area financial assets of the sector (see Chart A).

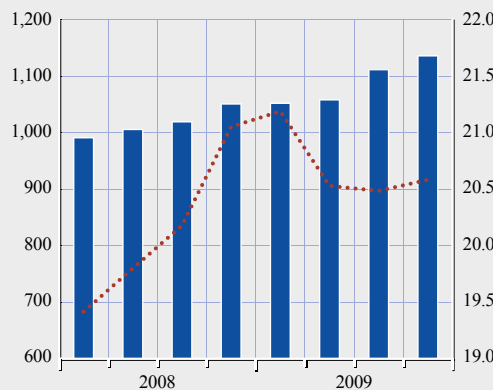
For assets of insurers and pension funds, an increase (decrease) in government bond yields will lead to unrealised losses (gains) in the short term as the value of the securities held declines (increases). This is because large listed insurers mainly classify their bond holdings as “available for sale” and they are thus entered in the balance sheets at fair value, with any losses or gains that are recorded leading to movements in shareholders’ equity. To gauge the potential impact of long-term interest rate increases, one can take ten-year average euro area government bond prices as a proxy and assume that they would fall back to their mid-2008 levels. In such a scenario, the result would be a decline of some €160 billion, or around 17%, in the market value of government bonds held by euro area insurers and pension funds. Insurers’ ability to hold investments until maturity (to back their long-term liabilities) means that the key risks facing insurers from debt security exposures are not temporary losses in value – unless they are forced to sell assets due to, for example, liquidity shortages or rating downgrades of the instruments held – but defaults.

In the *longer term*, higher government bond yields are positive for insurers’ investment since it allows them to invest in higher-yielding assets. 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 B). This risk, however, has been mitigated to some extent in recent years by some supervisors imposing lower maximum guaranteed rates. Nevertheless, the risk remains for a large proportion

Chart A Euro area insurance companies’ and pension funds’ holdings of government securities

(Q1 2008 – Q4 2009)

— government securities holdings (EUR billion; left-hand scale)
 government securities holdings (percentage of total financial assets; right-hand scale)

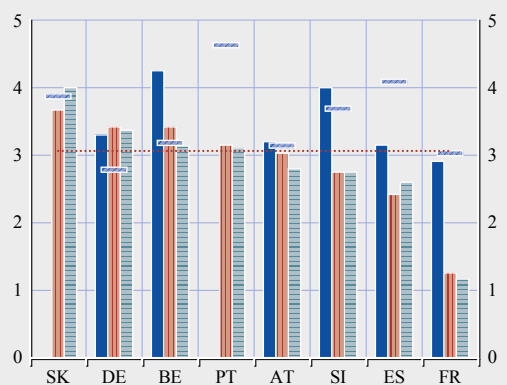


Source: ECB.

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

(percentage)

— average guaranteed rates in 2000
 average guaranteed rates in 2007
 — average guaranteed rates in 2009
 — ten-year government bond yield in mid-May 2010
 ten-year EUR swap rate in mid-May 2010



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

of outstanding contracts since the lower maximum guaranteed rates in most countries only apply to new contracts and average guaranteed rates therefore remain rather high in some countries (see Chart B).

Insurers have also taken actions in recent years to reduce their interest rate risks by, in particular, lowering their guaranteed rates and hedging exposures by using interest rate derivatives.

Turning to insurers' and pension funds' *liabilities*, an increase (decrease) in government bond yields has a positive (negative) effect on the value of their liabilities. This is because the use of higher bond yields to discount future liabilities reduces the net present value of the liabilities. The technical life insurance and pension fund reserves of euro area insurers and pension funds amounted to almost €4.7 trillion in the fourth quarter of 2009. This can be compared with the €1.1 trillion invested in securities issued by governments at the same time, which implies that the potential negative short-term impact of an increase in government bond yields on the asset side could be outweighed by the positive impact on the liability side.

All in all, an increase in government bond yields is generally positive for insurers and pension funds. This is because the negative shorter-term impact that rising interest rates can have on the value of holdings of government bonds is often mitigated by insurers' ability to hold investments until maturity and by a reduction of the present value of liabilities on account of higher discount rates. Nevertheless, insurers and pension funds with large exposures to interest rate risk could be faced with significant asset value declines if long-term interest rates were to rise. In addition, insurers and pension funds might be forced to sell government bonds if higher interest rates are accompanied by rating downgrades of government bonds, as insurers and pension funds are often only allowed to invest in highly rated assets.

Other investment risks

As has already been mentioned, most insurers continued to shift their investment strategies away from equities throughout 2009. As a result, large insurers' equity exposures, excluding those to mutual funds, decreased from about 4%, on average, at the end of 2008 to 3% at the end of 2009 (see Chart 5.8). This has left insurers less vulnerable to adverse developments in stock markets, although uncertainties in the markets remain (see Chart 5.9).

Many analysts and market observers believe that some insurers will continue to divest from equities in the run-up to the introduction of Solvency II in 2012. This is due mainly to the relatively higher capital charges for equity investments in the new solvency requirements. Some estimates put the potential shift from equities to credit in the range of €150-€200 billion over the next few years for all insurers adopting Solvency II.⁵ This can be compared

with the equity holdings of insurers in all European Economic Area (EEA) countries in 2008, which amounted to around €950 billion. From a broader financial stability perspective, the retrenchment of insurers in equity markets could lead to greater volatility since insurers often have long-term investment strategies and are thus a source of stability in financial markets.

Some insurers have significant exposures to commercial property markets, via direct investment in property (see Chart 5.8) or 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 5.9). This could, in turn, negatively affect insurers' commercial property investments.

⁵ See, Bank of America Merrill Lynch, "Solvency II: welcome to the casino", January 2010.

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 improvements in the economic outlook after the finalisation of the December 2009 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 four main ways in which this could continue to affect insurers negatively. First, insurance underwriting and investment income developments typically follow trends in the overall economy (see Chart 5.10). Underwriting and investment income are therefore likely to remain subdued in many segments until the economic recovery has gained more momentum.

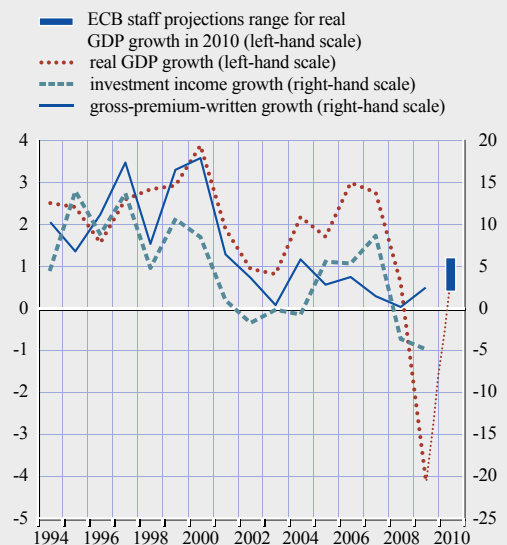
Second, in addition to reduced new premiums written, the moderate macroeconomic activity is reducing the disposable income of many households. This can lead to higher lapse and surrender rates, in particular for life insurers, as lower disposable income for households can reduce their ability to service premiums and may induce policy surrenders.

Third, the moderate economic conditions have weakened the conditions in 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 different types of commercial property investment (see the sub-section above).

Fourth, fraudulent claims are more common during periods of weak economic activity. In the past, there was a delay between the onset of a recession and the pick-up in fraudulent claims, as firms and households first try to cope with the tougher times before trying to extract money from an insurance policy. An increase in fraudulent claims in the period ahead cannot, therefore, be excluded.

Chart 5.10 Growth in gross premiums written and investment income for a sample of large euro area insurers, and euro area real GDP growth

(1994 – 2010; percentage change per annum)



Sources: ECB, Thomson Reuters Datastream and ECB calculations.

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.

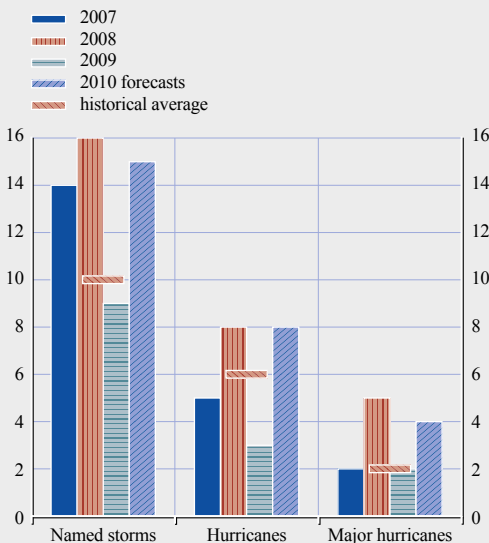
European windstorms – which are second in importance as a cause of global natural catastrophe insurance losses after Atlantic hurricanes – struck several European countries in the winter of 2009-10. In particular, windstorm Xynthia caused widespread damage and losses in western Europe. Xynthia had a negative impact on some insurers' profitability in the first quarter of 2010 and further claims in the period ahead are likely, but it is not expected to lead to material capital erosion among insurers.⁶

In addition, some euro area reinsurers endured significant losses as a result of the

⁶ See, Fitch Ratings, "Windstorm Xynthia Impact Manageable for French Insurers", March 2010.

Chart 5.11 Atlantic hurricanes and storms

(2007 – 2010; number of hurricanes and storms)



Source: Colorado State University (CSU).

Chilean earthquake in February, which also impacted earnings in the first quarter of 2010.

Looking ahead, the level of activity for the 2010 Atlantic hurricane season is forecast to be somewhat higher than the historical average (see Chart 5.11). This poses risks for those euro area insurers that are exposed to potential losses caused by Atlantic hurricanes.

All in all, catastrophic events during 2009 and in early 2010 did not cause severe losses for euro area insurers. However, the risk that future losses would be above projected losses increased after the finalisation of the December 2009 FSR.

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 insurers that are part of a financial conglomerate, have in many cases been more severely affected by the financial crisis, due to the especially testing 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 €465 billion of debt securities issued by euro area MFIs in the fourth quarter of 2009, up from €451 billion in the second quarter of 2009 (see also Box 15). This represents 19% of insurers' and pension funds' total holdings of debt securities and 7% of their total financial assets. At the same time, euro area insurers and pension funds held about €53 billion of quoted shares issued by euro area MFIs in the fourth quarter of 2009, compared with €56 billion in the second quarter.

Although the financial condition of the euro area banking sector improved after the finalisation of the December FSR, many risks and challenges confronting the sector remain. The associated risks for insurers therefore remain broadly unchanged.

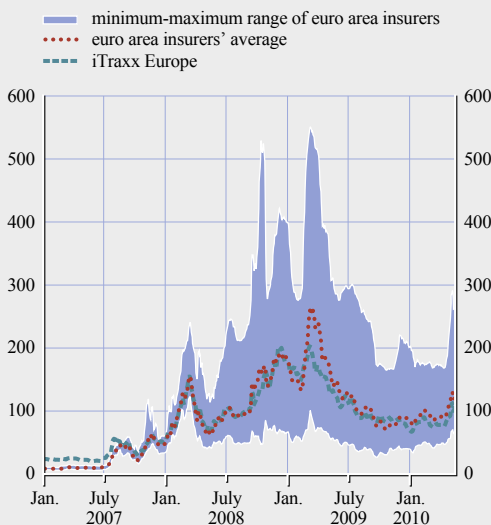
5.3 OUTLOOK FOR THE INSURANCE SECTOR ON THE BASIS OF MARKET INDICATORS

Market indicators for insurers signal a somewhat more uncertain outlook than they did six months ago. The stock prices of insurance companies in mid-May stood about 8% below the levels seen in late November 2009, which was comparable to the decrease for the Dow Jones EURO STOXX index during the same period. Reinsurers and non-life insurers recorded only slight decreases in stock prices during the past six months, whereas the stock prices of life insurers, which had generally been hardest hit by the financial crisis, saw further stock price declines during the past six months (see Chart S128).

Euro area insurers' credit default swap (CDS) spreads hovered around 100 basis points, on average, from late November 2009 until mid-April 2010. They did, however, once again rise above the overall iTraxx index and widened by some 40 basis points towards the end of April

Chart 5.12 Credit default swap spread for a sample of euro area insurers and the iTraxx Europe main index

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



Sources: Bloomberg and JPMorgan Chase & Co.

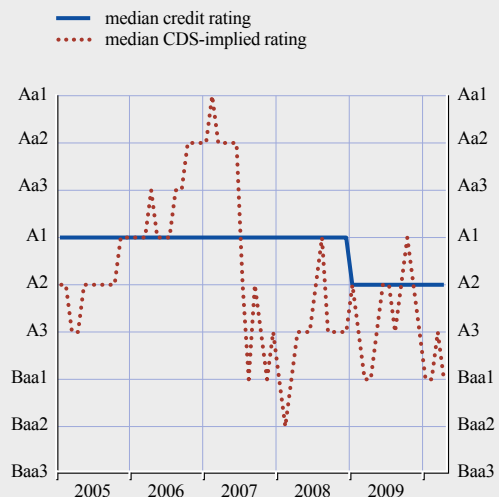
and early May due to the heightened uncertainty in financial markets at that time (see Chart 5.12).

As mentioned in previous FSRs, many euro area insurers saw their credit ratings downgraded by rating agencies during the financial crisis. Rating agencies have maintained their negative outlook for many European insurers and for most large primary euro area insurers covered in this section. However, there were no further rating downgrades after the finalisation of the December 2009 FSR.

Given the wider CDS spreads, but stable credit ratings after the finalisation of the December 2009 FSR, the gap between insurers' credit ratings and CDS-based market-implied ratings (MIRs), again turned negative (see Chart 5.13). This implies that CDS investors view large euro area insurers' credit risk as being higher than rating agencies do, although it should be noted that factors other than credit risk – such as liquidity risk – can impact the level of CDS spreads.

Chart 5.13 Credit and market implied ratings for a sample of euro area insurers

(Jan. 2005 – Apr. 2010)



Source: Moody's.

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 financial performance of primary insurers and reinsurers improved in the fourth quarter of 2009 and the first quarter of 2010, although some insurers continued to show a lacklustre performance. Many of the pre-existing risks and challenges for the sector remain, which contributes to some continued uncertainty about the outlook for the euro area insurance sector. In particular, the moderate recovery in economic activity is continuing to weigh on the underwriting performance of euro area insurers. At the same time, the uncertainty prevailing in financial markets and the low levels of yields on AAA-rated government bonds continue to pose challenges for the stability of insurers' investment income.

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

- ➔ the risk that yields on AAA-rated government bonds 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 December 2009 FSR*
 ➔ *Unchanged since the December 2009 FSR*
 ↓ *Decreased risk since the December 2009 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 materialisation of the risks they currently face. However, some insurers might need to raise the share of core equity in their overall capital buffers by retaining earnings, disposing assets or raising equity capital in the period ahead, in view of the forthcoming introduction of Solvency II.

6 STRENGTHENING FINANCIAL SYSTEM INFRASTRUCTURES

The operational performance of the key euro payment and securities settlement infrastructures continues to be stable and robust. In particular, TARGET2, with a market share of 90% in terms of value among large-value payment systems in the euro area, and the Continuous Linked Settlement (CLS) system have continued to run smoothly and maintained a high level of resilience. None of the few incidents observed in the second half of 2009 posed any significant risk.

During recent months, there have been important developments with respect to the efforts to establish central counterparties (CCPs) for over-the-counter (OTC) derivatives. Two CCPs for the clearing of credit default swaps (CDSs) were established within the euro area. At the same time, further regulatory initiatives to enhance the safety and soundness of CCPs for OTC derivatives and trade repositories are being undertaken by the European Commission as well as the Committee on Payment and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO).

It is of great importance for the overall stability of the financial system that the financial market infrastructure functions soundly and is resilient. The smooth operation of the payment and settlement infrastructure not only contributes to financial stability, but is also a precondition for the implementation of the Eurosystem's monetary policy.

This section presents, from an oversight perspective, the main developments in the euro financial market infrastructure and the relevant oversight activities carried out, and reports on the most important recent and ongoing initiatives in the field of payments and securities clearing and settlement services.

6.1 PAYMENT INFRASTRUCTURES AND INFRASTRUCTURE SERVICES

DEVELOPMENTS IN KEY EURO PAYMENT INFRASTRUCTURES

TARGET2

The geographical scope of TARGET2 is continuing to increase. Slovakia joined the system in January 2009, followed by Bulgaria in February 2010. In both cases the TARGET2 oversight function monitored the connection process, including the proper implementation of the harmonised TARGET2 rules into the respective national real-time gross settlement (RTGS) rules. Currently, 23 central banks (including the ECB) participate in or are connected to TARGET2.

TARGET2 is also continuously being developed further in terms of technical integration. In the course of 2009, two central banks (the Nationale Bank van België/Banque Nationale de Belgique and Banco de Portugal) moved all of their remaining settlement activities from the proprietary home accounts (PHAs) to the Single Shared Platform (SSP) of TARGET2. Currently only four national central banks maintain PHAs (those of Austria, Germany, Lithuania and Poland).¹

Operational performance

In the second half of 2009, the average daily value of settled transactions amounted to €2.06 trillion, which represents a small decrease in comparison with the first half of 2009 (€2.25 trillion). The daily average volume of transactions was 347,804, corresponding to a small increase in comparison with the first half of 2009 (343,640).

In the second half of 2009, the hourly average values settled on the SSP during the day were at

¹ In addition, Greece, Spain, Cyprus, Luxembourg, Malta and Slovenia operate PHA applications with limited functionalities and without providing RTGS services.

their highest in the first hour (7 a.m. to 8 a.m.) and the penultimate hour (4 p.m. to 5 p.m.) of operations (see Chart S133).

The overall level of non-settled payments² in the second half of 2009 was higher than in the first half of 2009. The daily average number of non-settled transactions increased from 542 to around 581, whereas the daily average value of these payments declined from €28 billion to €24 billion, which means that, in terms of value, 1% of the total daily average turnover was not settled.

TARGET2 maintained its leading position among large-value payment systems in the euro area, with market shares of 90% in terms of value and 60% in terms of volume.

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 classified as major incidents.³ This is because these events may point out potential risks and vulnerabilities inherent in the system which, ultimately, might have implications for its compliance with Core Principle VII on security and operational reliability.

The analysis of all incidents in TARGET2 in the second half of 2009 did not identify any significant risks in this respect. The number of minor incidents slightly increased compared with the previous semester. Since none of these events resulted in complete downtime, the calculated availability ratio of TARGET2 remained 100% over the reporting period (see Chart S134). All failures were properly followed up by the system operator, and there was no impact on the secure and operationally reliable functioning of TARGET2 during the reporting period.

Oversight assessment

Comprehensive TARGET2 oversight assessment

As reported in the previous issue of the FSR, the final report on the “Assessment of the design of TARGET2 against the Core Principles” was approved by the Governing Council and published in May 2009.

In the reporting period, the TARGET2 oversight function continuously monitored the compliance of the system with the applicable oversight standards, focusing special attention on the proper follow-up of the few remaining findings of the assessment report.

In March 2010 the TARGET2 oversight function completed its follow-up of two oversight findings concerning the change and release management procedures and the involvement of users in the future evolution of TARGET2 on the basis of information delivered by the TARGET2 operation function.

The TARGET2 oversight function concluded that the related provisions in the respective internal system documentation and in the “Information guide for TARGET2 users” allow for an orderly change and release management procedure, including sufficient participation of TARGET2 users in the change management process as well as transparency of the rules concerning collection and evaluation of changes, communication to users at various stages of the release management process and implementation of new requirements.

- 2 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.
- 3 Major incidents are those lasting more than two hours and/or leading to a delayed closing of the system.

The TARGET2 oversight function will reconsider the remaining open findings related to technical options for real-time synchronisation between the two processing regions and provision of additional collateral in contingency processing, operational overhead costs and cost recovery of the liquidity-pooling functionality after receiving additional information from the TARGET2 operation function on how the findings have been addressed.

The compliance of TARGET2 with the BCOE for SIPS

Following the publication of the Business Continuity Oversight Expectations (BCOE) in May 2006,⁴ operators of systemically important payment systems (SIPS) were requested to commence work on the implementation of the four key elements specified in the document. SIPS were expected to implement and test these elements by June 2009.

The oversight assessment was largely based on the information provided by the TARGET2 operation function. The TARGET2 oversight function found that the operator had made good progress in implementing the BCOE. The business continuity framework of TARGET2 is, in general, well established and ensures a high level of resilience. The four key areas of the BCOE are considered to have largely been addressed. While the assessment highlighted some areas where further improvements would be advisable, none of these imperfections pose significant risk to the effective functioning of the overall business continuity framework of TARGET2 from an oversight perspective.

Nevertheless, the TARGET2 oversight function issued a few recommendations to the TARGET2 operator and will closely monitor progress on these issues within the framework of the overall follow-up process for the BCOE assessment exercise.

New releases

Within 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 new software release implemented in November 2009 was subject to an oversight assessment. The relevant changes implemented in the new release were considered to be in line with the requirements of the Core Principles. Furthermore, all changes should have, to a larger or smaller degree, a positive impact on the management of liquidity by the system participants. The TARGET2 oversight function issued a few recommendations mostly related to the technical implementation and testing process.

CLS

Since it began operations in September 2002, CLS has rapidly developed into the market standard for foreign exchange settlement between banks, corporates, non-bank financial institutions and investment funds. A key feature of CLS is the settlement of gross-value instructions with multilateral net funding on a payment-versus-payment basis, also known as Pvp. 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 offers 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) supervised by the Federal Reserve. Given its multi-currency nature and systemic relevance, the G10 central banks, the ECB and the central banks whose currencies are settled in

4 In June 2006 the ECB published the BCOE for SIPS, presenting the Eurosystem's expectations of the system operators with regard to the business continuity aspects of the CPSS Core Principle VII, according to which "the system should ensure a high degree of security and operational reliability and should have contingency arrangements for timely completion of daily processing". These expectations are relevant for all euro area SIPS, including retail payment systems, and also for critical participants and third party providers to these systems.

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 2010 the number of CLS participants has continued to grow. In April 2010 there were 60 settlement members, as well as 7,520 third-party users (banks, corporates, non-bank financial institutions and investment funds) in the system. The increase was mainly due to investment funds joining the CLS system (as third-party users).

Main developments

The main development since the last issue of the FSR was the introduction of an aggregation service in January 2010.

The aggregation service is intended to reduce the number of high frequency, low value foreign exchange trades and to compress them into a single aggregated trade, thereby, *inter alia*, lowering the transaction processing costs for CLS members. At the same time, a new pricing structure for settlement services has been introduced as of 1 November 2009 to take account of the fact that volumes will decrease owing to the introduction of the aggregation service. The new pricing policy combines value-based, volume-based and fixed fee charges and is intended to stabilise the revenue stream.

Operational performance

After September 2009 the daily average volumes settled in CLS increased at first, then dipped slightly towards the end of the year, and have now increased again since the beginning of 2010. During the reporting period (September 2009 to April 2010), an average daily volume of 340,000 trades were settled per day with an average daily value equivalent of USD 3.8 trillion. The share of USD and EUR remained stable during the reporting period. The US dollar accounted for 44% of settled transactions and the euro for about 20%.

The share of single-currency transactions (non-PvP transactions) is still small in relative terms.

Incidents

Throughout this period, all instructions were settled and all pay-outs were achieved in CLS. In terms of service provision, the number of external issues impacting CLS' daily timeline was low.

OVERSIGHT OF INFRASTRUCTURE SERVICE PROVIDERS

SWIFT

SWIFT is a key messaging service provider for payments and securities settlement systems. Given its importance for the safety and efficiency of the payment and securities settlement systems, the G10 central banks oversee SWIFT. The Nationale Bank van België/Banque Nationale de Belgique is lead overseer of the central banks' cooperative oversight arrangement since SWIFT is incorporated in Belgium. In 2009 the activities relating to the oversight of SWIFT focused primarily on developing the distributed architecture project. Other activities relating to the oversight of SWIFT included the review of SWIFT's monitoring of and procedures for cyberdefence, information system audit activities and security risk management.

Main developments

In 2007 SWIFT announced its plans to implement a multi-zonal messaging architecture that would enable intra-zone messages to be processed and stored within their region. Distributed Architecture (DA) is a major SWIFT project described in a previous edition of the FSR. DA was split into two phases. During DA Phase 1, SWIFT planned, tested and implemented the required changes in its infrastructure for the creation and activation of two message processing zones, namely the European and transatlantic zones. The country allocation to the two processing zones was determined in 2008. As part of DA Phase 1, SWIFT set up a command and control centre in Asia, allowing its operations to be monitored from there, as well as from similar centres in Europe and the United States. Finally, SWIFT also set up an additional operating

centre for the European processing zone. The operating centre became operational in 2009. With the activation of the new operational site in Europe and the creation of processing zones in early 2010, Phase 1 of the project has been completed. SWIFT is now in the process of planning and implementing Phase 2 of the DA project. The main deliverable of DA Phase 2 is the implementation and roll-out of a new global SWIFT operating centre that will be used to serve both processing zones.

Other developments in 2009 included the activation of the annual SWIFT standards release in November 2009.

Operational performance

In accordance with statistics released by SWIFT, with an average daily volume just below 15 million messages, FIN traffic strengthened during the last quarter of 2009. Overall, FIN traffic declined by 2.6% in 2009 compared with 2008.

Concerning SWIFT resilience, FIN and SWIFTNet achieved 99.999% availability in 2009, with no major incidents affecting operational performance.

6.2 SECURITIES CLEARING AND SETTLEMENT INFRASTRUCTURES

OTC DERIVATIVES

Efforts to develop market infrastructures for OTC derivatives continued during the first half of 2010. This included three main areas of work.

First, further CCPs and trade repositories for OTC derivatives were established. Within the euro area, a new CCP for CDSs was set up on 29 March 2010 by the French clearing house LCH.Clearnet SA, which will complement the existing services provided by the German clearing house Eurex Clearing. The importance of the availability of euro area CCPs for OTC derivatives has recently been underlined by several euro area leaders,⁵ in line with the Eurosystem's view communicated by the

Governing Council in December 2008 and July 2009.

Second, a number of measures are underway to ensure the safety and soundness of CCPs for OTC derivatives and of trade repositories and to pre-empt the potential for regulatory arbitrage, as well as to enhance the safety and transparency of OTC derivatives markets more broadly. In close coordination with respective efforts in other jurisdictions, the European Commission is currently developing a legislative framework for OTC derivatives, including for central counterparty clearing and trade repositories in this field. Furthermore, on 12 May 2010 the CPSS and IOSCO issued a public consultation on the application of the 2004 recommendations for central counterparties to CCPs for OTC derivatives as well as on considerations regarding trade repositories.⁶

Finally, cooperation between overseers and regulators of OTC derivatives infrastructures is being stepped up to reflect their cross-border and cross-currency implications. A key element in this regard is the development of cooperative oversight arrangements for OTC derivatives CCPs and trade repositories, in line with the principles for international cooperative oversight. In addition, at the multilateral level, the OTC Derivatives Regulators Forum provides an informal body to support information sharing and coordination among interested central banks, securities regulators, banking supervisors and market surveillance authorities.

5 On 10 March 2010 Nicolas Sarkozy, Angela Merkel, George Papandreou and Jean-Claude Juncker wrote a joint letter to José Manuel Barroso and José Luis Rodríguez Zapatero to draw attention to CDS trading in European government bonds in order to prevent undue speculation, enhance transparency, and improve the soundness and safety of derivative transactions. In this context, the signatories strongly supported "the location of European CCPs within the euro area to enhance integrity and stability of the European financial system".

6 See <http://www.bis.org/press/p100512.htm>



IV SPECIAL FEATURES

A MACRO-PRUDENTIAL POLICY OBJECTIVES AND TOOLS

The need for a framework for macro-prudential policy has been widely recognised in the aftermath of the financial crisis. This special feature discusses, in a tentative way, core elements of this framework: namely its objectives and the policy tools that could be used to achieve them.

The bulk of the policy tools, for which concrete proposals have been put forward at the global level, tend to aim at enhancing the resilience of the financial system. A different set of tools, aimed at addressing financial imbalances directly, could also be of importance in mitigating system-wide risks. Central banks' involvement in macro-prudential policy advice could relate to this latter set of tools more prominently, supported by their systemic risk surveillance and assessment tasks.

INTRODUCTION

The financial crisis has illustrated a considerable gap between financial stability monitoring and assessment tasks (as are conducted by e.g. central banks with financial stability responsibilities) and their translation into effective macro-prudential policy action. In particular, as imbalances were building up in the financial system in the years prior to the summer of 2007, communications of financial stability assessments in both dedicated reports and speeches, for example, illustrate that a number of risks that have subsequently materialised had been identified and remained on central banks and other institutions' radar screens. While assessments might not have been formulated in a sufficiently sharp and eloquent way, the fact that market participants did not expect concrete policy action to derive from the publication of these assessments might also justify their lack of impact on contemporaneous market data, or the ability to affect the behaviour of market participants at longer time horizons.

The costs of financial instability in the event of systemic risks materialising, however,

proved to be too high in terms of both losses to the financial sector and losses to the real economy (as measured by a drop in GDP, for instance, or an increase in public debt) to leave the financial stability oversight process unchanged. In particular, it was recognised that raising awareness of growing vulnerabilities and potential material risks to financial systems' stability was not enough to influence market participants' behaviour and contain overall systemic risk.

In addition, the recent crisis has emphasised the importance of sources of systemic risk¹ such as those emerging from financial interlinkages between large financial institutions and their collective behaviour. These vulnerabilities concurred with those stemming from the build-up of imbalances over time that could, for example, be gauged from trends in aggregated macro-financial variables, possibly related to structural developments (and therefore tending to be more adequately monitored by central banks in charge of safeguarding financial stability). In particular, recognition that the supervisory and regulatory framework generally did not address system-wide risks directly has triggered an intense debate at the global level, and a comprehensive on-going reform.

At the same time, efforts to enhance the capacity of timely and effective risk detection and assessment, as well as effective macro-prudential oversight, are taking place along three fronts: (i) efforts to improve the quality and appropriateness of data and information sources on which assessments are based (e.g. recommendations endorsed by the Group of 20);² (ii) efforts to improve the technical tools supporting systemic risk analysis, notably risk

- 1 A commonly accepted definition of systemic risk does not exist at present. It can be broadly characterised as the risk that financial instability becomes so widespread that it impairs the functioning of a financial system to the point where economic growth and welfare suffer materially (see ECB, "The concept of systemic risk", *Financial Stability Review*, December 2009).
- 2 See FSB-IMF Report to the Group of 20 Finance Ministers and Central Bank Governors, "The Financial Crisis and Information Gaps", October 2009.

detection and risk assessment;³ and (iii) efforts to close the gap between systemic risk assessments and recommendations or decisions on policy action to mitigate the risks identified as material. The focus of this special feature is on the latter strand of efforts, discussing objectives and instruments that can be used by authorities in charge of macro-prudential oversight.

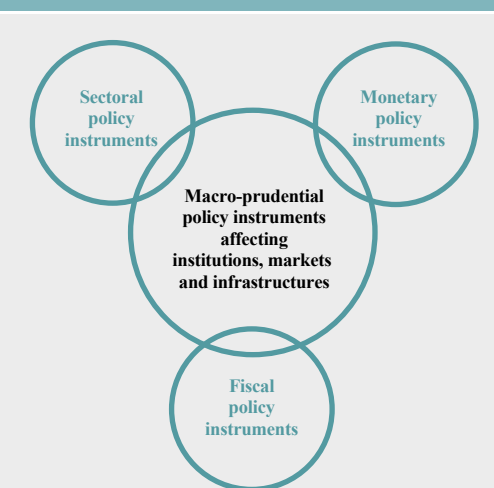
MACRO-PRUDENTIAL POLICY AND OTHER POLICY AREAS

Financial stability is by definition a multifaceted concept, given that it entails the stability of the whole financial system – comprising financial institutions, financial markets and financial infrastructure. As such, financial stability depends on interactions and externalities within and between financial institutions, markets and infrastructures, on the one hand, and the broad economic environment, on the other.⁴ This creates difficulties in defining the objectives of financial stability policy or, as it is more usually dubbed, of macro-prudential policy. It also implies that macro-prudential policy is likely to interact with a number of other macroeconomic policy fields, such as monetary or fiscal policy (see Chart A.1).

However, and irrespective of the scope for overlaps, it should be clear that macro-prudential policy relates exclusively to crisis prevention (as is indicated by the word “prudential”) and that is the concept within which the efforts to set up a framework for macro-prudential analysis and oversight are being undertaken. A clear distinction between crisis prevention, as opposed to crisis management (in which central banks may also have an important role to play), and crisis resolution helps in organising views with respect to the scope for interaction between macro-prudential and, for example, monetary policy, even if there might be some grey areas.

Turning to other policy areas such as fiscal and economic policy on specific sectors, it should be clear that, while there might be scope for

Chart A.1 Macro-prudential policy: interaction with other policy areas



Source: ECB.

interaction in addressing growing financial imbalances, macro-prudential policy may not be the right approach to address them.

Take, for example, a boom in property markets. The root causes for this imbalance may relate to (tight) regulations on building permits and specific features of the tax regime (e.g. tax deductibility of debt service). Reform in the property development industry (sectoral policy) and fiscal policy – and not macro-prudential policy – could address the problem at its source. The situation would be different if the boom in property markets was fuelled by financial leverage.

Another example relates to the use of a monetary policy instrument, such as the minimum reserve requirements, to address financial vulnerabilities (e.g. reserve requirements on foreign currency loans extended by banks in central and eastern European countries).⁵ As illustrated by countries’

3 See Special Feature B, entitled “Analytical models and tools for the identification and assessment of systemic risk”, in this FSR for an overview of analytical investments being made at the ECB.

4 See, for example, the definition of financial stability used in the preface of each issue of the ECB’s FSR.

5 See Special Feature D, entitled “Addressing risks associated with foreign currency lending in the EU Member States”, in this FSR.

experiences, such a measure has generally not proven to be very effective in enhancing liquidity positions of financial institutions.

