



EUROPEAN CENTRAL BANK

JUNE 2006

FINANCIAL STABILITY REVIEW

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In 2006 all ECB publications will feature a motif taken from the €5 banknote.

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Unless otherwise stated, this document uses data available as at 5 May 2006.

ISSN 1830-2017 (print)
ISSN 1830-2025 (online)



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PREFACE

Financial system stability requires that the principal components of the system – including financial institutions, markets and infrastructures – are jointly capable of absorbing adverse disturbances. It also requires that the financial system facilitates a smooth and efficient reallocation of financial resources from savers to investors, that financial risk is assessed and priced reasonably accurately, and that risks are efficiently managed. By laying the foundations for future vulnerabilities, inefficiencies in the allocation of capital or shortcomings in the pricing of risk can compromise the future stability of the financial system. This Review assesses the stability of the euro area financial system both with regard to the role it plays in facilitating economic processes, and 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 the possible sources of risk and vulnerability to 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 contribution by, the Banking Supervision Committee (BSC). The BSC is a forum for cooperation among the national central banks (NCBs) and supervisory authorities of the EU and the ECB.



I OVERVIEW OF RISKS TO FINANCIAL STABILITY

The strength and resilience of the euro area financial system continued improving in the six months following the finalisation of the December 2005 Financial Stability Review (FSR). However, during these six months financial imbalances also continued expanding, primarily at the global level, but also in the euro area. Although shock-absorption capacities have been improving, the fact that risks and vulnerabilities have remained and that some have grown and increased further means that there is no room for complacency: the financial stability outlook still rests upon a delicate balance. While a positive outcome remains the most likely prospect in the period ahead, the possibility that the risk management systems and loss-absorption capacities of key financial institutions may be severely tested, while still very small, cannot be excluded.

Despite further oil price rises, the pace of global economic activity was sustained and became more broadly-based in the course of 2005. This, together with continued strength of euro area corporate sector balance sheets, meant that the operating environment for euro area financial institutions and markets was favourable mirroring conditions in most mature economy financial systems. Although liquidity conditions were tightened in the G3 economies in the six months after the finalisation of the December 2005 FSR, conditions for raising funds in mature economy credit and equity markets remained favourable, and market volatility stayed very low across most financial asset classes. In this environment, there was further and broad-based improvement in the profitability of euro area banks, and the balance sheets of euro area insurance companies were strengthened. In addition, key financial infrastructures – including payment systems such as TARGET, and securities clearing and settlement systems – remained robust and continued operating smoothly.

Within the euro area financial system, the main source of vulnerability in the period ahead continues to centre upon concerns that a global search for yield, which began in 2003, may have led investors in the euro area either to

underestimate or take on too much risk. Very low long-term risk-free rates of return and ample liquidity in global financial markets were key factors in driving investors to seek higher expected returns in riskier markets, possibly raising asset prices in the euro area beyond intrinsic values, especially in corporate bond and credit risk transfer (CRT) markets. The concern is that the pricing of CRT products could prove vulnerable to an unexpected upturn in risk-free interest rates or an adverse turn of the credit cycle. Moreover, there has been growing unease about the relentless and exponential growth of CRT markets, coupled with the growing presence in these markets of hedge funds – institutions which tend to be rather opaque about their activities. These concerns have included uncertainties about the obscure way in which these markets have redistributed credit risks in the financial system and about the capability of these markets to function under stress, especially concerning the settlement of complex contractual arrangements.

Concerning sources of risk and vulnerability outside the euro area financial system, global financial imbalances continue to pose medium-term risks to the stability of foreign exchange and other financial markets. By raising energy costs, the further surge in oil prices over the past six months could dent future corporate sector profit growth, if it proves to be as lasting as futures prices currently suggest. Moreover, further unexpected rises in oil prices could, if sufficiently large to bring about anxieties about inflation risks, trigger a further upturn in long-term interest rates. Concerns also remain about the credit and wealth risk implications of rising household sector debt and house prices in some euro area countries. In addition, with signs that the phase of balance sheet consolidation in the euro area corporate sector may have come to an end, there have been concerns about the risk of an adverse turn in the corporate credit cycle.

It should be stressed that drawing attention to sources of risk and vulnerability for financial stability such as these differs from seeking to

identify the most probable outcome. It entails highlighting potential and plausible sources of downside risk, even if these are relatively remote. The remainder of this chapter examines the main sources of risk and vulnerability that could affect euro area financial system stability in the period ahead. The chapter concludes with an overall assessment of the outlook.

RISKS FROM GLOBAL FINANCIAL IMBALANCES

Large and growing global financial imbalances have generally been perceived as constituting a significant vulnerability for global financial system stability, at least since 2000. The balance between US private sector savings and investment began to deteriorate after 2003 – driven by a pace of household sector dis-saving which dwarfed sizeable corporate sector financial surpluses. This augmented existing funding pressures on global capital markets that had been created by growing US fiscal deficits. By 2005, US imports had reached around twice the size of exports, and the current account deficit had ballooned to more than 6% of US GDP, a new post-Bretton Woods record. The prolonged accumulation of large and expanding deficits has incited growing unease about the medium-term sustainability of the US external position, since the financing of these deficits has become increasingly vulnerable to the continuation of ever-greater capital inflows into the US from surplus economies.

From a financial stability viewpoint, the main source of unease about the size of global imbalances continues to be the possibility of an abrupt asset portfolio reallocation, either by the official or the private sector, or of a sudden deterioration in the risk appetite of global investors for accumulating US securities in sufficiently large amounts. While the likelihood of an abrupt unwinding of these imbalances appears to be low, as suggested by the pricing in global foreign exchange options markets, such an event could nevertheless entail sudden and destabilising changes in global capital flow patterns. This could bring with it the possibility

of considerable downward pressure on the US dollar, which could exert significant upward pressure on US long-term interest rates. Moreover, given the increasingly global nature of the asset allocation process, this would probably entail spillovers into most other financial asset classes – including corporate bonds and equities – and across the financial markets of most economies. Under such circumstances, global banks and their counterparties – especially leveraged investors such as hedge funds – could face increased risks from falling asset prices. At the same time, sizeable and more than likely highly correlated asset price movements could, together with spikes in market volatility, impair market liquidity and undermine the hedging of financial risks. Since this would probably adversely affect the earning capacity and capital bases of financial institutions, it would represent a challenging test of their risk management systems and loss-absorption capacities.

However, the likelihood of an abrupt unravelling of global financial imbalances still appears to be small. There has so far been no visible sign of any loss of appetite on the part of foreign investors for accumulating US dollar securities. In this vein, it should be recalled that there are two sides to prevailing global financial imbalances. The significant capital inflows needed to finance US current account deficits have been mirrored by sizeable outflows from surplus economies in Asia, especially China and Japan, and, more recently, by several oil-exporting countries which, thanks to the recent surge in oil prices, have benefited from revenue windfalls. Nevertheless, the longer these sizeable imbalances continue accumulating, the greater will be the likelihood that they could ultimately prove unsustainable. Hence, there is no room for complacency: if global imbalances are not corrected over the medium term, the risks for global financial stability are likely to grow.

RISKS IN GLOBAL CAPITAL MARKETS

In the six months following the finalisation of the December 2005 FSR, long-term interest rates edged up in the US, Japan and the euro area. However, in the US they still remained lower than what might have been expected given the constellation of underlying fundamentals, given that the Federal Funds rate was raised in several steps by a total of 375 basis points from June 2004 onwards, given a current account deficit of unprecedented proportions, and at a time when the pace of US economic activity remained strong.

Several potential explanations have been put forward for the fact that long-term interest rates across mature capital markets remained at persistently low levels after early 2003. Foremost among these has been the fact that in their pricing of bonds market participants have expressed a high degree of confidence in the ability of central banks to sustain low and stable rates of inflation. Very high rates of savings in some emerging market regions – especially in Asia – as well as an apparent reluctance on the part of corporations in many parts of the world to invest have also been advanced as potential explanations for the very low levels of real long-term interest rates. This was augmented by the strength of oil prices, which is thought to have played a role in pushing global bond yields down through the recycling of mounting petrodollar revenues of oil-exporting countries into fixed income assets. In addition, persistently ample global liquidity conditions in recent years may have pushed nominal bond prices upwards, as part of a wide-ranging inflation of asset prices that affected many asset classes, including credit market securities, precious metals and residential property. Structural factors – including regulatory measures and accounting standard changes – also appeared to encourage institutional investors to reduce the size of interest rate risk mismatches and the investment risk on their balance sheets, which in turn apparently lowered the demand for equity and boosted the demand for medium to

long-maturity bonds and for index-linked bonds.

While it remains challenging to disentangle the relative importance of each of these specific influences on the pricing of long-maturity bonds, valuations could be vulnerable to several potential adverse disturbances. These include the possibility of a further tightening of global liquidity conditions; macroeconomic surprises such as the possibility of further spikes in oil prices, which could lead to market perceptions of upward risks to price stability; the possibility of a pick-up in external funding by firms; or the risk of a change in global asset allocation, possibly brought about by growing unease regarding global imbalances. The materialisation of any of these disturbances could trigger upturns, possibly of an abrupt nature, in long-term yields across mature capital markets, including the euro area.

There has been a widely shared view among market participants and public policymakers that the very low returns offered by risk-free securities over the past three years, together with abundant liquidity in global capital markets, raised the risk tolerance of investors to the point of setting in motion a search for yield. Among asset classes, the chief beneficiaries of improved risk appetite are thought to have been credit market securities, emerging market equities and bonds, and precious metals. As well as favouring riskier asset classes, the search for yield is thought to have driven an acceleration of inflows into hedge funds and, more recently, into private equity funds. At the same time, it is believed to have brought about rising leverage in structured loan and leveraged buyout (LBO) markets.

One source of concern is that unusually high risk appetite may have led investors to accept insufficient compensation for holding risky assets, thus pushing asset valuations upwards and raising the exposures of key financial institutions to market sources of risk. Moreover, with the hunt for yield becoming increasingly

aggressive, there is a fear that it may have driven investors into similar positions, aggravating the vulnerability of several financial markets to potential stress. One indication of this herding, or so-called crowding of trades, is that hedge fund returns, both within and across different investment strategies, became increasingly correlated after mid-2003. In addition, an area of growing concern has been the exponential growth of CRT markets in which hedge funds – institutions which tend to be rather opaque about their activities – are known to have become increasingly active. Although the CRT markets proved to be relatively resilient to recent credit events, such as the widely expected downgrading of two large US automobile manufacturers in May 2005, its functioning under conditions of severe strain nevertheless remains largely untested.

From a financial stability viewpoint, the main cause for concern about the hunt for yield is the fact that it seems to have made a variety of markets more vulnerable to risk reappraisal and abrupt asset price adjustments. There have been some indications that higher funding costs may have led to an unwinding of carry-trades in some high-yielding countries. Mature markets have so far proved resilient, but in the period ahead asset valuations, where they are in excess of intrinsic values, could be vulnerable to several potential adverse disturbances, for instance if global liquidity conditions were tightened further or if clear-cut signs were to emerge of an adverse turn of the corporate credit cycle. A disruptive asset price adjustment could also be triggered by other financial sector shocks, such as the possibility of an idiosyncratic collapse of a key hedge fund or a cluster of smaller funds, fraud, adverse geopolitical news or an avian influenza pandemic. If such a triggering event of sufficient severity were to occur, it would bring about significant asset portfolio losses for banks and non-bank financial firms, and would most likely imply a loss of income for banks from other market-related activities. For financial markets, large and potentially correlated asset price adjustments could cause liquidity to dry up and

undermine the hedging of financial risks. Moreover, in such a market environment, primary issuers, especially corporations with ratings at the lower end of the credit quality spectrum, could struggle to find investors for their securities.

Although these vulnerabilities in the financial markets have been present for some time, there is no room for complacency. Persistent asset price misalignments can also carry significant medium-term risks for financial stability. For instance, very low risk-free returns have exacerbated mismatches on the balance sheets of insurance companies and pension funds. There is also a risk that medium-term vulnerabilities could be building up if the capital intermediated through financial markets is misallocated because of pricing misalignments, or if the pricing of credit risk in bank loans to corporations proves to be too market-sensitive at a time when concerns exist about pricing misalignments in markets.

In the six months after the finalisation of the December 2005 FSR, the vulnerability of some financial markets to risk reappraisal appears to have risen. Corporate credit spreads and credit default swap premia remained at low levels, while emerging market economy sovereign spreads fell further. At the same time, market yield curves flattened, with liquidity conditions being tightened in all three G3 economies, making carry-trades less attractive. In addition, the correlation of hedge fund returns both within and across investment strategies surpassed levels seen just before the near-collapse of Long Term Capital Management in 1998, and hedge funds suffered from net outflows for the first time in several years in the last quarter of 2005 following deteriorating returns. In part, this appears to be due to the fact that reduced market volatility may have lowered the scope for arbitrage, while the greater size and number of funds has intensified competition for the dearth of profit opportunities that remain.

EXPOSURES TO EURO AREA NON-FINANCIAL SECTORS

An evaluation of the credit risks posed by firms and households depends upon two factors: the nature of the exposures of banks and financial market participants, including investors in equities, corporate bonds and CRT instruments; and balance sheet conditions in the two sectors.

Considering the corporate sector, the profitability of euro area firms generally strengthened further in 2005 despite further oil price rises, thanks to strong revenue growth and cost containment. This allowed firms to add to already substantial cash balances. Although the pace of debt accumulation by the sector was faster than GDP growth, corporate sector leverage – when gauged by debt-to-equity ratios – declined. Moreover, in an environment of very low interest rates, the debt financing burden of firms remained contained. Against this background, several market-based yardsticks of corporate sector creditworthiness – including spreads on corporate bonds and expected default frequencies – continued to indicate significantly better assessments than in 2002, before the euro area corporate sector entered into a phase of balance sheet consolidation.

While no major balance sheet vulnerabilities can be detected in the corporate sector, some concerns exist about how balance sheet conditions will evolve in the period ahead. There is some evidence that the quality of earnings reported by euro area firms in 2005 may have overstated their medium-term profit-generating capacity, and equity analysts have been forecasting some slowdown in profit growth in the near term. As the profit cycle has shown some signs of maturing, uncertainty has grown about the prospect of a general adverse turn in the credit cycle. Although no clear-cut signs have yet emerged, it is notable that the ratio of rating agency upgrades to downgrades for euro area firms deteriorated somewhat towards the end of 2005. Furthermore, the

number of firms being placed on review for a downgrade rose. Against a background of a pick-up in the pace of bank lending growth to the corporate sector and rising LBO activity, this may have reflected concerns that firms had begun to re-leverage their balance sheets in an effort to sustain profits. In addition, while balance sheet restructuring generally contributed to improving corporate sector creditworthiness, there are some concerns that firms have effectively shortened the maturities of their debts, thereby making their balance sheets more interest rate-sensitive.

From a financial stability viewpoint, a deterioration in corporate sector credit quality would not only imply greater loan losses for banks, but could also trigger an asset price adjustment in the credit markets, especially if the frequency of unexpected idiosyncratic corporate defaults were to rise. Although still low, this risk appears to have increased somewhat over the past six months, given higher short-term interest rates and oil prices.

From early 2002 onwards, the rate of debt accumulation by euro area households accelerated, largely in conjunction with significant house price inflation in several euro area countries, and has so far shown no sign of abating. Nevertheless, household sector indebtedness is not a significant cause for concern at a euro area-wide level, not least because household sector debt-to-GDP ratios have remained low by international standards; debt servicing burdens have remained stable; and aggregate household sector solvency – gauged by debt-to-financial asset ratios – has remained comfortable. Moreover, there is evidence that the bulk of debt is held by households that are financially sound. However, aggregated data for the euro area conceal wide disparities across individual Member States, and there are some concerns regarding balance sheet vulnerabilities in countries where debt ratios are well above the euro area average, especially those where debt is predominantly financed at floating interest rates.