OBJECTIVE OF MACRO-PRUDENTIAL POLICY

Specifying the objective of macro-prudential policy is not straightforward, even if only formulated in broad and qualitative terms. The multifaceted nature of a stable financial system poses serious challenges to the development of a quantitative, more operational, characterisation of stability.

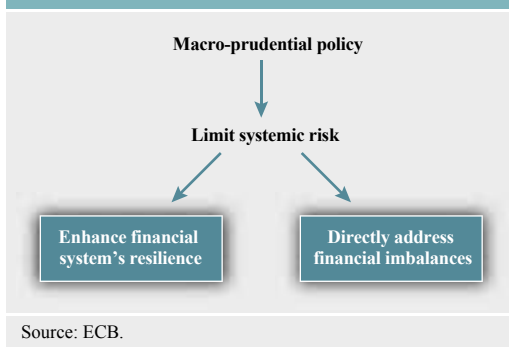
In broad terms, policy-makers tend to agree that the objective of macro-prudential policy is to limit systemic risk, so as to minimise the costs that financial instability can impose on the overall economy.⁶

Limiting systemic risk entails enhancing the resilience of the financial system by addressing both risks stemming from contagion and other forms of interaction between financial institutions (cross-sectional dimension of systemic risk) and the building-up of financial imbalances over time (time dimension of systemic risk).⁷

Improving the resilience and the capacity of the financial system to withstand shocks can be seen as an intermediate step to achieve the objective of ensuring a stable provision of financial intermediation services to the economy⁸ (in the sense that the former is a necessary condition for the latter).

Among the characteristics of a stable financial system, that of efficiently and smoothly reallocating financial resources from savers to investors figures prominently.⁹ The formulation of the objective of macro-prudential policy in these terms would call for policy action in a symmetric way, i.e. both in periods where systemic risk is assessed to be increasing and in periods where systemic risk might be perceived as low, but there are impediments to the efficient allocation of financial resources among players in the system.

Chart A.2 Objectives of macro-prudential policy



Finally, in limiting systemic risk, macro-prudential policy could go beyond enhancing the resilience of the system and ensuring the stable provision of credit and financial services by trying to address detected sources of systemic risk directly (see Chart A.2). Putting it in metaphoric terms, it would mean complementing efforts to build a robust shelter for the financial system with attempts to attack sources of imbalances directly or to intercept them before they “hit” the financial system.

MACRO-PRUDENTIAL POLICY INSTRUMENTS

The financial crisis has set in motion an intense debate on macro-prudential policy at the global level, coupled with efforts to enhance the information base on which systemic risk assessments and suitable policy responses will be formed.

6 Phrased in these terms, the specification of the objective implicitly suggests that there should be an underlying “unavoidable” or “optimal” level of systemic risk in the system. In developing a comprehensive framework for macro-prudential oversight, further thinking needs to go in this direction, also considering the possibility that this “appropriate” level of systemic risk could vary over time, (e.g. on account of structural changes in the financial sector).

7 See C. Borio, “Towards a macroprudential framework for financial supervision and regulation?”, *CESifo Economic Studies*, Vol. 49, No 2, 2003.

8 As proposed in, for example, Bank of England, “The role of macroprudential policy”, *Discussion Papers*, November 2009.

9 See G. Schinasi, *Safeguarding Financial Stability: Theory and Practice*, International Monetary Fund, 2005.

The range of macro-prudential policy instruments is potentially vast, not least on account of its need to encompass measures targeting all three components of the financial system. As such, macro-prudential policy instruments include measures addressing vulnerabilities stemming from financial markets – e.g. measures relating to securities markets or funding instruments such as margins and haircuts on unsecured lending¹⁰ – as well as measures addressing vulnerabilities related to market infrastructures – e.g. encouraging a wider use of central counterparty (CCP) clearing houses for over-the-counter (OTC) derivatives trading and making CCPs comply with sound standards. The bulk of macro-prudential policy measures under discussion, however, relates to the remaining component of the financial system, namely financial institutions. Instruments under discussion in this domain are, for the most part, supervisory or regulatory tools adjusted to address macro-prudential policy objectives, in broad terms, to limit systemic risk.¹¹ In particular, a number of macro-prudential policy proposals for the banking sector have been put forward by the Basel Committee on Banking Supervision (BCBS).¹²

While the debate is centred primarily on measures enhancing the resilience of the banking sector – given its weight on the whole financial system – other financial sectors such as insurance, securities firms and, to the extent that this is possible, unregulated financial entities should also be subject to macro-prudential policy.

Policy tools to enhance system-wide resilience

Proposals put forward by the BCBS relate to policy tools directly affecting banks' balance sheets. These comprise measures both of a micro-prudential nature, i.e. measures aimed at enhancing the resilience of institutions individually, and supervisory or regulatory measures adapted to achieve macro-prudential objectives. Among the policy tools to address the cross-sectional dimension of systemic risk are, for example,

revisions to the prudential treatment of counterparty risk exposures (e.g. risks arising from derivatives and securities financing activities). Possibly more widely debated, due to their novelty, have been BCBS proposals on policy tools to address the time-dimension aspects of systemic risk. Examples of these measures are the establishment of a variable capital buffer to be adjusted through the credit cycle, as well as forward-looking provisioning (Table A.1 provides a summary of the BCBS measures included in the latest consultative package).

Other bodies such as the Financial Stability Board (FSB) are analysing additional measures to enhance the resilience of the system. In dealing with the cross-sectional dimension of systemic risk, a measure under discussion is the possibility of introducing a capital surcharge on systemically relevant institutions (or systemically important financial institutions, SIFIs).¹³ These capital surcharges would attempt to account for these institutions' individual contributions to the overall level of risk in the financial system (implying a higher capital buffer for SIFIs). The difficulties in making this proposal operational are considerable, on account of the challenges of identifying the set of systemically relevant institutions and the appropriate calibration of the surcharge. In the same vein, the possibility of imposing a systemic tax on SIFIs is being examined. Consideration is also being given to the possibility of introducing additional liquidity surcharges for these institutions.

10 See Committee on the Global Financial System, "The role of margin requirements and haircuts in procyclicality", Bank for International Settlements, March 2010.

11 See Committee on the Global Financial System, "Macroprudential instruments and frameworks: a stock-taking of issues and experiences", Bank for International Settlements, May 2010. At the EU level, macroprudential policy will require close interaction between the European Systemic Risk Board and the new European Supervisory Authorities.

12 Basel Committee on Banking Supervision, "Strengthening the resilience of the banking sector" and "International framework for liquidity and risk measurement, standards and monitoring", *Consultative Documents*, Bank for International Settlements, December 2009.

13 See also Special Feature C, entitled "Recent regulatory initiatives to address the role of systemically important financial institutions", in this FSR.

Table A.1 Summary of the micro and macro-prudential measures for the banking sector proposed by the Basel Committee on Banking Supervision in December 2009

Proposed measures on capital and provisioning	
Addressing cross-sectional dimension of systemic risk	
Definition of capital	Tighten eligibility criteria for capital instruments classified as Tier 1 capital
Leverage ratio	Introduce minimum ratio of (high quality) capital over a measure of total exposure
Counterparty credit risk	Strengthen capital requirements for counterparty credit risk exposures (e.g. from derivatives, repos, securities financing)
Addressing time-dimension of systemic risk	
Minimum capital requirements	Reduce cyclicity of minimum capital requirements (e.g. by adjusting probabilities of default in good times)
Capital conservation buffer	Build-up buffer above the minimum that can be drawn down in periods of stress; (maintenance of the buffer could require restrictions on dividend payments, share buy-backs or staff bonus payments)
Countercyclical capital buffer	Adjust capital conservation buffer on the basis of signs of excessive credit growth; accumulation and release phase of the buffer would be conditioned on (macro) variables
Forward-looking provisioning	Move from the current “incurred loss” approach towards provisioning on the basis of expected losses
Proposed measures on liquidity	
Addressing cross-sectional dimension of systemic risk	
Net stable funding ratio (long-term)	Introduce structural ratio to address liquidity mismatches and provide incentives for banks to use stable sources to fund their activities over a one-year horizon
Liquidity coverage ratio (short-term)	Promote short-term resilience (over 30 days) to potential liquidity disruptions: ensure that high-quality liquid assets are sufficient to withstand a stressed funding scenario

Another proposal under discussion relates to contingent capital instruments. Under this proposal, financial institutions could issue debt instruments that would automatically be converted into equity under specified conditions of financial distress, thereby increasing their robustness to withstand unexpected shocks.¹⁴

Measures that are related mainly to crisis resolution, but which would also affect financial institutions’ behaviour towards risk by mitigating moral hazard, include, for example, risk-based deposit insurance schemes (affecting the banking sector as a whole) or measures to enhance the resolution of failures of large and complex financial institutions. Risk-based deposit insurance premia have already been in place in a number of deposit guarantee schemes in some countries in the EU, and around the world, for a number of years. Their wider adoption, or refinements of the financial parameters (measures of risk) on which they are based, could be recommended under the

macro-prudential policy toolkit. Among the measures addressing systemic entities (as are being considered by the FSB), recovery and resolution plans – in particular the so-called living wills – as well as resolution funds, are under debate with a view to enhancing resolvability.

Overall, the measures mentioned so far, in particular the tools acting directly on capital and provisioning, as well as measures relating to the liquidity risk framework, act primarily on banking institutions’ balance sheets, on their capital and liquidity positions, and thereby tend to impact on the supply of credit.

Besides policy tools targeting the banking sector with a view to enhancing its resilience, measures on non-bank financial institutions may also address macro-prudential goals. While less discussed, enhanced monitoring tools

¹⁴ Ibid.

and stricter prudential requirements are being considered in the regulatory reform underway for other regulated sectors such as insurance and securities firms. For the insurance sector in particular, the financial crisis has been interpreted as a sign of the imperative need to move fast towards the implementation of the Solvency II regulation, also ensuring that effective efforts are being made regarding the harmonisation of reporting frameworks.

Policy tools to address imbalances

Turning back to the banking sector, another set of macro-prudential tools can be aimed not at affecting the credit supply (by acting directly on banks' balance sheets), but rather at affecting credit demand (acting on the borrowing side) by directly addressing the sources of financial imbalances. Bringing back the discussion on policy objectives, these measures would complement those aimed at increasing the robustness of the system and its ability to withstand shocks. They would protect the system in a different way, namely by acting directly on the root causes of the identified imbalances. As such, authorities in charge of macro-prudential oversight (e.g. central banks, irrespective of possible responsibilities in the field of the supervision and regulation of the financial sector) could be better positioned to make proposals on potential measures affecting credit demand. Macro-prudential oversight tasks, which entail the continuous monitoring of endogenous¹⁵ and exogenous sources of risk to the system's stability, aim at the early identification of vulnerabilities and risks. These can relate to the building-up of leverage in specific sectors of the economy, in particular if they arise in combination with other latent financial fragilities. They could also relate to signs of overheating in particular financial or property markets.

Measures affecting imbalances could include attempts to act directly on mortgage demand or credit demand from specific sectors in the economy. Examples are measures on lending contracts with a likely impact on demand for credit, such as imposing limits on loan-to-value

(LTV) ratios to reflect greater risk in the underlying collateral. Other measures restricting borrowers' ability to contract a loan relate to limits on loan-to-income (LTI) ratios or other micro-based indicators of mortgage debt servicing capacity at the micro-level transposed into generalised rules or recommendations applicable to the sector as a whole.¹⁶

Like the time-varying policy instruments on capital or liquidity requirements, LTV ratios could be applied, in the macro-prudential context, in a dynamic way, responding to the detection of emerging imbalances. This would mean, for example, that LTV ratios and other measures restricting mortgage demand would be tightened in phases where growth is perceived to be excessive, and relaxed (i.e. increased) in housing market downturns.

The use of limits on LTV ratios in a time-varying way, as a macro-prudential policy tool, would be equally applicable to the commercial property sector, should imbalances be detected there. LTV ratio caps to curb excessive lending in property markets could be imposed uniformly, or according to property price buckets in the event of imbalances being detected, for example, primarily in high-priced or luxury property.

While these types of measures can certainly not eliminate the potential for the build up of bubbles in real estate markets (for example, related to fundamentals such as a limited supply of housing), and the scope for evasion might be higher in some constituencies, their use in a macro-prudential context may help to reduce the scope for overheating in property markets fuelled by bank debt.

Similar measures can be developed to target borrowing conditions for specific sectors in the economy for which growth in leverage levels might pose systemic concerns. This could be

¹⁵ As they stem from within the financial system.

¹⁶ A main drawback of this type of measure could be the scope for circumvention or evasion if it is not applied in a consistent and coordinated way.

done in the form of tighter collateral rules, e.g. by increasing collateral haircuts on secured lending in boom phases that would then be removed or relaxed in downturns. The recommendations on time-varying margins or haircuts on secured financial transactions proposed by the CGFS can also be seen as possibly having an impact on credit demand by affecting funding conditions of non-financial institutions active in securities markets.

Besides their potential effect in directly influencing demand for credit by households and the non-financial corporate sectors, another benefit of these types of measures might be found in their additional effect of clearly communicating, to investors and the public at large, where the main financial stability concerns lie, from the point of view of public authorities. This could have the advantage of affecting borrowers' preferences, thereby reducing incentives for circumvention.

Imbalances can also be addressed by acting indirectly via banks' balance sheets, not in the form of broad risk-based measures, but rather in the form of specific and discretionary measures addressing detected sources of risk. Building on the case of overheated housing markets, examples of such instruments could be

LTV-based capital surcharges on mortgage lending by imposing higher risk weights on loans granted with higher LTV ratios.

Similar surcharges could be applied to the lending and other financial services provided to specific sectors of the economy, should these be perceived as posing material risks to financial system stability at a given point in time. Measures to achieve this goal could entail changing the capital-ratio risk weights on exposures to the identified borrowing sectors or specific classes of borrowers. Measures would then be removed as signs of excessive (or under-priced) lending subside. Some of the measures taken to address excessive foreign currency lending could fall in this category.¹⁷ See Table A.2 for tentative examples of possible measures to address imbalances directly. Most of these hypothetical measures could be activated in phases in which financial imbalances are being built up (in the spirit of "taking away the punch bowl"), in the context of a dynamic approach to macro-prudential policy. They are therefore not contemplated as measures that are part of the regulatory reform under way at the present juncture, where efforts

¹⁷ See Special Feature D, entitled "Addressing risks associated with foreign currency lending in the EU Member States", in this FSR.

Table A.2 Tentative measures to address financial imbalances directly

Aiming at affecting credit demand		
Property markets	Time-varying LTV (and LTI) ratios	LTVs (LTIs) lowered in periods of overheated property markets, relaxed in downturns, possibly coupled with other borrower eligibility criteria
Credit to corporates	Collateral rules on secured lending	Tighter collateral rules in credit extended to sectors showing excessive credit growth, or in which system-wide vulnerabilities were detected
Corporates (active in securities markets)	Time-varying margins or haircuts on secured financial transactions	Increased margins or haircuts on secured financial transactions in booms and relaxed in downturns
Aiming at affecting the credit supply		
Property markets	Specific and discretionary capital surcharges	Capital surcharges focused on main exogenous sources of risk such as LTV-based capital-ratio risk weights
Credit to corporates	Specific and discretionary capital surcharges	Capital surcharges focused on main exogenous sources of risk such as adjusted risk weights on exposures to specific borrowing sectors or borrower classes
Securities markets	Time-varying margins or haircuts on secured financial transactions	Increased margins or haircuts on secured financial transactions in overheated periods, relaxed in downturns

to enhance resilience of the system are being given priority.

CHALLENGES

Progress needs to be made on a number of fronts before the implementation of macro-prudential policy can take place in earnest, at the national or the supra-national level.

While the rationale behind policy instruments might be straightforward, their appropriate calibration is of the essence to obtain the expected impact on financial institutions' or borrowers' behaviour. The fact that a large number of tools could be applied cumulatively adds an additional layer of complexity to their design and calibration (e.g. countercyclical capital buffers proposed by the BCBS). The right balance between enhancing the resilience of the system and its effectiveness needs to be taken into account in the selection of the tools for actual implementation and in determining their adequate calibration.

The appropriate calibration of measures – for the sector as a whole or for institutions considered of systemic relevance – will need to take into account the existence of both negative and positive externalities. For example, sound institutions at key nodes of the financial system's network (e.g. the interbank market) may have an important role to play, also in times of stress, as distributors of liquidity to smaller banks. Systemic levies or surcharges in the context of liquidity measures should take these aspects into account.

Furthermore, macro-prudential policy instruments of a time-varying nature require additional analytical efforts in the appropriate determination of the triggers for policy regime shifts. In the case of capital buffers, for instance, these triggers would determine the switch from the accumulation to the release of these buffers, based on macro-financial indicators of the financial cycle. In terms of the measures aimed at influencing credit demand, triggers could relate to property price valuations, or be based

on specific components of household credit or corporate sector credit growth rates. In defining the timing of shifts in the policy regime, distinguishing structural developments (e.g. those related to countries' catching-up processes) from the actual build-up of imbalances may prove to be a difficult and controversial task.

Closely linked to the financial system's reaction to the introduction of new policy tools and their cumulative interaction (as is being assessed, for example, by the quantitative impact studies in the context of the BCBS proposals) is its ultimate impact on economic growth, i.e. whether or not the tools broadly raise borrowing costs or affect the borrowing behaviour of households and corporates (at specific points in the financial cycle). This relates to the need to improve the understanding of macro-prudential policy transmission channels on which very little analytical and empirical work¹⁸ has been conducted as yet.

The task of understanding transmission channels and assessing the potential impact of measures poses a number of challenges such as that of accounting for substitutability and competition between institution and market-based credit. As such, the choice of the appropriate policy instruments may depend on country-specific factors such as the structure and features of the financial system.

Furthermore, a better understanding of the transmission channels of macro-prudential policy would be critical on account of the latter's interaction with other policy areas, in particular with monetary policy. As it tends to affect the quantity or price of bank credit, strengthening the role of macro-prudential policy requires an improved understanding of the expected impact of the policy measures that should inform monetary policy decisions.

¹⁸ See R. Barrell, E.P. Davis, T. Fie, D. Holland, S. Kirby and I. Liadze, "Optimal regulation of bank capital and liquidity: how to calibrate new international standards", *Occasional Paper Series*, Nr 38, UK Financial Services Authority, July 2009.

At the early stage of development at which the framework for macro-prudential analysis and policy stands, the need for reflection on the risks of unintended consequences is key, as formulating policies aimed at stability may lead to vulnerabilities further down the road. For example, introducing CCPs and mandating clearing, but excluding large non-financial corporations from margining or clearing requirements, may lead to the shifting of risk from the financial to the non-financial corporate sector.

The pursuit of macro-prudential policy objectives is likely to require a great degree of international coordination, in order to keep the scope for cross-border and cross-sector arbitrage contained. Avoidance of macro-prudential policies could be manifest in the form of a migration of lending or trading activity to the unregulated domestic financial sector, the domestic non-financial sector, or across the border. These considerations need to be taken into account in the design of the appropriate policy tools and their implementation, notably at the EU level.

CONCLUDING REMARKS

Among the lessons learnt from the recent financial crisis was the need to develop a framework for macro-prudential oversight so as to ensure that systemic risk assessments are accompanied by timely and appropriate policy responses, should these be deemed necessary. In this regard, the European Systemic Risk Board (ESRB), which is to start operating in 2011, will be in charge of macro-prudential oversight and policy recommendations at the EU level.

The regulatory and supervisory reform for the banking sector that is currently under way under the aegis of the BCBS constitutes an important part of the macro-prudential policy response to the crisis. Initiatives to address systemic risk concerns in the non-banking sectors (e.g. insurers and pension funds), securities

markets and financial market infrastructures are also being considered. These measures aim primarily at enhancing the resilience of the financial system.

Efforts to better align system-wide risk assessments with policy actions may justify a more prominent role for macro-prudential measures that address financial imbalances directly. This could be achieved by complementing measures that act primarily on financial institutions balance sheets with policy instruments that try to influence the demand for credit in case there are signs of overheated markets or of the build-up of financial imbalances. In the EU, the ESRB is favourably positioned to provide advice on this latter set of measures, relying on its systemic risk surveillance and assessment. At the same time, the ESRB could have an important coordinating role in the implementation of macro-prudential policy in the EU, e.g. to ensure consistency and a level playing field in the banking sector in the period ahead. Close cooperation between the ESRB and the new European Supervisory Authorities will be crucial to ensure the link between macro and micro-prudential supervision, in particular with respect to the implementation of time-varying prudential measures adjusted to the financial cycle. The need for macro-prudential supervision is now unquestionable, and European authorities are committed to ensuring its effectiveness and success.

B ANALYTICAL MODELS AND TOOLS FOR THE IDENTIFICATION AND ASSESSMENT OF SYSTEMIC RISKS

The identification and assessment of systemic risks is a core function of macro-prudential supervision. There are four broad approaches for analytical models and tools that can support this function. The first three each aim to detect early one of the three main forms of systemic risk, namely the endogenous build-up and unravelling of widespread imbalances, exogenous aggregate shocks and contagion. First, early-warning models and indicators use information in current data in order to signal the presence of emerging imbalances and risks without adding exogenous shocks that are not priced in by the market. Second, macro-stress-testing models are used to assess the resilience of the financial system against extreme but plausible scenarios of widespread exogenous shocks, irrespective of whether current market data give a particular weight to them. Third, contagion and spillover models assess the transmission of instability among financial intermediaries and among financial markets to the extent that the sources are not common. Financial stability indicators, the fourth approach, display the current state of systemic instability in order to, for example, identify the presence of crises. The specific tools underpinning these approaches are broadly available, although further research efforts are also necessary.

INTRODUCTION

The understanding of systemic risk is at the centre of macro-prudential supervisory and regulatory policies. Identifying and assessing systemic risks requires a broad and deep information basis and a wide range of tools to process the relevant information. Ingredients for meeting these requirements include market intelligence, plain data analysis and analytical models and tools.

While all these ingredients are equally important, this special feature focuses on the

analytical models and tools that can be used to interpret the information collected through market intelligence and statistics. The objective is to characterise the main broad approaches that are available and to illustrate with selected examples what macro-prudential policy-makers can learn from them.

The first section recalls some main elements of the phenomenon of systemic risk that analytical models and tools need to address. The remainder of the feature is organised into four sections, one on each of the main broad analytical approaches that can be used, followed by a concluding section.

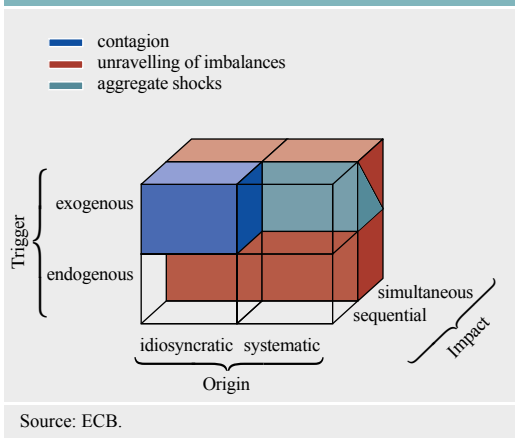
IDENTIFICATION AND ASSESSMENT OF SYSTEMIC RISKS IN THE PROCESS OF MACRO-PRUDENTIAL SUPERVISION

Systemic risk can be described as the risk that financial instability becomes so widespread that it impairs the functioning of a financial system to the point where economic growth and welfare suffer materially. The literature has identified three “forms” of systemic risk, namely contagion risk, the risk that widespread imbalances that have built up over time unravel abruptly, and the risk of macro shocks causing simultaneous failures. The three forms can be summarised in a “systemic risk cube” displayed in Chart B.1, which distinguishes their origins, the nature of triggers unleashing a systemic event and their impact.¹

There are four broad analytical approaches with which systemic risks and instability can be identified and assessed. First, coincident indicators of financial stability measure the current state of instability in the financial system. Second, early-warning signal models can be used to derive indications about the likelihood and severity of systemic events and crises

¹ The three forms of systemic risk and the “cube” characterisation are based on J.C. Trichet, “Systemic risk”, Clare Distinguished Lecture in Economics and Public Policy, Cambridge University, December 2009; O. de Bandt, P. Hartmann and J.L. Peydro, “Systemic risk: an update”, in A. Berger et al. (eds.), *Oxford Handbook of Banking*, Oxford University Press, 2009; and ECB, “The concept of systemic risk”, *Financial Stability Review*, December 2009, which contain more detailed discussions.

Chart B.1 Systemic risk cube



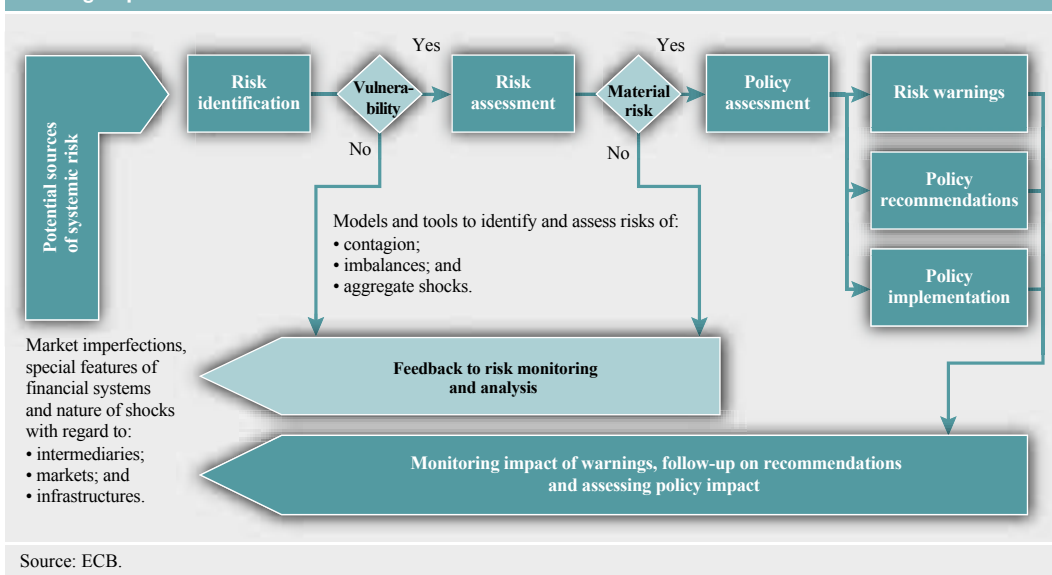
to widespread crises and about which the macro-prudential supervisor should thus be concerned. Notably, early-warning signal models can be used as a means to identify early the build-up of imbalances that may become so severe and widespread that they typically lead to a crisis in the future. Macro-stress-testing models can serve to identify aggregate shocks that are so severe that they would cause a systemic crisis. Finally, contagion models can be used to assess which financial intermediaries' failure could lead to the spreading of instability. In practice, however, specific models and tools can also serve a variety of macro-prudential purposes, as some examples chosen for this special feature will illustrate.

happening in the future. Third, macro-stress-testing models can be employed to assess the resilience of the financial system to extreme but plausible aggregate shocks. Fourth, contagion and spillover models can serve as means to assess how resilient the financial system is to the transmission of originally more limited financial shocks across intermediaries and markets.

The last three approaches are designed to allow for an early identification and assessment of the forms of systemic risk that can lead

The approaches for a forward-looking identification and assessment of systemic risks also fit well into the main steps that a macro-prudential supervisory body would logically follow (see Chart B.2). Such a body could structure the risks according to an economic framework such as that illustrated by the "systemic risk cube" and explained in greater detail in Special Feature B of the December 2009 FSR (see left-hand side of the chart). The process begins with risk identification. Early-warning signal models and indicators, in particular, are

Chart B.2 Role of analytical models and tools for systemic risk in the macro-prudential oversight process



designed for this purpose. Some of these tools can also assign probabilities to specific shocks or systemic events. These probabilities can be one input into the ranking of risks for the second step of the supervisory process, namely, the assessment of risks. For the assessment, macro-stress-testing models are particularly useful. These models can take the materialisation of the most plausible risk scenarios as input and then simulate the severity of the impact on the financial system. Similarly, contagion and spillover models can be used to evaluate the impact of specific failures on the financial system using, for example, counterfactual simulations.

The result of this process is, ideally, a prioritisation list of the most relevant risks, which consists of a list of detected risks, probabilities of each of these risks materialising, systemic losses given default for each of them, expected system losses and expected losses in macroeconomic output in the case of these risks materialising.

Based on such a process of risk identification and assessment, macro-prudential supervisory bodies would assess policy actions as early preventive measures. They could consider giving warnings about risks, recommending the use of policy instruments by other bodies or implementing policies with their own instruments. The assessment of different policies can again be supported by, inter alia, analytical models. Some of them may be extensions of the models and tools discussed in this special feature, while others will be different models. Analytical models to assess different macro-prudential policies are not the subject of this special feature.

FINANCIAL STABILITY INDICATORS

Financial stability and systemic risk indicators measure the contemporaneous level of instability and systemic stress. They can be direct indicators, such as those for asset price volatilities, debt yield spreads, credit default swap spreads, etc., or indicators derived from analytical models, such as those for default probabilities derived from credit risk models. A full macro-prudential

analysis requires financial stability indicators to be available for each systemically relevant intermediary, market and market infrastructure, as well as for combinations of these components, at the level of financial sub-sectors or the financial system as a whole.²

The example given below is a new composite indicator of systemic stress (“CISS”) developed at the ECB (see Chart B.1). CISS covers money, bond, equity and foreign exchange markets, as well as financial intermediaries, a novel feature in comparison with previous composite indicators of this kind. For each of these five components, stress is measured through several sub-measures involving volatilities, cumulative price declines, risk spreads or recourse to central bank emergency facilities. Each input is normalised by replacing observations with their quantile statistic,³ so that the overall index ranges from 0 (no stress) to 1 (extreme stress in all components at the same time). The aggregation of the five components into one number is weighted by the correlation between them, which brings in the systemic component – another novel feature of this indicator.⁴

2 Overviews of financial stability indicators have, for example, been provided in W.R. Nelson and R. Perli, “Selected indicators of financial stability”, in *Risk Measurement of Systemic Risk*, Bank of Japan, ECB and Federal Reserve Board, 2007, and in many central bank financial stability reports (including the ECB’s FSR).

3 For example, if – at a specific point in time – an input variable has reached its 95th highest value in a sample of 100 observations, then this observation is transformed into a value of 0.95.

4 The time-varying correlations across the different sub-components are estimated as exponentially weighted moving averages (EWMA) with a constant decay factor of 0.93. EWMA are widely applied by practitioners in the calculation of the value at risk (VaR) (see K. Cuthbertson and D. Nitsche, *Quantitative Financial Economics*, 2nd edition, 2004). The estimated correlations tend to display a relatively stable path over time, but still react sufficiently strongly to the arrival of new information. For more details about the calculation of, and the data used in, CISS, see D. Hollo, M. Kremer and M. Lo Duca, “CISS – a composite indicator of systemic stress in the financial system”, 2010, available at www.ssrn.com. The ECB and other policy authorities have also developed other composite financial stability indicators (see R. Caldarelli, S. Elekdag and S. Lall, “Financial stress, downturns, and recoveries”, *IMF Working Paper Series*, WP/09/100, International Monetary Fund, 2009; M. Illing and Y. Liu, “Measuring financial stress in a developed country: an application to Canada”, *Journal of Financial Stability*, 2006; C.S. Hakkio and W.R. Keeton, “Financial stress: what is it, how can it be measured, and why does it matter?”, *Economic Review*, Federal Reserve Bank of Kansas City, 2009; and Box 1 in ECB, *Financial Stability Review*, December 2009).

Chart B.3 Composite indicator of systemic stress (CISS)

(Jan. 1999 – May 2010)



- 1 peak of "dot.com bubble"
- 2 11 September 2001
- 3 Enron bankruptcy
- 4 Iraq War
- 5 WorldCom bankruptcy
- 6 subprime ABS downgrades
- 7 reported problems in banks' investment and hedge funds
- 8 Lehman Brothers' bankruptcy
- 9 press focus on public debt

Sources: Thomson Reuters Datastream, ECB and ECB calculations.

Chart B.3 suggests that the CISS identifies the crisis of the last three years as the only truly systemic financial crisis of the last decade. In the autumn of 2008, around the time of the Lehman Brothers' bankruptcy, the indicator even approaches its maximum level of 1. By August 2007, the extreme stress was already more widespread than in previous periods of tensions, for example after 11 September 2001 or after the WorldCom bankruptcy. It should be noted, however, that the earlier years of the last decade were relatively tranquil and that further experience with this indicator needs to be gained, and further refinements tested and potentially incorporated over time, before more reliable conclusions can be drawn.

The use of such financial stability and systemic risk indicators by macro-prudential bodies is justified by their typical task of identifying systemic risks and issuing warnings about heightened risks. Moreover, the availability of indicators of systemic stability can serve as an input for identifying states of emergency.

An advantage of these indicators is that they can be developed for all systemically relevant

intermediaries and markets. Moreover, the set of indicators can be extended relatively swiftly and flexibly, depending on the specific issues of interest at a given point in time, and in response to innovation and structural change in the financial system. This is why macro-prudential authorities need to have a comprehensive set of financial stability indicators at their disposal and to continuously review it for extensions and updates. A challenge is that most of these indicators are partial in nature, so that they do not convey an overall view. This problem can be reduced to some extent by the use of composite indicators such as the CISS. However, composite indicators are relatively rough by nature, and thus share specific problems that limits their comparability and interpretability, such as the wide-ranging freedom of choice as to the selection of both the input series and the aggregation method. The partial nature of financial stability indicators also poses another challenge in that they are often not informative about the origins and transmission channels for widespread instability. Since many of them are coincident indicators (as is the CISS above), it also needs to be kept in mind that they are not designed to predict systemic instability in the future, which is rather the role of early-warning signal models and indicators.