Looking ahead, the risks for euro area household sector balance sheets include risks to household incomes, as well as interest rate risks and, in some countries, house price and financial market risks as well. Balance sheet vulnerabilities of the euro area household sector remain low, but they have risen over the past six months. Household sector indebtedness has increased further from already historically high levels, and short-term interest rates have also risen somewhat. In practice even moderate increases in monthly payment burdens could be sufficient to raise the risk of financial distress for the most heavily indebted households. However, the risk of a significant deterioration in the debt-servicing ability of the household sector, as a whole, remains remote when taking account of the central macroeconomic outlook. That said, it is important to bear in mind that the interest rate risks that households face are not evenly spread across the euro area, given cross-country differences in debt levels, contractual interest rate variability, and typical loan maturities.

Risks on the asset side of euro area household sector balance sheets also appear to have increased over the past six months. For the euro area as a whole, house prices have risen further, and the increases in some Member States have been substantial. While household balance sheets have profited from improving wealth, in some countries there are indications that prices may have risen beyond intrinsic values. It is clear that the vulnerability of household balance sheets to house price corrections is likely to be largest in those Member States in which prices have risen beyond their intrinsic values, and where variable rate contracts are the most common type of mortgage product. Finally, in parallel with the increasing risk of an unwinding of the search for yield, there may be greater market risks facing household sector financial asset portfolios, including those held in the form of mutual fund savings and pensions.

PERFORMANCE OF THE EURO AREA BANKING SECTOR

Even though banks have faced significant challenges in their operating environments – including several years of subdued domestic economic activity, weak corporate demand for loans and thin lending margins – the financial performance of the largest euro area banks showed significant and broad-based improvement during 2005. Notwithstanding some uncertainties about the impact of new accounting standards on the financial performance figures disclosed by banks, average profitability improved significantly and, because the performance of formerly weak-performing banks significantly improved, the degree of dispersion of profitability performance around the mean narrowed considerably. This fed through into slightly improved bank solvency ratios. The main factors driving improved financial performance included continued strength in lending to households, mostly for housing purposes, and a recovery of lending to the corporate sector. Marked reductions in loan impairment as well as cost-cutting also contributed to the overall improvement. All in all, given stronger profitability and comfortable solvency buffers, the shock-absorbing capacity of the euro area banking sector has further improved over the past six months.

Looking ahead, the most likely outcome appears to be that euro area banks' profitability will improve further in an environment of generally benign credit and liquidity conditions. Moreover, given the recent pick-up in lending to the corporate sector, the diversification of banks' income is set to improve. However, notwithstanding the strengthening of profitability and the generally favourable outlook, as discussed above there are some risks and vulnerabilities for the operating environments of banks.

Concerning the risks posed by global financial imbalances, banks tend to hedge their foreign exchange exposures very well, but it cannot be

excluded that some of their more important counterparties – both non-bank financial and non-financial firms – may not have managed these risks as effectively. At the same time, while significant advances have been made in the stress-testing practices of larger banks, it is not clear whether stress-tests adequately reflect situations of impaired financial market liquidity.

As for the risks posed by the possibility of an abrupt unwinding of the search for yield, in such a scenario banks could be exposed to greater market risks than normal, especially if this were to trigger a reassessment of the appropriateness of credit risk premia in markets. Even if the direct market risks faced by banks prove to be manageable, banks may still face risks to other market-related business activities, as well as counterparty risks from both non-financial and non-bank financial firms, where risk management practices may be less advanced. While counterparty risk management practices in large banks are known to be improving, it is unclear whether the intensity of competition, for instance in the provision of prime brokerage services to hedge funds, may have compromised standards at the margin. Moreover, as low interest rates may have sustained tight credit spreads, to the extent that banks' pricing of credit risks is market-sensitive, medium-term vulnerabilities related to the pricing of credit risk could be building up.

Regarding the risks posed by expanding household balance sheets, it is unlikely that an unexpected disturbance to interest rates would diminish the strength of aggregate household balance sheets to the point of materially raising the credit risks faced by banks across the euro area. As for exposures to the risk of a property price reversal, banks appear by and large to have carefully managed the risks inherent in the collateral used to secure mortgages by setting loan-to-value ratios at conservative levels. However, there are signs that intensifying competition in mortgage markets may have led to a loosening of credit standards.

Concerning risks within the banking system, banks have faced challenges over recent years to maintain or increase interest income, given the margin erosion caused by persistently low interest rates and intense competition in the granting of loans. Hence, there is a risk that banks may have loosened their credit standards too much, possibly increasing future exposures to credit risk, or that they have sought out alternative sources of income which will ultimately prove to be riskier. A further risk is that it has yet to be tested whether historically low loan impairment charges will prove to be adequate in the face of an unexpected deterioration in the credit cycle.

Even though vulnerabilities and financial imbalances have grown over the past six months, forward-looking indicators based on asset prices generally suggest that the outlook for the euro area banking sector remains bright and that the shock-absorption capacity of the system is more than adequate. The performance of banks' stock prices over the past six months suggests that market participants expect a further strengthening of profitability, an outlook which is confirmed by private sector analysts' forecasts of future banking sector profitability, as well as by patterns in banking sector credit risk indicators. However, account needs to be taken of the fact that some options market-based indicators do point towards rising uncertainty about the outlook for banking sector profitability.

PERFORMANCE OF THE EURO AREA INSURANCE SECTOR

Despite significant losses incurred by reinsurers following the damage caused by natural catastrophes, the financial performance of the euro area insurance sector improved in 2005, owing to stronger investment income, against a background of rising equity prices, and improving underwriting income. Market-based indicators suggest that the outlook for the sector remains favourable. However, there are a

number of risks facing the industry in the period ahead. These include the possibility of premium competition in the non-life sector, longevity risk in the life sector, and the possibility, albeit diminishing, of an influenza pandemic.

OVERALL ASSESSMENT

Despite further oil price rises, continued and more broad-based strength in the pace of global economic activity in 2005, together with a further strengthening of the balance sheets of euro area financial institutions, has contributed positively to the financial stability outlook of the euro area. However, several potential sources of risk and vulnerability have remained in the past six months and some have grown and increased further. This calls for vigilance in risk management – including stress testing – as there is no room for complacency in the period ahead.

The greatest medium-term risk for global financial stability continues to be the possibility of an abrupt unwinding of global imbalances, especially because these imbalances have widened further. While the likelihood of this occurring still appears small, the materialisation of such an event would represent a challenging test of the risk management systems and loss-absorption capacities of financial institutions.

Within the financial system, the durability of banking sector profitability could despite its strength be tested in the period ahead. Declining loan impairment charges could adversely affect the ability of banks to cope with an unforeseen deterioration in credit quality such as an adverse turn of the corporate credit cycle or a weakening of household sector credit worthiness. In addition, a far-reaching reappraisal could take place with regard to market risks stemming from the ongoing search for yield. Given their exposures, concerns about financial asset price misalignments have left some financial markets and institutions vulnerable to changes in global liquidity conditions and to unexpected credit events. The recent relatively orderly increase in

US long-term yields has lowered the risk of an abrupt correction but if yields were to rise further in a disorderly way, this could potentially disrupt the intermediation of funds through global capital markets, which would have implications for euro area capital markets. Moreover, it could expose euro area banks to greater than expected market risks either directly or indirectly through exposures to counterparties with less advanced risk management systems and capabilities. On the other hand, the euro area life insurance industry would most likely benefit, as a further rise in long-term rates would help to relieve remaining balance sheet vulnerabilities.



II THE MACRO-FINANCIAL ENVIRONMENT

I THE EXTERNAL ENVIRONMENT

In the second half of 2005, the pace of global economic activity remained robust, and continued to prove resilient to further oil price rises. Looking ahead, global growth is expected to moderate somewhat while, at the same time, becoming more evenly spread. If sustained, this pattern of growth could help to ease the global financial stability risks posed by sizeable global current account imbalances. Apart from this, the persistent strength of oil prices could imply some downside risks for global growth, especially if they were to rise further. As global growth appears to be an important driver of risk tolerance all else being equal, continued strength in risk appetite can be expected in financial markets in the period ahead.

I.1 RISKS AND FINANCIAL IMBALANCES IN THE EXTERNAL ENVIRONMENT

US CURRENT ACCOUNT AND FINANCING

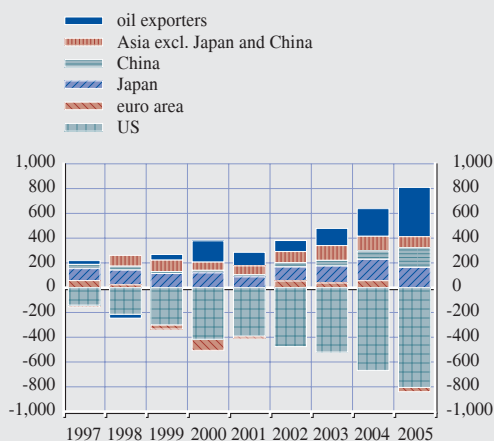
In 2005, the US current account deficit set a new historical record, exceeding USD 800 billion (see Chart 1.1) or around 6.4% of

GDP. The main factors driving the further widening of the US external deficit continued to be significant household borrowing together with relatively large fiscal imbalances. Offsetting these domestic imbalances was a rise in the funding surplus of the corporate sector (see Chart 1.2). Looking ahead, the income balance, which has so far remained positive and has marginally offset the growing trade deficit, could turn negative as US interest rates have been rising.¹ On the one hand, growing negative investment income would in turn imply a smaller sustainable trade deficit over the long run, and would complicate current account adjustment. On the other hand, the ability of US residents to earn high returns on their foreign assets while paying relatively low yields on their liabilities implies that the sustainable level of US net foreign liabilities may be larger than that of other countries (see Box 1).

1 With rising yields in the US, the differential in rates of return paid to service US international liabilities and the rate of return received from the stock of international assets is likely to diminish in the period ahead. This may potentially result in a negative investment income balance. See M. Higgins, T. Klitgaard and C. Tille (2005), "The income implications of rising U.S. international liabilities", Federal Reserve Bank of New York, *Current Issues in Economics and Finance*, Vol. 11, No. 12, December.

Chart 1.1 The US current account deficit and its counterparts

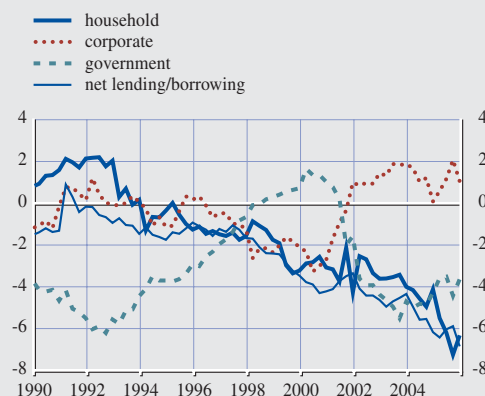
(1997 - 2005, USD billions)



Sources: IMF (WEO database) and ECB calculations.
Note: Data for 2005 are preliminary estimates.

Chart 1.2 Net lending and borrowing in the US economy

(Q1 1990 - Q4 2005, % of GDP)



Source: US Bureau of Economic Analysis.
Note: Net lending/borrowing equals gross saving (net saving plus consumption of fixed capital) minus gross investment. The contributions of the three domestic sectors do not add up to the total owing to capital account transactions and statistical discrepancies.

Although the current account deficit has been rising more or less continuously since 2001, there has however so far been no evidence of any financing challenges. In 2005, according to US Treasury data, foreign investors purchased around one trillion US dollars in US securities, mainly US government securities and corporate bonds and notes. These financial flows into the US were supported by widening interest rate differentials between the US and the euro area plus Japan, while the introduction of the Homeland Investment Act led to an estimated repatriation of profits by US corporations of about USD 300 billion in 2005.²

Large and growing global imbalances continue to pose significant risks for global financial stability over the medium term, as they have the potential to generate severe downward pressure on the US dollar and to bring about other, possibly unruly, asset price adjustments. However, there are also some partly offsetting factors. For instance, as long as international

prices for oil remain high, the financial recycling of oil revenues by oil-exporting countries may to some extent help finance large US current account deficits, at least over the short to medium term. Soaring oil prices caused the US oil bill to rise to more than USD 200 billion in 2005, or around one quarter of the entire current account deficit. At the same time, estimates suggest that the financial outflows of oil-exporting countries surged to around USD 400 billion in 2005. There is no evidence that oil-exporting countries have been shifting investment away from US dollar securities and deposits, which makes it probable that the size of the oil bill recycling in US assets by oil exporters may be at least as large as, if not larger than, the US oil trade deficit.

2 See Goldman Sachs (2005), "Global viewpoint", Issue No. 05/32, November. The Homeland Investment Act allows US companies to repatriate profits earned by foreign subsidiaries at a reduced tax rate for a limited period of time. The financial flows show up in the balance of payments as smaller direct investment outflows or as inflows.

Box 1

EXPLAINING THE US INCOME BALANCE

In 1980, the US was a net creditor towards the rest of the world to the tune of USD 360 billion. However, by the end of 2004 the US owed foreigners USD 2.5 trillion, or around 22% of US GDP. Despite this marked deterioration of the US international investment position (i.i.p.) over the past quarter century, the US income balance has consistently recorded surpluses ranging between 0.1 and 0.5% of GDP, although in 2005 this surplus dramatically shrank to an estimated USD 1 billion because of rising debt service obligations. One way of interpreting this is that the US has been earning a negative rate of return on its net foreign liabilities. This Box discusses some of the reasons why the US income balance has been in surplus despite the fact that the US has a net foreign liability position vis-à-vis the rest of the world, and it additionally examines the implications this may have for global financial stability.

The most common explanation given for positive US income balances is that the US has effectively behaved as if it was a "leveraged investor", by issuing low-yielding debt securities and making high-yielding direct investments abroad.¹ In this vein, the asset composition of the US i.i.p. does show a strong asymmetry between a relatively large negative net position in debt securities (-28% of GDP in 2004) and a relatively small surplus in the direct investment position (+5% of GDP in 2004), each generating approximately the same income flow in absolute

1 See P. O. Gourinchas and H. Rey (2005), "From world banker to world venture capitalist: US external adjustment and the exorbitant privilege", *NBER Working Paper*, No 11563, August.

amounts of around 1% of GDP in 2005. These two income flows roughly offset one another and, once additional minor flows such as other portfolio income and compensation of employees are taken into account, this results in a small surplus in the income balance. However, when returns on foreign direct investment (FDI) and debt securities for both assets and liabilities are disaggregated, the picture becomes more complex. In recent years the yields on US debt securities have been very low, well below the returns on US direct investment abroad, thereby lowering the net servicing of the rising debt burden (see Chart B1.1). However, at least before 2002, the difference between the rate of return that the US “received” from direct investment abroad and the rate of return the US “paid” on its debt was not so large as to produce a positive income balance (and was even slightly negative in 2000-2001) (see Charts B1.1 and B1.2). Instead, the persistence of a positive balance on income is mainly due to the very low average returns received by foreign investors on their direct investments in the US compared to US direct investment earned abroad (see Chart B1.2). Moreover, the increase in the gross size of direct investment stocks in both directions over time amplified the impact of this excess return on US FDI on the net income flows. All in all, the US’s positive income balance appears to be mainly due to excess returns from US direct investment abroad relative to returns from FDI made in the US, and not to the US’s leveraged portfolio.

Three tentative explanations can be advanced as to why returns on US direct investment abroad tend to be much higher than returns on FDI made in the US. First, US direct investment abroad may enjoy a seniority or maturity premium with respect to relatively younger FDI in the US. Start-up costs and more competitive pressure in the US market may depress the rate of return of foreign subsidiaries in the US. Mataloni (2000) provides some supporting evidence that factors such as firm age and market share may have accounted for the low rates of return earned by foreign-owned companies in the US in the past.² Second, around one-third of US direct investment abroad is directed towards emerging markets. The rates of return of these investments most likely include higher risk premia than on FDI made in the US. Supporting this hypothesis, the Congressional Budget Office (CBO) has recently noted that the weighted average Standard

² See R. J. Mataloni (2000), “An examination of the low rates of return of foreign-owned U.S. companies”, U.S. Bureau of Economic Analysis, *Survey of Current Business*, March.

Chart B1.1 Rates of return on debt securities held abroad and on US debt held by foreigners

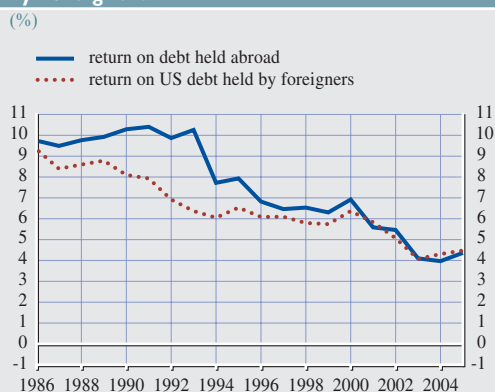
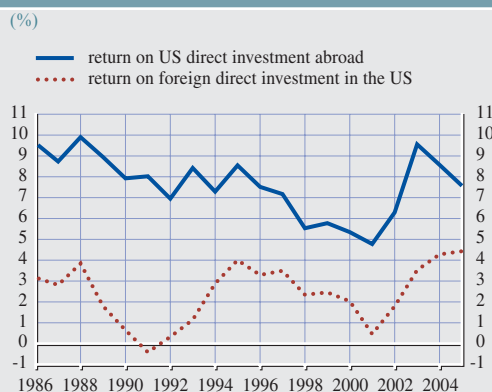


Chart B1.2 Rates of return on US direct investment abroad and on FDI in the US



Sources: IMF (BPS and IFS) and ECB calculations.

Note: For each asset class, returns are calculated dividing the respective flow in the income balance by the relevant stock from the i.i.p. in the previous year. These returns do not include capital gains.

& Poor's rating for countries which receive US direct investment abroad is equal to BBB+, eight notches lower than the US rating (AAA).³ Third, the excess return on US direct investment abroad may be the result of transfer pricing activities of multinational corporations, with US companies shifting profits to low-tax countries and foreign subsidiaries operating in the US shifting profits back to the parent company or to low-tax countries. There is indeed some indirect evidence that US-controlled multinationals tend to shift their profits into low-tax countries. For instance, an examination of the country breakdown of the rate of return on inward and outward US direct investment reveals that the US records significant positive excess returns on FDI vis-à-vis most other economies, obtaining particularly high excess returns versus low-tax countries such as Ireland, Bermuda and the Caribbean islands, as well as financial centres such as Switzerland and Luxembourg.⁴

The apparent puzzle of a positive US income balance vis-à-vis a negative i.i.p. has prompted some economists to question how net foreign assets are accounted for, and to gauge instead their value through the income streams that they generate.⁵ For instance, Hausmann and Sturzenegger (2006) draw a parallel between net foreign assets and the fair share price of a firm. Using this insight, they compute a fair value for US net assets of USD 600 billion, and from this conclude that the US is in fact a net international creditor rather than a net debtor.⁶ They label the difference between this fair value and the statistical reporting of USD -2.5 trillion at the end of 2004 “dark matter”, referring to invisible assets that nevertheless generate revenues. According to Hausmann and Sturzenegger, there are three possible explanations for this large discrepancy. First, the stock of US FDI abroad could be more valuable than the market value reported by official statistics because it entails a substantial amount of brand recognition, expertise and R&D, all of which are not properly measured in official statistics. Second, while foreigners hold US currency as a store of value and as a liquid asset, for the US this represents a non-interest-bearing liability which can be used to buy profitable assets abroad, generating so-called dollar seigniorage which is not accounted for in the statistics. Third, foreigners are also likely to pay an insurance premium in order to buy relatively safe assets (US Treasuries), thereby financing the US current account with funds which are then transformed into foreign financing of risky assets (e.g. emerging market debt or equity). Of these three explanations, only the first appears to be significant in terms of explaining the characteristics of the US income balance and, hence, Hausmann's “dark matter”.

It is worth noting that in 1991, the US Bureau of Economic Analysis had already discarded the capitalisation of earnings as a method for the valuation of US net foreign assets “because of the large uncertainties involved in choosing an appropriate rate of discount”.⁷ Moreover, some of Hausmann and Sturzenegger's findings are open to debate because their analysis does not account for the fact that US debt has been increasing, thereby generating rising debt servicing obligations that are likely to undermine the ability of the US to generate positive earnings in the future (i.e. a positive income balance). Following the fair valuation approach, the most

3 Congressional Budget Office of the United States (CBO) (2005), “Why does U.S. investment abroad earn higher returns than foreign investment in the United States?”, *Economic and Budget Issue Brief*, 30 November.

4 See M. Higgins, T. Klitgaard and C. Tille (2005), “The income implications of rising U.S. international liabilities”, Federal Reserve Bank of New York, *Current Issues in Economics and Finance*, Vol. 11, No 12, December.

5 See R. Hausmann and F. Sturzenegger (2006), “Global imbalances or bad accounting? The missing dark matter in the wealth of nations”, *CID Working Paper*, No 124, Harvard University, January.

6 Hausmann and Sturzenegger (2006) multiply the average US net income over the past 25 years (USD 30 billion) by a somewhat arbitrary price-earnings ratio (set at 20, implying a return on assets of 5%). Hence, this valuation corresponds to the capitalisation of an infinite future annual stream of income of USD 30 billion at a 5% discount rate.

7 See J. S. Landefeld and A. M. Lawson (1991), “Valuation of the US net international investment position”, US Bureau of Economic Analysis, *Survey of Current Business*, May.

important variable for assessing the fair valuation of net assets is their expected economic earnings, rather than past reported earnings, which may be a relatively poor indicator of future earnings performance. This notwithstanding, an important point implicit in Hausmann and Sturzenegger's analysis is that the sustainable level of US net foreign liabilities may be larger than that of other countries because of the ability of US residents to earn high returns on their assets while paying relatively low yields on their liabilities.

To sum up, on the one hand, the unwinding of global imbalances could be complicated by the potential deterioration of the US investment income balance, owing to rising debt servicing obligations, which would in turn imply a smaller sustainable trade deficit over the long run. On the other hand, as long as the US is paying a relatively low rate of return on its net foreign liabilities, its position as the world's largest debtor should not generate any real cause for concern.

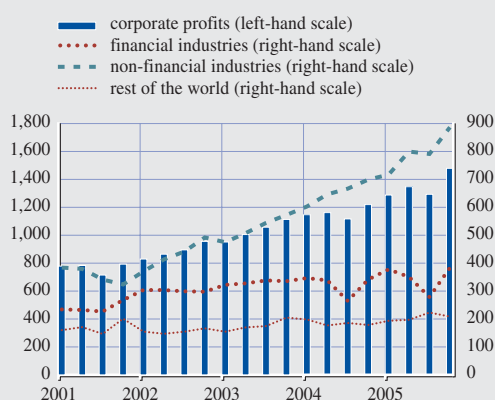
US CORPORATE SECTOR BALANCES

The strength of US corporate sector balance sheets can have a bearing on financial system stability in the euro area. This is because many euro area financial institutions have direct exposures to US firms through lending. Furthermore, the financing needs of US corporations may affect the costs faced by large euro area firms in global capital markets, both through competing demands for funds as well as in the pricing of corporate sector credit and equity market risks in global capital markets.

After three consecutive quarters of improvement, there was a decline of US corporate profits in the third quarter of 2005, which took place against the background of a moderation in the pace of US economic activity (and in conjunction with the losses resulting from Hurricanes Katrina and Rita). However, the decline proved short-lived and there was a rebound in the final quarter of the year to new record levels (see Chart 1.3). With the exception of profits earned from abroad, the strengthening was reasonably broadly based.

Chart 1.3 US corporate sector profits

(Q1 2001 - Q4 2005, USD billions, seasonally adjusted and annualised)



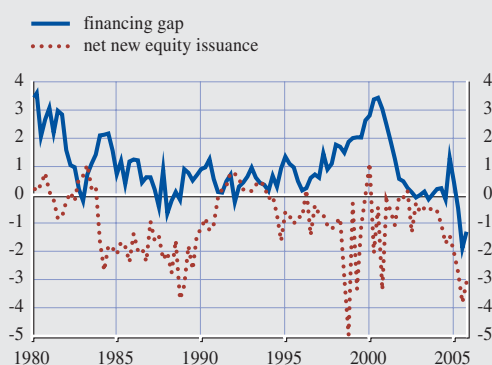
Source: US Bureau of Economic Analysis.
Notes: Corporate profits are net of taxes and include inventory valuation and capital consumption adjustments. Profits from the rest of the world (RoW) are receipts from the RoW less payments to the RoW.

Reflecting the overall strength of profits, corporate sector cash flows continued to grow at a healthy pace in 2005, and were largely sufficient to cover corporate investment spending. For instance, in the non-farm, non-financial sector, internally generated funds outpaced spending on fixed investment after the second quarter of 2005. US corporations used some of their internally generated funds to finance the repurchase of their shares from the marketplace. However, in the last quarter of 2005, this pattern was reversed somewhat as spending on business capital investment rebounded and the pace of net equity retirement by non-farm, non-financial corporations decelerated somewhat (see Chart 1.4).

The pace of debt accumulation by US corporations accelerated in the last quarter of 2005. The nominal amount of corporate debt

Chart 1.4 US non-farm, non-financial corporate sector financing gap and net new equity issuance

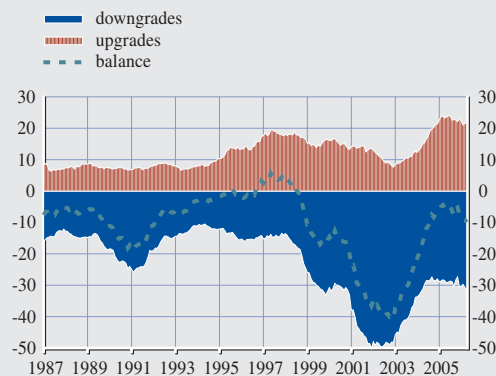
(Q1 1980 - Q4 2005, % of GDP)



Source: US Federal Reserve Board.
Note: The financing gap equals capital expenditures less internal funds and inventory valuation adjustments.

Chart 1.5 US corporate sector rating downgrades, upgrades and balance

(Jan. 1987 - Apr. 2006; 12-month moving average, number)



Source: Moody's.

outstanding grew at a quarter-on-quarter rate of 6.1%, up from 4.7% in the previous quarter. Underlying this upturn was a strengthening of demand for short-term credit. Bank loans in particular continued to increase, probably owing to steadily growing activity in cash-financed mergers and acquisitions (M&A). At the same time, the growth of the stock of long-term debt remained subdued with the exception of commercial mortgage debt.

In the Federal Reserve *Senior Loan Officer Opinion Survey on Bank Lending Practices* for October 2005 and January 2006, it was reported that progressively easier credit standards and terms were applied by banks on loans to the corporate sector. The explanations given by US domestic banks for loosening their lending standards included higher competition and an increase in risk tolerance. There were also some indications that US banks increasingly securitised their loan portfolios, explaining rapid growth in gross issuance by banks of collateralised loan obligations (CLOs) as well as commercial mortgage-backed securities (CMBS). In fact, while long-term borrowing as a whole continued to grow at a modest pace, and corporate bond issuance remained subdued, commercial mortgage debt recorded new increases.

However, on aggregate, the total liabilities of the non-farm, non-financial corporate sector as a proportion of GDP continued to decline, dropping by around 6% between the last quarter of 2004 and the last quarter of 2005 (see Chart S1). At the same time, the assets of non-farm non-financial corporate sector balance sheets continued to increase. While the market value of outstanding assets as a proportion of GDP remained virtually unchanged through 2005, the steadily rising market value of tangible assets raised the nominal value of total assets up by 6.3% when compared with the last quarter of 2004.

All in all, the phase of US corporate sector balance sheet consolidation in the aftermath of the bursting of the equity price bubble has meant that the credit risk posed by US firms has declined considerably since early 2003. However, some risks do lie ahead. The upturn in short-term interest rates since mid-2004 as well as the more recent upturn in long-term interest rates can be expected to cut into US corporate sector profitability in the period ahead, possibly implying some deterioration of credit quality. Notable in this respect is that some concerns were expressed by respondents to the *Senior Loan Officer Opinion Survey on Bank Lending Practices* for January 2006 that

they anticipate that the quality of their loans to businesses will deteriorate somewhat in 2006. The further rise in oil prices may also pose a risk for firms' cost bases, especially if these increases prove to be lasting.

Furthermore, there are signs of a weakening of corporate credit quality. The ratio of rating agency upgrades to downgrades has deteriorated since March 2005 (see Chart 1.5). Although the risk of losses for euro area banks has remained rather low, it has been increasing since the last FSR issue.

US HOUSEHOLD BALANCES

If rising US household sector indebtedness were to lead to rising default rates, this could pose risks for euro area financial system stability. This is because some euro area banks are directly exposed to US households through lending, or indirectly by being exposed to US credit institutions that have extended loans to US households. Exposures of the euro area financial system also arise through holdings of mortgage-backed securities issued by US credit institutions.

Over the second half of 2005, the demand of the US household sector for credit, and in particular for mortgage loans, continued to outpace disposable income, albeit at a slower growth rate. This raised debt-disposable income ratios further (see Chart S3).

Both the October 2005 and January 2006 Federal Reserve *Senior Loan Officer Opinion Survey on Bank Lending Practices* reported that demand for residential mortgages and consumer loans was weaker, despite essentially unchanged lending standards and credit terms. However, some banks increased the minimum percentage on outstanding credit card balances that is required to be repaid each month. New borrowing for consumer credit actually fell over the last three months of 2005 and in January 2006; revolving credit, which mostly accounts for credit card debt, recorded an annual growth rate of 2.2% (down from 4.2% in January 2005); while non-revolving credit, which primarily reflects car and boat loans, eased to an

Chart 1.6 US personal bankruptcy filings and consumer credit



annual growth rate of 3.2% (down from 4.3% a year earlier).

Consumer credit growth slowed owing to continued home equity withdrawal and rising interest rates, and possibly also because of the new bankruptcy code, the Bankruptcy Abuse Prevention and Consumer Protection Act, which was signed into law in October 2005. This act makes it more difficult for individuals filing for bankruptcy to get their debts written off as opposed to submitting a repayment plan, and also appears to explain the surge in bankruptcy filings in the second and third quarters of 2005, before the new law comes into effect (see Chart 1.6). Hence, the upturn may turn out to be temporary.

Meanwhile, the debt servicing ratio (DSR) also increased, as debt payments made by the household sector rose by more than disposal personal income. By the end of 2005, the DSR stood about 5 percentage points higher than one year earlier, while the financial obligations ratio (FOR)³ was 3.6 percentage points higher

³ The DSR is an estimate of the ratio of debt payments to personal disposable income. Debt payments consist of the estimated required payments on outstanding mortgage and consumer debt. The FOR, a broader measure, adds automobile lease payments, rental payments on tenant-occupied property, homeowners' insurance and property tax payments to the DSR.

than in the last quarter of 2004 (see Chart S4). However, delinquency rates on credit card debt and auto loans remained contained, indicating that US households were still well able to meet their financial obligations at prevailing interest rates.