EARLY-WARNING SIGNAL MODELS AND INDICATORS

Early-warning models and indicators are designed to predict financial instability that may emerge in the future and identify emerging vulnerabilities. As for the models, an index of bubble, imbalance, distress or crisis is typically defined first. Then, an empirical analysis is undertaken to identify variables that predict the index. Once variables are found which forecast the index well, these variables are monitored with respect to thresholds. Simple signalling approaches, for example, use single variables and derive optimal thresholds in terms of a percentile of their own distribution. More advanced approaches, such as limited dependent variable estimations or Markov-switching models, exploit a set of variables to estimate the probability of a

systemic event over a specific future horizon. In case the variables come close to, or exceed, a threshold, or when the crisis probability exceeds a certain level, one speaks of a vulnerability that implies a significant risk that a systemic event may occur in the future. The performance of an early-warning signal model can be assessed on the basis of the frequency of false alarms (type-I errors) and missed crises (type-II errors), compared with correctly predicted crises and correctly identified tranquil periods.

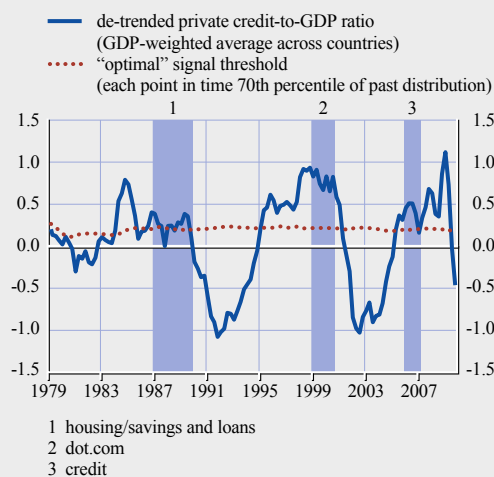
Early-warning indicators are the right-hand side variables in the models. They can also be used independently as simple indicators. They often compare current asset prices, balance-sheet relationships (such as leverage) or macroeconomic variables with estimates of their equilibrium levels. These levels can be estimated with economic models, with statistical models that extract, for example, “principal components” or through long-term averages of past data. Significant deviations of current observations from equilibrium levels are taken as signals for imbalances or vulnerabilities that could lead to crises in the future. Macro-prudential bodies need a comprehensive framework of early-warning models and indicators, so that no part of the financial system is excluded and warning signals across them are coherent.⁵

The example chosen in this special feature is the “global” credit-to-GDP gap as an early-warning indicator of widespread asset-price misalignments, the unravelling of which is associated with pronounced economic downturns. This indicator, defined as the de-trended and GDP-weighted average across 18 OECD countries, is shown as the blue line in Chart B.4 for the period from 1979 to late 2009. The shaded areas mark periods in which equity and mortgage prices in a larger number of industrial countries moved significantly above trend and in which their correction was associated with an extended period of growth below potential (“costly” misalignments).

The dashed red line is a time-varying signal threshold, which is optimally derived as the

Chart B.4 “Global” credit gap as an early warning signal of “costly” asset price misalignments

(Q1 1979 – Q4 2009)



Sources: IMF, BIS and ECB calculations.

Note: The blue shaded areas refer to widespread mortgage/equity boom episodes (more than eight countries with 1.75 standard deviations above trend), which proved “costly” (i.e. were followed by three years of GDP growth 3 p.p. below potential).

70th percentile of the past distribution of the credit gap series. When the solid blue line moves above the dashed red line, a signal is given that a costly boom-bust cycle is building up.⁶ The indicator exceeded the threshold before each of the three major asset price misalignments, namely that at the end of the 1980s, the dot.com bubble and the boom preceding the latest crisis. With respect to this latter cycle, the “global” credit gap would have started issuing warning signals as early as mid-2005. Thus, policy-makers paying attention to such an indicator could have taken some corrective measures in advance.⁷ Moreover, an interesting result of the underlying research is the degree of commonality

5 For a more wide-ranging overview of early-warning techniques, see, for example, M. Chui and P. Gai, *Private Sector Involvement and International Financial Crises. An Analytical Perspective*, Oxford University Press, 2005.

6 See L. Alessi and C. Detken, “‘Real time’ early warning indicators for costly asset price boom/bust cycles: a role for global liquidity”, *Working Paper Series*, No 1039, ECB, March 2009. Other examples of early warning indicators are described in ECB, “Indicators of financial distress in mature economies”, *Financial Stability Review*, June 2005; ECB, “Assessing the determinants of financial distress in French, Italian and Spanish firms”, *Financial Stability Review*, June 2005.

7 This is also in line with other research highlighting the usefulness of credit gaps as early-warning indicators

of such severe asset price cycles across countries and the superiority of “global” and aggregate indicators over domestic indicators.

The use of early-warning signal models by macro-prudential bodies is also justified by their tasks in risk identification and early risk warnings. These indicators are particularly useful for the identification of the build-up of widespread imbalances (see the red parts in Chart B.1). They show the information that market variables contain about risks for the future. Such indicators would also integrate well in the newly emerging global set-up for macro-prudential oversight, such as the early warning exercises jointly undertaken by the Financial Stability Board and the International Monetary Fund.

They have to be used cautiously, however, since there are some significant challenges. First, in the past, early-warning models have rarely predicted new crises. While the new generation of models seems to have improved, predicting the exact timing of a crisis remains an extremely difficult task. Second, optimal early-warning models will probably vary for countries with different financial structures. In an international context, this raises the challenge of how they can be aggregated and how the signals for different countries can be made comparable. Third, early-warning indicators based solely on market information should always be complemented with information that the market is not pricing in, in order to capture vulnerabilities that are less obvious.

MACRO-STRESS-TESTING MODELS

In contrast to early-warning models, stress-testing models do not take market expectations regarding the likelihood and severity of shocks as a given, but allow supervisory authorities to assume extreme but still plausible shocks and assess their consequences for different entities, also taking the propagation of the shock into account. The basic idea is borrowed from risk management, where the loss potential of specific portfolios can be assessed for

extreme market conditions (micro-stress-testing). Macro-prudential supervisors are particularly interested in macro-stress tests, where the banking system, or the financial system more broadly, is the object of interest. They can be particularly useful for assessing how resilient the system is against various adverse scenarios, even though they have not (yet) materialised in practice. This allows authorities to take early corrective action if the resilience is judged not to be high enough.

A macro-stress-test for banks, for example, consists of several inputs. First, an adverse macroeconomic (or macro-financial) downturn scenario needs to be defined on hypothetical grounds, or estimated from tail density forecasts of a macroeconomic model. Second, for every bank’s loan book, the adverse scenario impact needs to be linked to the probabilities of default (PDs) and losses given default (LGDs) of the loans.⁸ Expected losses can then be calculated and comparisons with capital can be used to see whether and how many banks fail as a consequence.⁹

The use of macro-stress-testing frameworks by macro-prudential bodies is also justified by their task to assess and warn about systemic risks. In particular, by simulating losses and failures for different scenarios, they contribute to the prioritisation of different risks and potential policy responses such as the need for additional capital.

⁸ Expected losses are calculated as “loan exposure at default” multiplied by PD multiplied by LGD.

For an overview of macro-stress-testing techniques, see, for example, M. Sorge, “Stress-testing financial systems: an overview of current methodologies”, *BIS Working Paper Series*, No 165, Bank for International Settlements, December 2004.

⁹ See Section 4.2 in ECB, *Financial Stability Review*, December 2009, for a recent example, and for the methodology, see ECB, “Global macro-financial shocks and corporate sector expected default frequencies in the euro area”, *Financial Stability Review*, June 2007; ECB, “Assessing portfolio credit risk in a sample of euro area large and complex banking groups”, *Financial Stability Review*, June 2007; ECB, “Assessing credit risk in the loan portfolios of euro area large and complex banking groups”, *Financial Stability Review*, December 2007; and O. Castrén, T. Fitzpatrick and M. Sydow, “Assessing portfolio credit risk changes in a sample of EU large and complex banking groups in reaction to macroeconomic shocks”, *Working Paper Series*, No 1002, ECB, February 2009.

One of the main challenges of macro-stress-testing in general, besides data availability, is the definition of appropriate stress scenarios. Finding the right balance between plausibility and severity is not always straightforward. Moreover, stress-testing frameworks are not single coherent economic models. They are typically made up of a combination of separate modules. There is a lack of appropriate general equilibrium models capturing all the relevant relationships. Thus, simple reduced-form models are often used in this context. Frequently, non-bank intermediaries are not captured either. Last, there are no coherent macro-stress-testing models that take the two-way interaction between the financial system and the economy at large into account. Once the impact of a macro-scenario on the banking system has been simulated, the process stops.

CONTAGION AND SPILLOVER MODELS

Contagion and spillover models mainly serve to assess the cross-sectional transmission of financial instability. They are designed to measure the likelihood that, and extent to which, the failure of one or several intermediaries could cause the failure of other intermediaries or that the crash of one or several financial markets could lead to crashes of other markets. Two broad approaches have been used for this purpose, namely estimations of the extreme dependence of negative asset returns and counterfactual simulations using balance-sheet data. In the first approach, the extent to which a large loss of market value or a large increase in default probability, as incorporated in market prices, leads to further such losses or increases is considered after checking for common factors. The second approach simulates whether the failure of certain intermediaries would lead to losses by other intermediaries, which would erase their capital, thus causing further failures. If the initial failure or crash is solely responsible for subsequent failures or crashes, then one speaks of contagion. If it is not possible to test for confounding common factors, then the term spillover is often used.¹⁰

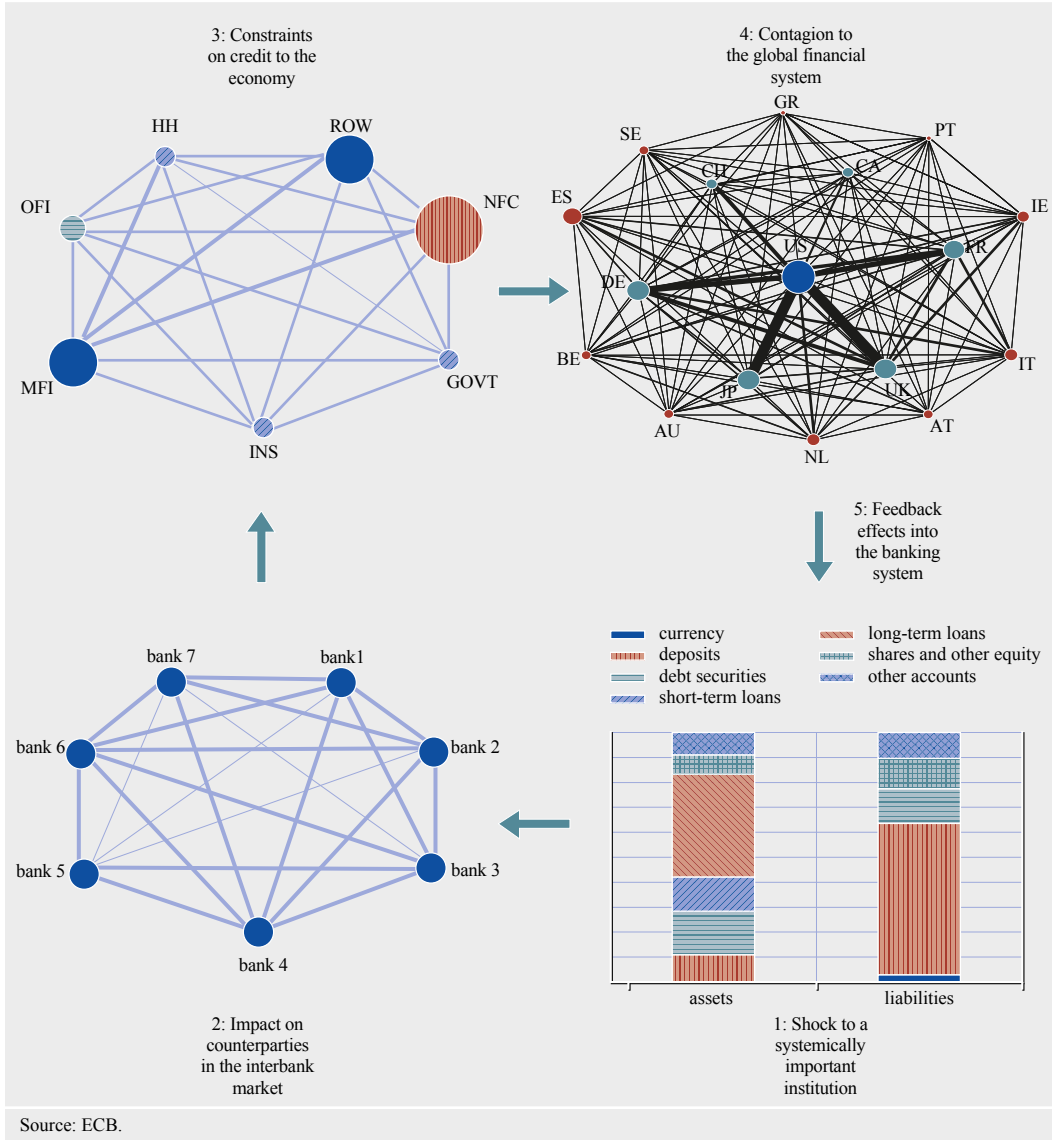
The example chosen for this special feature considers a spillover analysis that goes from the micro to the aggregate level, using the financial accounts in the ECB's euro area accounts. These data provide detailed information on the specific counterparties of the instruments issued by a given sector (the "who-to-whom" accounts). Once the bilateral exposures have been calculated, a network connecting all sectors in the financial system can be constructed. Chart B.5 illustrates shock propagation and spillover channels on the basis of a network of balance-sheet exposures. A shock to a systemically important institution will have an impact on its counterparties in the interbank market (see the lower left quadrant). This leads to credit constraints in the overall economy and, ultimately, to contagion effects in the global financial system, with possible feedback effects to the banking system (see the upper quadrants).¹¹

The use of contagion and spillover models is again justified by the task of macro-prudential bodies to identify and assess systemic risks early and to warn about them (see the blue part in Chart B.1). They show and quantify transmission channels of instability across intermediaries, markets and market infrastructures, addressing externalities and also helping to identify systemically important intermediaries and markets. The specific flow-of-funds approach illustrated above also allows transmissions to the economy at large to be considered, because

10 For general reviews of contagion models, see, for example, O. de Bandt et al., op. cit.; C. Upper, "Using counterfactual simulations to assess the danger of contagion", *BIS Working Paper Series*, No 234, Bank for International Settlements, 2007; or ECB, "Financial market contagion", *Financial Stability Review*, December 2005. Special Feature D in this FSR discusses in depth one specific approach to assessing contagion risk based on network techniques.

11 For more details and further analysis, see Special Feature D in this FSR and ECB, "Balance sheet contagion and the transmission of risk in the euro area financial system", *Financial Stability Review*, June 2009; O. Castrén and I. Kavonius, "Balance sheet interlinkages and macro-financial risk analysis in the euro area", *Working Paper Series*, No 1124, ECB, December 2009. For a more advanced contagion analysis on the basis of euro area accounts data, see Box 13 in Section 4.2 of this FSR.

Chart B.5 Assessing shock propagation and contagion channels



the data link, inter alia, financial sub-sectors with the household, non-financial firm and government sectors.

Despite their usefulness in the above senses, contagion and spillover models also pose significant challenges. In particular, most of them do not capture endogenous reactions of market participants that could be present during crises, such as the amplification of instability through fire sales. Second, there are

data limitations with respect to access to, and the availability of, exposure data among banks and non-bank intermediaries. In addition, the few approaches that capture effects on the real economy, such as the flow-of-funds analysis presented above, may not give the full picture on them as only a sub-set of relevant instabilities and transmission channels is covered. Last but not least, available models do not distinguish well between contagion and the unravelling of imbalances.

CONCLUDING REMARKS

One conclusion from the overview of approaches, models and tools in this special feature is that a broad analytical toolkit to support the new macro-prudential policy bodies in terms of risk identification and risk assessment is available. At the same time, further research efforts to improve and extend available models and tools are justified. For example, new financial stability and early-warning indicators need to be developed in response to financial innovation and structural change in the financial systems. Macro-stress-testing models need to be made more consistent and would benefit from the incorporation of non-bank intermediaries and new theoretical frameworks that reflect the two-way relationship between financial systems and the broader economy. Finally, contagion models would improve if they incorporated some amplification mechanisms that may play a role in actual stress situations and could better distinguish contagion from the unravelling of imbalances (see Chart B.1).

While it is necessary to use analytical models and tools for macro-prudential supervision, their precision and reliability should not be overstated. Each model or analytical tool relies on specific assumptions, as well as on the reliability and availability of the data. This special feature illustrated limitations and challenges in the use of various approaches. On the one hand, this has highlighted the need for future research efforts. On the other hand, it has also highlighted that market intelligence, regular data analysis, judgement and the experience of decision-makers are as important as the use of analytical models.

C RECENT REGULATORY INITIATIVES TO ADDRESS THE ROLE OF SYSTEMICALLY IMPORTANT FINANCIAL INSTITUTIONS

The financial crisis has demonstrated the critical role played by some large and complex financial institutions in undermining financial stability. Particular attention is currently being paid by policy-makers to the question as to how systemically important financial institutions (SIFIs) should be regulated and how failures, if they occur, should be resolved.

This special feature provides an overview of the ongoing initiatives at the European and international level to deal with these institutions in the broader context of measures aimed at curbing moral hazard and institutions' contributions to systemic risk.

INTRODUCTION

The financial crisis brought to the fore the need to ensure that large and complex financial institutions are subject to regulatory and supervisory requirements commensurate to the risks they pose to the financial system and the real economy. This awareness, coupled with the sense of urgency that measures need to be put in place as a matter of priority, has provided impetus for a significant amount of work at the European and international level.

The recent events in the financial markets have shown that large and complex financial institutions do not refrain from taking on excessive risks, even if the bailout policy is not announced *ex ante* (so-called “constructive ambiguity” approach). Among market participants there is a widespread perception that a troubled SIFI would inevitably receive some form of direct or indirect financial support. The underlying rationale is that the failure of a SIFI would have major repercussions on the functioning of the financial system, which would be difficult to control.

This problem is exacerbated because countries in general, including several EU Member States, do not have adequate legal frameworks for

dealing effectively with distressed large, complex and interconnected financial institutions. An effective resolution regime would restore market discipline, so that governments would be able, on the one hand, to find a resolution for failing institutions without recourse to taxpayers' funds and, on the other, to avoid potential social disruption stemming from the interruption of banking activities.

In April 2009 the leaders of the G20, with their “Declaration on strengthening the financial system”, agreed that all systemically important financial institutions, markets and instruments should be subject to an appropriate degree of regulation and oversight. The G20 entrusted the Financial Stability Board (FSB) with the task of overseeing concrete regulatory steps and monitoring the implementation of the reform agenda. In this context, the FSB has been leading and coordinating the international work aimed at reducing systemic risk,¹ moral hazard and other consequences of the “too big to fail” concept.

THE SPECIFIC ROLE PLAYED BY SIFIS IN SYSTEMIC RISK

The starting point for gauging the special risks posed by SIFIs is the notion of systemic risk.

While the definition of systemic risk is still under debate,² it is generally accepted that systemic risk is related to a situation where the failure and distress of a significant part of the financial sector may, through various channels, adversely affect the real economy, for instance, by hampering the stable provision of credit and other essential services.

¹ As part of this wide work stream, the Basel Committee on Banking Supervision is evaluating the pros and cons of surcharges for systemically important banks, as well as considering other supervisory tools as possible options. These surcharges refer to additional capital and could be applied in the context of the supervisory review.

² A joint paper by the IMF, BIS and FSB has recently provided a definition of the related concept of a “systemic event”, defined as “the disruption to the flow of financial services that is: (i) caused by an impairment of all or parts of the financial system; and (ii) has the potential to have serious negative consequences for the real economy.” See IMF, “Guidance to assess the systemic importance of financial institutions, markets and instruments”, 2009.

Furthermore, it is acknowledged that systemic risk is endogenous to the financial system as it depends on the collective behaviour and the interconnectedness of financial institutions, financial markets and market infrastructures. It also depends on the tendency of economic agents³ to engage in excessive risk-taking and indebtedness during a boom and later exhibiting extreme risk aversion during a downswing, as well as on the complex chain of interactions between the financial system and the overall economy. In broad terms, two – interdependent – dimensions⁴ or sources of systemic risk can be identified:

- (i) The time series, vertical or aggregate dimension, i.e. the collective tendency to periodically underestimate/overestimate risks. It materialises in the pro-cyclicality of the financial system in the form of credit, liquidity and asset price cycles.
- (ii) The cross-sectional, horizontal or network dimension: this focuses on the interplay between institutions, markets and infrastructures, which materialises in the form of common (correlated) exposures, arising as a result of direct exposures to similar asset classes, liabilities interlinkages and counterparty risk.

Systemic risk can thus crystallise in the form of contagion – reflecting the various interdependencies across institutions, market infrastructures and markets – as well as the unravelling of imbalances which feed back along the multiple intersections between the financial sector and the real economy.⁵

Against this background, the role of SIFIs as major contributors to systemic risk becomes clear. Indeed, SIFIs contribute directly to the creation of cross-sectional systemic risk, leading to higher interconnectedness between financial institutions, markets and market infrastructures, thereby increasing the complexity and potential fragility of the system. They also contribute to

the time series dimension. In a boom, SIFIs may play a role in the build-up of leverage and wider maturity mismatches, while at the same time fostering recourse to complex and opaque forms of financial innovation. This mechanism is reversed during a downswing, when SIFIs have a disproportionate effect on the deleveraging process. The intensity of deleveraging, liquidity hoarding and asset fire sales is proportional to the size and interconnectedness of a SIFI's balance sheet. Furthermore, the economic losses and the deterioration of confidence triggered by the distress of a SIFI are likely to generate ripple effects that dwarf those stemming from a non-systemic institution, as the Lehmann Brothers default has dramatically clarified.

SYSTEMIC IMPORTANCE OF FINANCIAL INSTITUTIONS AND MORAL HAZARD

In order to deal with the risks posed by SIFIs, the current agenda of policy-makers includes the following issues.

First, how to assess the systemic importance of a financial institution. While the issue is still being debated, the systemic importance of a

3 Not only financial players, but households and non-financial corporations as well.

4 The Special Feature B of the December 2009 FSR characterises the phenomenon of systemic risk from an academic research perspective. See also C. Borio, "Towards a macroprudential framework for financial supervision and regulation?", *BIS Working Paper*, No 128, 2003; and Bank of England, "The role of macro-prudential policy", *Bank of England Discussion Paper*, November 2009.

5 The notion of systemic risk is closely linked to the concept of externality, meaning that each financial intermediary individually manages its own risk but does not consider the impact of its actions on the risk of the system as a whole. As a consequence, the aggregate amount of risk in the financial system can prove excessive and, on account of interdependencies, larger than the sum of the risks of individual banks in isolation. At the same time, once the system has reached a certain degree of fragility, even apparently small or localised shocks – such as the crash of the relatively small US sub-prime mortgage market in the summer of 2007 – may trigger a disruptive chain of events. In this respect, another crucial aspect of systemic risk is the non-linearity associated with the build-up of vulnerabilities along the cycle.

financial institution can be gauged on the basis of a combination of several factors⁶, notably:

- (i) size, either in absolute terms or in relative terms, as reflected by a dominant position in a specific market or product;
- (ii) interconnectedness, i.e. linkages with the rest of the system, mostly via interbank lending or a special position as counterparty in key markets (e.g. over-the-counter derivatives), a critical participant in various market infrastructures and a provider of major functions related to the risk management of market infrastructures;
- (iii) substitutability, i.e. the extent to which other components of the system can provide the same services in the event of a failure.

These basic criteria may be used for assessing the systemic importance of a financial institution, in combination with the evaluation of other relevant factors, including the institution's specific risk profile (leverage, liquidity, maturity mismatches and concentration of assets/liabilities), and its organisational/legal structure. The assessment of systemic importance is a dynamic, time-varying and forward-looking process, depending, *inter alia*, on the particular conditions of financial markets, as well as on the structure of the financial sector.⁷

In the light of these considerations, it is clear that the assessment cannot be derived solely on the basis of quantitative inputs, but should rather incorporate the qualitative judgement and knowledge of the relevant authorities.

Turning to the classification of institutions, the ultimate aim should be to achieve a continuous or at least a finely granular ranking, as opposed to a simple division of firms into either systemically relevant or not. Furthermore, it appears desirable to avoid, at any given point in time, public disclosure of a list of SIFIs, as such behaviour might unduly drive market expectations and possibly create distortions

at the boundary between institutions that are systemically important and those that are not.

Second, the rationale underlying a specific regulatory/supervisory treatment of SIFIs. An ad hoc regulatory/supervisory treatment of SIFIs is justified on the basis of their higher contribution to systemic risk when compared with the rest of the financial system. However, another related rationale can be traced back to the notion of “too big or interconnected to fail” and the associated moral hazard. The general notion of moral hazard is linked to the expectation that governments and supervisory authorities would not let an ailing SIFI fail,⁸ given the serious damage to the financial system and the economy that would follow its default.⁹ In turn, this expectation of government support translates into a funding advantage¹⁰ compared with non-systemic banks. When debt-holders do not have to consider the risk of default on their investment, they will naturally tend to require a lower rate of return¹¹ on the debt issued by systemic institutions. This lack of market discipline is by itself conducive to risk-taking:

6 See the extensive discussions in IMF, “Guidance to assess the systemic importance of financial institutions, markets and instruments”, 2009; and FSA, “The Turner Review Conference Discussion Paper”, 2009.

7 In this context, it should be noted that also a group of individually non-systemic institutions could become systemic as a whole, for instance because of a similar business model and/or sizable exposures to common sources of risk.

8 Some commentators have argued that the chain of events following Lehmann Brothers' demise was a direct consequence of the uncertainty triggered by the deviation from the “too systemic to fail” doctrine, which had been further extended to brokers/dealers in the Bear Stearns episode only a few months earlier. Virtually no other large and complex institution has been allowed to fail since, neither in the United States nor in Europe, including broker/dealer Merrill Lynch and insurance company AIG. Historically, the LTCM bail-out in 1998 is the first instance of the application of this doctrine to non-commercial banks.

9 The issue is made more complex by the casual observation that, in the heat of crisis, authorities appear to consider most institutions as SIFIs. For instance, the broker/dealer Bear Stearns was not considered systemically important before the crisis.

10 Moral hazard can persist even if a bail-out is uncertain. Even a small probability of a partial bail-out will reduce the rate of return demanded by SIFIs' creditors.

11 For attempts to measure this funding advantage, see D. Baker and T. McArthur, “The value of the ‘too big to fail’ big bank subsidy”, CEPR Issue Brief, September 2009; and JP Morgan “Global banks – too big to fail? Big can also be beautiful”, 17 February 2010.

endowed with an implicit subsidy on their cost of funding, it is economically convenient for SIFIs to engage in riskier strategies, expanding their balance sheets without appropriate price penalties. This moral hazard creates a bias towards risk-taking and is further compounded by the presence of flawed managerial compensation schemes. Under prevailing practice, the objective of management deviates from maximising the long-term performance of the bank. Rather, management strategies have become skewed towards the maximisation of short-term profitability, irrespective of the potentially negative long-term consequences on the soundness of the business model.¹²

Overall, SIFIs benefit from a double distortion to fair competition. In fact, the ex post subsidy embodied in the implicit or explicit bailout guarantee translates into an ex ante funding advantage compared with non-systemic institutions. In turn, this pervasive moral hazard exacerbates the incentives towards excessive risk-taking.

POSSIBLE WAYS TO MITIGATE THE RISKS RELATED TO SIFIS

The special risks posed by SIFIs have prompted, at the European and international level, a wide range of proposals on how to best address them. From a regulatory perspective, there are two apparent objectives to be achieved. On the one hand, regulation should aim both to increase the shock-absorbing capacity of SIFIs and to lower their contribution to systemic risk, with special reference to the potential for contagion and spillover effects. On the other hand, regulation should aim to mitigate moral hazard and the related implicit or explicit bailout guarantee, with a clear focus on reducing the burden on taxpayers.

The distinction between the two objectives, however, is cloudy at best since the systemic risk relevance of SIFIs and the moral hazard problem associated with the status of “too big or interconnected to fail” complement and reinforce each other, and it is hard to disentangle

the effect of a relevant measure according to the two above-mentioned objectives. As a result, it can be argued that actions addressing one objective are instrumental in achieving the other objective as well.

REGULATORY INITIATIVES TO STRENGTHEN THE RESILIENCE OF THE BANKING SECTOR

When considering specific measures to curb the risks associated with SIFIs, it is important not to overlook regulatory proposals that may already effectively target some key issues, despite not being specifically targeted at SIFIs.

On 17 December 2009 the Basel Committee on Banking Supervision issued its latest reform package¹³ to strengthen global capital and liquidity regulations, promoting a more resilient banking sector. The objective of the reform is to improve the banking sector’s ability to absorb shocks arising from financial and economic stress, thus reducing the risk of spillover from the financial sector to the real economy. The core of the proposal requires banks to considerably raise the quantity, the quality and the loss-absorbing capacity of capital. In turn, this has a positive effect on the resilience of banks and reduces the expected cost in case of government intervention.

Several of the new rules are likely to have relevant effects on SIFIs, including revised capital charges for the trading book, a stricter treatment of securitisations, a non-risk-based leverage ratio, enhanced requirements for counterparty credit risk and a new liquidity framework. All of these measures specifically target the cross-sectional dimension of systemic risk, with potentially far-reaching effects on the activities of large universal or investment banks with extensive wholesale activities, large derivatives exposures and great reliance on

¹² This behaviour is rational on an individual basis, given that the manager benefits on the upside but does not incur the costs of failure, which are shifted to the tax-payers.

¹³ The reform package comprises two consultative documents entitled: “Strengthening the resilience of the banking sector” and “International framework for liquidity risk measurement, standards and monitoring”.

short-term, fragile sources of funding (repos, securities financing): exactly those institutions that are most likely to attain systemic relevance. At the same time, the envisaged capital buffers above the regulatory minimum would directly address the time-series dimension of systemic risk, reducing the breadth and intensity of the leverage and risk-taking cycle. Therefore, the new Basel framework may have a significant impact on SIFIs and deserves careful analysis.

SPECIFIC REGULATORY AND SUPERVISORY APPROACHES FOR SIFIS

The centrality of SIFIs in the crisis has also revealed the need for a robust regime which specifically addresses how SIFIs should be regulated and, if they fail, how this should be resolved.

There is a common agreement that in order to reduce the probability of default of banks in general, and of SIFIs in particular, it is a prerequisite to improve supervisory regimes, both at the micro and at the macro level. These enhancements should take place both at the domestic and at the EU level.

A wide discussion is underway regarding possible rules to reduce the risk of the failure of a SIFI and/or to mitigate the consequences of such failures for the financial system as a whole. The current debate includes two broad sets of policies: (i) *ex ante* measures, aimed at reducing the probability and impact of a SIFI's default, and (ii) *ex post* measures, aimed at ensuring that the failure of a financial institution can be resolved in an orderly fashion, and that the impact of the crisis resolution on the financial system is contained.

Ex ante measures

This set of measures attempts (i) to reduce the systemic relevance of financial institutions by modifying the structure/business model so as to separate business activities, or (ii) to decrease the probability of default via additional prudential requirements.

Various proposals have been put forward to reduce the probability of failures of SIFIs by intervening in the corporate structure or business model. This avenue is also being taken by the proposals recently unveiled by the US Administration, which are commonly known as the "Volcker rule". These proposals aim to limit proprietary trading and investment in hedge funds or private equity funds, as well as the excessive growth of leverage of the largest financial institutions relative to the financial system as a whole. The Volcker rule has mainly been designed with the US financial system in mind. Its application elsewhere would require a careful assessment of important implications (e.g. in the presence of a prevailing model of universal banking, the potential distortions to the functioning of the internal market in the EU).

Another view put forward on how to address the specific risks posed by SIFIs is to introduce additional prudential requirements, for instance via capital surcharges or contingent capital instruments.

The implementation of a capital surcharge would imply that a higher capital buffer would be calibrated for SIFIs, on the basis of their contribution to the creation of systemic risk.¹⁴ A higher capital buffer could also be achieved by contingent capital: a bank issues debt instruments that would automatically convert into equity in specific circumstances, for instance when the capital ratio falls below a certain threshold. This threshold would be set such that it entails a significant dilution of pre-existing shareholdings in the event of a systemic crisis (to be appropriately defined) or in case of government recapitalisation.

Both methods may contribute to mitigating systemic risk by creating additional layers of capital, both as a going and gone concern. They

¹⁴ The contribution of each SIFI depends on its particular characteristics, so that additional prudential requirements, like a surcharge, could be better calculated in the context of the specific supervisory review of each institution, with strong guidance to avoid issues of level playing field.

could also help internalising the externality costs arising from systemic importance and decrease the expected burden on taxpayers.

Contingent capital may have the additional advantage of directly strengthening the market discipline exerted by both debt and equity-holders, who have stronger incentives to monitor management choices that may decrease the value of their claims. However, it is acknowledged that certain operational features of the contingent capital proposal still need to be refined further (e.g. triggers, conversion rates). The effectiveness of contingent capital instruments would depend crucially on their characteristics, but also on pricing and the way it would be marketed to investors.

Capital surcharges would be more costly than contingent capital, as the extra capital would be available on a permanent basis and not only in adverse circumstances; moreover, their design is heavily dependent on the availability of a precise, robust and agreed methodology to measure systemic risk and define its mapping into a charge.