The bulk of outstanding US mortgage debt remains contracted at relatively low fixed interest rates following unparalleled mortgage refinancing in 2003. It is thus largely sheltered from interest rate increases. Moreover, the share of adjustable rate mortgages (ARMs), which had been rising steadily after mid-2003, began to decline since November 2005 (see Chart S5).

US home prices rose at a brisk pace through 2005, rising by 13% on average between the last quarter of 2004 and the end of 2005. Notwithstanding continued house price appreciation, there were some signs that activity in this market may have started to subside in some areas. This was suggested by a rise of inventories of unsold homes during the second half of 2005. This may have been due to the pick-up in mortgage rates, both at longer and shorter maturities.

Rising home values have been the main contributor to rising household sector asset valuations in recent quarters, producing sizeable gains in household sector net worth. In the fourth quarter of 2005, rapid growth in liabilities matched strong house price appreciation, so that there was a levelling off in the household net worth to disposable ratio, following several quarters of robust expansion (see Chart 1.7).

Overall, record levels of US household sector indebtedness have left the sector vulnerable to unexpected adverse disturbances. The rise in debt service ratios resulting from rising debt and interest rates may lead to a deterioration of household sector credit quality in the period ahead. Notable in this respect is that concerns were expressed by respondents to the *Senior Loan Officer Opinion Survey on Bank Lending Practices* for January 2006 that they anticipate

Chart 1.7 US household net worth

(Q1 1975 - Q4 2005, % of disposable income)



Source: US Federal Reserve Board.

that the quality of both credit card and non-credit-card consumer loans will deteriorate somewhat in 2006. Moreover, a large fraction of domestic respondents to the survey indicated that they anticipate the quality of their non-traditional residential mortgages will decline in the coming year. By contrast, the quality of traditional residential mortgages was not expected to deteriorate significantly in 2006. The sector also remains vulnerable to a turn in the house price cycle or to a rise of unemployment.

US FISCAL IMBALANCES

Against a background of wide current account imbalances – which US fiscal dis-saving has exacerbated – and low real interest rates, large US budget deficits may pose additional risks for global financial stability. By raising the financing needs of the US public sector, the strength of federal bond issuance risks both crowding out US private sector debt issuance and pressuring global real interest rates, especially if foreign investors were to lose some of their appetite for investing in US government securities.

In 2005, the general government deficit – which comprises federal, state and local government net borrowing – improved according to IMF estimates, falling to 4.1% of GDP (down from 4.7% in 2004). Much of the improvement at the federal level (which comprises the bulk of the

general government sector) appears to have been due to cyclical and one-off factors, according to estimates by the Congressional Budget Office (CBO). The improvement in the deficit was however insufficient to prevent the debt-to-GDP ratio from rising and, by the end of 2005, the gross debt of the general government, which reflects the value of outstanding liabilities, had risen to 62.6% of GDP (see Chart S6).

Despite the recent slowdown in the pace of US public sector debt accumulation, a correction of US fiscal imbalances in the short term is unlikely to materialise. At the federal level, the White House foresees an expansion of the deficit from 2.6% in the fiscal year (FY) 2005 to 3.2% of GDP for FY 2006, although it expects some improvement over the medium term, with the federal deficit declining to 1.4% of GDP by FY 2009.⁴ This improvement, however, rests on some debatable assumptions, including the very strong compression of a rather small component of federal government spending in conjunction with a failure to account fully for likely tax liabilities. Indeed, the US federal deficit remains a source of concern as, in the absence of corrective measures, it is likely to remain high.

RISKS IN NON-EURO AREA EU MEMBER STATES

The general economic outlook for non-euro area EU Member States in the six months following the finalisation of the December 2005 Financial Stability Review (FSR) remained favourable.

In the UK, the annual growth of lending to households increased slightly after late 2005, mainly driven by a pick-up in secured lending for housing. This was accompanied by a recovery in house prices, which rose at a faster pace in late 2005 and early 2006 when compared with mid-2005. At the same time, growth in unsecured lending continued to slow down.

As lending rates to individuals exceeded UK GDP growth, household indebtedness continued to increase. The aggregate data did not indicate

that the household sector was encountering any material challenges in its ability to service outstanding debt. However, according to a September 2005 survey of 2,000 individuals, about 10% of those who had unsecured debts found those debts a heavy burden.⁵ The proportion of homeowners reporting problems in paying their mortgage costs also edged up in 2005 to around 7%.

On aggregate, the financial situation of UK non-financial corporations remained comfortable, despite the strength of oil prices. However in some sectors, profit growth rates were slow. Against this background, the number of UK companies issuing profit warnings to investors in 2005 reached its highest level since 2001.⁶ This was partly mirrored in the performance of UK stock prices which, on average, underperformed euro area stock prices between the end of 2005 and early May 2006.

In Sweden, due to a deterioration in the inflation outlook, the Swedish Riksbank increased its monetary policy rate by 25 basis points in January and again in February by the same amount, bringing it to 2%. In Denmark, amid accelerating output growth and strong growth in credit to the private sector, house price inflation continued to rise. Monetary policy in Denmark is aimed at keeping the krone stable against the euro and the Danmarks Nationalbank raised its official interest rates by a total of 50 basis points in December 2005 and in March 2006, following the interest-rate decisions taken by the ECB. Furthermore, the Danmarks Nationalbank raised its lending rate by 10 basis points in February following an outflow of foreign exchange in the first weeks of February.

The economic situation in the Member States that joined the EU in 2004 generally remained very positive in the six months after the finalisation of the December 2005 FSR, with

4 In the US, fiscal years do not coincide with calendar years, beginning instead on 1 October and ending on 30 September.

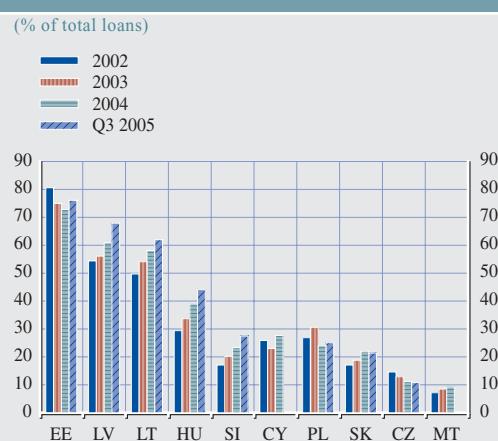
5 See Bank of England (2006), *Quarterly Bulletin*, Spring.

6 See Bank of England (2006), *Inflation Report*, February.

both domestic demand and net exports contributing to growth. Credit growth remained strong during the second half of 2005 and in early 2006 in most of the new Member States, especially in Latvia, Lithuania and Estonia (where growth rates exceeded 30% per annum), a situation that can be attributed to favourable financing conditions, encouraging macroeconomic performances, increasing diversity in the range of loan products offered to customers, as well as higher incomes. More moderate but nevertheless strong annual rates of credit growth of around 15% or more were observed in Slovenia, Slovakia, the Czech Republic, Hungary and Poland. However, there were some exceptions, with relatively subdued credit growth being recorded in Cyprus and Malta (see Table 1.1).

The bulk of the banks operating in these countries are owned by euro area banks. This means that these euro area banks may be ultimately exposed to credit risks arising from lending to the household and corporate sectors in the new Member States. In this vein, one area of concern has been that the proportion of foreign currency-denominated lending has been growing in importance in most of the new

Chart 1.8 Share of foreign currency loans in total loans in the new EU Member States



Sources: ECB, NCBs and the World Bank.

Member States in recent years (see Chart 1.8). This ultimately has been translated into higher indirect credit exposures of euro area banks to firms and households with no natural hedges for foreign currency debt – such as those where income or revenues are not denominated in the same foreign currency as the loan. The significance of foreign currency lending as a share of total lending appears to some extent to be determined by the exchange rate regime

Table 1.1 Credit to the private sector in the non-euro area EU Member States

	annual			quarterly			monthly	
	2003	2004	2005	Q2 2005	Q3 2005	Q4 2005	Jan. 2006	Feb. 2006
Czech Republic	-1.7	11.5	24.4	21.5	25.4	25.9	27.7	26.3
Denmark	4.8	7.7	12.2	10.6	13.3	14.0	13.2	13.1
Estonia	26.0	27.7	35.4	33.5	36.7	38.3	36.4	36.7
Cyprus	4.6	5.5	4.9	5.3	5.2	4.7	..	..
Latvia	26.2	38.4	48.0	41.6	47.8	58.8	61.8	63.3
Lithuania	43.1	55.3	40.2	37.7	44.3	54.0	66.7	67.2
Hungary	18.0	27.2	18.1	17.0	16.5	15.5	15.6	14.0
Malta	0.6	12.2	4.7	5.3	3.5	4.6	..	..
Poland	-8.2	4.0	18.3	19.7	17.1	14.0	16.5	13.6
Slovenia	9.6	23.4	21.9	21.8	22.3	24.5	24.0	24.8
Slovakia	11.0	13.7	21.7	18.2	23.7	26.9	28.3	29.2
Sweden	4.5	4.6	7.9	7.7	8.2	5.5	9.0	6.8
UK	10.2	11.4	10.3	10.5	10.2	10.3	9.7	10.5
EU10	3.5	14.3	21.2	20.5	20.9	20.6	22.3	20.8
Euro area	4.9	5.9	8.4	7.8	9.1	9.7	10.5	11.2

Sources: ECB and NCBs.

Note: The EU10 aggregate comprises the ten countries that joined the EU in 2004, calculated with 2003 GDP weights.

adopted by each country. In the three Baltic countries, which either operate a full currency board (Estonia and Lithuania) or a quasi-currency board (Latvia), between two-thirds and three-quarters of total lending is denominated in foreign currency (mostly in euro). In the other countries with exchange rate regimes, ranging from nearly perfect pegs (e.g. Slovenia) to floating regimes (e.g. Poland), higher exposure to foreign exchange risk may have led to a smaller proportion of foreign currency lending.

On the demand side, the main reason for steady growth in foreign currency lending is the positive interest rate spread between loans in domestic and foreign currency, which currently permits lower interest servicing of loans denominated in foreign currency (i.e. in euro). While the proportion of borrowers with a natural hedge remains significant, there might also be a lack of risk awareness among some borrowers whose decisions are firmly based on prevailing exchange rate and interest rate levels. On the supply side, a number of factors could explain this increase, including the fact that these subsidiaries have access to financing from their parent banks. Besides the default risk of foreign currency borrowers, banks are exposed to concentration risk due to correlated exposures: if the domestic currency depreciates, all foreign currency loans are affected together, increasing the repayment burden on borrowers. It should be noted, however, that banks' direct foreign exchange exposures are nevertheless of minor importance, given that mismatches between assets and liabilities tend to be small.

Stock markets in the new EU Member States have performed favourably since mid-2005, with benchmark stock market indices in just over half of these countries – with the exception of Estonia, Lithuania, Slovakia and Slovenia – outperforming the rise of the Dow Jones EURO STOXX Index. The strength of equity prices in these countries mainly continued to reflect strong demand from foreign institutional investors, as well as solid profits of companies listed on stock exchanges. Foreign inflows to

these stock markets have fuelled upward pressures on some of the currencies with flexible exchange rates.⁷

Looking ahead, the EU-10 countries remain vulnerable to changes in the sentiment of foreign investors. Growing external imbalances and rapid credit growth could ultimately pose risks to financial stability in some of these countries. Vulnerabilities are likely to be largest in those countries with flexible exchange regimes and high shares of foreign currency loans in total loans. This notwithstanding, the banks operating in these countries are well-capitalised, and the ratios of non-performing loans are currently limited or decreasing.

SOURCES OF RISKS AND VULNERABILITY IN EMERGING MARKET ECONOMIES

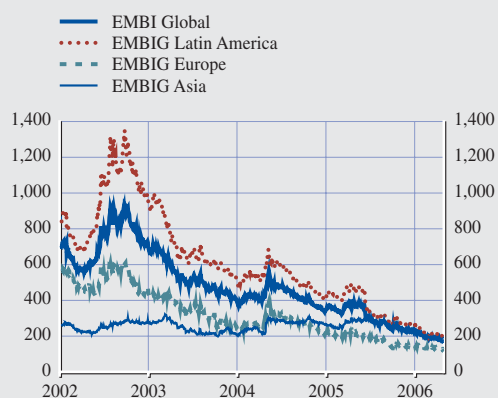
The economic and financial outlook for emerging market economies (EMEs) remains favourable. The pace of economic activity across emerging regions moderated after the December 2005 FSR was finalised, except in China and Russia, but remained robust. The sluggish economic momentum in some major Latin American EMEs (notably Brazil) was a partial exception to this pattern, although economic activity in these economies is expected to accelerate as domestic demand recovers.

Persistently benign financing conditions and healthy surpluses on external accounts (except in south-east Europe) continued to underpin improvements in traditional EME vulnerability indicators, especially external indebtedness (see Table S1). Together with the fact that the consolidated euro area banking sector has limited direct exposure to emerging areas (see Table S4), this suggests that risks to euro area financial stability stemming from EMEs are likely to remain contained in the near term.

⁷ The Czech koruna and the Polish zloty appreciated by 5.3 and 4.2% respectively from mid-2005 to early May 2006. The Hungarian forint, however, depreciated by 6.7% in the same period.

Chart 1.9 Emerging market sovereign bond spreads

(Jan. 2002 - May 2006, basis points)



Source: JP Morgan Chase & Co.

Notwithstanding the favourable outlook, the balance of risks from EMEs remains skewed towards the downside. This is because in the short term, EMEs remain vulnerable to sudden shifts in global liquidity conditions. For instance, it cannot be excluded that the search for yield across EME bond markets – which was triggered in part by very low interest rates in the G3 economies – could unwind, possibly in a disorderly fashion, and reverse the prevailing benign financing conditions (see Chart 1.9). In the event of such an adverse disturbance, the fact that the EME asset class has become very popular among foreign investors in recent years suggests that any heightening of volatility in EME bond markets could significantly contribute to – and potentially amplify – any financial dislocation at the broader systemic level. On the other hand, however, improvements in EME fundamentals and structural developments in the EME asset class in recent years suggest that this process – should it materialise – would in all likelihood be differentiated on both of these fronts. Other short-term risks to the EME outlook include the possibility of more sluggish external demand than currently anticipated, possibly associated with a sustained upturn in international energy prices.

Region and country-specific sources of risk to financial stability across EMEs include electoral uncertainty in Latin America and strong credit growth together with high current account deficits in south-east Europe. Should the risks posed by these vulnerabilities crystallise, EMEs would probably act in a more “traditional” vein as sources of shocks to mature economies – with both macroeconomic and financial implications – rather than as potential transmitters or amplifiers.

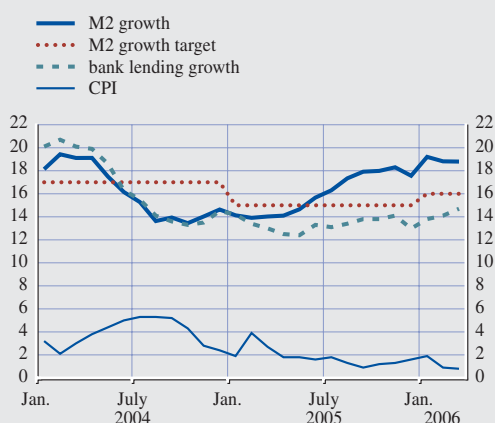
Over the medium term, the main downside risk to euro area financial stability stemming from EMEs remains their vulnerability to a potentially abrupt correction of global imbalances, as well as the extent to which they have participated in the building up of these positions in the first place. For EMEs as a bloc, an abrupt correction of prevailing global current account configurations would most likely be associated with greater than normal financial market volatility, tighter financing conditions, or more sluggish external demand. In addition, for some EMEs, the extent to which they might exacerbate the widening of already large global imbalances in the pursuit of certain policy objectives – and thus potentially contribute to an abrupt correction of these in the future – is also a matter of concern. The possibility of a hard landing in China also remains a downside risk in this context.