More recently, in addition to the above-mentioned tools, another type of instrument – a systemic tax or levy – has featured on the reform agenda. A systemic levy, to be targeted either at the whole financial sector or at a specific set of SIFIs, would charge a financial institution on the basis of its contribution to systemic risk. Depending on its design, a levy generally has both ex ante and ex post features. In fact, to the extent that a levy is calibrated to target sources of systemic risk and improve incentives, it acts as an ex ante measure, similar in spirit to a capital surcharge. However, several proposals suggest that the proceeds of a levy would accrue to a resolution or crisis management fund or, alternatively, to the general government budget: from this perspective, a levy displays ex post features as it, in essence, raises a contribution from the financial sector to pay for the cost of financial crises.

The evaluation of these measures – contingent capital, surcharges and levies – should be framed under a comprehensive comparative analysis investigating the interaction between the proposals and their overall cumulative effects. In particular, full account should be taken of the impact of the Basel reform package on the banking system and the broader economy. This is necessary to prevent, inter alia, additional requirements adopted beyond the regulatory minimum standard from hampering the provision of bank credit to the non-financial private sector.

Ex post measures

These measures focus on ensuring that authorities are endowed with appropriate mechanisms to resolve the failure of a financial institution in an orderly and prompt manner, with the cost of default/restructuring falling on equity and bond-holders and no socialisation of losses.

In this context, the development of recovery¹⁵ and resolution¹⁶ plans – collectively referred to as “living wills” – is a major step towards entrenching the notion that SIFIs should no longer be perceived by the market as warranting government support in case of distress. Living wills could also contribute towards (i) reducing the market-wide impact of financial distress and (ii) enhancing the information authorities have at their disposal, as well as their preparedness to address distress, thereby favouring more effective supervision and early intervention. The need for *credible* plans is crucial. In this respect, it could be argued that the credibility of resolution plans may be inversely proportional to the complexity of the institution, which may result in the need for institutions to simplify the structure of their organisation or business model

15 Recovery or “going concern” plans include contingency funding and de-risking plans and should be prepared by the financial institutions and reviewed by competent authorities.

16 The resolution or “gone concern” plans should fall within the responsibility of competent authorities. These plans identify actions to be taken once the “going concern” plans have proven insufficient without taking into account the possibility of public support. Their focus should be on the institution maintaining the provision of its essential business operations, such as access to payment services and to insured deposits and, if this fails, on the winding-up of the institution.

in order to comply with the credibility requirement.

According to the agreement reached at the G20 Pittsburgh Summit on 25 September 2009, a crisis management and resolution framework should be in place in order to reduce to a minimum the possible burden for taxpayers arising from any crisis of financial institutions and reduce moral hazard. To reach this objective, concrete initiatives should be taken at both the EU and the national level with the aim of achieving a framework that would allow Member States to have the legal and operational means to address the failure of a cross-border SIFI and to ensure smooth cooperation with other countries involved in case of need. In this context, the recent Communication of the Commission on “An EU framework for cross-border crisis management in the banking sector”¹⁷ is a first step in this direction. The three pillars of this framework – early intervention, resolution and insolvency – involve measures to be taken in several phases of a crisis, which may involve different types of response, from different authorities, and with different funding implications.

In parallel with the Commission’s initiative, the Economic and Financial Committee – through its ad hoc working group on crisis management – has been working towards developing a comprehensive and pragmatic approach to the enhancement of the EU policy coordination framework for crisis prevention, management and resolution, including procedures for enhancing the preparedness of the EU Member States for ex post burden-sharing and procedures for the possible establishment of a resolution or bailout fund.

Overall, before coming to any policy conclusions, it is necessary to carry out further analysis about the potential effectiveness of each individual measure in terms of achieving the objectives of containing systemic risk and reducing the element of moral hazard, and to what extent the envisaged measures are alternatives or complementary.

COORDINATION AMONG COMPETENT AUTHORITIES

The measures to address the risks posed by SIFIs must be consistent, and thus require strong collaboration and coordination at the international level. In this context, global coordination would help to promote a level playing field and prevent international regulatory arbitrage. Given the differences between individual financial institutions and the structure of national financial systems, a one-size-fits-all approach is neither feasible nor desirable. Rather, the focus should be on putting a policy toolbox in place, to be used as appropriate.

Policy tools should ultimately be selected on the basis of a detailed analysis of the trade-offs between feasibility, effectiveness, enforceability and transparency, with due consideration of countries’ financial structures and legal frameworks and institutions’ specific features. While the specific measures need not be the same in all countries, it is crucial that a coordinated framework is in place, given the global scope of SIFIs’ activities. This framework should combine the need for flexibility, while adequately reflecting the degree to which individual institutions contribute to systemic risk, incorporating appropriate incentives for institutions to reduce their overall impact on the financial system and minimise the risks of international regulatory arbitrage.

CONCLUDING REMARKS

The financial crisis has revealed the scale of the potential fallout from the failure of SIFIs. In order to address, or mitigate, their potential contribution to financial instability, an overarching approach is being adopted by European and international policy-makers.

From a micro-prudential perspective, the development of a strengthened regulatory and

¹⁷ Commission Communication on “An EU Framework for Cross-Border Crisis Management in the Banking Sector”, COM(2009) 561, 20 October 2009 (available at http://ec.europa.eu/internal_market/bank/crisis_management/index_en.htm).

supervisory regime is under way in order to reduce the risk contribution of a failure of a SIFI and increase the overall resilience of the financial system.

However, the impact of systemic risk depends very much on the collective behaviour of financial institutions and their interconnectedness, as well as on the interaction between financial markets and the overall economy. The recognition of the public good aspect of financial stability, therefore, underpins the recent emphasis on a macro-prudential approach to regulation and supervision.

At the EU level, macro-prudential oversight will be the key task of the European Systemic Risk Board (ESRB). The ESRB will be expected to actively monitor the various sources of risk to financial stability across countries, financial sectors and institutions, while also taking into account global developments. This will make it possible to identify system-wide risks also for the benefit of regulatory and supervisory policies.

D FINANCIAL NETWORKS AND FINANCIAL STABILITY

The recent global financial crisis has illustrated the role of financial linkages as a channel for the propagation of shocks. It also brought to the fore the concept that institutions may be “too interconnected to fail”, in addition to the traditional concept of being “too big to fail”.

This special feature introduces recent research on networks in disciplines other than economics, reviews its application to financial networks and discusses how network analysis can be used to gain a better understanding of the financial system and enhance its stability.

INTRODUCTION

The recent financial crisis has revealed the intertwined nature of modern financial systems. While the events unfolded, it became clear that the consequences of such interconnected and complex systems are particularly hard to predict. However, the intricate structure of linkages between financial institutions, among sectors of the economy and across entire financial systems can in fact be captured by using a network representation.

Faced with the challenging task of strengthening the current framework for financial stability, economists and policy-makers have developed a stronger awareness of the need for analytical methods that help to better identify, monitor and address systemic linkages, i.e. sources of systemic risk.¹ Recognition of the fact that the impact of systemic risk depends on the collective behaviour of market participants and on their interconnectedness underpins the recent emphasis on the adoption of a macro-prudential framework for financial regulation. Regulations that target individual institutions, but also take account of vulnerabilities that emerge from exposures to particular (potentially systemically relevant) counterparties in the system, may prevent a local crisis from becoming global.

Supranational institutions and fora, such as the International Monetary Fund (IMF) and the Financial Stability Board, are fully aware of the need to take into account network aspects of the global financial system in order to develop new measures of financial fragility.² The work of the new European Systemic Risk Board in mapping financial risks and their concentration at the system level, and therefore in issuing warnings as deemed appropriate, would certainly benefit from the availability of methods that make it possible to model interlinkages and mutual exposures among financial institutions, to identify the central nodes in the system and to detect and assess shock transmission channels.

The literature reviewed in this special feature, and the significant progress made by the research community in the last decades with respect to understanding complex networks, suggest that financial network analysis has the potential to represent a useful policy tool to that end.³

THE ANALYSIS OF NETWORKS

The general concept of a network is very intuitive: a network describes a collection of *nodes* or *vertices* (e.g. financial institutions) and the links between them, which can be directed (i.e. arcs) or undirected (i.e. edges). The links denote different relationships between the nodes, depending on the domain of analysis. In the financial context, it is of particular interest to focus on credit relationships, on exposures between banks and on liquidity flows in the interbank payment system.

The main premise of network analysis is that the structure of the links between the nodes matters.

- 1 In ECB, “The concept of systemic risk”, *Financial Stability Review*, December 2009, systemic risk is broken down into three forms: contagion, macroeconomic shocks and unwinding of imbalances. This special feature focuses on contagion.
- 2 See IMF, “Assessing the systemic implications of financial linkages”, *Global Financial Stability Report*, April 2009.
- 3 In October 2009 the ECB organised a workshop on “Recent advances in modelling systemic risk using network analysis”. A detailed summary of the topics discussed was published on the ECB’s website (<http://www.ecb.europa.eu>) in January 2010.

The properties and behaviour of a node cannot be analysed on the basis of its own properties and behaviour alone, as these may be affected by nodes that have links to it, and also by other nodes that have no directed links, but are linked to its neighbours. Thus, in order to understand the behaviour of one node, one must analyse the behaviour of many nodes, including those that are, perhaps, several other nodes apart in the network.⁴

From the perspective of analysing the financial system, perhaps the most relevant adjacent fields where research on networks is advanced are within sociology (social network analysis) and physics (network science or physics of networks).

Social network analysis is the older of the fields and has brought forth a number of important findings related, for instance, to the diffusion of ideas, the contagiousness of habits and behaviours, the efficiency of groups based on their social network properties, the origins of power among groups and the concepts of centrality or importance of nodes in a network. The approach in physics has been to focus more on the statistical properties of networks, the resilience of different structures and the processes that take place in networks; moreover, researchers have tried to explain how networks grow over time and exhibit the complex non-random structure that has been uncovered for many empirical networks.⁵ Newman, as well as Albert and Barabási,⁶ review advances in modelling complex networks, focusing on the statistical mechanics of network topology and dynamics. The main models and analytical tools are used to explain a wide range of natural and societal systems, ranging from the World Wide Web and the internet to cellular, ecological and citation networks – to name but a few.

Recently, a number of academics and policy-makers have pointed out the strong potential of network analysis as a tool to better understand financial markets and to model and assess systemic risk.⁷

FINANCIAL NETWORK ANALYSIS

Starting with the seminal papers by Allen and Gale, and Freixas et al.,⁸ the economic literature has focused on the implications that a higher/lower degree of *completeness* of interbank structures (i.e. of interconnectedness generated by cross-holdings of deposits) might have for financial stability. These papers evaluate the potential for contagion that follows an aggregate and/or an idiosyncratic liquidity shock or a bank's failure and analyse the role of the central bank in preventing systemic repercussions. While the results depend strongly on the assumptions of the process taking place in the network, the common lesson learnt from these models is the importance of understanding the *structure* of financial flows in order to understand the functioning of the system, and thus to be able to assess systemic stability.⁹

In fact, a recent paper by Allen and Babus argues that a network approach to financial systems is particularly important for assessing financial stability and can be instrumental in capturing the externalities that the risk associated with a single institution may create for the entire system.¹⁰

4 The study of network externalities in economics, by contrast, has traditionally assumed a fully connected network structure.

5 For a comprehensive synthesis of several strands of network science in sociology, physics, mathematics, computer science and economics, see M.O. Jackson, *Social and Economic Networks*, Princeton University Press, 2008.

6 M.E.J. Newman, "The structure and function of complex networks", *SIAM Review*, 2003; R. Albert and A.L. Barabási, "Statistical mechanics of complex networks", *Review of Modern Physics*, 2002.

7 See G. Tumpel-Gugerell's introductory remarks at the ECB workshop on "Recent advances in modelling systemic risk using network analysis", Frankfurt am Main, October 2009; A.G. Haldane, "Rethinking the financial network", speech delivered at the Financial Student Association, Amsterdam, April 2009; and D. Strauss-Kahn, "An IMF for the 21st century", speech held at the Bretton Woods Committee Annual Meeting, Washington D.C., February 2010.

8 F. Allen and D. Gale, "Financial contagion", *Journal of Political Economy*, 2000; X. Freixas, B. Parigi and J.C. Rochet, "Systemic risk, interbank relations, and liquidity provision by the central bank", *Journal of Money, Credit, and Banking*, 2000.

9 See also E. Nier, J. Yang, T. Yorulmazer and A. Alentorn, "Network models and financial stability", *Journal of Economic Dynamics and Control*, 2007.

10 F. Allen and A. Babus, "Networks in finance", *Wharton Financial Institutions Center Working Paper*, No 08-07, 2008.

May et al. stress the importance of identifying structural attributes shared by diverse systems – such as ecosystems and financial systems – that have survived rare systemic events, or have been shaped by them, to get indications about which characteristics of complex systems correlate with a high degree of robustness.¹¹

In this respect, market microstructure studies carried out from a network perspective can significantly enrich the traditional view taken in economics. First, network analysis contributes to existing theoretical results on systemic risk in the interbank market by considering the overall structure of the network (thus going beyond the earlier focus on its degree of completeness). Second, it provides a stronger basis for the assessment of contagion risk by means of counterfactual simulations.¹²

Early analyses applying network concepts to financial data include Boss et al. for interbank exposures in Austria,¹³ and Soramäki et al. on payment flows between banks in the US real-time gross settlement system, the Fedwire Funds Service.¹⁴

The empirical findings of both papers were in marked contrast to the interbank networks that had usually been considered in the economic literature. The networks were found to be complex with a small number of highly connected large nodes that had connections with a large number of small nodes. The cores of the networks, composed of the most connected banks, processed a very high proportion of the total value. More recently, a number of studies have looked at national interbank networks, reconstructed using payment flows.¹⁵

The unsecured overnight money market (broadly called *interbank* market) is one of the segments of financial markets where network analysis has been applied intensively as well. This is due to the key role money markets play in modern financial systems. Money markets constitute the locus where banks exchange deposits, which allows the efficient redistribution of liquidity in the system and the effective implementation

of the monetary policy stance, and represent a possible channel of contagion.

In order to gain insights into unsecured interbank loan networks, variations of a methodology proposed by Furfine have been applied to payment data to construct time series of this market.¹⁶ In its simplest form, the algorithm looks for two payments: first, a payment with the value v from bank A to bank B on day t and, second, a payment with the value $v + \text{interest}$ on day $t+1$ from bank B to bank A. Loan data of this granularity are generally not available from other sources. The data sets generated with this algorithm can be used to analyse the topology and contagion in interbank markets. A representative paper following this approach is that of Atalay and Bech,¹⁷ who use data from Fedwire to recover federal funds loans.¹⁸ Iori et al. perform a network analysis of the

11 R.M. May, S.A. Levin and G. Sugihara, “Complex systems: ecology for bankers”, *Nature*, No 451, 2008.

12 Note that this strand of empirical analysis of contagion is often criticised on the grounds that simulations ignore endogenously emerging risks and feedback effects. The argument here is that more realistic structural assumptions – determined by an improved understanding of the structure underlying financial flows – might strengthen the robustness and the reliability of results.

13 M. Boss, H. Elsinger, M. Summer and S. Thurner, “The network topology of the interbank market”, *Computer Networks and ISDN Systems*, 2004.

14 K. Soramäki, M.L. Bech, J. Arnold, R.J. Glass and W.E. Beyeler, “The topology of interbank payment flows”, *Physica A*, 2007.

15 See, among others, C. Becher, S. Millard and K. Soramäki, “The network topology of CHAPS Sterling”, *Working Paper Series*, No 355, Bank of England, 2008; M. Boss, G. Krenn, V. Metz, C. Pühr and S.W. Schmitz, “Systemically important accounts, network topology and contagion in ARTIS”, *OeNB Financial Stability Report*, No 15, Oesterreichische Nationalbank, 2008; M. Pröpper, I. van Lelyveld and R. Heijmans, “Towards a network description of interbank payment flows”, *DNB Working Papers*, No 177, De Nederlandsche Bank, 2009; and L. Embree and T. Roberts, “Network analysis and Canada’s Large Value Transfer System”, *Discussion Paper Series*, No 13, Bank of Canada, 2009.

16 C. Furfine, “The microstructure of the federal funds market”, *Financial Markets, Institutions & Instruments*, 1999.

17 M.L. Bech and E. Atalay, “The topology of the federal funds market”, *Staff Report No 354*, November 2008, Federal Reserve Bank of New York.

18 Other applications are K. Bonde and M.L. Bech, “The topology of Danish interbank money flows”, *Finance Research Unit Working Paper Series*, No 2009/01, 2009; A. Wetherilt, K. Soramäki and P. Zimmerman, “The sterling unsecured loan market during 2006–2008: insights from network topology”, in H. Leinonen (ed.), *Simulation analyses and stress testing of payment networks*, Bank of Finland Scientific Monographs E:42, 2009.

Italian overnight money market using a different data source.¹⁹ Iazzetta and Manna identify banks that are important in terms of a liquidity crisis, based on the distribution of liquidity among Italian banks since 1990.²⁰

Empirical research on other parts of the financial system is less common, probably on account of the restricted nature of sufficiently detailed data. Bonanno et al. look at networks of financial stocks,²¹ while Degryse and Nguyen investigate the extent of systemic risk and network structure in the Belgian banking system over a ten-year period.²² Hasan and Schmiedel find evidence that the adoption of network strategies by stock exchanges creates additional value in the provision of trading services.²³ On a more aggregate level, Castren and Kavonius use a network approach to flow-of-funds data to look at shock transmission within sectors of the economy in the euro area.²⁴

TOO INTERCONNECTED TO FAIL

As a consequence of the recent financial crisis, the concept of “too interconnected to fail” has emerged alongside the traditional “too big to fail” paradigm.

During the recent crisis, considerations about the linkages of troubled institutions in the markets, in addition to their absolute size, sometimes became an important factor in the decisions to provide them with emergency funding.²⁵ A key question now is how systemically important institutions could be identified *ex ante* so that regulators can prepare for these adverse events.

A key concept in social network analysis, also suitable for applying to the financial system, is *centrality*. In a broad sense, centrality refers to the importance of a node in the network. Traditional centrality measures have included the number of links that terminate on a node (*in-degree*) or that depart from a given node (*out-degree*), or the distance from other vertices (*closeness*) via the shortest paths. Centrality can depend iteratively on the centralities of a node’s neighbours (so-called *eigenvector centrality*²⁶),

or by the fraction of shortest paths between other vertices that a certain node falls upon (*betweenness centrality*).

Each of these established measures was originally developed for its own area of application. The challenge for financial network analysis is to devise centrality measures that accurately correlate with the impact of adverse events. These measures may differ, depending on the particular episode, as well as on the market or part of the financial infrastructure where the episode takes place. Borgatti provides a classification of network processes and proposes relevant centrality indicators for them.²⁷ For instance, financial losses can spread via a process of “parallel duplication” (to many nodes at once and with all originating nodes retaining their losses), while payment flows are a “serial transfer”-type of process (whereby money moves serially from one bank to another, and sent funds are no longer available to the originating node). Important nodes in the former type of system could be captured by eigenvector centrality, while important nodes in the latter case could be better identified by a special stochastic process called a Markov chain. In their

19 G. Iori, G. de Masi, O.V. Precup, G. Gabbi and G. Caldarelli, “The microstructure of the Italian overnight money market”, *Journal of Economic Dynamics and Control*, 2008.

20 C. Iazzetta and M. Manna, “The topology of the interbank market: developments in Italy since 1990”, *Working Paper Series*, No 711, Banca d’Italia, 2009.

21 G. Bonanno, G. Caldarelli, F. Lillo, S. Micciché, N. Vandewalle and R.N. Mantegna, “Networks of equities in financial markets”, *The European Physical Journal B*, 2004.

22 H. Degryse and G. Nguyen, “Interbank exposures: an empirical examination of systemic risk in the Belgian banking system”, *International Journal of Central Banking*, 2007.

23 I. Hasan and H. Schmiedel, “Networks and equity market integration: European evidence”, *International Review of Financial Analysis*, 2004.

24 O. Castren and I. Kavonius, “Balance sheet interlinkages and macro-financial risk analysis in the euro area”, *Working Paper Series*, No 1124, ECB, December 2009.

25 See, for instance, the Federal Reserve’s decision to extend funding to Bear Sterns on account of its “prominent position in the markets” (Minutes of the Board of Governors of the Federal Reserve System, 14 March 2008).

26 A version of eigenvector centrality is behind Google’s PageRank score to assess the relevance of search results. Pages that are linked to pages with a high PageRank get a higher PageRank score themselves.

27 S. Borgatti, “Centrality and network flow”, *Social Networks*, 2005.

recent paper, Bech et al.²⁸ use Markov theory to model the money exchange process flowing through Canada's Large Value Transfer System and provide a ranking of system participants according to liquidity holdings, as predicted by their network analysis.

The study of centrality measures might have important policy implications, especially in the current policy debate on how to best reform financial regulation. The strengthened focus on a macro-prudential orientation calls for a pragmatic approach that considers and cross-checks a number of indicators to calibrate prudential tools with respect to the systemic importance of financial institutions.²⁹ Centrality measures could prove a good tool to "operationalise" the new framework.

In particular, centrality measures might offer relevant insights concerning the identification of which nodes should be considered of "systemic importance". These measures could then be used to direct regulatory efforts and, for example, to assess the opportunity to limit institutions' exposures, set up some form of regulatory fees or capital surcharges, or to introduce an insurance fund financed through institution-specific insurance premia. Such an approach has recently also been taken in the IMF's Interim Report for the G20, which outlines that an ideal levy on financial institutions should be based on a network model that would take into account all possible channels of contagion.³⁰

THE WAY FORWARD

The application of network analysis to transaction-level data from national large-value payment systems is a relatively well-established tool used in many leading central banks for the macro-prudential analysis of systemic stability. However, in order to enable financial network analysis to fulfil its promising role in better understanding financial stability, work is needed on three aspects: (1) a better theory on contagion channels in the financial system, on the information content of financial links and on the behaviour of financial institutions under both

normal and stress situations; (2) better tools to manage and analyse the financial information available; and (3) a broader set of data on financial linkages – at bank-to-bank level, cross-market and cross-currency, both nationally and on a cross-border basis. Developments on all these three aspects are likely to depend on each other.

Better theory should be able to identify the various contagion channels in different parts of the financial system and explain the formation of various types and the information content of links between financial institutions and their behaviour under normal and stress situations. Focusing on how institutions form connections, especially when exposed to the risk of contagion, models of systemic risk could make sense of real economic interactions among market participants. Such a focus might help policy-makers in promoting safer financial structures.

Tools for network analysis have developed substantially over the last few years.³¹ The application of network analysis to monitor and assess systemic risk and contagion in financial systems should benefit from important progress made in other sciences. It should, however, be kept in mind that the results depend on the process and behaviour of the particular network, and may not be directly applicable to the financial context.

Finally, the availability of relevant data is a key prerequisite for the use of financial network analysis as a surveillance tool. Data on relevant exposures are already collected by many authorities, but these are often neither granular nor frequent enough, or the time series do not

28 See M.L. Bech, J.T.E. Chapman and R. Garratt, "Which bank is the 'central' bank? An application of Markov theory to the Canadian Large Value Transfer System", *Journal of Monetary Economics*, forthcoming.

29 See, for example, J. Caruana, "The international policy response to financial crises: making the macroprudential approach operational", panel remarks in Jackson Hole, August 2009.

30 IMF, "A fair and substantial contribution by the financial sector – interim report for the G20", 24 April 2010.

31 A recent addition designed particularly for the analysis of financial networks is the "Financial Network Analyzer", an open-source project sponsored by Norges Bank (see: www.financialnetworkanalysis.com).

cover long enough periods for a statistical analysis of different market conditions. Going forward, regulators and overseers should continue to develop ways to systematically collect, share and analyse the data from both market sources and financial infrastructures. Uncovering the intricate structure of linkages between financial institutions and infrastructures, among sectors of the economy or across entire national financial systems, is crucial for understanding channels of systemic risk; but this is also important because network metrics, reflecting the architecture of interactions that arise among economic agents when they form connections, can provide an insight into agents' behaviour.

As regards the Eurosystem, it is planned to make data on TARGET2 available for oversight purposes to the ECB and the relevant national central banks of the European System of Central Banks. TARGET2 is the pan-European interbank payment system in which a total of €551 trillion was settled in 2009. These data will allow the formation of a picture of interbank payment flows in euro, and of their evolution and stability both during the crisis and in simulated stress scenarios, so as to uncover parts of the euro money market and to develop proxies for the linkages established between institutions and infrastructures that settle their payments in TARGET2.

CONCLUDING REMARKS

Recently, a substantial amount of research has been carried out with respect to the network properties of various systems in biology, telecommunications and sociology. The main premise of network analysis is that the structure of the links between the nodes matters. The properties and behaviour of a node cannot be analysed in isolation of its position in the network.

The intricate structure of linkages between financial institutions and infrastructures, among sectors of the economy or across entire financial systems, can be captured using a network representation.

By understanding the financial system as a complex and dynamic network, empirical analysis on the properties of this network and the development of contagion and behavioural models using this information would allow regulators to acquire a deeper understanding of systemic risk and the ability to better identify systemically important financial institutions.

E ADDRESSING RISKS ASSOCIATED WITH FOREIGN CURRENCY LENDING IN EU MEMBER STATES

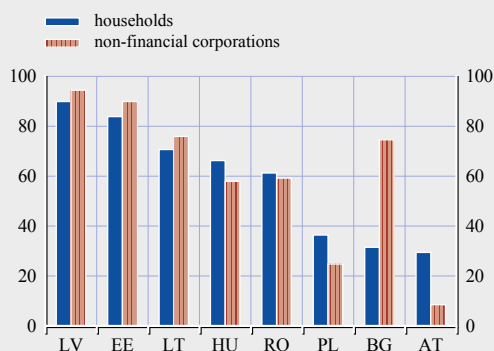
As the impact of the recent financial crisis began to spread beyond mature economy financial systems, attention was increasingly drawn to the potential systemic risks associated with the prevalence of foreign currency lending in some EU Member States. Although the direct exchange rate risk for banks in most of these countries is controlled by regulatory limits on open foreign exchange positions, banks are still exposed to the indirect exchange rate risk that can arise from currency mismatches on their clients' balance sheets. This special feature summarises the measures that have been taken by several EU countries to address the financial stability risks related to rapidly expanding foreign currency lending to the non-financial private sector. The experience gained so far indicates that the effectiveness of these measures has been rather limited. Although a variety of factors appear to explain this, what has been particularly important is the persistence of wide differentials in the interest rates paid on loans in domestic currency over those paid in foreign currency, as well as the intensity of bank competition. Moreover, countries' experiences have revealed that when the presence of foreign-owned banks in local markets is significant, as is the case in non-euro area EU countries in central and eastern Europe, the impact of implementing these measures has been materially curtailed.

INTRODUCTION

Lending in foreign currencies to the non-financial private sector is not an entirely new phenomenon in the EU, but in most countries such activities account for only a fraction of total lending by banks. There are nevertheless several EU countries in which lending in foreign currencies has led to the build-up of substantial currency mismatches on private sector balance sheets. Although the countries where this has occurred are mainly non-euro area EU Member States in the central and eastern Europe (CEE) region¹, the issue is also

Chart E.1 Loans in foreign currency to the domestic non-financial private sector in selected EU countries

(Q4 2009; percentage of total loans)



Source: ECB.

Note: Countries with a share of foreign currency loans in total loans to domestic households that exceeds a threshold of 15% are shown.

relevant in the case of Austria (see Chart E.1). Borrowers in some of these countries have accumulated high debt volumes denominated in foreign currencies, particularly in euro, but also in Swiss francs and Japanese yen.²

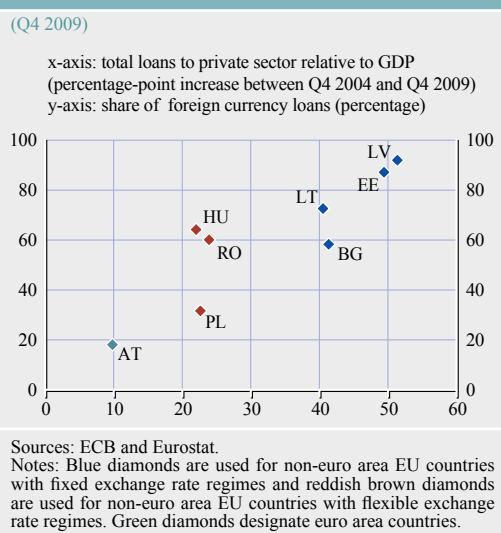
There seems to be a strong link between rapid credit growth and borrowing in foreign currencies in non-euro area EU countries of the CEE region. Countries which had experienced particularly strong credit growth before the global financial crisis also tended to have a higher share of foreign currency loans (see Chart E.2).

With the spreading of the global financial crisis from financial systems in mature economies, some of the non-euro area EU countries in the CEE region faced a depreciation of their currency. This contributed to raising debt servicing costs for domestic borrowers, although the low interest rates on loans in foreign currencies to some extent mitigated the short-term consequences of currency

1 As defined here, the non-euro area EU Member States of the CEE region are Bulgaria, Estonia, Hungary, Latvia, Lithuania, Poland and Romania.

2 Euro-denominated loans are dominant in the Baltic states, Bulgaria and Romania, while Swiss franc-denominated loans are popular in Austria, Hungary and Poland.

Chart E.2 Credit growth and foreign currency lending in selected EU countries



depreciation. Nevertheless, if foreign currency interest rates were to rise unexpectedly, this would most likely threaten the performance of loans denominated in foreign currency.³

This special feature lists some of the driving factors behind foreign currency lending in EU countries and provides a brief overview of the financial stability risks associated with these activities. It also explains some of the measures that authorities in these countries have implemented in attempts to address the associated risks. In order to understand how these risks could be addressed in a better way, an evaluation is also provided of the effectiveness and the limitations of the measures taken and, based thereon, conclusions are drawn on how to tackle the issue of mitigating the risks associated with foreign currency lending to unhedged borrowers.

FACTORS EXPLAINING FOREIGN CURRENCY LENDING IN EU COUNTRIES

Several factors have contributed to the prevalence of foreign currency lending in non-euro area EU countries in the CEE region. On the supply side, insufficient domestic savings in some of these countries and a high

presence of foreign-owned banks in all non-euro area EU countries in the CEE region are important factors in explaining the strength of foreign currency lending there. On the demand side, high differentials between the interest rates paid on loans in domestic and foreign currency, as well as exchange rate-related factors (such as a low exchange rate volatility, expectations of a further appreciation of the domestic currency and expectations of a future adoption of the euro, especially in those countries with fixed exchange rate regimes) contributed to the rapid expansion of foreign currency lending (see Chart E.3). As the demand for credit went beyond domestically available resources, banks attracted capital from abroad, benefiting primarily from the financial linkages with their parent banks residing in the rest of the EU. Countries with lower domestic savings tend to have higher shares of foreign currency loans.

The empirical literature supports the view that factors such as the degree of domestic deposit euroisation, banks' desire for currency-matched portfolios and the large interest rate differentials between domestic and foreign currency loans remained behind foreign currency lending in non-euro area EU countries in the CEE region.⁴ The high prevalence of foreign currency lending in countries with tightly pegged exchange rates or currency board arrangements suggests that the degree of exchange rate flexibility also played a role. However, according to the literature, the direct link between the exchange rate regime and foreign currency lending appears relatively weak for emerging market economies.⁵

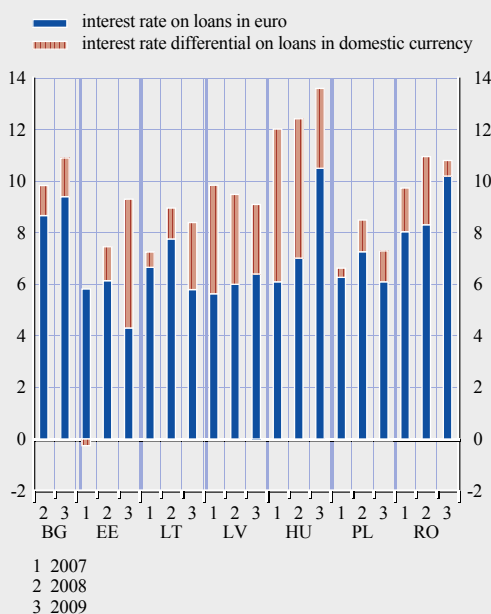
3 Although the share of foreign currency loans in total domestic lending virtually stopped growing in countries with floating exchange rate regimes in the course of 2009, it is difficult to distinguish the extent to which this reflected a greater risk awareness among both lenders and borrowers as a consequence of the impact that lower economic activity had on the overall decrease in new lending activity.

4 See A. Luca and I. Petrova, "What drives credit dollarization in transition economies?" *Journal of Banking and Finance*, Vol. 32, 2008, pp. 858-869; and Ch. Rosenberg and M. Tirpák, "Determinants of foreign currency borrowing in the new Member States of the EU", *Czech Journal of Economics and Finance*, Vol. 59, Issue 3, pp. 216-228.

5 See A. Honig, "Dollarization, exchange rate regimes and government quality", *Journal of International Money and Finance*, Vol. 28, 2009, pp. 198-214.

Chart E.3 Interest rate differential on loans for house purchase in selected non-euro area EU countries

(2007-2009; percentage points)



Source: ECB.

Note: Average level weighted by volumes of new loans.

This may, in part, reflect the fact that foreign currency lending in some of the countries with fixed exchange rates has increased only in recent years, while other factors, such as increasing interest rate differentials, may have played a more important role in explaining the variation over time. The exchange rate regime may nonetheless be an important factor explaining the degree of foreign currency lending in non-euro area EU countries in the CEE region: overheating and high inflation rates in countries with fixed exchange rates are likely to have contributed to the divergence of nominal interest rates, thereby increasing the attractiveness of the low interest rates on foreign currency loans. In addition, the plans for the adoption of the euro that have been announced by the authorities in these countries, and their strong commitment towards keeping to the central parity rate, increased incentives for borrowing in euro.

Moreover, there can be other economic reasons, such as natural hedging (e.g. export receipts or

remittance inflows to households denominated in foreign currency), which could motivate borrowing in foreign currencies. However, the extent to which natural hedging might cover sizeable currency mismatches non-euro area EU countries in the CEE region generally appears rather small, in particular for households.