EMERGING MARKET ECONOMIES AND GLOBAL IMBALANCES

After the finalisation of the December 2005 FSR foreign reserve accumulation moderated in all major reserve holders except in China, where reserves increased by USD 209 billion in 2005, compared with an increase of USD 206 billion in 2004. In addition, the nominal exchange rate appreciation of certain tightly managed currencies in emerging Asia remained limited, with the renminbi appreciating by 3.0% against the USD after July 2005. The main risks in this context are related to uncertainties regarding the management of the expected renminbi appreciation against the USD by the Chinese authorities, and the potential for conflicts between domestic and external policy objectives, which are related to both

Chart 1.10 Chinese M2 and credit growth, and inflation

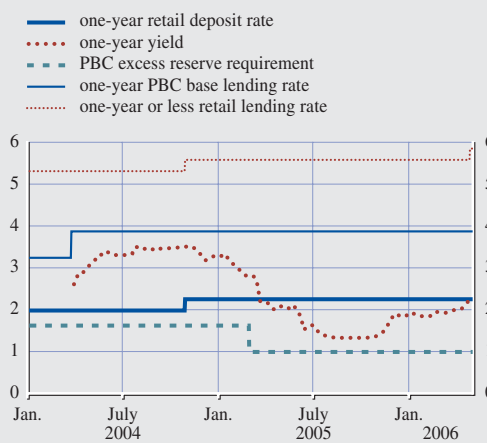
(Jan. 2004 - Mar. 2006, % per annum)



Source: CEIC.

Chart 1.11 Chinese deposit and money market rates

(Jan. 2004 - May 2006, %)



Source: CEIC.

Note: PBC denotes People's Bank of China.

potential valuation losses and monetary and financial sector issues. Four main challenges may be identified in this regard.

First, the gap between changes in China's basic balance (i.e. FDI inflows plus the trade balance surplus) and the increase in foreign exchange reserves diminished after the second half of 2005, suggesting that speculative capital inflows also declined. Although this gap increased in December, the downward trend in market expectations for a further renminbi appreciation (as reflected in the RMB/USD non-deliverable forward market) suggested that speculative inflows probably continued to fall in January and February 2006. These trends were confirmed with the release of Chinese reserve data for Q1 2006. Short-term speculative inflows could, nonetheless, resurface if the Chinese authorities were to encounter problems in managing expectations of a gradual and orderly renminbi appreciation in the context of renewed US dollar weakness.

Second, rising domestic liquidity in China resulting from foreign exchange interventions had little discernable inflationary impact so far (see Chart 1.10). However, it has been posing increasing challenges to domestic monetary

management and banking sector stability more generally. Broad money growth (M2) overshoot the central bank's target in 2005 and, against a background of a tightening of bank credit, diverged significantly from the more subdued growth in bank lending. Given that M2 growth was primarily driven by renminbi deposit growth and not by lending, the overall bank loan-to-deposit ratio fell from 75% to 69% in the course of 2005. The increase in excess deposits and the growing mismatches between banks' deposit liabilities and their loan assets could ultimately weaken banking sector balance sheet positions through reduced net interest income, especially as the growth in bank holdings of low-yielding commercial paper (CP) increasingly substituted for a deceleration in higher-yielding bank loans on the asset side of bank portfolios.

Third, the Chinese government has imposed controls on credit growth, which has also meant that much of the large liquidity injection resulting from foreign exchange interventions has been channelled into the Chinese domestic CP market. This drove short-term money market rates below the regulated benchmark retail loan and deposit rates and, as a result, triggered a boom in demand for renminbi time deposits

(see Chart 1.11). In response to these developments, the central bank stepped up its sterilisation operations towards the end of 2005 in an effort to drive money market rates upwards. In light of the positive differential between US and Chinese interest rates, the financing cost of sterilised foreign exchange interventions has remained small. However, the large share of foreign exchange reserve assets in the central bank's balance sheet (60% of total assets) has left it heavily exposed to the possibility of a large renminbi appreciation.

Fourth, the exceptionally buoyant pace of investment activity in China continues to pose risks to domestic economic and financial stability in the medium term. Restraining strong investment growth in overheating sectors with lingering overcapacity problems, and unlocking bottlenecks in other key sectors (e.g. agriculture, transportation, energy), have remained important elements in the economic policy of the Chinese authorities. However, in spite of the deceleration in bank credit, investment growth in manufacturing rebounded in 2005, as firms increasingly relied on retained earnings, CP issuance and other non-bank-related sources of financing. Looking ahead, a reversal of this trend would appear to depend on a continued profit margin squeeze on firms brought about by a lack of pricing power and rising raw material and energy costs.

Overall, the combination of these challenges suggests that the risk of a hard landing of investment growth in China remains a key concern in the medium term from a financial stability viewpoint. Insofar as the narrowing of global imbalances partly relies on an increase in domestic demand in so-called surplus EMEs – which in the case of China would imply a more balanced relationship between domestic investment and private consumption – the effect of a potential hard landing on Chinese investment would significantly dampen a key source of growth in terms of global demand. In turn, this would worsen current account imbalances and make any exchange rate adjustment in China less likely than would otherwise be the case.

1.2 KEY DEVELOPMENTS IN INTERNATIONAL FINANCIAL MARKETS

FOREIGN EXCHANGE DEVELOPMENTS

The broad appreciation of the US dollar that got underway at the beginning of 2005 came to an end in November 2005 (see Chart S9). Among the factors accounting for this appeared to be growing concerns about the further widening of the US current account deficit in the second half of 2005, together with indications of some deceleration in the pace of US economic activity towards the end of 2005. After rebounding temporarily at the beginning of 2006, the US dollar weakness has broadened since April, as the supportive role of positive interest rate differentials vis-à-vis other major economic regions in the world appeared to be playing a diminishing role.

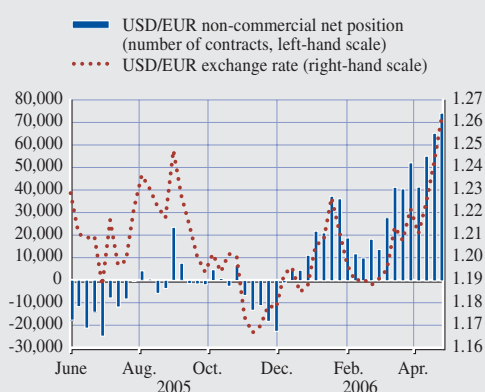
In the six months after the finalisation of the December 2005 FSR, foreign exchange rate analysts continued to put considerable emphasis on the possible medium-term repercussions of Asian authorities' intervention policies. The pace of accumulation of foreign reserve holdings of major central banks in Asia⁸ slowed down considerably in 2005 to about USD 220 billion in annualised terms, compared with around USD 540 billion for the full year of 2004. This slowdown mainly stemmed from the ending of intervention policies in Japan in early 2004. This change in policy, together with an improvement in the Japanese economic outlook, did not spur a strengthening of the yen, because of pressure on the Japanese trade balance from high oil prices and because of the environment of very low interest rates in Japan. By contrast, the rate of accumulation of foreign holdings remained robust in China, at levels similar to those observed in 2004 of around USD 200 billion per year.

One factor that may have played some supportive role for the US dollar could be related to the windfall gains of oil exporters. A possible scenario following a period of sustained high

⁸ These include Japan, China, Taiwan, South Korea, Hong Kong, India, Singapore, Thailand and Malaysia.

Chart 1.12 Speculative positions and the USD/EUR exchange rate

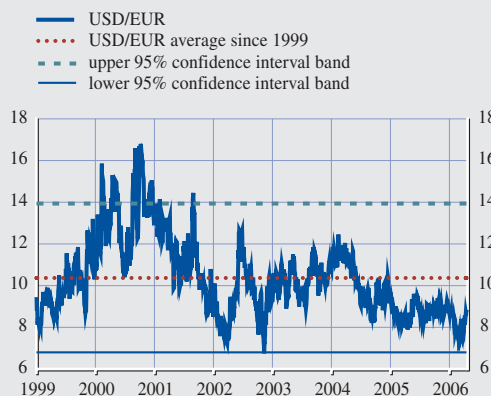
(June 2005 - May 2006)



Source: Bloomberg.

Chart 1.13 One-month implied volatility on USD/EUR

(Jan. 1999 - May 2006, %)



Source: Reuters

oil prices is that oil-exporting countries might have increased their purchases of US foreign equity and debt instruments. An examination of cross-border capital flow data, collected by the US Treasury, shows a considerable increase in OPEC holdings of US Treasury securities between early 2001 and early 2006. In addition, oil export revenues may also have been channelled into US Treasury securities through offshore markets.

Turning to market sentiment indicators, net euro-dollar speculative positions – the difference between non-commercial long positions and non-commercial short positions – were negative when the December 2005 FSR was finalised. In other words, these market participants had been positioning themselves for a fall in the value of the euro, in line with the overall broad weakness of the euro vis-à-vis the dollar that had prevailed until then. At the beginning of 2006, however, positioning moved in favour of the euro (see Chart 1.12), gathering strong momentum in April and early May 2006.⁹

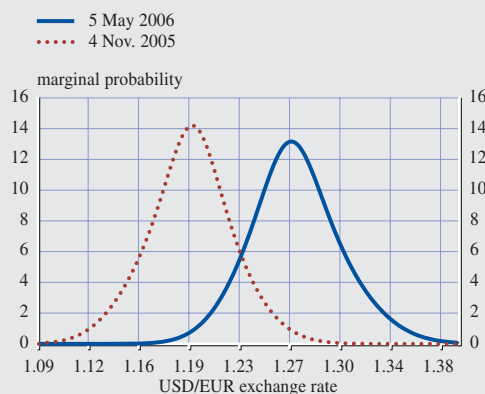
Expected short-term exchange rate volatility vis-à-vis the euro implied in options prices also remained moderate after the finalisation of the December 2005 FSR, declining at the beginning of 2006, before rebounding slightly

from early April (see Chart 1.13). The fact that investors envisaged moderate levels of foreign exchange volatility over the short-term may seem at odds with concerns about growing imbalances at the global level, and could possibly point to some degree of complacency on the part of investors. However, there do appear to be some mitigating factors. One possible explanation is that implied volatility tends to be lower when the USD/EUR is trading relatively close to its historical averages (as this may suggest that the currency is considered to be trading close to fair value). A low exchange rate volatility environment could also reflect the fact that the forces shaping market expectations about the USD/EUR over short-term horizons may be partly offsetting each other. In particular, while growing imbalances in the US probably weighed on the US dollar, the continued positive performance of the US economy may have played an offsetting and supportive role.

Risks of large and abrupt changes in exchange rates remained low after the finalisation of the December 2005 FSR, as indicated by the

9 For a comprehensive analysis of the usefulness and limitations of studying the relationship between weekly changes in speculators' net positions and exchange rate moves, see T. Klitgaard and L. Weir (2004), "Exchange rate changes and net positions of speculators in the futures market", *FRBNY Economic Policy Review*, pp. 17-28.

Chart 1.14 One-month risk-neutral probability density function of the USD/EUR exchange rate



Sources: Citibank and ECB calculations.

evolution of the one-month risk-neutral density (RND) function for the USD/EUR implied in options prices since then. Although it became slightly less dense in early May, the overall shape of this distribution changed little compared to early November 2005 (see Chart 1.14). The mass at the tails of the distribution continued to suggest that market participants evaluated as low the likelihood of unusually large, or disorderly, exchange rate movements in the short-term.

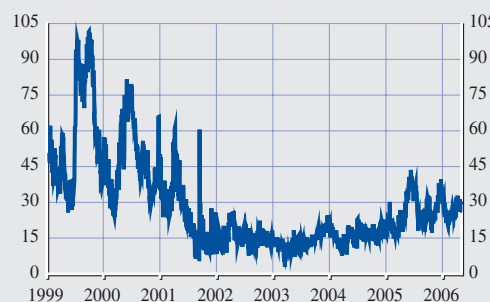
US MONEY MARKETS

US money market conditions are important from a euro area financial stability perspective because financial institutions – including counterparties of euro area banks – tend to use these markets to transfer their short-term liquidity surpluses or to fund their deficits. Therefore, the orderly functioning of the US money markets is required to ensure the smooth functioning of the global financial system, including that of the euro area.

The continued strength of the US economy allowed the Federal Reserve to proceed with a measured removal of its earlier monetary policy accommodation. The Federal Open Market Committee (FOMC) increased interest rates by

Chart 1.15 US six-month TED spread

(Jan. 1999 - May 2006, basis points)



Source: Bloomberg.

Note: The TED spread is measured as the difference between uncollateralised money market interest rates and risk-free Treasury bill rates.

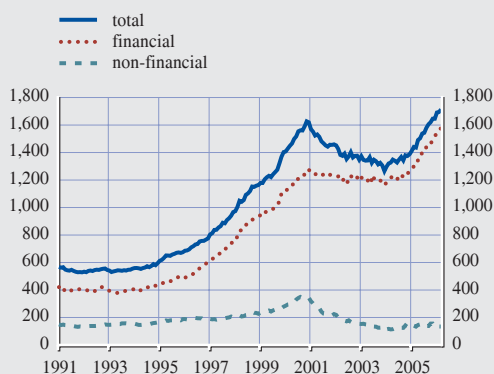
25 basis points at each of its meetings from 30 June 2004 onwards, so that by the beginning of May 2006, the Federal Funds target rate had been raised 15 times, and by a total of 375 basis points, bringing it to 4.75%, a level last seen in April 2001.

By early May 2006, the pricing of Federal Funds futures contracts showed that markets were expecting the Federal Funds target rate to be raised to 5.00% in the course of May, while market participants attached an increasing probability to a further 25 basis point rate hike before the end of 2006. Therefore, expectations were significantly scaled up after the finalisation of the December 2005 FSR.

Market participants' perceptions concerning money market counterparty credit risks can be evaluated by examining patterns in the so-called TED spread – the difference between uncollateralised money market interest rates and risk-free Treasury bill rates of similar maturities. The volatility of the spread rose after the ratings downgrades of General Motors (GM) and Ford in early 2005, as did the volatility of other short-term money market spreads that can be used to measure credit risk. After the finalisation of the December 2005 FSR, this

Chart 1.16 US commercial paper, total amounts outstanding

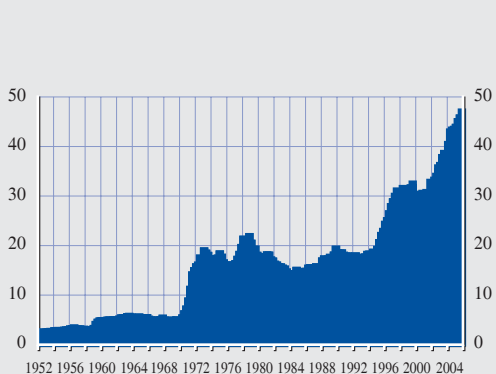
(Jan. 1991 - Mar. 2006, USD billions)



Source: US Federal Reserve Board.