In the case of Austria, the strength of foreign currency lending can be explained more or less entirely by demand factors, especially the low interest rates on loans extended in Swiss francs and Japanese yen.

FINANCIAL STABILITY RISKS ASSOCIATED WITH FOREIGN CURRENCY LENDING

There are several ways in which foreign currency borrowing can create risks for financial stability. When domestic borrowers have unhedged foreign currency debt, a significant depreciation of the local currency would translate into an increase in the local-currency value of outstanding debt. As a consequence, this would lead to a deterioration of the debt-servicing capacity of unhedged domestic borrowers. Since a large fraction of the private sector would be adversely affected at the same time, such an event could have the potential, if the exchange rate shock was sufficiently large, to pose a systemic financial stability risk for the country concerned. Moreover, if the foreign currency appreciation were to take place together with a rise in the interest rates on foreign currency loans, this would clearly aggravate the borrower default risk.⁶ An increase in borrower defaults would transform into an increase in

6 The particular riskiness of foreign currency lending originates in a non-linear relationship between default and exchange rate risk, which is easily neglected in standard risk management approaches that treat credit and market risks separately. The building blocks of this malign riskiness of foreign currency loans and its empirical relevance was demonstrated in a recent study led by the Oesterreichische Nationalbank and conducted in the context of a working group of the Basel Committee Research Task Force. See Basel Committee on Banking Supervision, "Findings on the interaction of market and credit risk", *Working Paper Series*, No. 16, Bank for International Settlements, May 2009; and P. Hartmann, "Interaction of market and credit risk", *Journal of Banking and Finance*, No 34(4), 2010, pp. 697-702.

provisions and write-offs and could pose a significant decrease in banks' capital levels. The low prevailing level of interest rates on loans in foreign currencies has to some extent mitigated the short-term consequences of currency depreciation in the non-euro area EU countries with floating exchange rate regimes; however, a future rise in foreign currency interest rates and a depreciation of domestic currencies, if this was to recur, would threaten the performance of loans denominated in foreign currency via higher monthly payments. As the largest part of foreign currency loans to households are long-term housing loans secured by collateral in the form of residential property, this fact could have created a perception that these loans are free of risk. However, activity in housing markets tends to move in line with overall economic activity, and it might be difficult for banks to realise collateral in periods of an overall slowdown in economic activity.

In addition to credit risk, a significant deterioration of the quality of foreign currency loan portfolios can expose banks to earnings risk, through a significant decrease in interest income (as loan portfolios represent the major part of banks' assets in non-euro area EU countries in the CEE region) and an increase in provisioning.

Another source of risk for financial stability can arise from the fact that a significant deterioration in the quality of foreign currency loan portfolios can also create funding risk for banks, as the inflows of funds that are available to banks for repayment of their own liabilities could decrease significantly (as a result of a rise in loan arrears). This would result in higher rollover needs with respect to existing funding over the duration of the loan portfolio. In addition, if liquidity in foreign currency swap markets decreases significantly and banks have no access to central banks' lending facilities in foreign currency, funding risk of foreign currency loans can materialise in the short term.

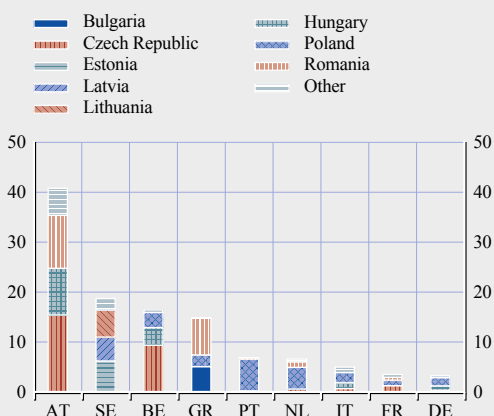
Finally, there are also macroeconomic implications that stem from the high exposure of private non-financial sector balance sheets to

foreign exchange fluctuations. An appreciation of the domestic currency will have a positive effect on the net wealth of borrowers in foreign currency, and this can raise demand for new foreign currency loans, especially if there is a persistently wide interest rate differential on loans in domestic currency over those in foreign currency. This, in turn, can facilitate aggregate demand and raise the risk of an overheating of the economy. Similarly, a depreciation of the domestic currency will lead to an increase in the value of foreign currency debts in domestic currency terms. This, in turn, will lead to wealth destruction and a decrease in households' capacity to spend and save. Hence, a high exposure of household sector balance sheets to foreign exchange fluctuations may also create the risk of excessive credit growth during booms and, subsequently, larger credit squeezes during bust periods, thereby aggravating boom-bust cycles.

In addition to the above-mentioned risks to the countries concerned, high shares of foreign currency lending in non-euro area EU Member States in the CEE region and other countries outside the EU can create credit risk for large EU and, especially, euro area banks that are active in these countries. A number of large EU banking groups have significant exposures to the non-euro area EU countries in the CEE region through their consolidated asset holdings (including direct cross-border lending and lending by subsidiaries and branches of these banks in non-euro area EU countries in the CEE region). Countries, whose banking groups are particularly active in lending to borrowers resident in non-euro area EU countries in the CEE region are Austria, Belgium, France, Germany, Greece, Italy, the Netherlands and Sweden (see Chart E.4). However, it should be mentioned that the exposures shown in the aforementioned chart combine domestic and foreign currency lending, and should thus not be interpreted in a straightforward manner as a measure of foreign currency risk. In the case of the Czech Republic, in particular, lending in domestic currency by foreign-owned banks' subsidiaries dominates lending in foreign

Chart E.4 Consolidated lending exposures of selected EU banking systems to selected non-euro area EU countries

(2009; percentage of GDP, per lending country)



Sources: BIS and Eurostat.

Notes: BIS statistics on consolidated foreign claims of domestically owned banks in lending countries on individual non-euro area EU countries on an immediate borrower basis. The largest three exposures to each particular country are shown in the chart, while smaller exposures are combined under other countries.

currency. To the extent that the lending exposures of large EU banking groups to non-euro area EU countries in the CEE region are denominated in foreign currency and that the associated risks are not normally hedged by borrowers in these countries, this can translate into greater credit risks for these banking groups.

EFFECTIVENESS OF THE MEASURES THAT HAVE BEEN TAKEN BY AUTHORITIES⁷

In addressing risks related to foreign currency lending, some countries, especially non-euro area EU countries that have floating exchange rate regimes in place, took a variety of measures aimed at increasing the costs for banks of extending loans in foreign currency during the period of rapid lending expansion from 2004 to 2007. These include the activation of monetary policy instruments, prudential tools and administrative measures.

These measures can be divided in three groups, according to the target they were expected to address. The first group includes higher reserve requirements on bank liabilities in

foreign currency and regulatory measures such as higher risk weights and higher provisioning rates on loans in foreign currency. The measures were designed mainly to create additional “implicit costs” for banks related to the holding of foreign currency liabilities and assets on their balance sheets, aiming at decreasing the supply of loans. However, in addition to the impact on the supply side, the measures have the potential to address the demand side if they lead to an appropriate pass-through of costs to a higher interest rate on new foreign currency loans in order to compensate for higher opportunity costs or additional capital charges. Second, restrictions on loan-to-value ratios explicitly set the maximum amount for each individual new loan, while at the same time controlling risk-taking by banks. And third, restrictions on payment-to-income ratios and other eligibility criteria for borrowers are pure demand-side measures intended to curtail the demand for new loans in foreign currency.

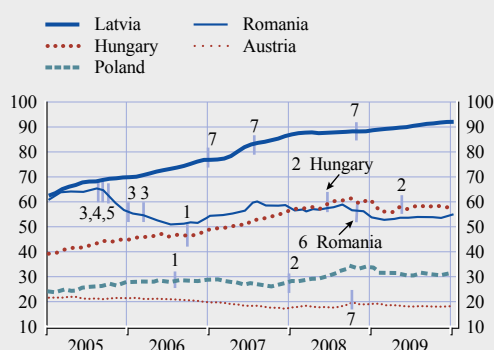
The effectiveness of the measures taken to discourage foreign currency lending in the period from 2005 to 2007 has proven to be rather limited (see Chart E.5).

The limited impact of these measures could be explained by a number of factors: (i) persistently wide differentials between interest rates on loans in domestic currency and those on loans in foreign currency resulted in continuously strong demand for foreign currency loans; (ii) a shortage of domestic (local currency) savings and intense bank competition underpinned the supply of foreign currency loans; and (iii) a significant presence of foreign-owned banks in the non-euro area EU countries in the CEE region provided opportunities for banks to circumvent such measures by partially shifting the foreign currency loans to the balance sheets of parent banks or to affiliated non-bank financial

⁷ This section draws mainly upon the information collated in the survey conducted via the Banking Supervision Committee (BSC) and on the subsequent assessments provided by the national central banks concerning the effectiveness of these measures.

Chart E.5 Shares of foreign currency lending in selected EU countries in which related measures were introduced

(Jan. 2005 – Jan. 2010; percentage of total lending)



- 1 recommendations for customers
- 2 higher risk weights
- 3 higher reserve requirements on bank liabilities in foreign currency
- 4 higher provisioning rate
- 5 quantitative restrictions on foreign currency lending
- 6 restrictions on payment to income ratio
- 7 recommendations for banks

Sources: ECB, BSC survey (Nov. 2009) and information collected from national central banks (Feb. 2010).
Note: Shares adjusted for foreign exchange rate effects.

intermediaries, which were outside the scope of responsibility of national authorities. In some countries, such measures were implemented only recently and their implementation coincided with the beginning of the slowdown in economic activity, or came shortly before the impact of the recent crisis had spread across non-euro area EU countries in the CEE region. The stabilisation of the share of foreign currency loans during the crisis may reflect supply-side factors resulting from a decrease in cross-border lending by parent banks. Therefore, it may be premature to make a robust assessment of their effectiveness.

The exception to this rule is to be found in Romania where a differentiation between minimum reserve requirements on bank liabilities in domestic and those in foreign currency (although taken in combination with other measures) seems, to some extent, to have helped in limiting the potential for lending in foreign currencies in the short term (see Chart E.5). In the long term, however, the constraining effect of the measure was weakened by the factors explained above.

Some countries with floating exchange rate regimes have issued recommendations to banks or their customers, addressing risks related to foreign currency loans and providing guidelines for borrower risk assessment. It seems that recommendations issued by the authorities in some countries have helped, to some extent, to raise the risk awareness of borrowers; however, their impact was offset by the further increase in interest rate differentials.

Recently, authorities in some countries (e.g. Austria and Hungary) have approved more strict minimum standards that require banks to assess the creditworthiness of unhedged borrowers more strictly or impose explicit restrictions on loan-to-value and payment-to-income ratios.

A number of countries, in particular those with fixed exchange rate regimes, have sought to address the rapid growth of overall domestic lending, which was – in the case of these countries – mostly in euro, rather than focusing only on lending in foreign currency. In these cases, the scope of the previously described instruments was extended to also cover lending in domestic currency (see Table E.1).

One way of assessing the effectiveness of the measures that were introduced in the countries concerned in order to address rapid overall lending growth is a comparison of the percentage changes in average year-on-year lending growth rates after the introduction of the measure to the same indicator before the measure was introduced (for example, a 20% decrease in the average year-on-year lending growth rate means a reduction in annual lending growth by one-fifth in the course of the year after the introduction of the measure). To control for an adverse impact of the slowdown in global economic activity, the percentage changes calculated are compared with the same indicator for the euro area.⁸

⁸ Another option for controlling for the impact of the slowdown in domestic economic activity is to compare a country's credit growth rate with the growth rate of its GDP or the growth rate of the credit-to-GDP ratio, with negative growth indicating a slowdown of lending growth.

If the indicator calculated for a particular country is lower than that for the euro area, it could indicate that the measure was effective, at least, to some extent. On comparison across categories, regulatory and administrative measures seem to be more effective in addressing rapid lending growth than monetary policy tools. Again, caution is warranted when assessing the effectiveness of these measures, since – in many cases – their implementation coincided with the slowdown in economic activity and the start of recent crisis.

CONCLUDING REMARKS

The recent financial crisis underlined the potential systemic risks associated with the prevalence of foreign currency lending in some EU Member States and highlighted the need to address the issue in order to prevent a further increase in the stock of foreign currency loans. As a general principle, an overall operating environment for economic agents that encourages prudent and well-informed decision-making by lenders and borrowers is key to the prevention of growing currency mismatches on the private sector balance sheets. This involves the pursuit of sound and stability-oriented macroeconomic policies. In addition, the adoption of regulatory and supervisory policy measures can also play an important role in mitigating the risks stemming from foreign currency lending.

A certain combination of prudential and administrative measures (such as restrictions on loan-to-value ratios of mortgage-backed loans, a mandatory minimum down-payment and the requirement of a proof of a borrower's legal income), even if designed at the national level only, seem to have the potential to slow down overall mortgage lending, if introduced in a timely manner. The combination of restrictions

on the loan-to-value ratio and the requirement of an obligatory minimum down-payment as a percentage of the value of the property bought seems to limit the opportunities available to both banks and their clients to circumvent the measures (since both measures include the same property value).

The experiences of non-euro area EU countries' in the CEE region has shown that, given the significant presence of foreign-owned banks in these countries, addressing the issue of foreign currency lending and excessive credit growth, particularly from the supply-side, at the national level has had a very limited impact only, or no impact at all. This leads to the conclusion that broadly coordinated action involving home country supervisors is needed to address the issue both at the subsidiary and at the consolidated level. That would ensure that the effectiveness of the implemented measures is not curtailed by shifting parts of the loan portfolios to the balance sheets of parent institutions or non-bank subsidiaries, which are outside of the scope of national policy-makers' responsibility.

However, it should be borne in mind that most of the non-euro area EU Member States in the CEE region are in a catching-up phase and have insufficient domestic funding resources. For these countries, strong inflows of foreign capital are a normal phenomenon and foreign currency lending is indeed an important source of financing for real investments. Therefore, it is particularly important to find an optimal balance between the risks associated with foreign currency lending and the desired economic growth, and – subsequently – to develop policies to eventually replace foreign currency loans with the domestic currency lending, while at the same time avoiding a credit crunch.

Table E.1 Measures taken to slow down overall domestic lending growth in non-euro area EU countries with a high proportion of foreign currency loans

	Countries with fixed/pegged exchange rate							
	Bulgaria	Loan growth change (%)	Estonia	Loan growth change (%)	Lithuania	Loan growth change (%)	Latvia	Loan growth change (%)
Monetary policy tools:								
Interest rate increase							III & XI 2004; VII & XI 2006 ¹⁾ ; III & V 2007 ¹⁾	-20(1)
Reserve requirements	2004; 2005; VII 2007 ¹⁾	114(-3)	X 2006	0(1.7)	V 2002	n.a.	VII 2004; I 2005; XII 2005 ¹⁾ ; V 2006 ¹⁾	23(20)
Regulatory measures:								
Higher risk weights	X	n.a.	III 2006	4(19)	II 2007	-33(-1)	I 2008	-61(-16)
Restrictions on LTV	IV 2006	-36(17)					VII 2007	-41(-3)
Provisioning rate	XI 2005	n.a.					I 2008	-61(-16)
Tighter regulation on higher risk/large exposures	IV 2006	-36(17)						
Quantitative restrictions on lending growth	IV 2005 - XII 2006	n.a.						
Limits on inclusion of bank profits into capital	IV 2005	n.a.			I 2008	-25(-16)		
Administrative measures:								
Eligibility criteria for borrowers	X	n.a.						
Restrictions on payment-to-income ratio	X	n.a.						
Introduction of first down-payment							VII 2007	-41(-3)
Submission of income statement from State Revenue Service							VII 2008	-76(-50)
Tighter rules on taxes related to real estate transactions and government-subsidised mortgage conditions			2003; 2004	n.a.	X 2006	-27(2)	IV 2006	15(17)
Guidelines/recommendations for banks or customers	II 2006	see above	2003; 2004	n.a.	X	n.a.	I & VII 2007	-28(-2)

Sources: BSC survey (Nov. 2009) and information collected from national central banks (Feb. 2010).

Notes: The dates in the boxes denote the time of the implementation of the measures. X denotes that the measure was implemented, but the precise timing was not indicated.

1) Denotes the timing of the measures to which the assessment is provided on the right-hand side of each column. The change in lending growth is defined as a percentage change in the average year-on-year lending growth rates after the introduction of the measure when compared with the same indicator before the measure was introduced. The number in brackets denotes the change in lending growth in the euro area.

Table E.1 Measures taken to slow down overall domestic lending growth in non-euro area EU countries with a high proportion of foreign currency loans (continued)

	Countries with floating exchange rate					
	Hungary	Loan growth change (%)	Poland	Loan growth change (%)	Romania	Loan growth change (%)
Monetary policy tools:						
Interest rate increase					2004-2008	n.a.
Reserve requirements					VI 2006	8(7)
Regulatory measures:						
Higher risk weights	V 2008 ¹⁾	-27(-38)	I 2005;	n.a.	I 2007	3(-1)
Restrictions on LTV	V 2009	n.a.			II 2004	n.a.
Provisioning rate						
Tighter regulation on higher risk/large exposures						
Quantitative restrictions on lending growth						
Limits on inclusion of bank profits into capital						
Administrative measures:						
Eligibility criteria for borrowers	VI 2011	n.a.				
Restrictions on payment-to-income ratio					II 2004; VIII 2005	n.a.
Introduction of first down-payment						
Submission of income statement from State Revenue Service					VIII 2008	-72(-56)
Tighter rules on taxes related to real estate transactions and government-subsidised mortgage conditions	2003; 2009	n.a.				
Guidelines/recommendations for banks or customers						

Sources: BSC survey (Nov. 2009) and information collected from national central banks (Feb. 2010).

Notes: The dates in the boxes denote the time of the implementation of the measures. X denotes that the measure was implemented, but the precise timing was not indicated.

1) Denotes the timing of the measures to which the assessment is provided on the right-hand side of each column. The change in lending growth is defined as a percentage change in the average year-on-year lending growth rates after the introduction of the measure when compared with the same indicator before the measure was introduced. The number in brackets denotes the change in lending growth in the euro area.



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. Where it is 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 special 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 pre-defined 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 euro overnight index average (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, 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 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

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5 EURO AREA FINANCIAL INSTITUTIONS

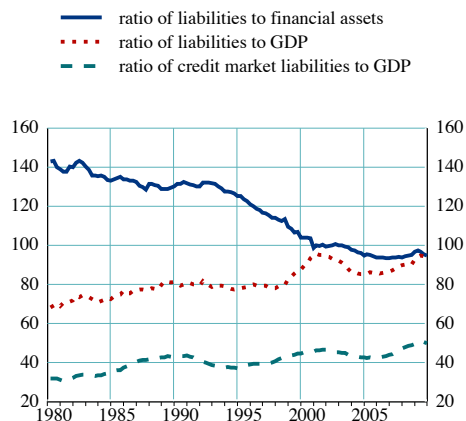
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I EXTERNAL ENVIRONMENT

Chart S1 US non-farm, non-financial corporate sector business liabilities

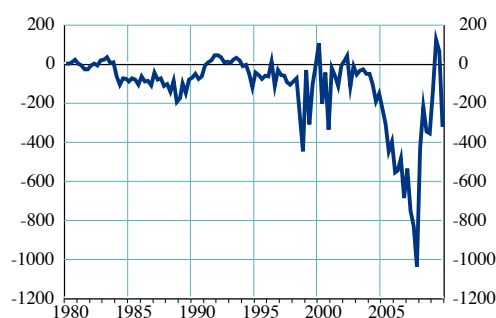
(Q1 1980 - Q4 2009; percentage)



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

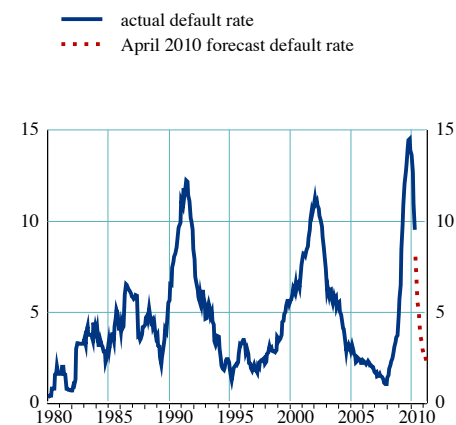
(Q1 1980 - Q4 2009; USD billions; seasonally adjusted and annualised quarterly data)



Source: BIS.

Chart S3 US speculative-grade corporations' actual and forecast default rates

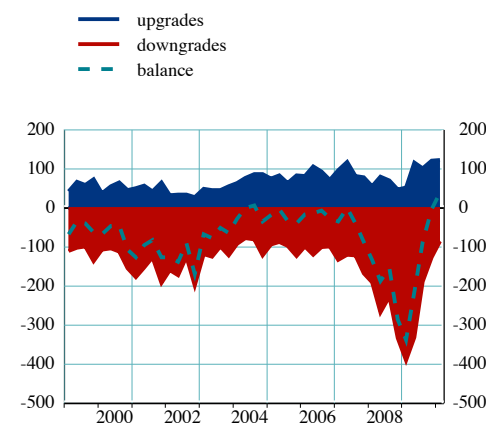
(Jan. 1980 - Apr. 2011; percentage; 12-month trailing sum)



Source: Moody's.

Chart S4 US corporate sector rating changes

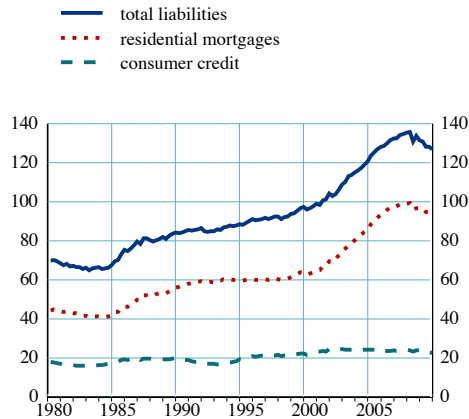
(Q1 1999 - Q1 2010; number)



Sources: Moody's and ECB calculations.

Chart S5 US household sector debt

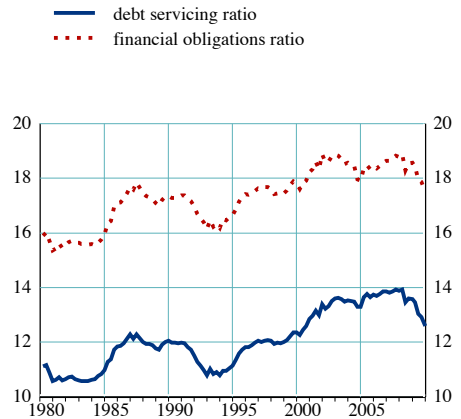
(Q1 1980 - Q4 2009; percentage of disposable income)



Sources: Thomson Reuters Datastream, BIS and ECB

Chart S6 US household sector debt burden

(Q1 1980 - Q4 2009; percentage of disposable income)

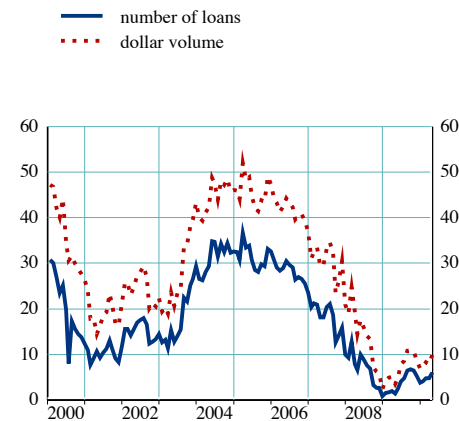


Source: Thomson Reuters Datastream.

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 - Apr. 2010; percentage of total new mortgages)



Source: Thomson Reuters Datastream.

Chart S8 US general government and federal debt

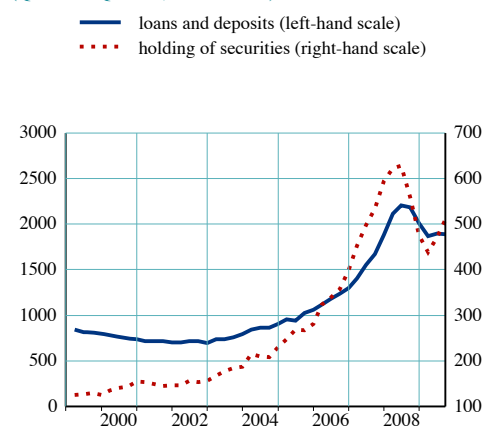
(Q1 1980 - Q1 2010; percentage of GDP)



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 - Q3 2009; 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	8.7	10.0	9.9	0.7	3.1	2.4	5.8	6.2	6.5
Hong Kong	-2.7	5.0	4.4	-2.6	2.0	1.7	11.1	12.1	10.1
India	5.7	8.8	8.4	15.0	8.1	4.6	-2.1	-2.2	-2.0
Indonesia	4.5	6.0	6.2	2.8	5.7	5.3	2.0	1.4	0.4
Korea	0.2	4.5	5.0	2.8	3.0	3.0	5.1	1.6	2.2
Malaysia	-1.7	4.7	5.0	1.2	2.0	2.1	16.7	15.4	14.7
Singapore	-2.0	5.7	5.3	-0.3	2.3	1.3	19.1	22.0	22.4
Taiwan	-1.9	6.5	4.8	-6.4	1.5	1.5	11.2	8.5	7.7
Thailand	-2.3	5.5	5.5	3.5	2.7	2.0	7.7	2.5	0.3
Emerging Europe									
Russia	-7.9	4.0	3.3	8.8	6.0	5.4	3.9	5.1	4.6
Turkey	-4.7	5.2	3.4	6.5	8.4	6.1	-2.3	-4.0	-4.4
Ukraine	-15.1	3.7	4.1	12.3	9.4	9.0	-1.7	-2.3	-2.3
Latin America									
Argentina	0.9	3.5	3.0	7.7	9.7	9.7	2.8	2.8	2.0
Brazil	-0.2	5.5	4.1	4.3	5.3	4.8	-1.5	-2.9	-2.9
Chile	-1.5	4.7	6.0	-1.4	3.7	3.0	2.2	-0.8	-2.1
Colombia	0.1	2.2	4.0	2.0	3.8	3.4	-1.8	-3.1	-2.9
Mexico	-6.5	4.2	4.5	3.6	5.3	3.0	-0.6	-1.1	-1.4
Venezuela	-3.3	-2.6	0.4	25.1	34.3	32.0	2.5	10.5	10.8

Source: International Monetary Fund (IMF) and ECB calculations.

Notes: Data for 2010 and 2011 are forecasts. In the case of real GDP for China, India, Russia, Brazil, Chile and Colombia, inflation for China, India and Chile, current account balance for China, India, Malaysia, Russia, Ukraine, Chile and Colombia, the data for 2009 are forecasts.

Table S2 Financial condition of global large and complex banking groups

(2004 - 2009)

	Minimum	First quartile	Median	Average	Weighted average ¹⁾	Third quartile	Maximum
Return on shareholders' equity (%)							
2004	4.23	13.02	15.50	14.63	13.23	16.93	19.59
2005	7.91	14.94	15.91	17.03	16.35	18.05	28.72
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	-52.00	-17.23	3.36	-5.07	-6.48	5.71	14.18
2009	-12.98	-2.74	2.71	3.43	4.15	7.09	18.67
Return on risk-weighted assets (%)							
2004	0.56	1.51	1.75	1.75	1.59	2.00	2.78
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	0.93	1.46	1.19	1.00	1.82	2.27
2008	-6.97	-2.78	0.50	-0.70	-0.83	0.61	2.60
2009	-2.78	-0.39	0.44	0.44	0.60	0.98	3.10
Total operating income (% of total assets)							
2004	2.36	3.43	3.94	4.12	3.84	4.56	6.70
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	2.96	2.29	3.76	6.16
2009	1.95	2.34	3.37	3.69	3.45	4.94	6.20
Net income (% of total assets)							
2004	0.39	0.58	0.83	0.83	0.77	1.01	1.52
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	0.24	-0.08	-0.32	0.26	1.04
2009	-1.19	-0.15	0.25	0.17	0.27	0.58	1.58
Net loan impairment charges (% of total assets)							
2004	-0.02	0.01	0.19	0.17	0.21	0.25	0.48
2005	-0.02	0.00	0.18	0.20	0.24	0.31	0.53
2006	-0.02	0.00	0.20	0.18	0.22	0.34	0.57
2007	-0.01	0.00	0.11	0.25	0.31	0.49	0.77
2008	0.00	0.04	0.34	0.54	0.69	0.96	1.74
2009	0.00	0.09	0.57	0.80	1.09	1.57	2.18
Cost-to-income ratio (%)							
2004	50.79	53.68	64.75	63.17	61.02	67.33	84.33
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	62.83	79.88	139.71	87.46	96.05	745.61
2009	46.35	53.75	59.64	68.65	58.91	72.91	119.14
Tier 1 ratio (%)							
2004	7.00	8.20	8.70	9.38	8.50	10.40	13.30
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	7.85	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	12.00	15.30	17.70
Overall solvency ratio (%)							
2004	10.10	11.72	12.00	12.58	11.89	13.01	16.60
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	11.79	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	15.28	18.20	20.60

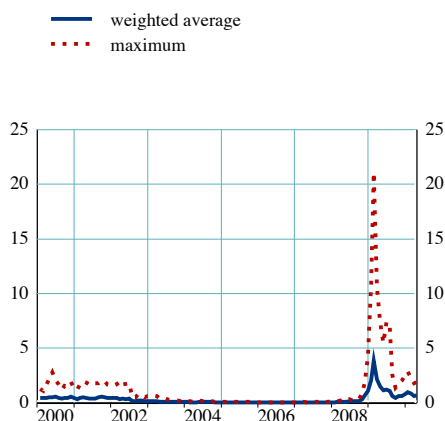
Sources: Bloomberg, individual institutions' financial reports and ECB calculations.

Notes: Based on available figures for 13 global large and complex banking groups.

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

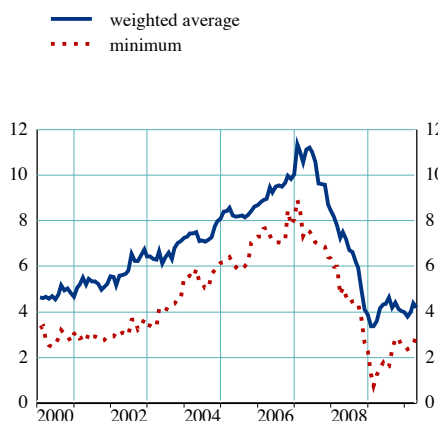
(Jan. 2000 - Apr. 2010; percentage probability)



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

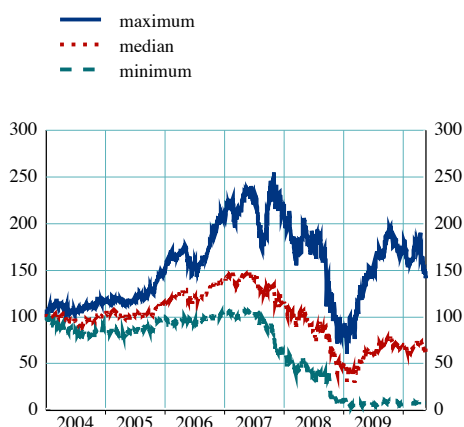
(Jan. 2000 - Apr. 2010)



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

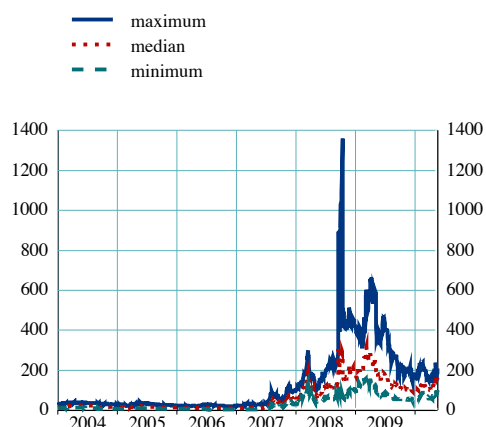
(Jan. 2004 - May 2010; index: Jan. 2004 = 100)



Sources: Bloomberg and ECB calculations.

Chart S13 Credit default swap spreads for global large and complex banking groups

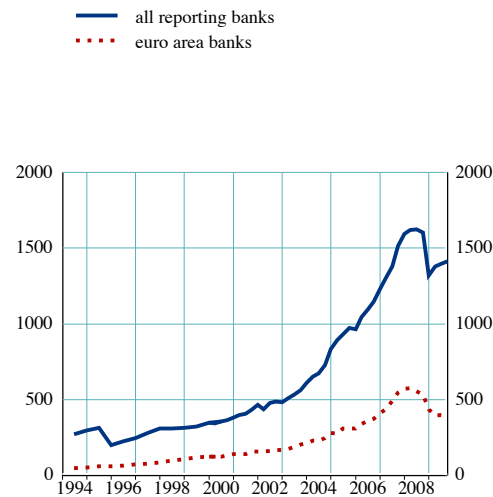
(Jan. 2004 - May 2010; basis points; senior debt five-year maturity)



Sources: Bloomberg and ECB calculations.

Chart S14 Global consolidated claims on non-banks in offshore financial centres

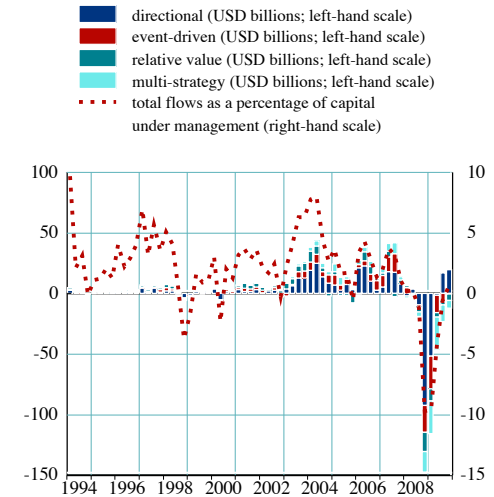
(Q1 1994 - Q3 2009; USD billions; quarterly data)



Source: 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

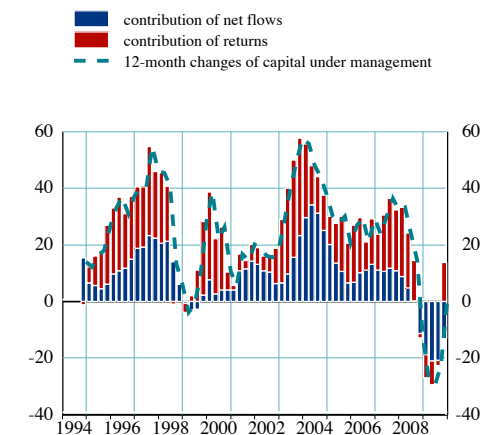
(Q1 1994 - Q4 2009)



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

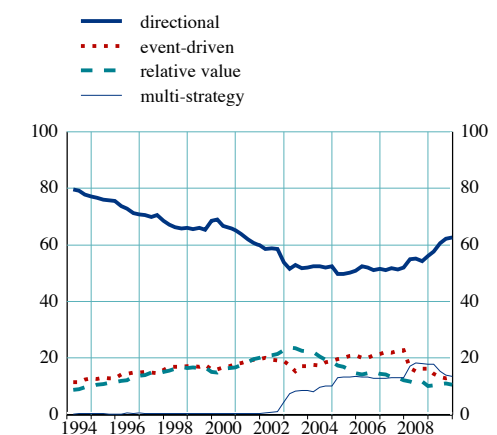
(Q4 1994 - Q4 2009; percentage)



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 - Q4 2009; percentage)

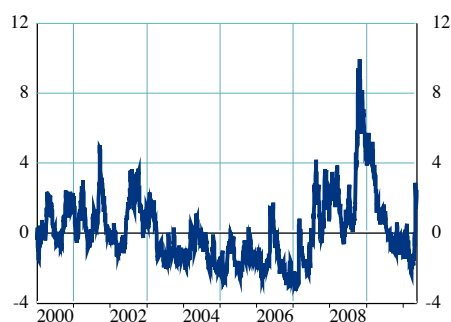


Sources: Lipper TASS and ECB calculations.
 Notes: Excluding funds of hedge funds. The directional group includes long/short equity hedge, global macro, emerging markets, dedicated short-bias and managed futures strategies. The relative-value group consists of convertible arbitrage, fixed income arbitrage and equity market-neutral strategies.

2 INTERNATIONAL FINANCIAL MARKETS

Chart S18 Global risk aversion indicator

(Jan. 2000 - May 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 - Apr. 2010; index: Jan. 2000 = 100)

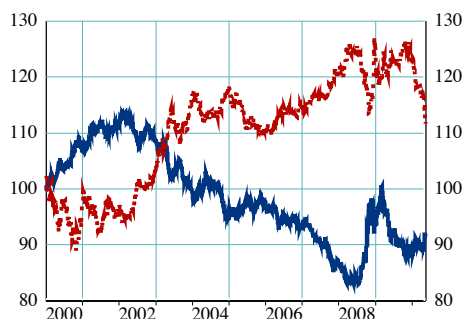


Source: Thomson Reuters Datastream.
Notes: Weighted average of the foreign exchange values of the US dollar against the currencies of a large group of major US trading partners, deflated by the US consumer price index. For further details, see "Indexes of the foreign exchange value of the dollar", *Federal Reserve Bulletin*, Winter 2005.

Chart S20 Selected nominal effective exchange rate indices

(Jan. 2000 - May 2010; index: Jan. 2000 = 100)

— USD
••••• EUR

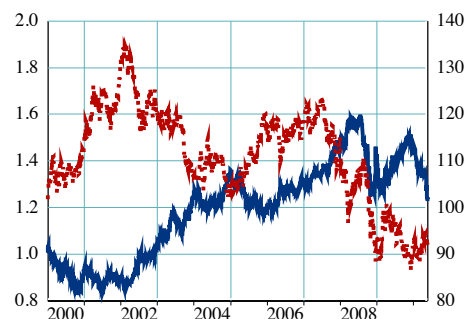


Sources: Bloomberg and ECB.
Notes: Weighted averages of bilateral exchange rates against major trading partners of the euro area and the United States. For further details in the case of the euro area, see ECB, "The effective exchange rates of the euro", *Occasional Paper Series*, No 2, February 2002. For the United States see the note of Chart S19.

Chart S21 Selected bilateral exchange rates

(Jan. 2000 - May 2010)

— USD/EUR (left-hand scale)
••••• JPY/USD (right-hand scale)

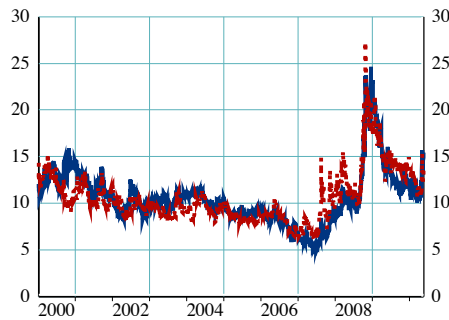


Source: ECB.

Chart S22 Selected three-month implied foreign exchange market volatility

(Jan. 2000 - May 2010; percentage)

— USD/EUR
 JPY/USD

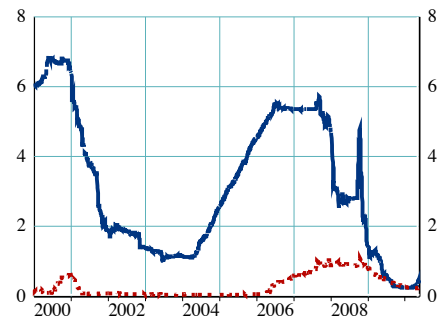


Source: Bloomberg.

Chart S23 Three-month money market rates in the United States and Japan

(Jan. 2000 - May 2010; percentage)

— United States
 Japan

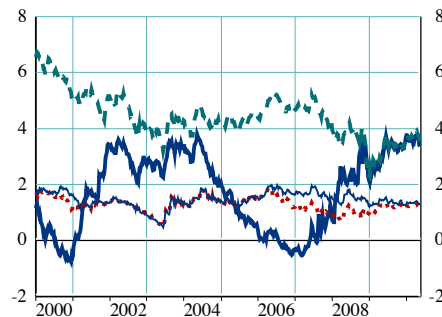


Source: Thomson Reuters.
 Note: US Dollar and Japanese Yen 3-month LIBOR.

Chart S24 Government bond yields and term spreads in the United States and Japan

(Jan. 2000 - May 2010)

— US term spread (percentage points)
 Japanese term spread (percentage points)
 - - - US ten-year yield (percentage)
 — Japanese ten-year yield (percentage)



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

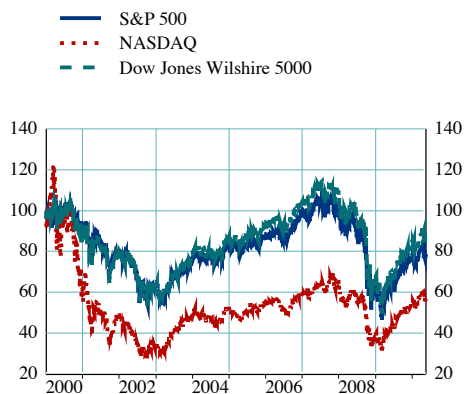
(Jan. 2000 - May 2010; thousands of contracts)



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

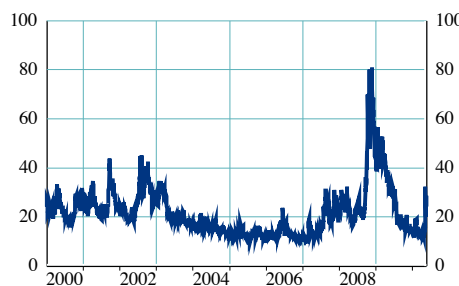
(Jan. 2000 - May 2010; index: Jan. 2000 = 100)



Sources: Bloomberg, Thomson Reuters and ECB calculations.

Chart S27 Implied volatility for the S&P 500 index

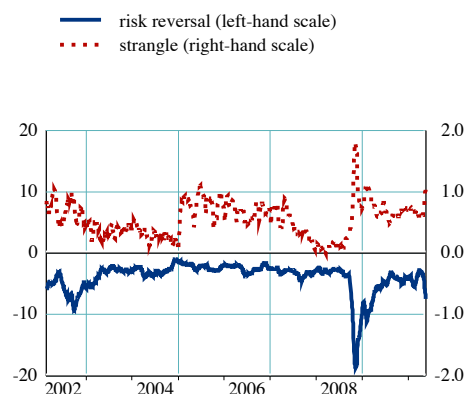
(Jan. 2000 - May 2010; percentage)



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

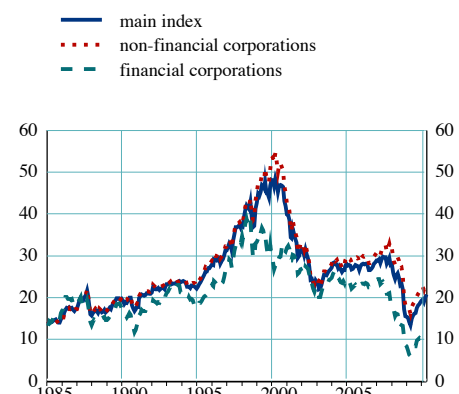
(Feb. 2002 - May 2010; percentage; implied volatility; 20-day moving average)



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

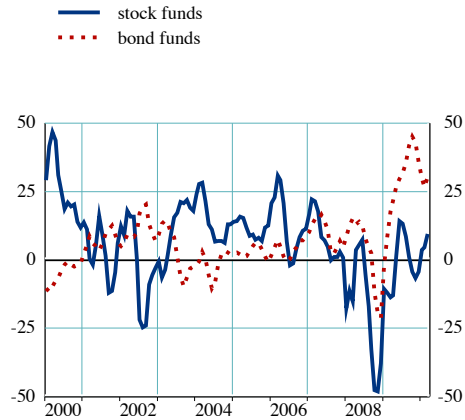
(Jan. 1985 - Apr. 2010; percentage; ten-year trailing earnings)



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 - Mar. 2010; USD billions; three-month moving average)



Source: Thomson Reuters Datastream.

Chart S31 Debit balances in New York Stock Exchange margin accounts

(Jan. 2000 - Mar. 2010; USD billions)

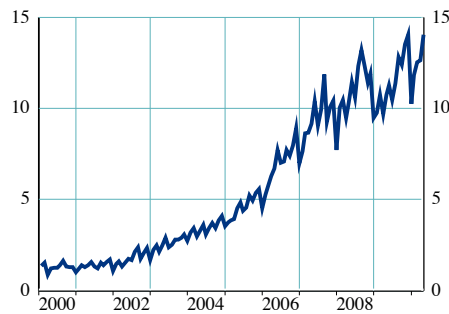


Source: Bloomberg.

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 - Apr. 2010; millions of contracts)

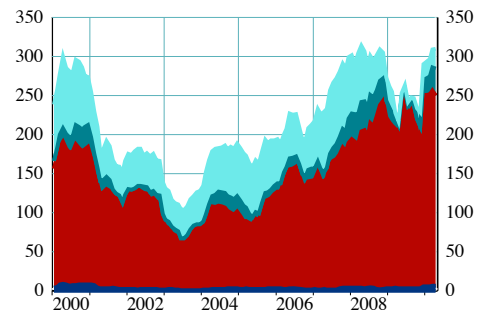


Source: Bloomberg.

Chart S33 Gross equity issuance in the United States

(Jan. 2000 - Apr. 2010; USD billions)

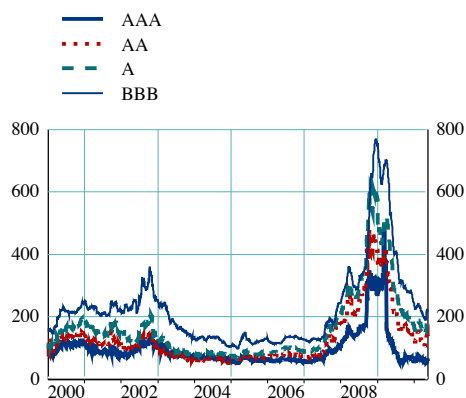
- secondary public offerings - planned
- secondary public offerings - completed
- initial public offerings - planned
- initial public offerings - completed



Source: Thomson ONE Banker.

Chart S34 US investment-grade corporate bond spreads

(Jan. 2000 - May 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

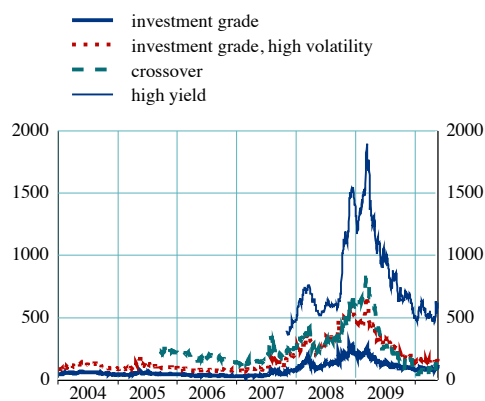
(Jan. 2000 - May 2010; basis points)



Source: Merrill Lynch.
 Note: Options-adjusted spread of the US domestic high-yield index (average rating B, average maturity of seven years).

Chart S36 US credit default swap indices

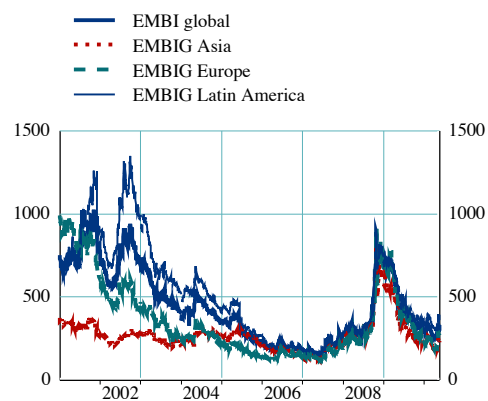
(Jan. 2004 - May 2010; basis points; five year maturity)



Sources: Bloomberg and ECB calculations.

Chart S37 Emerging market sovereign bond spreads

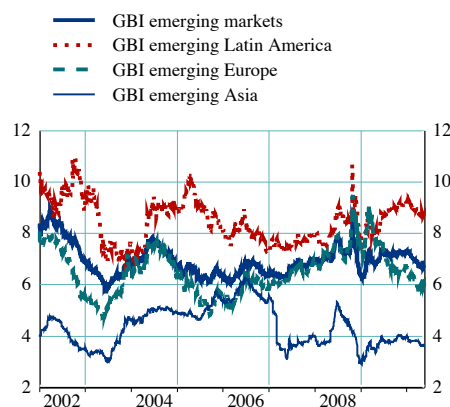
(Jan. 2001 - May 2010; basis points)



Source: Bloomberg and ECB calculations.

Chart S38 Emerging market sovereign bond yields, local currency

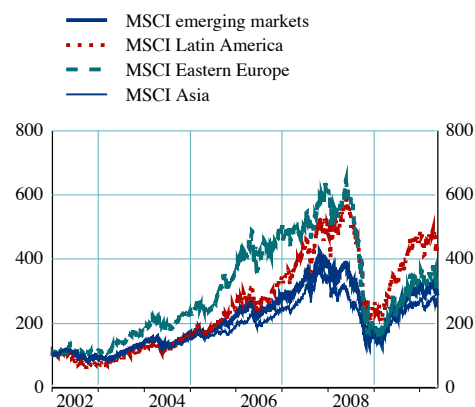
(Jan. 2002 - May 2010; percentage)



Source: Bloomberg.
Note: GBI stands for "Government Bond Index".

Chart S39 Emerging market stock price indices

(Jan. 2002 - May 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	47,968	45,848	66,812	43,185	39,045	54,760
<i>of which</i>								
China	1,781	4,484	5,830	1,945	2,196	5,000	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	5,069	4,854	13,673	5,500	4,500	6,500
Indonesia	500	1,540	4,456	4,603	4,408	3,400	5,800	5,300
Malaysia	907	4,132	2,765	1,620	0	2,321	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	752	370	500
Emerging Europe	11,100	19,952	25,242	30,014	57,725	34,630	16,682	32,575
<i>of which</i>								
Russia	6,686	10,140	15,620	21,342	46,283	29,000	10,500	25,000
Turkey	3,417	6,439	8,355	7,236	6,163	4,150	4,982	6,700
Ukraine	0	1,457	1,197	962	4,525	1,230	200	500
Latin America	33,884	35,143	41,315	36,253	40,219	39,567	39,623	49,603
<i>of which</i>								
Argentina	0	918	2,734	3,123	5,387	3,700	0	1,250
Brazil	13,160	10,943	14,831	15,446	16,907	13,000	13,000	22,000
Chile	2,130	2,375	1,200	1,463	250	920	2,000	1,053
Colombia	2,047	1,545	2,304	2,866	1,762	1,000	5,000	1,500
Mexico	10,181	12,024	8,804	7,769	9,093	11,500	9,000	11,500
Venezuela	3,763	4,260	6,143	100	1,250	8,000	6,000	10,000

Source: Thomson Financial Datastream.

Notes: Data for 2009 and 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 - June 2011; USD per barrel)

- historical price
- futures prices on 19 May 2010

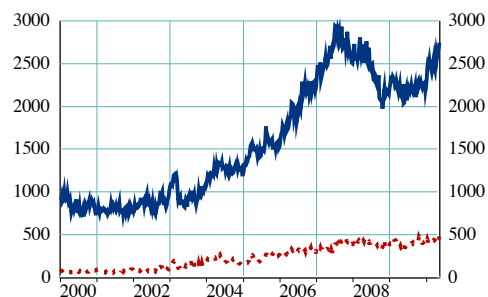


Sources: Thomson Reuters, Bloomberg and ECB calculations.

Chart S41 Crude oil futures contracts

(Jan. 2000 - May 2010; thousands of contracts)

- total futures contract
- non-commercial futures contract

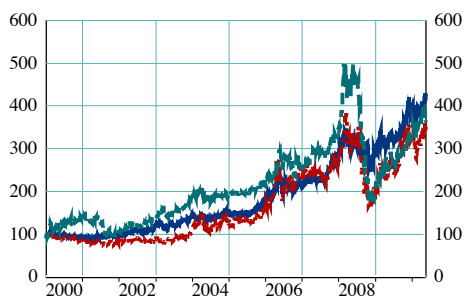


Source: Bloomberg.
Notes: Futures traded on the New York Mercantile Exchange. Non-commercial futures contracts are contracts bought for purposes other than hedging.

Chart S42 Precious metal prices

(Jan. 2000 - May 2010; index: Jan. 2000 = 100)

- gold
- silver
- platinum

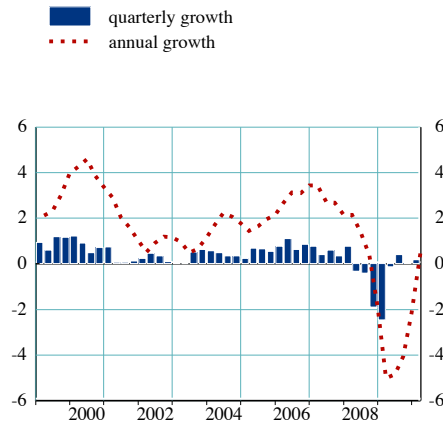


Sources: Bloomberg and ECB calculations.
Note: The indices are based on USD prices.

3 EURO AREA ENVIRONMENT

Chart S43 Real GDP growth in the euro area

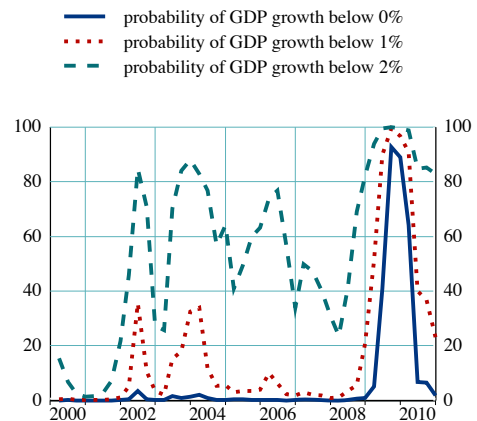
(Q1 1999 - Q1 2010; percentage change)



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 - Q4 2010; percentage)

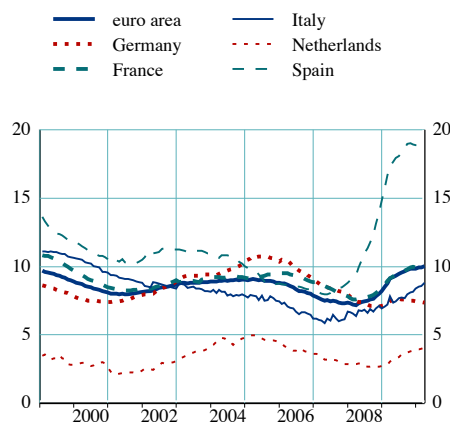


Sources: ECB Survey of Professional Forecasters (SPF) and ECB calculations.

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

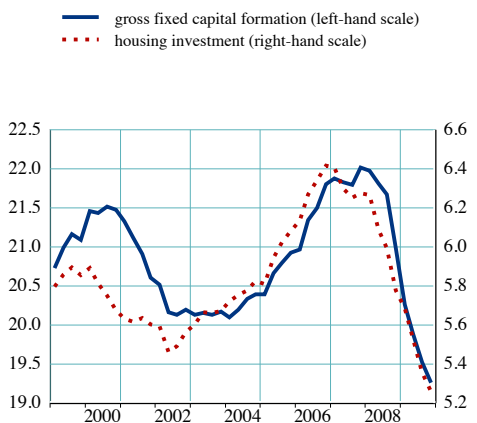
(Jan. 1999 - Mar. 2010; percentage of workforce)



Source: Eurostat.

Chart S46 Gross fixed capital formation and housing investment in the euro area

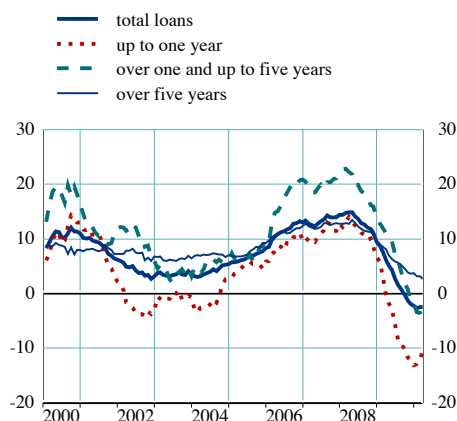
(Q1 1999 - Q4 2009; percentage of GDP)



Sources: Eurostat and ECB calculations.

Chart S47 Annual growth in MFI loans to non-financial corporations in the euro area

(Jan. 2000 - Mar. 2010; percentage change per annum)

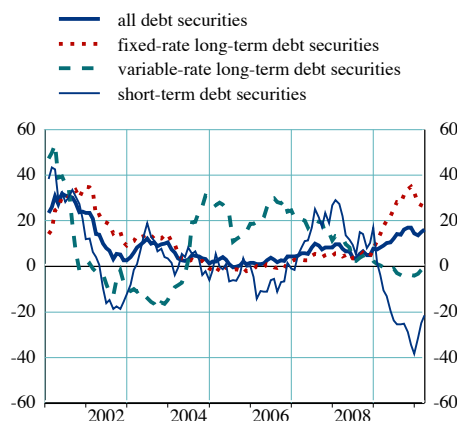


Sources: ECB and ECB calculations.

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

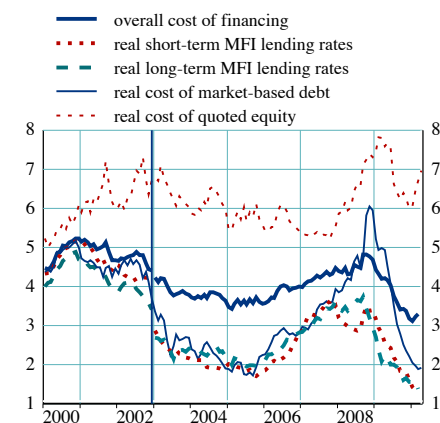
(Jan. 2001 - Mar. 2010; percentage change per annum)



Source: ECB.

Chart S49 Real cost of the external financing of euro area non-financial corporations

(Jan. 2000 - Apr. 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

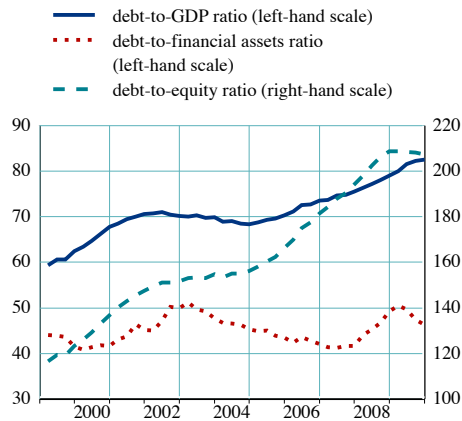
(Q1 2000 - Q4 2009; percentage of gross value added of non-financial corporations; four-quarter moving sum)



Sources: ECB and ECB calculations.

Chart S51 Total debt of non-financial corporations in the euro area

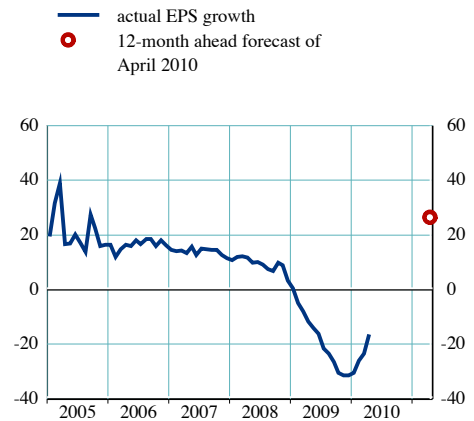
(Q1 1999 - Q4 2009; percentage)



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

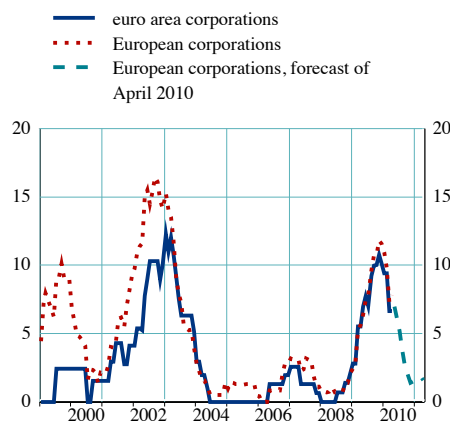
(Jan. 2005 - Apr. 2011; percentage change per annum)



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

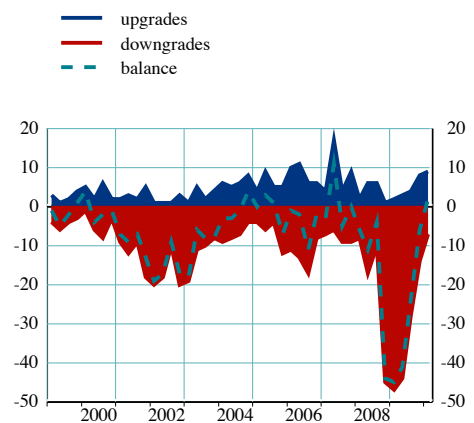
(Jan. 1999 - Apr. 2011; percentage; 12-month trailing sum)



Source: Moody's.

Chart S54 Euro area non-financial corporations' rating changes

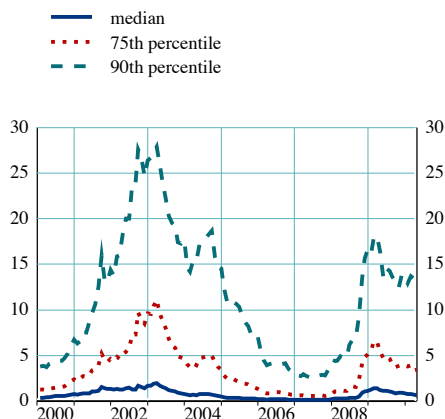
(Q1 1999 - Q1 2010; percentage)



Sources: Moody's and ECB calculations.

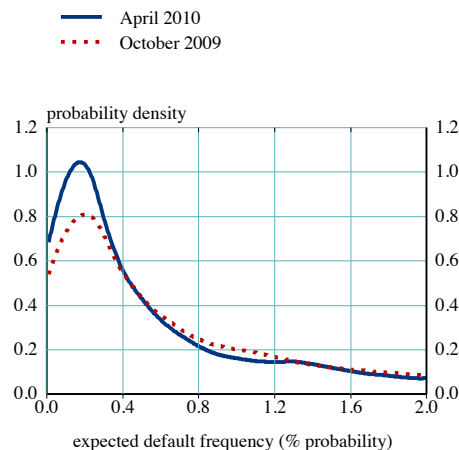
Chart S55 Expected default frequency (EDF) of euro area non-financial corporations

(Jan. 2000 - Apr. 2010; percentage probability)



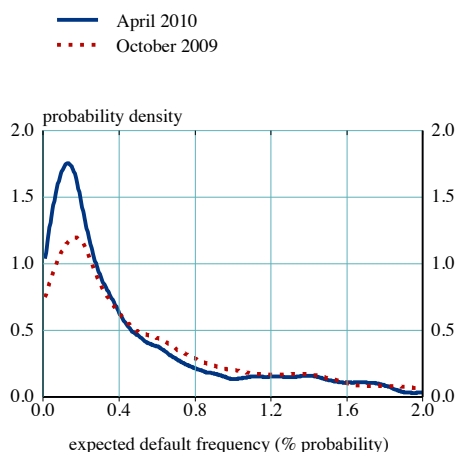
Sources: Moody's KMV and ECB calculations.
Notes: The EDF provides an estimate of the probability of default over the following year. Due to measurement considerations, the EDF values are restricted by Moody's KMV to the interval between 0.01% and 35%.

Chart S56 Expected default frequency (EDF) distributions for euro area non-financial corporations



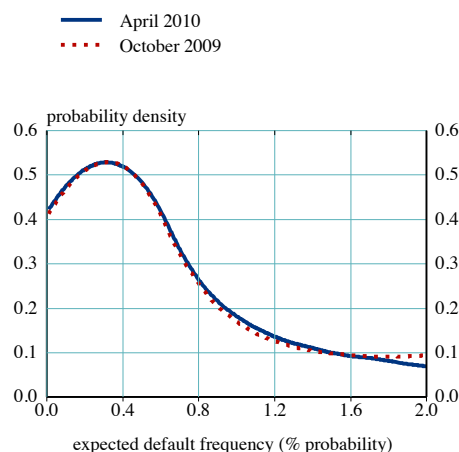
Sources: Moody's KMV and ECB calculations.

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.

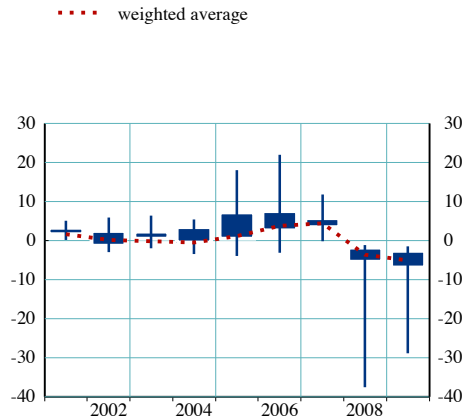
Chart S58 Expected default frequency (EDF) distributions for small euro area non-financial corporations



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

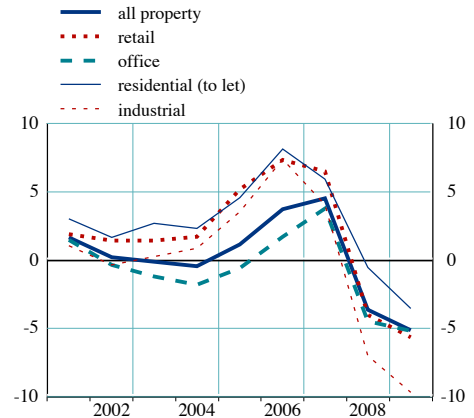
(2001 - 2009; capital values; percentage change per annum; minimum, maximum and interquartile distribution)



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

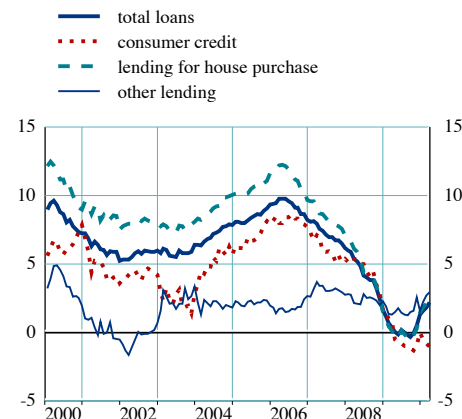
(2001 - 2009; capital values; percentage change per annum; cross-country weighted average)



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

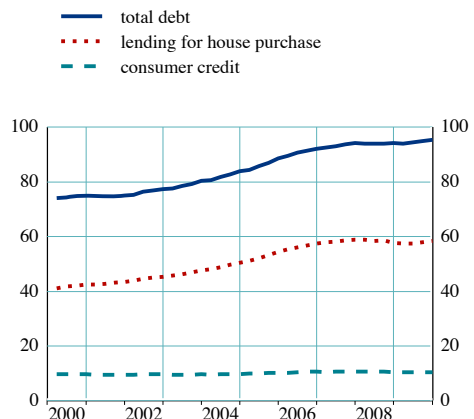
(Jan. 2000 - Mar. 2010; percentage change per annum)



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

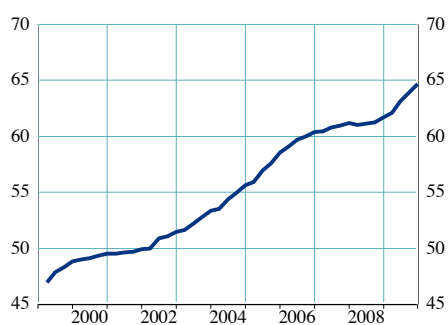
(Q1 2000 - Q4 2009; percentage of disposable income)



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 - Q4 2009; percentage)

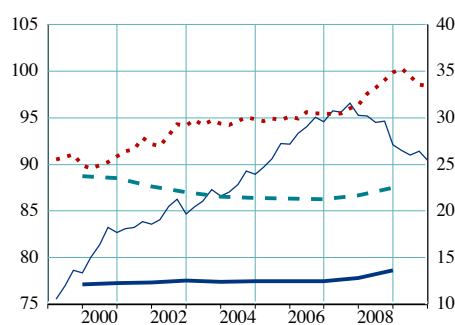


Sources: ECB, Eurostat and ECB calculations.