Chart 1.17 Foreign holding of US Treasuries

(Q1 1952 - Q4 2005, % of total amounts outstanding)



Sources: US Federal Reserve Board and ECB calculations.

spread remained at a relatively low level with the exception of the turn of the year, when shallower liquidity conditions rather than credit risk factors led to a temporary widening (see Chart 1.15). Overall, this might suggest that although market participants still considered the level of credit risk among money market counterparties to be rather low, their degree of uncertainty about counterparty credit risks nevertheless somewhat increased.

Concerning the issuance of US money market instruments, such as commercial paper, robust growth was recorded in the course of 2005 and the first months of 2006. The strength of commercial paper issuance activity was mainly driven by issuance by domestic financial corporations (see Chart 1.16). Various factors contributed to raising investors' appetite for holding short-term securities like commercial paper, such as rising short-term yields coupled with a flattening of the yield curve, improved credit quality, and low default rates. The improvement of financial corporations' access to direct short-term financing should be seen as a positive indication for US financial system stability.

US GOVERNMENT BOND MARKETS

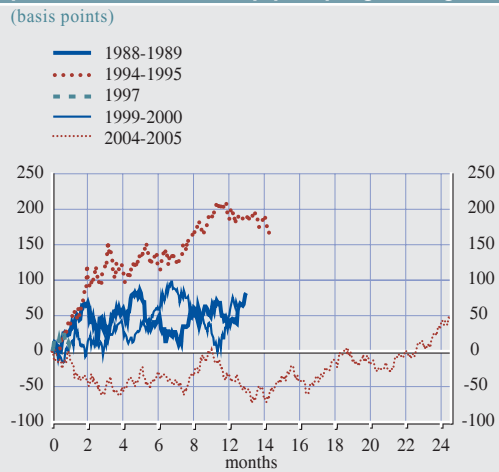
Over the six months after the finalisation of the December 2005 FSR, ten-year government bond

yields in the US have increased from unusually low levels by historical standards by around 50 basis points to reach 5.2% by early May (see Chart S11). While this level was still somewhat lower than the Consensus Economics Forecast for average US nominal GDP growth over the following ten years of 5.5%, it lowered the likelihood of an abrupt upturn in yields.

In recent years, the demand for US long-term bonds has been influenced by several forces other than those arising from US economic and financial activity, as indicated by a surge in foreign investment in US government bonds. Between 1997 and the end of 2005, the proportion of foreign ownership of US Treasuries increased by around 20 percentage points (see Chart 1.17). This was mainly the result of demand from Japan (until early 2004), and from other Asian countries with current account surpluses and, more recently, from oil-exporting countries.

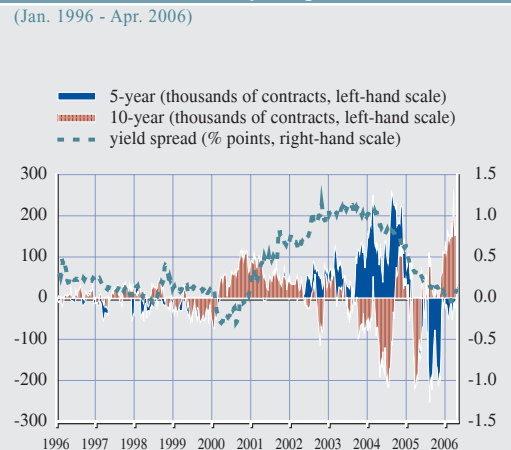
As described at length in the December 2005 FSR, other demand-related factors also appear to have played an important role in putting downward pressure on US long-term yields, such as high demand for US Treasuries from institutional investors in order to reduce balance sheet mismatches.

Chart 1.18 Cumulative changes in US ten-year government bond yields over periods of US monetary policy tightening



Sources: Bloomberg and ECB calculations.

Chart 1.19 Net non-commercial positions on futures and options, and the yield spread between ten and five-year government bonds



Sources: Commodity Futures Trading Commission (CFTC) and Bloomberg.

The most recent phase of US monetary policy tightening, unlike earlier phases, had little impact on the level of long-term yields for a considerable amount of time (see Chart 1.18). As a result, there was a substantial flattening of the yield curve, which even became inverted until April 2006, at least when measured by the spread between the ten-year government bond yield and the three-month deposit rate. At the time of writing this FSR, the flat slope of US yield curve did not seem to be a reflection of high short-term interest rates, but rather unusually low long-term interest rates, mainly reflecting exceptionally low risk premia. The latter tend to blur the link between future output growth and the slope of the yield curve. Nevertheless, the flat yield curve slope in the US rendered US market yield curve carry-trades unattractive, and it may have put some pressure on the net interest incomes not only of US banks, but also euro area banks active in the US.

In early 2006, speculative investors were positioning themselves for a continuation of the pattern of flattening of the US yield curve, betting on rising prices of longer-term bonds (see Chart 1.19). The curve even became inverted in some maturity segments, with

spreads between ten and five-year bonds and five and two-year bonds becoming negative.

Looking ahead, there still appear to be risks of a further rise in US long-term bond yields, for instance due to the possibly unsustainable strength of demand for US Treasuries from foreign investors which could reverse. If foreign investors were to lose some of their appetite for US bonds, their yields would most likely rise. Moreover, it cannot be excluded that a disorderly upturn could involve some overshooting vis-à-vis the levels that appear to be warranted by US economic and financial fundamentals. This could be transmitted through the economy in various ways that could have financial stability implications. For instance, rising mortgage rates might be expected to negatively affect house prices, which have reached very high levels. Ultimately, through adverse wealth and balance sheet or collateral effects, this could have negative consequences for economic growth and for the financial sector, including euro area financial institutions with a high exposure to the US. Moreover, financial institutions that hold unhedged fixed income securities in their portfolios continue to face interest rate risks.

US CREDIT MARKETS

Corporate bond spreads at the lowest end of the rating class spectrum changed little in the six months after early November 2005, remaining at fairly low levels (see Chart S21). The main US credit default swap (CDS) indices, the CDX investment-grade and high-volatility indices, even declined after November (see Chart 1.20), almost retreating to the levels where they stood at in early 2005, before the downgrades of GM and Ford to sub-investment grade triggered a sharp widening in risk premia.¹⁰ Even though very narrow credit spreads can be explained by improving credit quality, it cannot be excluded that the search for yield across global financial markets may have carried these spreads beyond the levels justified by the fundamentals, thereby leaving credit risk underpriced. In this respect, the resilience of these spreads to rising risk-free short-term interest rates and a flattening of the market yield curve was remarkable. Moreover, they remained relatively unperturbed to a decline in credit rating upgrade-downgrade ratios for industrial corporations after the summer of 2005, which took place mainly because of rising M&A activity and share buybacks. Looking ahead, however, the number of defaults is expected to increase from the very low levels seen in 2005: Standard & Poor's forecasts that the default rate of US speculative-grade companies will rise from 1.9% in 2005 to

2.7% by the end of 2006.¹¹ If it materialises, this could put some pressure on spreads to widen.

Another indicator for capturing corporate credit risk, the Barron Confidence Index, suggests that the risks for lower quality US corporate bonds rose in 2006.¹² When investors become worried about corporate credit risk, they move to the best-grade bonds, and this confidence index declines, indicating flight to safety. The drop in this index in 2006 suggested that corporate bond investors' confidence in intermediate-grade bonds was declining, with them preferring instead safer high-grade issues (see Chart 1.21).

All in all, it cannot be excluded that credit markets remain vulnerable to a reappraisal of credit risk pricing in the period ahead, especially

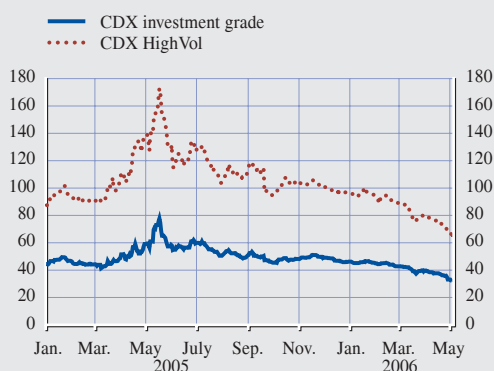
10 For a discussion of the financial stability implications of the growth of global credit derivatives markets, see IMF (2006), "The influence of credit derivative and structured credit markets on financial stability", *Global Financial Stability Report*, Chapter II, April.

11 See Standard & Poor's (2006), "Global bond markets' weakest links and monthly default rates", February.

12 This confidence indicator is calculated by dividing the average yield on Barron's high-grade bonds by the average yield on Dow Jones intermediate-grade bonds. The discrepancy between the two yields is indicative of investor confidence in the corporate bond market.

Chart 1.20 Five year US credit default swap (CDS) indices

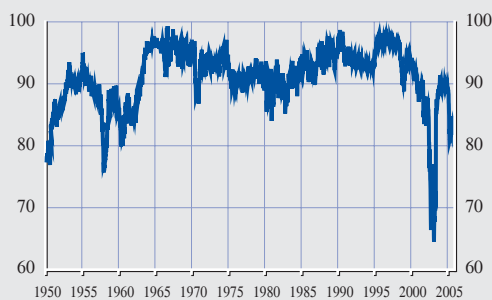
(Jan. 2005 - May 2006, basis points)



Source: Bloomberg.

Chart 1.21 The Barron Confidence Index

(Jan. 1950 - Apr. 2006)



Source: Global Financial Data.

Note: The Barron Confidence Index is calculated by dividing the Barron's high-grade bond yield by the Dow Jones intermediate-grade bond yield.

if the frequencies of corporate sector defaults pick up in the period ahead. This could materialise in a gradual way through rising spreads on lower-rated corporate bonds and on CDS, for instance if there was increased bond issuance in order to finance more aggressive growth strategies, or if further large-scale and unexpected credit events similar to the 2005 GM and Ford downgrades were to materialise.

US EQUITY MARKETS

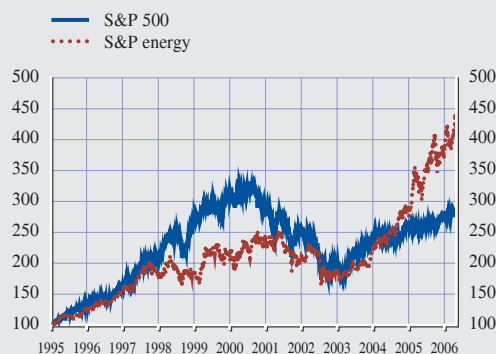
Overall, US stock prices increased somewhat after the finalisation of the December 2005 FSR (see Charts 1.22 and S13). Investors' willingness to invest in risky US assets such as equity remained in neutral territory after November 2005 (see Chart S12), although equity mutual fund inflows increased strongly (see Chart S17). Moreover, despite increasing funding costs, borrowing to purchase equities continued to rise, albeit still remaining below the levels reached in early 2000 (see Chart S18).

Although the overall increase in US equity prices was limited, the performance across different market segments was varied. In particular, the energy sector outperformed the overall market, mainly because of the surge in oil and gas prices (see Chart 1.22). Other segments which recorded strong equity price performances included the small and mid-cap stock price indices, which reached new all-time highs in the first half of 2006. At the end of April 2006 the ratio between their stock prices and reported earnings stood at about 25, compared to 19 for the S&P 500. This suggests that market participants expect strong profit performance from these segments, although it cannot be excluded that the search for yield in global financial markets also induced some lowering of risk premia in certain parts of the US equity markets. In this vein, based on ten-year trailing earnings, the price-earnings ratio for the S&P 500 remained high (see Chart S14).

With high earnings yields and low stock market volatility, financing conditions in the US equity

Chart 1.22 S&P 500 and energy stock price indices

(Jan. 1995 - May 2006; Jan. 1995 = 100)



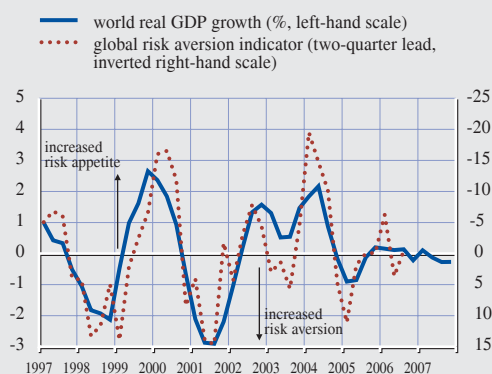
Source: Thomson Financial Datastream.

markets remained favourable. This was reflected in the high activity in the initial public offering (IPO) market and in secondary public offerings (SPOs) (see Chart S20).

Looking ahead, according to the low levels of stock market volatility implied in options prices, market participants expect conditions in stock markets to remain relatively tranquil in the short-term (see Chart S15). Also risk neutral density functions for US stock prices based on one-month option prices did not suggest by April 2006 that market participants were concerned about the likelihood of abnormally large stock price changes (see Chart S16). The reasons why US equity prices may face longer-term downside risks are manifold: many indicators suggest that the corporate earnings cycle has peaked, and there are some remaining upward risks to risk-free long-term interest rates which, if they were to crystallise, could also lead to a reappraisal of stock market valuations as could a tightening of liquidity conditions in global capital markets. A sharp rise in risk aversion on the part of international investors triggered by weaker global growth expectations would also weigh on US stock prices in the period ahead (see Chart 1.23).

Chart 1.23 Annual change in global risk aversion and in world real GDP growth

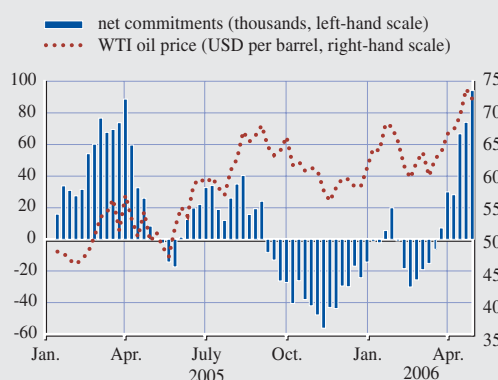
(Q1 1997 - Q4 2007)



Sources: IMF, Merrill Lynch and ECB calculations.
 Note: World real GDP growth including 2006 and 2007 forecasts.

Chart 1.24 Speculative positions on oil futures and oil prices

(Jan. 2005 - May 2006, net futures commitments of non-commercials on the New York Mercantile Exchange)



Source: Bloomberg.
 Note: "Net commitment" equals the number of long-short contracts, where each contract represents 1,000 barrels of West Texas Intermediate (WTI) crude oil. "Non-commercials" denotes entities not engaged in crude oil production or refining.

COMMODITY MARKETS

Financial stability risks arising from developments in commodity markets, especially oil markets, operate largely through indirect (or macroeconomic) channels, as high and volatile oil prices can pose risks to economic activity and inflation and could contribute to financial sector stress. Furthermore, asset prices such as stock prices can be adversely affected by sharp oil price increases. There are indications that speculative activity in the markets for derivatives on commodities has been rising over recent years, so that the importance of direct channels (i.e. exposures of financial institutions to oil price movements) may have risen commensurately.

After the finalisation of the December 2005 FSR, a strong global demand continued to put significant upward pressure on oil and commodity prices. The price of Brent crude oil reached a new all-time high of USD 74.4 on 3 May. This rise coincided with large increases in the prices of oil futures contracts with expiry dates at long horizons. Unlike the rise of 2004 and the first half of 2005, when oil prices were mainly driven by unexpectedly strong demand

for oil and the consequent erosion of spare capacity all along the oil supply chain, the latest surge in prices was mainly driven by supply-side factors. A significant worsening of the geopolitical climate was the main factor adding upward pressure on prices. In particular, recent developments with respect to Iran's nuclear ambitions and speculation of sanctions against the country and its repercussions for oil markets fuelled concerns over the security of future oil supplies.

Speculative activity does not appear to have played a major role in driving recent oil price developments, as speculative activity tends to follow rather than lead oil price developments (see Chart 1.24).