Chart S64 Household debt-to-assets ratios in the euro area

(Q1 1999 - Q4 2009; percentage)

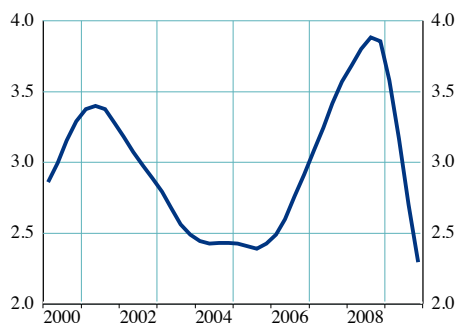
- household debt-to-wealth ratio (right-hand scale)
- household debt-to-financial assets ratio (right-hand scale)
- - - household debt-to-housing wealth ratio (right-hand scale)
- household debt-to-liquid financial assets ratio (left-hand scale)



Sources: ECB, Eurostat and ECB calculations.

Chart S65 Interest payment burden of the euro area household sector

(Q1 2000 - Q4 2009; percentage of disposable income)

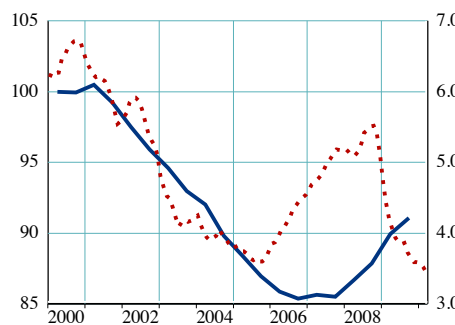


Sources: ECB.

Chart S66 Narrow housing affordability and borrowing conditions in the euro area

(Jan. 2000 - Mar. 2010; percentage of disposable income)

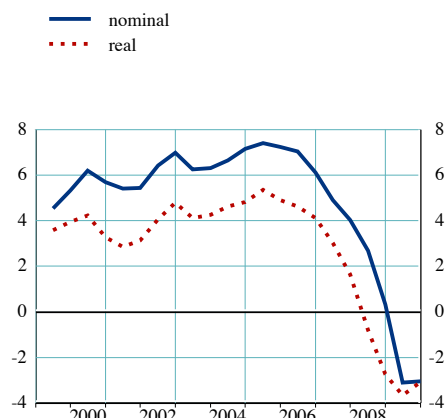
- ratio of disposable income to house prices (index: 2000 = 100; left-hand scale)
- lending rates on loans for house purchase (percentage; right-hand scale)



Sources: ECB and ECB calculations.
Notes: 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

(H1 1999 - H2 2009; percentage change per annum)

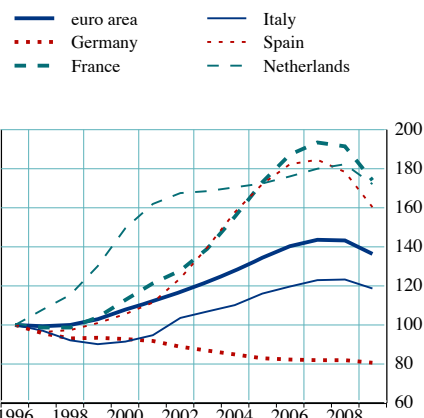


Sources: Eurostat and ECB calculations based on national sources.

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

Table S4 Changes in residential property prices in the euro area countries

(percentage change per annum)

	Weight	1999 2006	2007	2008	2009	2009 H1	2009 H2	2009 Q2	2009 Q3	2009 Q4	2010 Q1
Belgium¹⁾	3.8	8.0	9.3	4.8	-0.3	-0.6	-0.1	-2.1	-1.4	1.2	-
Germany^{2),3)}	26.7	-0.5	0.7	1.0	-0.2	-	-	-	-	-	-
Ireland^{3),4)}	1.8	13.4	-0.5	-9.1	-13.7	-11.3	-16.1	-11.6	-13.8	-18.5	-18.9
Greece²⁾	2.6	9.8	6.2	1.5	-4.7	-4.1	-5.2	-4.1	-5.2	-5.3	-
Spain^{2),5)}	11.7	12.6	5.8	0.7	-7.4	-7.6	-7.1	-8.3	-8.0	-6.3	-4.7
France^{1),6)}	21.6	10.8	6.6	1.2	-7.1	-8.1	-6.2	-9.3	-7.9	-4.4	-
Italy²⁾	16.9	6.0	5.0	2.6	-0.5	-0.3	-0.7	-	-	-	-
Cyprus^{2),7)}	0.2	-	15.0	13.0	-6.0	-	-	-	-	-	-
Luxembourg²⁾	0.4	10.4	10.1	-	-	-	-	-	-	-	-
Malta²⁾	0.1	8.9	1.1	-2.7	-5.0	-7.9	-2.0	-6.0	-2.5	-1.4	-
Netherlands^{1),6)}	6.3	8.4	4.2	2.9	-3.3	-1.5	-5.1	-2.8	-5.1	-5.0	-4.3
Austria^{2),5),8)}	3.1	0.8	4.1	1.3	3.6	4.6	2.6	4.9	3.4	1.9	5.6
Portugal^{2),4)}	1.8	3.6	1.3	3.9	0.4	1.5	-0.7	0.3	-0.8	-0.6	-
Slovenia^{1),6)}	0.4	-	22.6	3.1	-8.2	-8.4	-8.0	-9.8	-10.9	-5.1	-
Slovakia^{1),6)}	0.7	-	23.9	22.1	-11.1	-8.9	-13.3	-13.4	-14.3	-12.3	-8.3
Finland^{1),6)}	1.9	-	5.5	0.6	-0.3	-4.5	4.1	-3.6	0.4	7.9	11.3
euro area	100.0	6.3	4.5	1.5	-3.1	-3.1	-3.0	-	-	-	-

Sources: Series compiled by the national central banks, unless otherwise specified.

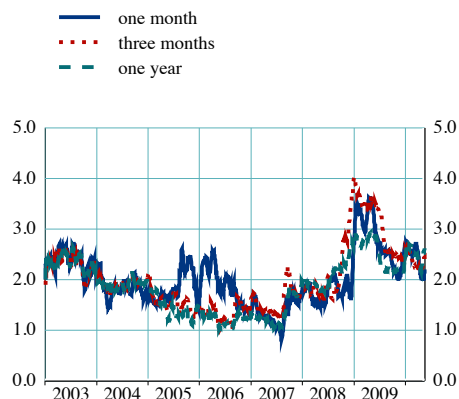
Notes: Weights are based on nominal GDP in 2009 and are expressed as a percentage. The estimates of the euro area aggregate for the first and second halves of a year are partially based on the interpolation of annual data.

- 1) Existing dwellings (houses and flats); whole country.
- 2) All dwellings (new and existing houses and flats); whole country.
- 3) Series compiled by the ECB, based on data of the national central bank.
- 4) Series compiled by national private institutions.
- 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

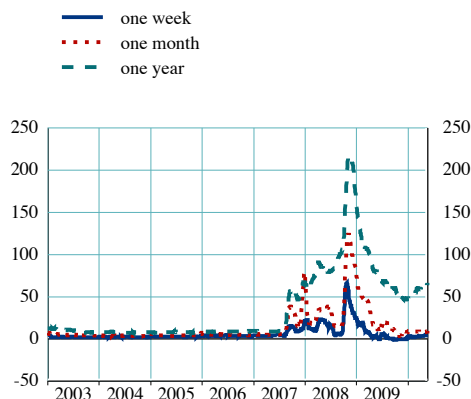
(Jan. 2003 - May 2010; basis points; 20-day moving average; transaction-weighted)



Sources: Thomson Reuters and ECB calculations.

Chart S70 Spreads between euro area interbank deposit and repo interest rates

(Jan. 2003 - May 2010; basis points; 20-day moving average)



Sources: Thomson Reuters and ECB calculations.

Chart S71 Implied volatility of three-month EURIBOR futures

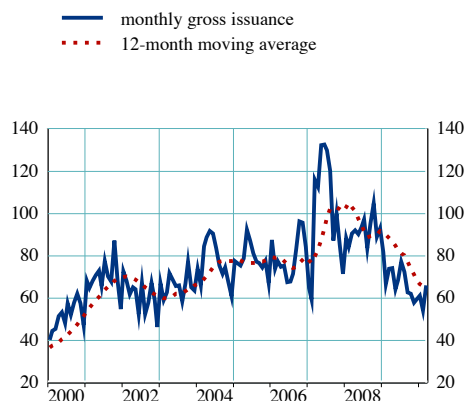
(Jan. 2000 - May 2010; percentage; 60-day moving average)



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

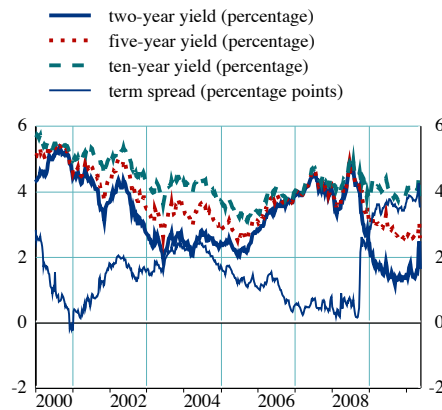
(Jan. 2000 - Mar. 2010; EUR billions; maturities up to one year)



Sources: ECB and ECB calculations.

Chart S73 Euro area government bond yields and the term spread

(Jan. 2000 - May 2010; weekly averages)



Sources: ECB, 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

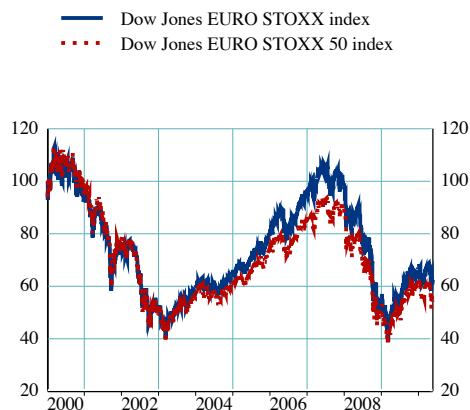
(Jan. 2000 - May 2010; percentage; implied volatility; 20-day moving average)



Sources: Bloomberg and ECB calculations.

Chart S75 Stock prices in the euro area

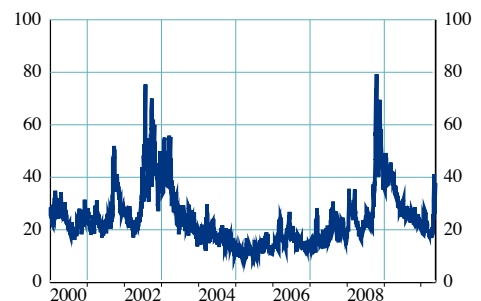
(Jan. 2000 - May 2010; index: Jan. 2000 = 100)



Sources: Bloomberg and ECB calculations.

Chart S76 Implied volatility for the Dow Jones EURO STOXX 50 index

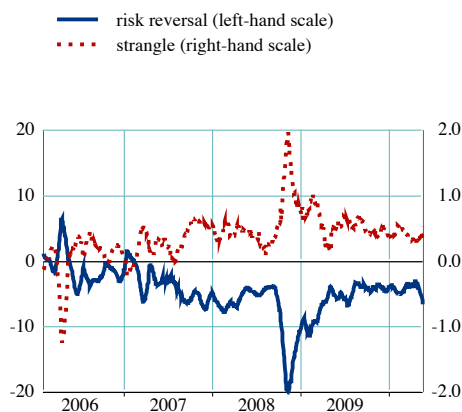
(Jan. 2000 - May 2010; percentage)



Sources: Bloomberg and ECB calculations.

Chart S77 Risk reversal and strangle of the Dow Jones EURO STOXX 50 index

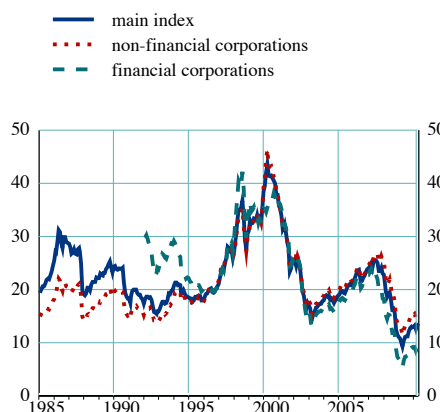
(Jan. 2006 - May 2010; percentage; implied volatility; 20-day moving average)



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 - Apr. 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

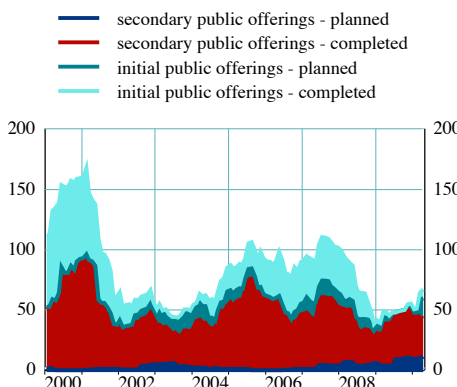
(Jan. 2000 - Apr. 2010; millions of contracts)



Sources: Eurex and Bloomberg.

Chart S80 Gross equity issuance in the euro area

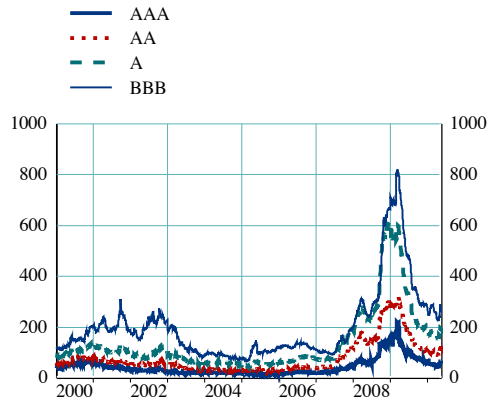
(Jan. 2000 - Apr. 2010; EUR billions; 12-month moving sum)



Source: Thomson ONE Banker.

Chart S81 Investment-grade corporate bond spreads in the euro area

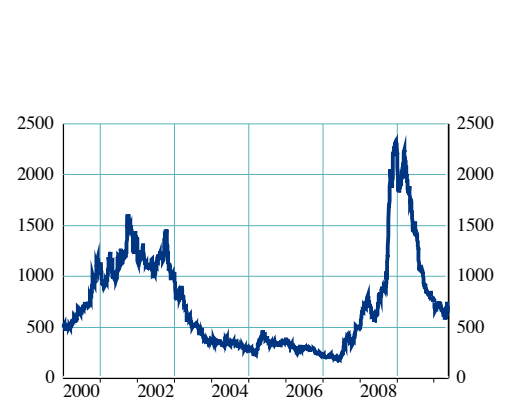
(Jan. 2000 - May 2010; basis points)



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

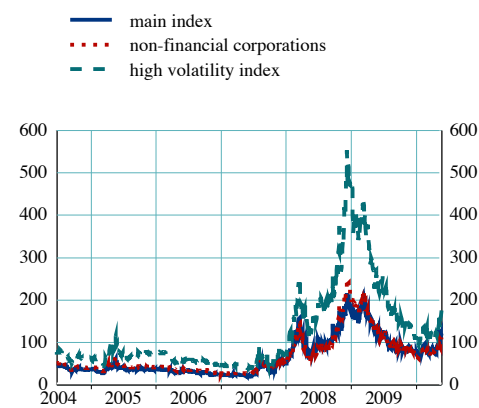
(Jan. 2000 - May 2010; basis points)



Sources: Merrill Lynch.
Note: Options-adjusted spread of euro area high-yield index (average rating B+, average maturity of 5 years).

Chart S83 iTraxx Europe five-year credit default swap indices

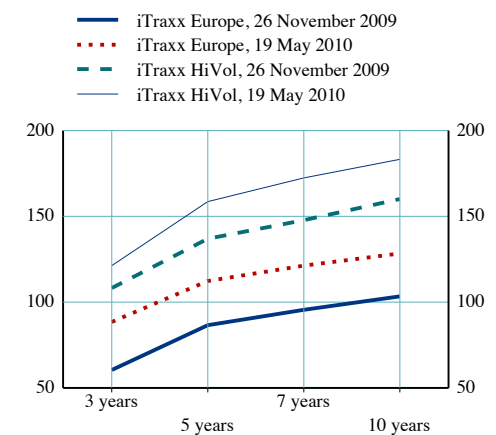
(June 2004 - May 2010; basis points)



Sources: Bloomberg and ECB calculations.

Chart S84 Term structures of premiums for iTraxx Europe and HiVol

(basis points)

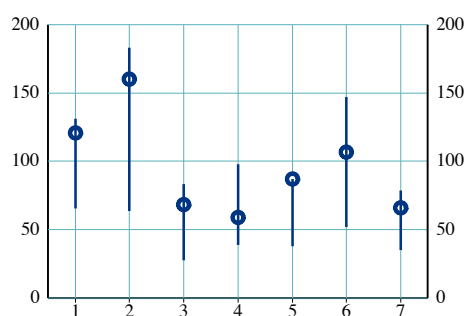


Source: Thomson Reuters Datastream.

Chart S85 iTraxx sector indices

(Nov. 2009 - May 2010; basis points)

- | | |
|--------------|---------------|
| 1 main index | 5 industrials |
| 2 financial | 6 autos |
| 3 energy | 7 TMT |
| 4 consumer | |



Source: Bloomberg.

Note: The points show the most recent observation (19 May 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

(2004 - 2009)

	Minimum	First quartile	Median	Average	Weighted average ^{b)}	Third quartile	Maximum
Return on Tier 1 capital (%)							
2004	0.76	7.10	11.93	12.26	13.15	18.21	29.39
2005	2.39	9.14	13.32	13.96	14.98	17.63	30.81
2006	4.55	13.60	15.06	16.95	17.54	21.55	30.46
2007	0.66	7.80	12.22	14.74	15.47	22.57	31.26
2008	-32.11	-12.80	2.08	-1.15	2.40	8.22	22.43
2009	-17.69	-1.75	4.02	1.78	4.45	9.23	15.76
Return on shareholders' equity (%)							
2004	0.74	5.97	10.04	10.36	10.63	14.33	26.66
2005	2.32	7.74	10.29	11.28	11.52	12.89	29.20
2006	4.79	10.89	13.61	13.60	13.21	15.46	26.01
2007	0.71	8.09	12.67	11.85	12.25	15.81	24.69
2008	-84.93	-13.17	2.53	-7.97	2.18	5.62	18.88
2009	-19.15	-1.72	3.38	1.17	3.99	8.21	14.34
Return on risk-weighted assets (%)							
2004	0.04	0.52	1.06	1.00	1.07	1.43	2.03
2005	0.19	0.86	1.08	1.14	1.22	1.53	2.26
2006	0.35	1.10	1.34	1.39	1.41	1.71	2.66
2007	0.05	0.68	1.01	1.15	1.19	1.69	2.55
2008	-2.57	-1.08	0.17	-0.11	0.21	0.62	1.77
2009	-1.93	-0.15	0.37	0.19	0.45	0.94	1.82
Net interest income (% of total assets)							
2004	0.51	0.61	0.89	1.01	0.95	1.31	1.90
2005	0.52	0.58	0.68	0.94	0.92	1.30	1.87
2006	0.33	0.54	0.69	0.94	0.92	1.22	2.03
2007	0.26	0.55	0.77	0.92	0.88	1.20	1.95
2008	0.51	0.64	0.77	1.05	1.01	1.43	2.19
2009	0.57	0.83	1.17	1.29	1.31	1.69	2.68
Net trading income (% of total assets)							
2004	0.02	0.06	0.21	0.23	0.26	0.32	0.74
2005	0.01	0.05	0.16	0.23	0.28	0.32	0.83
2006	0.04	0.10	0.23	0.31	0.34	0.49	1.08
2007	-0.23	0.01	0.14	0.23	0.30	0.42	0.96
2008	-0.98	-0.35	-0.13	-0.14	-0.12	0.02	0.43
2009	-1.03	0.09	0.19	0.12	0.20	0.29	0.47
Fees and commissions (% of total assets)							
2004	0.06	0.26	0.43	0.57	0.58	0.91	1.28
2005	0.07	0.26	0.44	0.53	0.57	0.84	1.27
2006	0.08	0.27	0.47	0.55	0.60	0.80	1.10
2007	0.08	0.27	0.51	0.53	0.58	0.70	1.10
2008	0.07	0.25	0.46	0.46	0.49	0.63	0.92
2009	0.07	0.23	0.44	0.48	0.53	0.76	0.85
Other income (% of total assets)							
2004	0.04	0.06	0.12	0.13	0.13	0.15	0.43
2005	-0.02	0.05	0.12	0.14	0.13	0.15	0.64
2006	0.00	0.06	0.14	0.19	0.16	0.25	0.71
2007	-0.05	0.07	0.12	0.16	0.15	0.21	0.51
2008	-0.54	-0.12	0.11	0.05	0.11	0.24	0.54
2009	-0.35	-0.09	0.01	-0.01	0.00	0.09	0.27
Total operating income (% of total assets)							
2004	0.82	1.26	1.86	1.95	1.92	2.46	3.38
2005	0.78	1.29	1.77	1.85	1.90	2.30	3.32
2006	0.77	1.51	1.85	1.98	2.02	2.49	3.81
2007	0.51	1.25	1.81	1.84	1.91	2.40	3.61
2008	-0.18	0.58	1.32	1.42	1.48	1.96	3.66
2009	0.76	1.18	1.86	1.91	2.04	2.24	3.86

Table S5 Financial condition of large and complex banking groups in the euro area
(continued)

(2004 - 2009)

	Minimum	First quartile	Median	Average	Weighted average ¹⁾	Third quartile	Maximum
Net income (% of total assets)							
2004	0.02	0.22	0.40	0.41	0.42	0.54	0.92
2005	0.08	0.36	0.41	0.46	0.48	0.50	0.97
2006	0.16	0.41	0.51	0.55	0.54	0.66	1.15
2007	0.02	0.23	0.39	0.47	0.46	0.55	1.22
2008	-1.21	-0.22	0.06	0.01	0.07	0.28	0.93
2009	-0.77	-0.05	0.16	0.08	0.17	0.33	0.81
Net loan impairment charges (% of total assets)							
2004	0.04	0.06	0.09	0.13	0.11	0.16	0.40
2005	0.01	0.05	0.07	0.10	0.10	0.12	0.29
2006	0.01	0.05	0.07	0.11	0.10	0.12	0.36
2007	0.01	0.03	0.05	0.10	0.10	0.08	0.38
2008	0.03	0.16	0.26	0.27	0.26	0.37	0.57
2009	0.17	0.32	0.42	0.49	0.47	0.59	0.97
Cost-to-income ratio (%)							
2004	44.40	55.15	64.08	61.60	64.39	67.75	79.90
2005	46.66	54.40	61.38	59.83	61.38	64.85	73.70
2006	42.56	53.50	56.50	57.53	59.21	61.10	70.20
2007	41.25	55.18	61.80	60.89	60.22	67.75	84.70
2008	41.86	62.50	71.01	82.05	69.83	101.50	159.42
2009	40.44	56.82	61.50	63.65	60.75	71.45	97.35
Tier 1 ratio (%)							
2004	5.25	7.33	7.90	8.13	8.11	9.00	10.90
2005	6.70	7.60	7.90	8.29	8.12	8.75	11.60
2006	6.70	7.53	7.80	8.15	8.02	8.82	10.10
2007	6.50	7.15	7.40	7.84	7.71	8.60	10.70
2008	6.90	7.85	8.78	8.77	8.63	9.51	12.70
2009	8.40	9.55	10.10	10.32	10.12	10.73	13.80
Overall solvency ratio (%)							
2004	8.50	10.63	11.10	11.35	11.19	12.50	13.20
2005	8.50	10.63	11.10	11.29	11.15	11.90	13.50
2006	10.00	10.75	11.10	11.29	11.22	11.77	12.90
2007	8.80	9.65	10.50	10.71	10.61	11.50	13.00
2008	9.00	10.70	12.10	11.70	11.61	12.54	13.90
2009	9.70	12.72	13.60	13.30	13.29	14.20	15.70

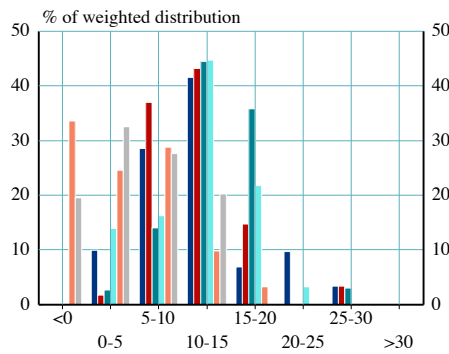
Sources: Individual institutions' financial reports and ECB calculations.

Notes: Based on available figures for 19 IFRS-reporting large and complex banking groups in the euro area.

- 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

(2004 - 2009; percentage)

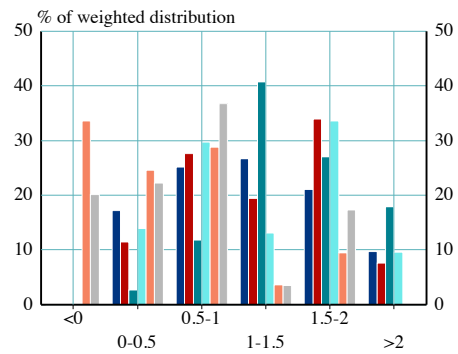
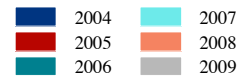


Sources: Individual institutions' financial reports and ECB calculations.

Notes: Distribution weighted by total assets. Based on available figures for 19 IFRS-reporting large and complex banking groups in the euro area.

Chart S87 Frequency distribution of returns on risk-weighted assets for large and complex banking groups in the euro area

(2004 - 2009; percentage)

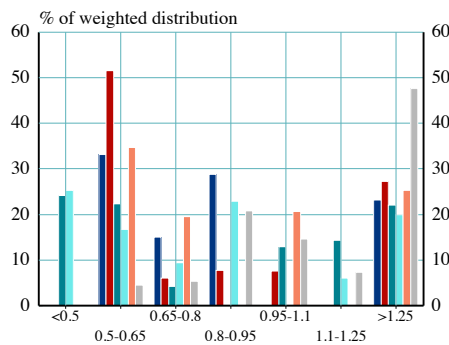
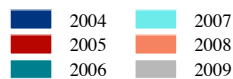


Sources: Individual institutions' financial reports and ECB calculations.

Notes: Distribution weighted by total assets. Based on available figures for 19 IFRS-reporting large and complex banking groups in the euro area.

Chart S88 Frequency distribution of net interest income for large and complex banking groups in the euro area

(2004 - 2009; percentage of total assets)

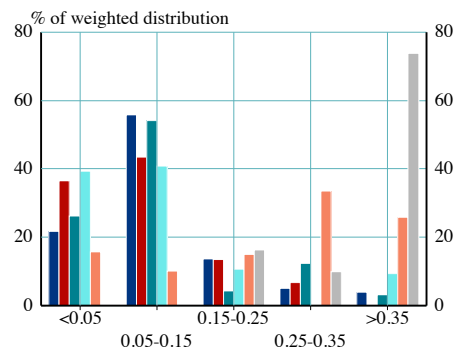
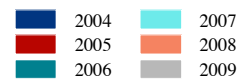


Sources: Individual institutions' financial reports and ECB calculations.

Notes: Distribution weighted by total assets. Based on available figures for 19 IFRS-reporting large and complex banking groups in the euro area.

Chart S89 Frequency distribution of net loan impairment charges for large and complex banking groups in the euro area

(2004 - 2009; percentage of total assets)

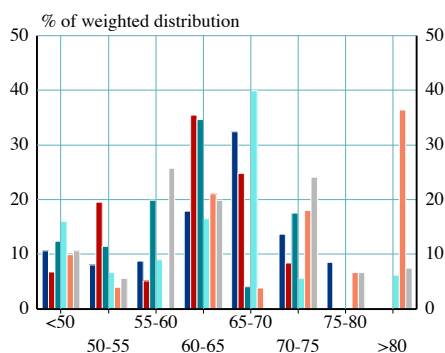
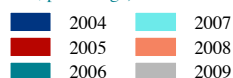


Sources: Individual institutions' financial reports and ECB calculations.

Notes: Distribution weighted by total assets. Based on available figures for 19 IFRS-reporting large and complex banking groups in the euro area.

Chart S90 Frequency distribution of cost-to-income ratios for large and complex banking groups in the euro area

(2004 - 2009; percentage)

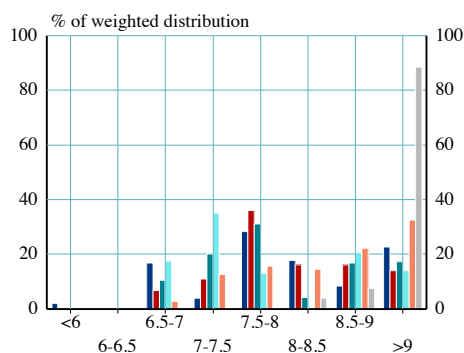
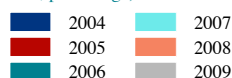


Sources: Individual institutions' financial reports and ECB calculations.

Notes: Distribution weighted by total assets. Based on available figures for 19 IFRS-reporting large and complex banking groups in the euro area.

Chart S91 Frequency distribution of Tier I ratios for large and complex banking groups in the euro area

(2004 - 2009; percentage)

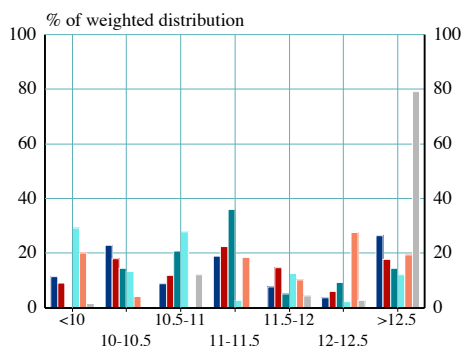


Sources: Individual institutions' financial reports and ECB calculations.

Notes: Distribution weighted by total assets. Based on available figures for 19 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

(2004 - 2009; percentage)

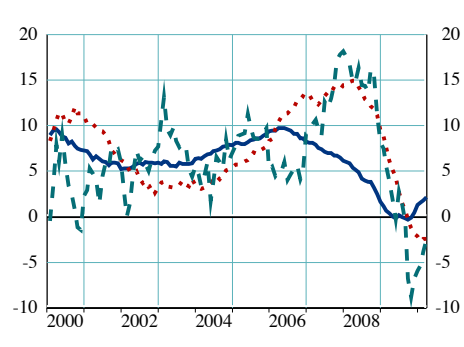
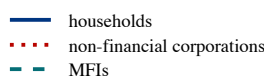


Sources: Individual institutions' financial reports and ECB calculations.

Notes: Distribution weighted by total assets. Based on available figures for 19 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 - Mar. 2010; percentage change per annum)

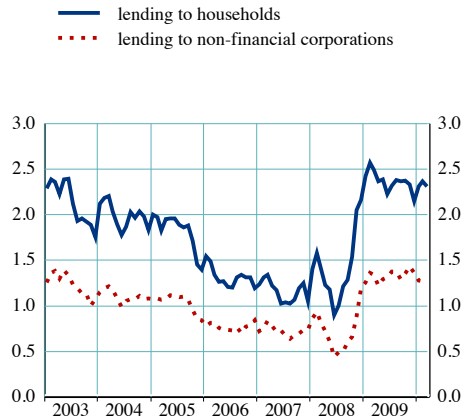


Sources: ECB and ECB calculations.

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 - Mar. 2010; percentage points)

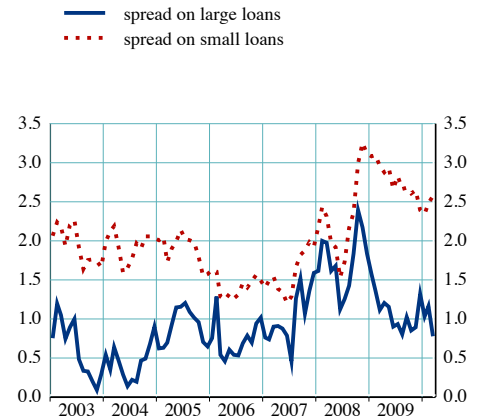


Sources: ECB, Thomson Reuters, Thomson Reuters Datastream and ECB calculations.

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 - Mar. 2010; basis points)

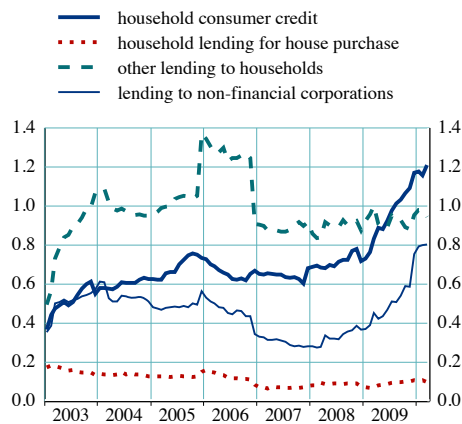


Sources: ECB, Thomson Reuters Datastream and ECB calculations.

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

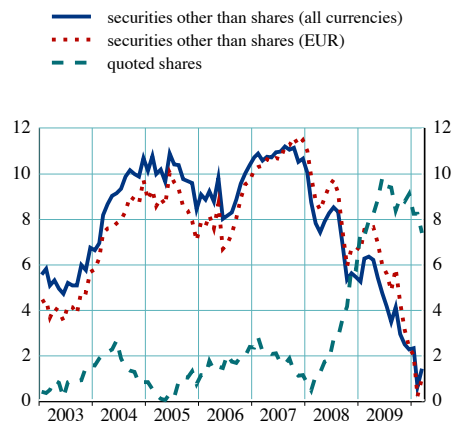
(Jan. 2003 - Mar. 2010; 12-month moving sums; percentage of the outstanding amount of loans)



Sources: ECB and ECB calculations.

Chart S97 Annual growth in euro area MFI's issuance of securities and shares

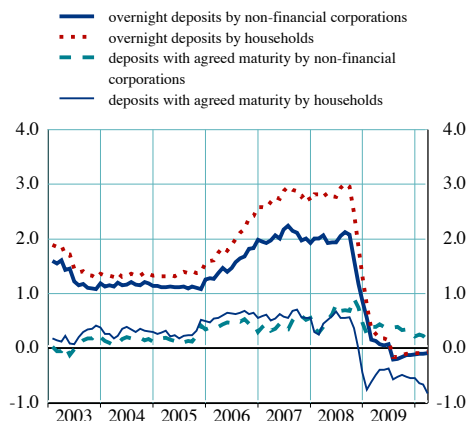
(Jan. 2003 - Mar. 2010; percentage change per annum)



Source: ECB.

Chart S98 Deposit margins of euro area MFIs

(Jan. 2003 - Mar. 2010; percentage points)

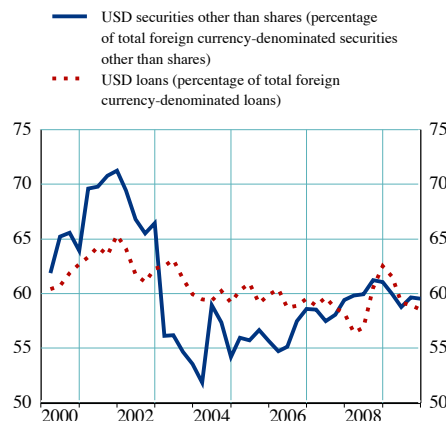


Sources: ECB, Thomson Reuters, Thomson Reuters Datastream and ECB calculations.

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

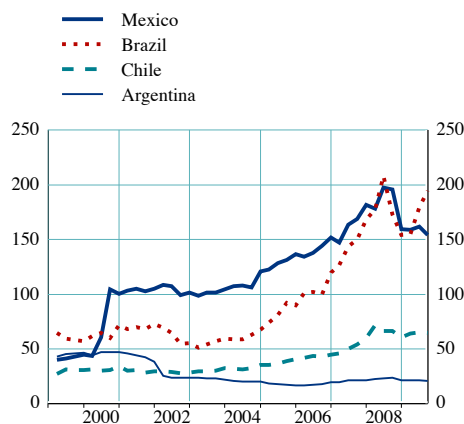
(Q1 2000 - Q4 2009)



Sources: ECB and ECB calculations.

Chart S100 Consolidated foreign claims of domestically owned euro area banks on Latin American countries

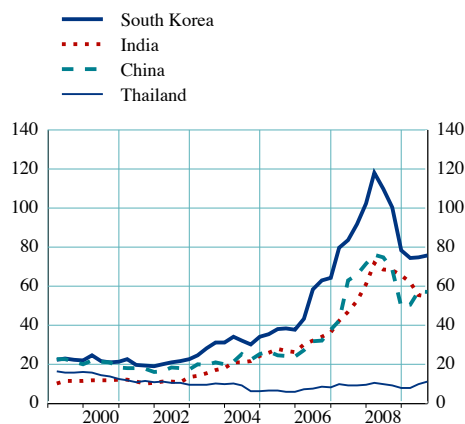
(Q1 1999 - Q3 2009; USD billions)



Sources: BIS and ECB calculations.

Chart S101 Consolidated foreign claims of domestically owned euro area banks on Asian countries

(Q1 1999 - Q3 2009; 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)

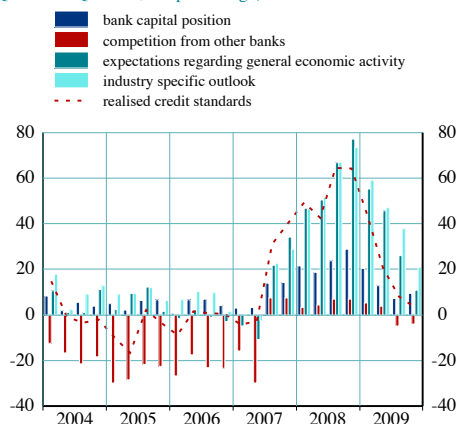
	2007 Q2	2007 Q3	2007 Q4	2008 Q1	2008 Q2	2008 Q3	2008 Q4	2009 Q1	2009 Q2	2009 Q3
Total offshore centres	7.5	8.0	8.2	7.9	7.8	8.0	7.5	7.1	7.0	6.9
<i>of which</i>										
Hong Kong	0.7	0.7	0.7	0.8	0.7	0.8	0.8	0.7	0.7	0.7
Singapore	0.9	0.7	0.7	0.8	0.9	0.9	0.8	0.9	0.9	0.9
Total Asia and Pacific EMEs	3.4	3.5	3.9	4.0	4.1	4.0	3.9	3.9	3.9	3.9
<i>of which</i>										
China	0.7	0.7	0.8	0.8	0.8	0.8	0.6	0.7	0.7	0.7
India	0.5	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.7	0.7
Indonesia	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Malaysia	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Philippines	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
South Korea	0.9	1.0	1.1	1.2	1.1	1.1	1.0	1.0	1.0	1.0
Taiwan	0.2	0.3	0.3	0.3	0.4	0.3	0.2	0.2	0.2	0.3
Thailand	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total European EMEs and new EU Member States	9.2	10.1	11.2	11.4	12.3	12.6	13.5	13.1	13.5	13.7
<i>of which</i>										
Czech Republic	1.4	1.6	1.6	1.8	2.0	2.0	2.0	2.0	2.2	2.3
Hungary	1.2	1.3	1.4	1.4	1.5	1.5	1.7	1.7	1.8	1.8
Poland	1.9	2.0	2.2	2.4	2.7	2.8	2.9	2.7	2.9	3.0
Russia	1.2	1.5	1.6	1.6	1.8	1.9	2.1	2.0	1.9	1.7
Turkey	0.9	1.0	1.1	1.0	1.1	1.2	1.2	1.2	1.2	1.2
Total Latin America	4.9	5.0	5.4	5.2	5.8	5.9	5.9	6.2	6.4	6.3
<i>of which</i>										
Argentina	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
Brazil	1.6	1.6	1.8	1.7	2.1	1.9	1.9	2.0	2.3	2.5
Chile	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.8
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	1.8	1.9	1.8	2.0	2.1	2.0	2.1	2.1	2.0
Peru	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
Uruguay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Venezuela	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.4	0.4	0.2
Total Middle East and Africa	2.0	2.1	2.3	2.4	2.5	2.6	2.9	3.1	3.0	3.1
<i>of which</i>										
Iran	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Morocco	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	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	27.1	28.7	30.9	30.8	32.5	33.1	33.6	33.5	33.9	34.0

Source: 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 2004 - Q4 2009; net percentage)

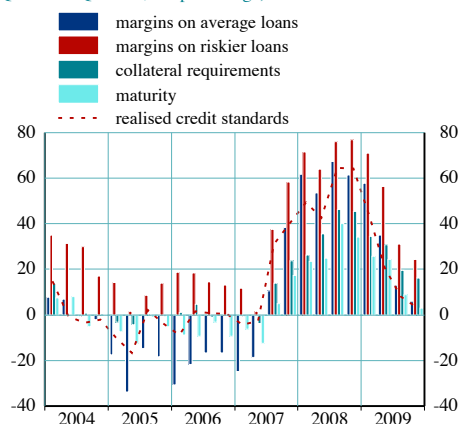


Sources: ECB and ECB calculations.

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 2004 - Q4 2009; net percentage)

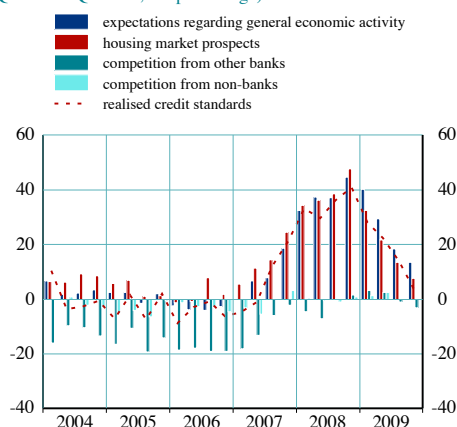


Sources: ECB and ECB calculations.

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 2004 - Q4 2009; net percentage)

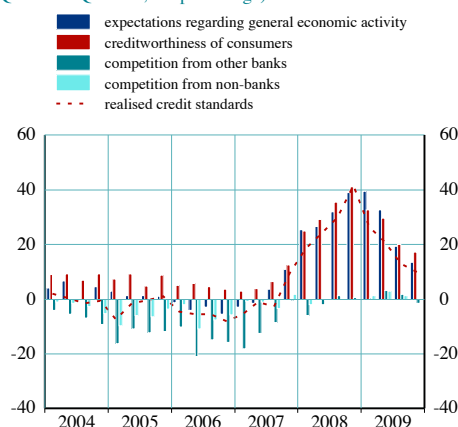


Sources: ECB and ECB calculations.

Note: See the note of Chart S102.

Chart S105 Credit standards applied by euro area banks to consumer credit, and contributing factors

(Q1 2004 - Q4 2009; net percentage)

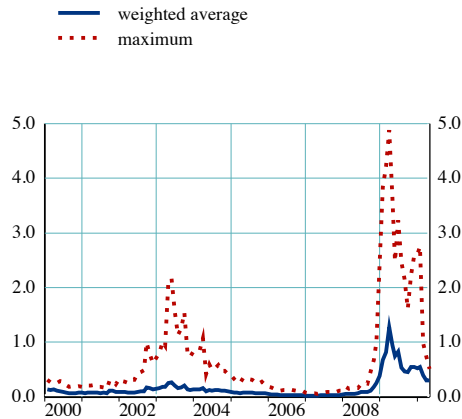


Sources: ECB and ECB calculations.

Note: See the note of Chart S102.

Chart S106 Expected default frequency (EDF) for large and complex banking groups in the euro area

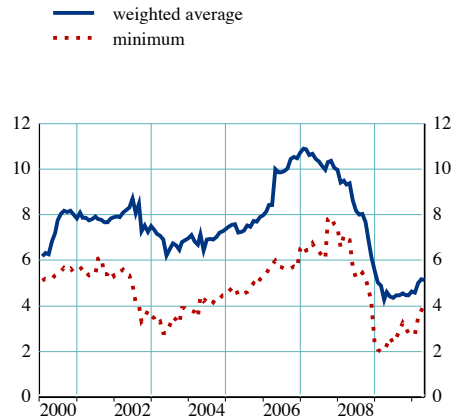
(Jan. 2000 - Apr. 2010; percentage probability)



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

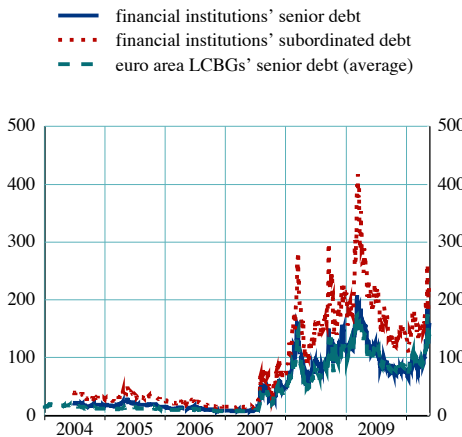
(Jan. 2000 - Apr. 2010)



Sources: Moody's 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

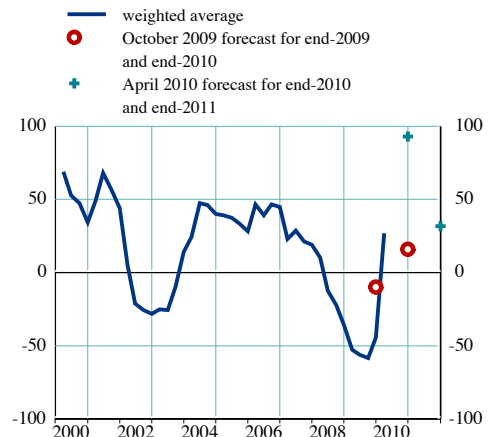
(Jan. 2004 - May 2010; basis points; five-year maturity)



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)

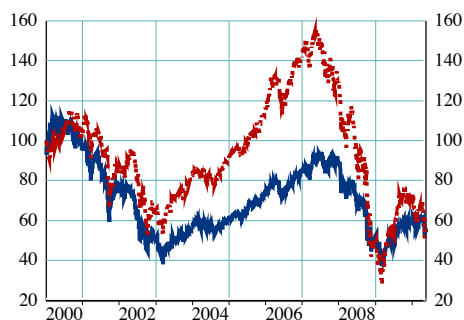


Sources: Thomson Reuters Datastream, I/B/E/S and ECB calculations.
Notes: Growth rates of weighted average earnings for euro area large and complex banking groups, using their market capitalisations at March 2010 as weights. Actual earnings are derived on the basis of historical net income; forecasts are derived from IBES estimates of earnings per share.

Chart S110 Dow Jones EURO STOXX total market and bank indices

(Jan. 2000 - May 2010; index: Jan. 2000 = 100)

— Dow Jones EURO STOXX 50 index
 Dow Jones EURO STOXX bank index

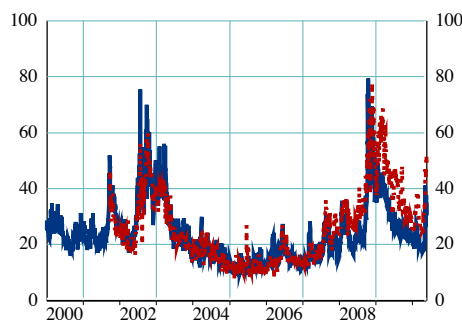


Sources: Bloomberg and ECB calculations.

Chart S111 Implied volatility for Dow Jones EURO STOXX total market and bank indices

(Jan. 2000 - May 2010; percentage)

— Dow Jones EURO STOXX 50 index
 Dow Jones EURO STOXX bank index

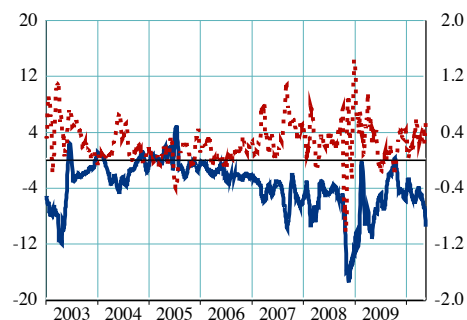


Source: Bloomberg and ECB calculations.
 Note: Weighted average of the volatility of the two closest options.

Chart S112 Risk reversal and strangle of the Dow Jones EURO STOXX bank index

(Jan. 2003 - May 2010; percentage; implied volatility; 20-day moving average)

— risk reversal (left-hand scale)
 strangle (right-hand scale)

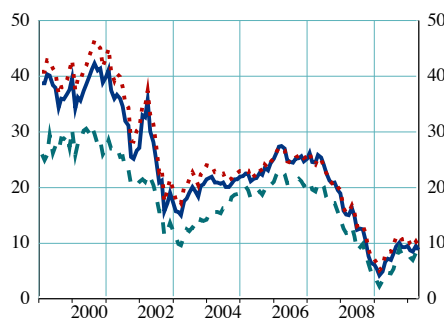


Sources: Bloomberg and ECB calculations.
 Notes: The risk-reversal indicator is calculated as the difference between the implied volatility of an out-of-the-money (OTM) call with 25 delta and the implied volatility of an OTM put with 25 delta. The strangle is calculated as the difference between the 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 - Apr. 2010; ten-year trailing earnings)

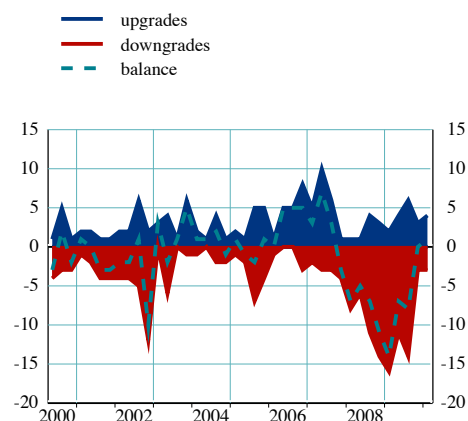
— simple average
 weighted average
 - - - 25th percentile



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 April 2010.

Chart S114 Changes in the ratings of large and complex banking groups in the euro area

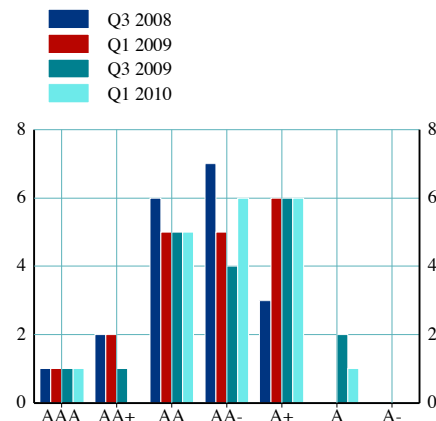
(Q2 2000 - Q1 2010; number)



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

(April 2010)

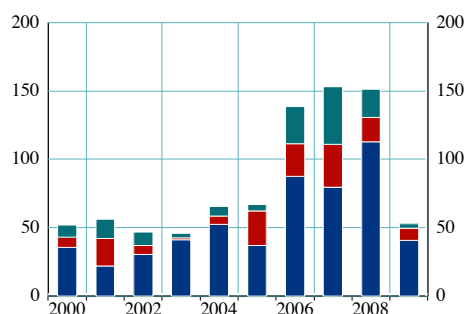
	Moody's	S&P	Fitch	Total
Ratings available out of sample	18	16	19	53
Outlook available	18	18	19	55
Rating average	Aa2	AA-	AA-	4.2
Outlook average	-0.5	-0.4	-0.2	-0.4
Number of positive outlooks	0	0	1	1
Number of negative outlooks	9	7	4	20
Rating codes	Moody's	S&P	Fitch	Numerical equivalent
	Aaa	AAA	AAA	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)

■ domestic
■ euro area other than domestic
■ rest of the world



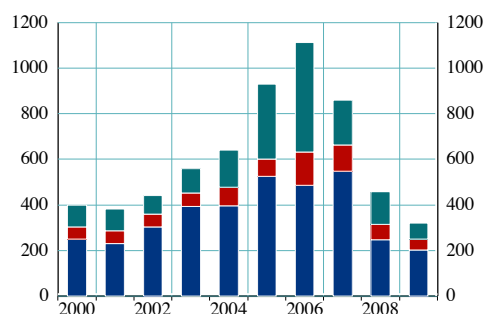
Sources: Bureau van Dijk (ZEPHIR database) and ECB calculations.

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)

■ domestic
■ euro area other than domestic
■ rest of the world



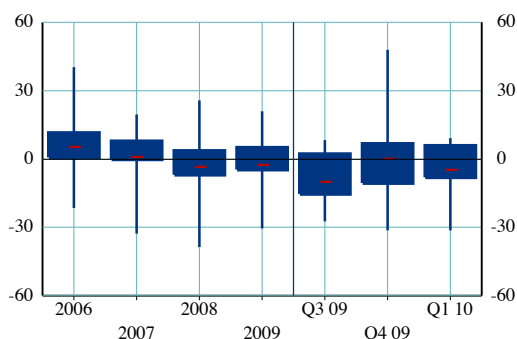
Sources: Bureau van Dijk (ZEPHIR database) and ECB calculations.

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 - Q1 2010; percentage change per annum; nominal values; maximum, minimum, interquartile distribution)

— average



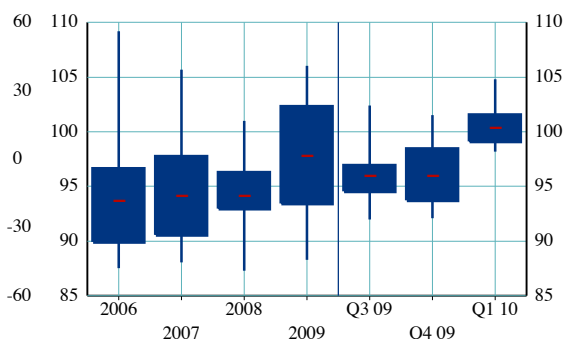
Sources: Bloomberg, individual institutions' financial reports and ECB calculations.

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 - Q1 2010; percentage of premiums earned; maximum, minimum, interquartile distribution)

— average

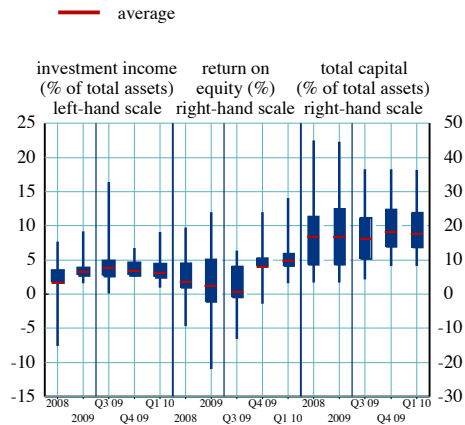


Sources: Bloomberg, individual institutions' financial reports and ECB calculations.

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

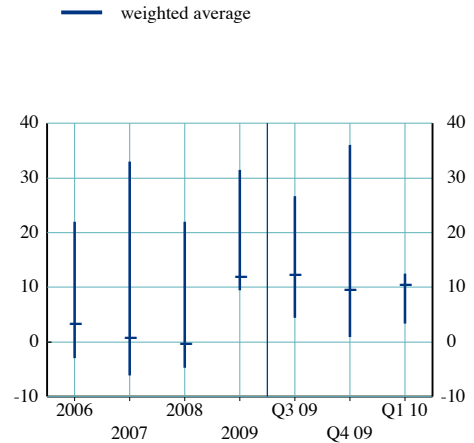
(2008 - Q1 2010; maximum, minimum, interquartile distribution)



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 - Q1 2010; percentage change per annum; maximum-minimum distribution)

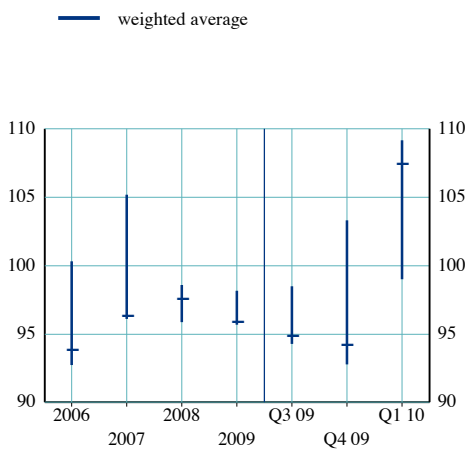


Sources: Bloomberg, individual institutions' financial reports and ECB calculations.

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 - Q1 2010; percentage change per annum; nominal values; maximum-minimum distribution)

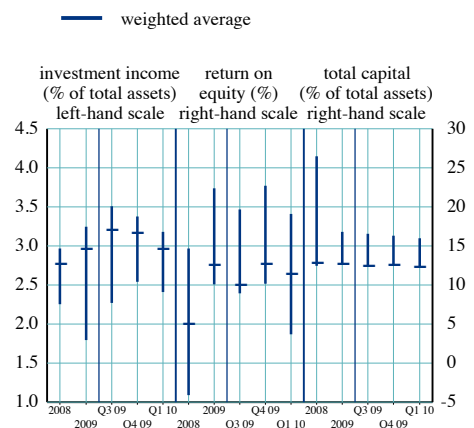


Sources: Bloomberg, individual institutions' financial reports and ECB calculations.

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 - Q1 2010; percentage of premiums earned; maximum-minimum distribution)

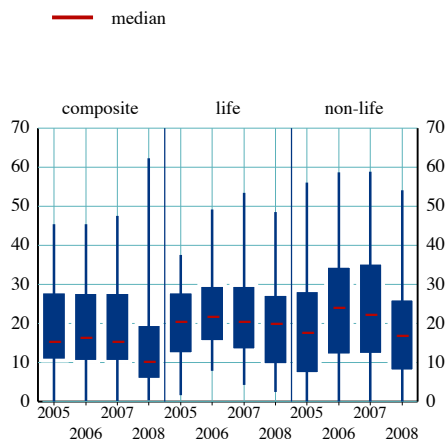


Sources: Bloomberg, individual institutions' financial reports and ECB calculations.

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

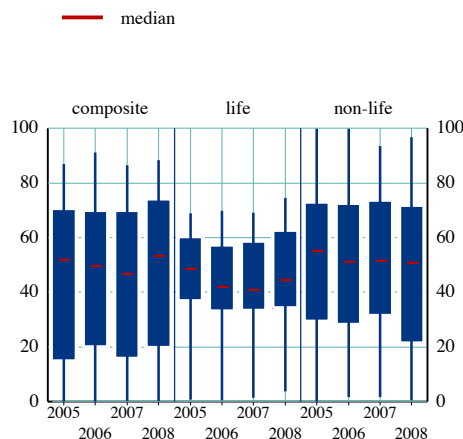
(2005 - 2008; percentage of total investment; maximum, minimum, interquartile distribution)



Source: Standard and Poor's (Eurothesys database).

Chart S125 Distribution of bond asset shares of euro area insurers

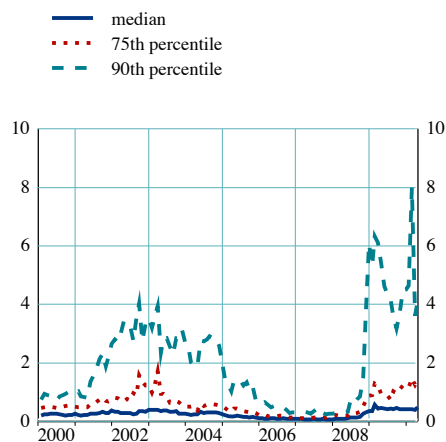
(2005 - 2008; percentage of total investment; maximum, minimum, interquartile distribution)



Source: Standard and Poor's (Eurothesys database).

Chart S126 Expected default frequency (EDF) for the euro area insurance sector

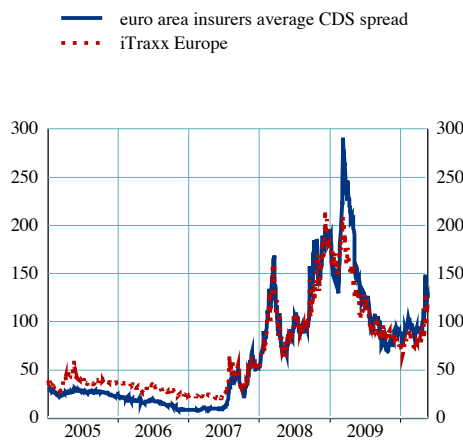
(Jan. 2000 - Apr. 2010; percentage probability)



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

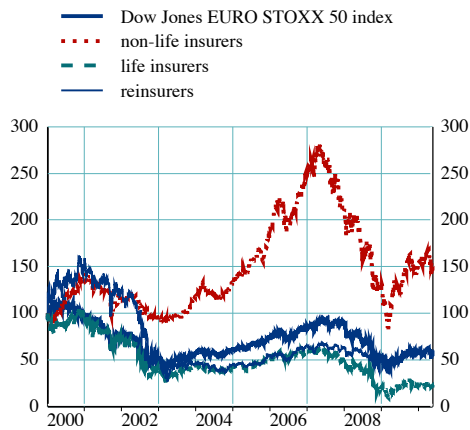
(Jan. 2005 - May 2010; basis points; five-year maturity)



Sources: Bloomberg and ECB calculations.

Chart S128 Dow-Jones EURO STOXX total market and insurance indices

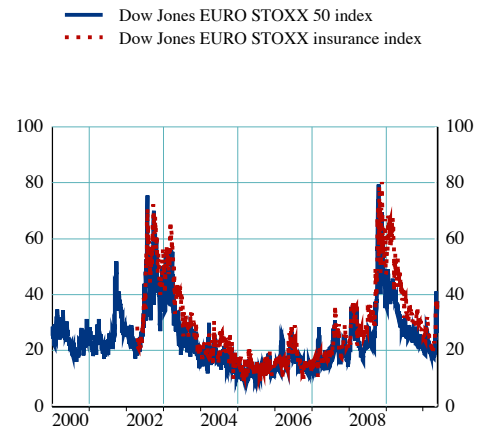
(Jan. 2000 - May 2010; index: Jan. 2000 = 100)



Source: Thomson Reuters Datastream.

Chart S129 Implied volatility for Dow Jones EURO STOXX total market and insurance indices

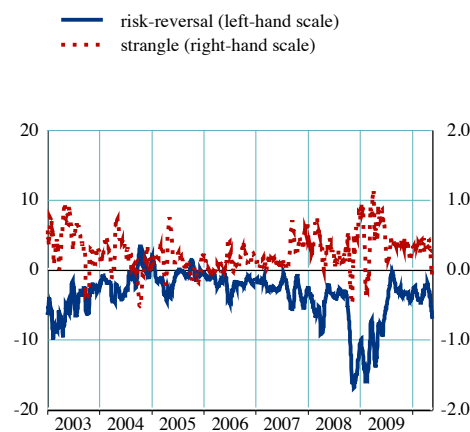
(Jan. 2000 - May 2010; percentage)



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

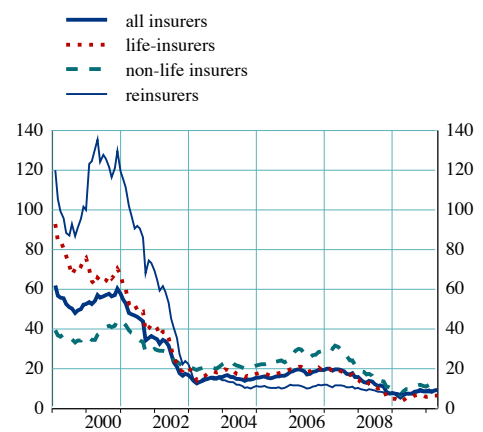
(Jan. 2003 - May 2010; ten-years trailing earnings)



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 - Apr. 2010; ten-years trailing earnings)

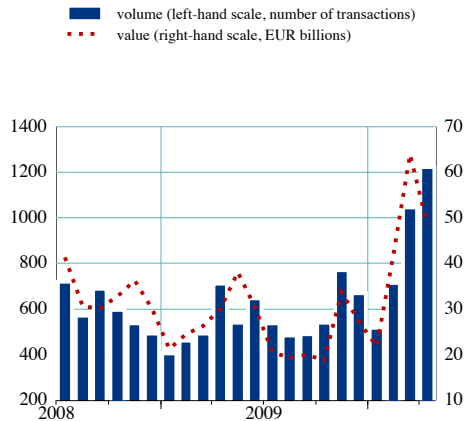


Sources: Thomson Reuters Datastream and ECB calculations.
Note: The P/E ratio is based on prevailing stock prices relative to an average of the previous ten years of earnings.

6 EURO AREA FINANCIAL SYSTEM INFRASTRUCTURES

Chart S132 Non-settled payments on the Single Shared Platform (SSP) of TARGET2

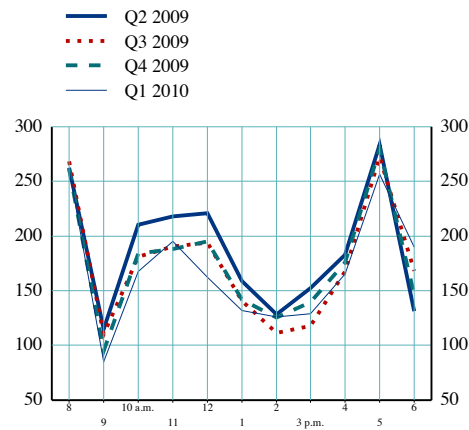
(July 2008 - Apr. 2010)



Source: ECB.
Note: Monthly averages of daily observations.

Chart S133 Value of transactions settled in TARGET2 per time band

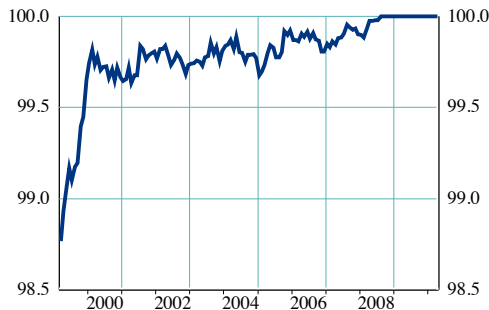
(Q2 2009 - Q1 2010; EUR billions)



Source: ECB.
Note: Averages based on TARGET2 operating days.

Chart S134 TARGET and TARGET2 availability

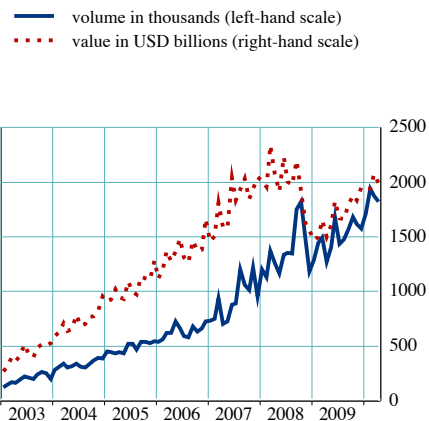
(Mar. 1999 - Apr. 2010; percentage; three-month moving average)



Source: ECB.

Chart S135 Volumes and values of foreign exchange trades settled via Continuous Linked Settlement (CLS)

(Jan. 2003 - Apr. 2010)



Source: ECB.

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