Looking ahead, given that there is limited spare capacity all along the oil supply chain, oil prices are likely to remain highly sensitive to any unanticipated changes in the supply-demand balance. The geopolitical environment is also likely to remain an important factor in driving oil price movements, as market participants have remained concerned about the security of future oil supplies.

EMERGING MARKET FINANCING CONDITIONS

EME financing conditions remained favourable in the months after the finalisation of the December 2005 FSR, with an intensification of the search for yield that led to record inflows in both traditional and non-traditional EME asset class segments (see Box 2). Shrinking supplies of securities due to buybacks (e.g. of Brady bonds), as well as a widening of the investor base, also contributed to this pattern.

After early November 2005, emerging market sovereign spreads were compressed further, with the aggregate USD denominated Emerging Market Bond Index Global (EMBIG) benchmark index declining by 64 basis points to 174 basis points by early May – a new all-time low in spite of the upturn in US long-term government bond yields. EME local currency bond yields also declined (see Chart 1.25), with foreign investor interest in these instruments also helped by favourable exchange rate dynamics (notably against the USD, for example in the case of Brazil). However, there were indications that EME equities in particular were in relative terms the main beneficiaries among EME assets, with inflows of USD 15 billion in the year to March 2006 according to JP Morgan (compared with USD 30 billion in 2005 as a whole),¹³ and stock markets up by over 20% in

the aggregate Morgan Stanley Capital International Inc. (MSCI) benchmark index (in USD terms) in the year to early May 2006 (see Chart S23).

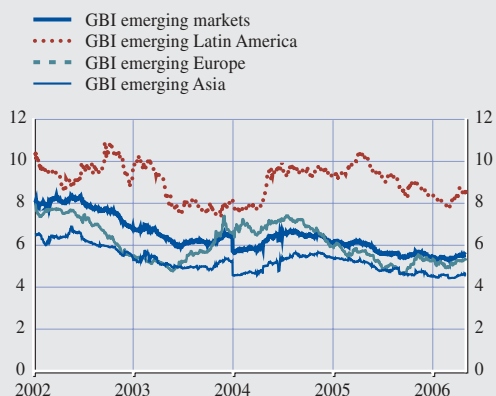
The low yield and tight valuation environment continued to be underpinned by steady improvements in EME fundamentals, which in some cases primarily reflected the cumulative impact of high export commodity prices on external balances. The downward adjustments in external debt stocks associated with reduced external financial needs was in turn a key factor behind sovereign debt rating upgrades across various major EMEs (including Brazil and Venezuela, as well as Turkey). Given this favourable financing environment, active debt management continued apace, with three Latin American EMEs (Brazil, Colombia and Venezuela) announcing plans to retire outstanding Brady bonds, while others (such as Mexico) engaged in swap operations to reduce amortisation costs and improve maturity profiles. The net reduction in the available amount of ‘traditional’ EME sovereign debt was a further supply-side factor that helped to maintain the tight spread environment.

Against this background, bond issuance remained brisk (see Table S2), with domestic issuances – which accounted for half of all traded EME securities by volume in 2005, according to the Emerging Markets Traders Association – remaining particularly dynamic. Coupled with the advent of external sovereign issuance in domestic currency, this was further confirmation that a redemption of EMEs’ “original sin”¹⁴ was underway.

Looking ahead, the baseline scenario for the broad EME asset class is one of continued support amid a generally expected moderation of the US monetary policy tightening cycle. The improvement in EME fundamentals and

Chart 1.25 Emerging market local currency sovereign bond yields

(Jan. 2002 - May 2006, %)



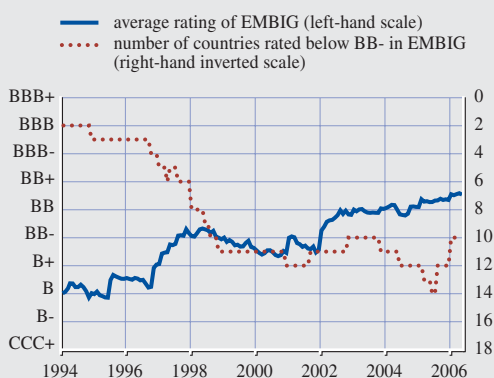
Source: JP Morgan Chase & Co.
Note: GBI denotes Government Bond Index.

¹³ See JP Morgan (2006), “Emerging markets outlook and strategy”, 3 March.

¹⁴ “Original sin” refers to a country’s inability to borrow abroad in domestic currency. The term was first coined by Eichengreen, B. and R. Hausmann (1999), “Exchange rates and financial fragility”, *NBER Working Paper*, 7418.

Chart 1.26 Underlying credit quality of the benchmark EMBIG bond index

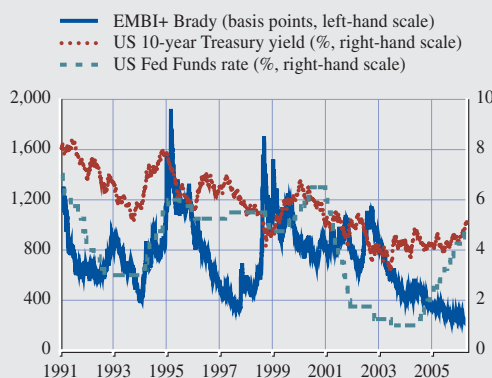
(Jan. 1994 - May 2006, %)



Source: JP Morgan Chase & Co.

Chart 1.27 Emerging market bond spreads relative to US short and long-term interest rates

(Jan. 1991 - May 2006)



Sources: JP Morgan Chase & Co. and Bloomberg.

structural developments in recent years – including a broadened investor base, in part also due to financial innovation – have lent support for this case of continued benign financing outlook. However, concerns remain about potential mispricing and overstretched valuations in certain market segments (for instance in the traditional EME fixed income sector, although the improvement in the underlying credit quality of the EMBIG index was notable (see Chart 1.26)), the extent to which these may be associated with higher risk-taking by agents, and the role that hedge funds might play as amplifiers of risk in the event of a dislocation event.

Overall, at the time of writing, EMEs were unambiguously in a much better position to weather external shocks relative to the situation at the beginning of the decade, as illustrated by fundamental improvements in vulnerability indicators. The advent of local currency borrowing in both domestic and international capital markets – and the increased reliance of EMEs on these instruments as a form of financing – is also a critical factor in this context, primarily because it dilutes the traditionally close relationship between balance of payments and solvency crises in EMEs. This increased resilience has been further reflected by a moderate “decoupling” of EME bond

spreads from mature economy government bond yields in recent months (see Chart 1.27).

However, sight should not be lost of the fact that these developments were also fundamentally underpinned by ample global liquidity, and sharp reversals in liquidity conditions have yet to materialise. The extent to which the EME asset class will prove resilient to tighter global liquidity conditions has yet to be fully tested. Moreover, the gradual expansion of the EME asset class from traditional (hard currency) instruments to less traditional ones (e.g. local bond markets and equities) suggests that the relative fortunes of each market segment might diverge in the event of a sharp unwinding of the search for yield.

Box 2

THE SPILLOVER OF THE SEARCH FOR YIELD TO NON-TRADITIONAL EMERGING MARKET ASSETS

As investors came to believe that the upside potential of traditional emerging market debt – broadly defined as foreign currency-denominated debt issued by EME sovereigns with an established credit record – became more limited after substantial spread compression, they began to shift their attention to securities that promised higher returns within the EME universe. These included external debt issued by less established EME issuers, EME local currency bonds and EME equities. This Box describes recent trends in the structure and breadth of EME markets and assesses their implications for market stability.

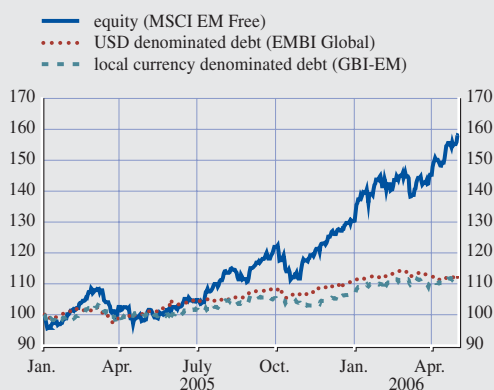
Many of newer EME issuers with low credit standing have successfully placed bonds in international capital markets amid the tight spread environment in recent years. Some of these non-traditional issuers have migrated into mainstream portfolios owing to their inclusion in benchmark bond indices (including Pakistan, Serbia and Vietnam, following their inclusion into the EMBIG benchmark index during 2004/2005). In spite of this, the average credit quality of the typical EME market portfolio has considerably improved because of the small weight of these issuers in total asset allocations and because of rating upgrades of some countries with high market capitalisation (e.g. Brazil, Russia and Turkey) in benchmark indices (see Chart 1.26). Some non-traditional issuers (such as Nigeria) have improved their fundamentals due to high commodity prices and their bond spreads tend to be correlated with traditional EME debt, which is also sensitive to this factor. However, other issuers (such as Serbia) would appear to have contributed to the diversification of investors' portfolios, as is also the case with distressed or illiquid EME securities.

Local currency debt issued by EMEs has also made rapid inroads into mainstream portfolios, as demonstrated by the availability of benchmark indices for such securities since mid-2005. The share of local currency-denominated bonds in total marketable EME sovereign debt has steadily increased at the expense of foreign currency debt since the late 1990s, in particular in Latin America and emerging Europe.¹ This has reflected structural changes in EME securities markets, including deliberate policies to develop domestic debt securities markets. A growing local base of institutional investors has also contributed, often fostered by pension reform and also helped at times by local currency issuances by regional intergovernmental institutions. In addition, foreign investors increased the weight of local currency EME debt in their portfolios, as swift disinflation and the perception that some currencies were undervalued following periods of financial turmoil raised their return expectations, with the downside risks in this context mitigated by improved macroeconomic stability and better economic governance in EMEs. The increased availability of structured or 'access' products (such as credit-linked notes) decisively contributed to the broadening of the foreign investor base, as did the availability of local currency bonds issued in international markets (by both sovereigns and corporates, above all in Latin American economies such as Mexico, Brazil and Colombia). The tightening of valuations of established EMEs' local debt led to growing foreign interest in African local debt markets (e.g. Ghana, Namibia, Tanzania and Zambia), which provides a further indication of the spillover effects of the search for yield within EME asset class segments.

¹ Foreign currency sovereign debt has traditionally been low in Asian EMEs.

Chart B2.1 The performance of EME equity markets in comparison to EME debt

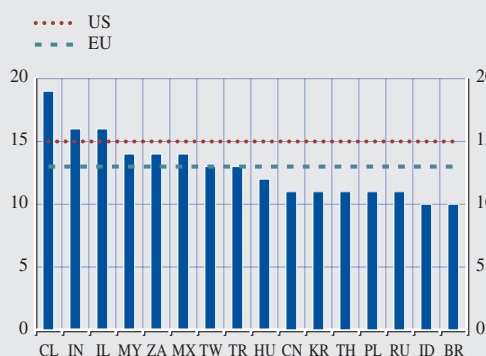
(index Jan. 2005 = 100)



Source: Bloomberg.

Chart B2.2 EME equity market valuations in international comparison

(February 2006, price-earnings ratios, %, 12 month trailing)



Source: Deutsche Bank.

Note: CL = Chile, IN = India, IL = Israel, MY = Malaysia, ZA = South Africa, MX = Mexico, TW = Taiwan, TR = Turkey, HU = Hungary, CN = China, KR = South Korea, TH = Thailand, PL = Poland, RU = Russia, ID = Indonesia, BR = Brazil.

In addition, EME equities appear to be the latest beneficiary of the global search for yield within the broad EME asset class. Net portfolio equity flows to EMEs reached an all-time high of USD 61.5 billion in 2005, according to the Institute of International Finance, with indications that these inflows accelerated in the early part of 2006. This led to a substantial price rally in EME equity markets after mid-2005 (see Chart B2.1). As a result there was a significant narrowing of the valuation gap between EME companies and those of mature economies with some valuations even rising above those of mature economies (see Chart B2.2).

Overall, the spillover of the search for yield into non-traditional EME assets appears to have reflected not only ample global liquidity, but also a new-found appetite in the market for apparently undervalued assets on account of structural changes underpinning the broad EME asset class. The increased appetite of public and private pension funds for EME securities (primarily fixed income) has been just one example of this. To some extent, these investments should contribute to the diversification of risk in investors' portfolios.

Notwithstanding the benefits of the deepening and broadening of the EME asset class, three principal risks for financial stability can be identified. First, high exposure to certain (and perhaps more risky) market segments by single market participants cannot be ruled out, particularly as the combination of ample liquidity and low volatility on a global scale has placed fund managers under increasing pressure to outperform both their peers and the applicable benchmarks. In the current environment, market participants in the broad EME asset class tend to see periods of volatility as an opportunity to engage in opportunistic purchases. The largely temporary correction in EME financial markets following the outlook change for Iceland's sovereign debt rating in end-February 2006 may be seen as an illustration of this.

Second, certain sub-segments may suffer from overstretched valuations. For example, most EME equity markets still seem to be trading at a discount compared to mature markets, but price-earnings ratios indicate that some EME equity valuations have started to look tight on account

of the specific risks associated with these assets. Such performance is often justified on the basis of significantly improved balance sheets and the steady earnings growth prospects of EME firms (due to exposure to the commodities cycle, or higher growth potential relative to mature economies, for example). However, in spite of improvements in this context, EME firms tend to lag behind mature economy firms in terms of international accounting and disclosure standards and corporate governance levels. A parallel case may be drawn concerning certain similarly rated fixed income sovereign credits for EMEs which nonetheless exhibit significant differences in terms of the perceived quality of the institutions underpinning economic governance.

Third, while the overall share of less traditional EME assets in the portfolio of most investors has remained small, specific risks may have to be reassessed under more adverse market conditions, regardless of whether developments underpinning these asset segments are deemed to be structural or cyclical in nature. These include currency risk (which appears to be hedged only selectively), the convertibility risk of local markets, and liquidity risk. Following the considerable yield compression and currency appreciation of recent years, returns on local EME debt may be subject to differentiated corrections, in particular in economies where disinflation has not progressed as fast as anticipated, or in those with high current account deficits. The concentration of foreign investors toward the long-end of yield curves in local markets is an additional concern in some cases, particularly in the event of significant financial turmoil involving widespread portfolio rebalancing among market participants. In addition, the correlation between EME equity and external debt markets has in some cases been considerable, perhaps due to the fact that the earnings prospects of EME companies are affected by factors that also impact market assessments of sovereign default risk. This implies that portfolio diversification, which is a key motive behind foreign interest in EME assets, might be hampered. In addition, the market structure for some of these assets may also be of concern, in particular that of EME equity markets which appear to be dominated by hedge funds and short-term-oriented cross-over investors. This suggests that increased purchases by investors with a longer-term view (such as asset management firms) may not suffice to offset the forced selling of assets by leveraged investors in the event of a large and negative shock to these market segments.

In the medium-term, the structural changes to the broad EME asset class which have underpinned the extension of “search for yield” to non-traditional EME assets should contribute to more stable and diversified financing and investment patterns for both borrowing economies and international investors. However in the short-term, concerns about overstretched valuations in certain market segments have not been dispelled.

I.3 CONDITIONS OF NON-EURO AREA FINANCIAL INSTITUTIONS

CONDITIONS IN NON-EURO AREA EU BANKING SECTORS

Preliminary information suggests that the financial condition of banks in the UK, Sweden and Denmark remained very strong in 2005, or even improved when compared to the previous year. Besides the favourable global environment in capital markets, which fuelled positive

returns from trading, banks in Denmark and Sweden also benefited from somewhat more robust domestic economic environments than in most euro area countries, with higher GDP growth rates, lower unemployment rates, and continued growth in house prices. In the UK, by contrast, banks’ profitability was largely driven by non-UK retail areas, particularly overseas and capital market operations, and relied less on domestic factors.

Growth in lending to corporations and to households remained strong in these three countries (particularly in Denmark, where growth rates of close to 25% are estimated for 2005), despite a slowdown from very high growth rates in previous years in UK household lending. Lending to the real estate sector accounted for more than 30% and 40% of domestic corporate exposures in the UK and Sweden, respectively.

Given such favourable conditions, banks' profitability improved further in 2005 in all three countries. Estimates suggest that the average return on equity (ROE) stood at around 20% in the UK and 25% in Denmark. The strength of profitability seems to have been mainly attributable to buoyant non-interest sources of income such as fees and commissions, trading profits and insurance sector income. Although net interest margins continued to narrow slowly throughout 2005, higher lending volumes enabled banks to increase their overall net interest income. Nonetheless, the importance of net interest income has been gradually declining, and preliminary data for the UK banking sector suggests that it no longer constitutes the largest percentage of total income.

Similar to patterns seen among many euro area banks, cost-cutting no longer appeared to be a driver of profitability. Lower than usual provisioning for loan losses, or impairment costs under International Financial Reporting Standards (IFRS) terminology, also ceased to support profits in the UK. Instead there was a pick-up in provisioning in 2005, marking the end of a cycle of declining provisioning which commenced in 2003. The turnaround was mostly linked to concerns about unsecured lending to households (e.g. credit card lending).

Regarding the central and eastern European countries (CEECs),¹⁵ economic growth remained much more buoyant than in the euro area countries, and banking sector profitability also increased significantly in 2005, with average ROEs of close to, or well in excess of, 20% (with

the exception of Slovenia where the ROE was 14%). Fuelled by strong growth in lending, mostly to households, interest income increased. However, the share of interest income as a percentage of the total generally declined (except in Poland) owing to a significant rise in net non-interest income. The strength of this source of income was mostly driven by increases in fees and commissions as well as from trading income on foreign exchange and derivatives operations.

Most CEECs recorded an increase in operational costs, especially labour costs, which suggests that there may no longer be any room for cost-cutting. Nonetheless, cost-to-income ratios remained stable or even improved owing to the significant increase in income.

Provisioning for loan losses continued to decline in most CEECs, and banks in Hungary, Poland and Slovenia further lowered their provisioning rates in 2005. Only in the Czech Republic was there an increase in provisions and write-offs, possibly reversing the low provisioning pattern that characterised the banking environment in 2004.

Average capital adequacy ratios declined in all five CEECs owing to a significant increase in risk-weighted assets. This was mainly attributed to high lending growth, which increases credit risk requirements. Nevertheless, these banking sectors still remain well capitalised, with the gap between Tier 1 and the regulatory solvency ratio standing well above regulatory minimum levels.

The banking systems of the three Baltic countries (Estonia, Latvia and Lithuania) also continued to enjoy improved profitability, with end-2005 ROEs exceeding 20% in Estonia and Latvia. Despite low interest margins in these countries, which declined even further in 2005, net interest income increased owing to strong growth in banks' loan portfolios, which was facilitated by improved credit conditions. Net fees and commissions grew at a slower pace

¹⁵ These include the Czech Republic, Hungary, Poland, Slovenia and Slovakia.

than net interest income in Latvia, and at the same pace in Lithuania. Cost-to-income ratios decreased further in Estonia, Latvia and Lithuania to 46%, 50% and 54% respectively due to high income growth, even though there were increases in operational costs arising from higher administrative or staff costs. The low provisioning cycle seems to have come to an end in Lithuania, where an increase in provisions from the very low levels of 2004 was observed. In Estonia and Latvia, provisions declined further and, by end-2005, stood at an all-time low. Liquidity ratios remained at rather satisfactory levels throughout 2005.

In the Baltic countries, as in some central and eastern European Member States, rapid credit expansion was increasingly financed by borrowing from foreign (mostly parent) banks, as the largest banking groups are generally subsidiaries of foreign banks. This may warrant further monitoring, as these funds are usually of a short-term nature. Solvency ratios (capital adequacy and Tier 1), while still remaining at comfortable levels at the end of 2005, declined slightly in all three countries. This was mostly driven by a high credit demand, especially in the housing loans, and by a more efficient use of capital.

The profitability of the banking systems of Malta and Cyprus also improved. In Malta, the ROE stood close to 15% at the end of 2005, up from 14% in 2004. As for Cyprus, the indications are that the banking sector ROE is likely to remain a single-digit figure. The improvement in both countries mostly reflected an expansion of net interest income and cost containment efforts. For the Maltese banking system, the increase in profitability was also a result of an improvement in asset productivity measured by the ratios of gross income to risk weighted assets. A further albeit lesser factor, was a slight rise in the risk profile for banks measured by risk weighted assets to total assets. In both countries, growth in non-interest income was fuelled by higher fees and commissions, although this was hampered by a drop in trading profits – namely income from trading in foreign exchange – and

dividend income. Cost containment also contributed to the increase in profitability, with improved cost-to-income ratios compared to 2004: the ratio was close to 40% in Malta, while it is still likely to remain above 60% in Cyprus.

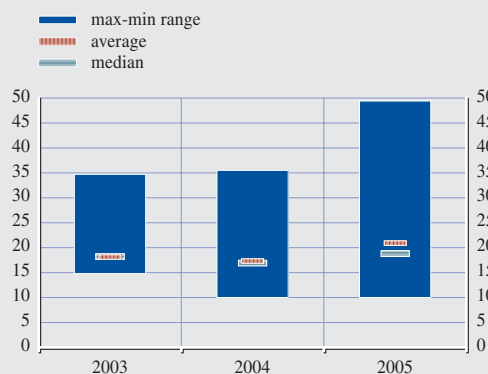
The proportion of non-performing loans (NPLs) dropped significantly in Malta, reflecting a lower degree of credit risk within the banking system and improved asset quality. In Cyprus, although more stringent criteria for the classification of non-performing credit facilities have been adopted, NPLs only declined slightly. The stock of provisions declined further in both countries during 2005. The capital adequacy ratio of the Maltese banking system contracted marginally, but solvency indicators remained well above the minimum regulatory levels at the end of 2005. Half-year figures indicate that the same applies to Cyprus.

GLOBAL BANKS

Despite the continued removal of excess liquidity in the global financial system, which reduced the profitability of maturity transformation and carry-trades, full year results for 2005 for most global financial institutions showed further and broad-based improvements in profitability (see

Chart 1.28 Global banks' return on equity (ROE)

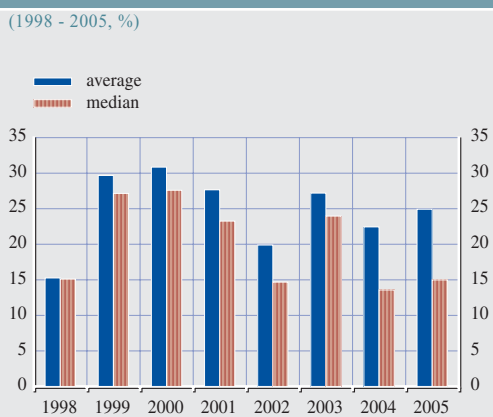
(2003 - 2005, %)



Sources: Annual reports, earnings releases and ECB calculations.

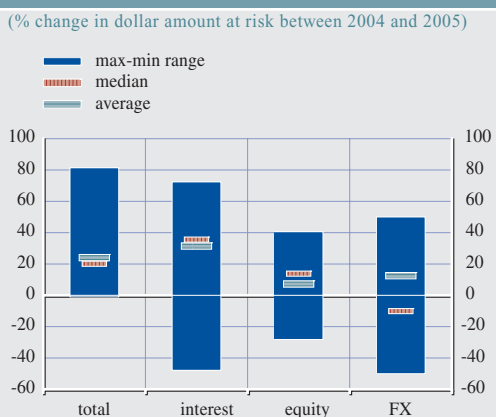
Note: The institutions included are Goldman Sachs, Lehman Brothers, JP Morgan Chase & Co., Morgan Stanley, Merrill Lynch, Citigroup, UBS, and CSFB. ROE is calculated as net earnings divided by average tangible common shareholders' equity.

Chart 1.29 Trading revenues of global banks as a proportion of total net revenues



Sources: Securities Exchange Commission (SEC) filings, institutions' earnings reports and ECB calculations.
 Note: The institutions included are Goldman Sachs, Lehman Brothers, JP Morgan Chase & Co., Morgan Stanley, Merrill Lynch, Citigroup, UBS, and CSFB.

Chart 1.30 Change in Value at Risk (VaR) levels of global banks



Sources: SEC filings, institutions' earnings reports and ECB calculations.
 Note: The institutions included are Goldman Sachs, Lehman Brothers, JP Morgan Chase & Co., Morgan Stanley, Merrill Lynch, Citigroup, UBS, and CSFB.

Chart 1.28). Increased revenue from business lines such as M&A and investment banking operations, as well as the arrangement and provision of financing for private equity transactions, contributed positively to overall profitability growth. Some institutions also benefited from an expansion of prime brokerage activities in 2005.

The decline in volatility across various asset classes, combined with tight credit spreads and a flattening of the US yield curve, had a mixed impact on financial results from trading. In the first half of 2005, some institutions' trading revenue declined, in most cases owing to the Ford/GM downgrades and the reduced profitability of carry-trades induced by the continued withdrawal of excess liquidity in the global financial system. For 2005 as a whole, the rebound in global equity markets, combined with continued investor demand for higher-margin structured products, led to an increase in trading revenue for most institutions in 2005 compared with 2004 (see Chart 1.29).

Overall, the market risk levels of these institutions increased in 2005 compared with 2004 (see Chart 1.30).¹⁶ This overall pattern however masks some heterogeneity across

firms. Some institutions reduced their interest rate risk exposure against the background of continued monetary policy tightening in the US, preferring to allocate risk capital to commodities/energy trading and to equity markets. Other institutions increased their positions in the interest rate and energy markets.

¹⁶ While VaR measures are useful as an indicator of market risk, caution should be exercised in comparing VaR measures across banks as they do not have similar portfolios; the method of calculation is not standardised; and VaR measures are not measures of maximum losses that may occur. For more details, see Box 5 in Banque de France (2005), *Financial Stability Review*, June.

Table 1.2 Value at risk (VaR) amounts by category of risk of global banks

(USD million, one-day holding, 99%)

	Commodities	Equities	Interest rates	FX
2004 Average	19.4	31.5	63.7	16.0
2004 Median	18.0	31.5	63.3	16.6
2005 Average	20.1	43.5	62.8	15.4
2005 Median	17.1	42.5	61.5	14.5

Sources: SEC and ECB calculations.
 Note: The institutions included are JP Morgan Chase, Goldman Sachs, Morgan Stanley, and Citigroup. These institutions are chosen on the basis of similar calculation of VaR (a 99% confidence interval with a one-day holding period).

While VaR levels for positioning in commodities increased markedly in percentage terms, the actual money amount at risk from moves in the market prices of commodities remained limited in comparison with the market risk incurred through interest rate or equities exposure (see Table 1.2).

JAPANESE BANKS

While the direct links between euro area financial institutions and Japanese financial institutions appear to be limited, individual euro area banks may have exposures to the Japanese banking sector through direct claims or through financial markets.

In recent quarters the financial condition of Japanese banks improved, partly reflecting the continuing recovery of the economy and a concomitant improvement in credit risk conditions. According to data from the Financial Services Agency of Japan, between March and September 2005 the profitability of Japanese banks continued to increase, while their NPL ratios fell further. These developments were accompanied by a rise in capital adequacy ratios. The improvement in financial conditions was, however, more pronounced for large banks than for regional financial institutions. More generally, differences in balance sheet conditions between large and regional banks have persisted, partly reflecting different regulatory regimes and customer bases.

The average NPL ratio of the eleven main Japanese banks stood at 2.4% at the end of September 2005, compared with 2.9% at the end of March 2005. Over the same period the average NPL ratio of the regional banks declined more moderately to 5.2%, from 5.5%. Thus, the NPL ratios of regional banks remained significantly higher than those of the main banks. Differences between the main and regional banks also persisted regarding capital adequacy ratios. At the end of September 2005, the average capital adequacy ratio of the main banks stood at 11.6% (unchanged from the end of March 2005), compared with 9.6% at the regional banks (up from 9.4% at the end of March 2005).

Some progress was also made in reducing the recourse to (net) deferred tax assets (DTAs) by the main banks in order to maintain their regulatory capital above minimum thresholds. DTAs are discretionary accounting items included in balance sheets in order to bridge the gap between accounting and taxable income. At the end of March 2003, on the eve of the collapse of Resona Bank, DTAs accounted on average for 58.0% of the Tier 1 capital of the other main banks. This ratio subsequently declined to 18.8% at the end of September 2005. Nevertheless, ratios remained significantly higher at some individual institutions, prompting discussion on the need for further regulatory measures.

From a financial stability perspective, some challenges may potentially arise from the announcement on 8 March 2006 by the Bank of Japan (BOJ) that it would end its quantitative easing policy, the monetary policy framework that had been in place since March 2001. In particular, problems may potentially arise in case of disruptions to money markets, although the BOJ has stressed that it will withdraw the excess liquidity only gradually in order to guarantee a smooth transition.

Another potential source of concern is the possible impact of an abrupt rise in long-term interest rates on the value of the large holdings of Japanese government bonds (JGBs) by domestic banks. However, potential valuation losses should be mitigated by the BOJ's decision to continue its monthly purchases of JGBs, which might limit the magnitude of the increases in long-term yields. Furthermore, in recent years Japanese banks shortened the duration of their holdings.¹⁷ More generally, higher market interest rates may contribute to restoring lending margins if banks succeed in passing them through to customers.

¹⁷ See Bank of Japan (2005), "An assessment of the financial system stability, focusing on the banking sector", *Financial System Report*, August.

2 THE EURO AREA ENVIRONMENT

Against a background of improved economic growth in the euro area after the finalisation of the December 2005 FSR, macro-financial risks in the euro area environment have remained. Corporate sector profit growth was encouraging in 2005, despite sustained high oil prices, but the outlook is uncertain for several reasons. Uncertainties relate to the risks to economic growth posed by high oil prices and to the possibility of tighter financing conditions compared to the currently favourable situation. Hence, the prospect of an adverse turn of the corporate credit cycle cannot be fully ruled out in the period ahead. Household sector indebtedness in the euro area has grown further, and debt servicing costs are likely to rise in the next six months. At the same time, house prices continued to rise and may be vulnerable to correction in some countries.

2.1 ECONOMIC OUTLOOK AND RISKS

A stable macroeconomic environment is important for financial system stability and, as a corollary, an adverse economic environment can sow the seeds of financial system vulnerabilities.¹ This means that monitoring of the macroeconomic environment is an important part of any assessment of the sources of risks and vulnerabilities for financial system stability.² Macroeconomic data published after the finalisation of the December 2005 FSR suggested that the pace of economic activity in the euro area gained momentum in the third quarter of 2005. Furthermore, survey and confidence indicators published in the first quarter of 2006 suggested that the recovery was broad-based, and they signalled that the deceleration of real GDP growth in the fourth quarter of 2005 was only temporary.

Looking ahead, on the external side, expectations that the pace of global economic growth will continue to remain robust, together with improvements in euro area competitiveness,

should support euro area exports. On the domestic side, investment growth should benefit from a central expectation of ongoing strength of external demand, favourable financing conditions, strong corporate profitability and improved business confidence. While consumption growth in the euro area remained subdued over recent quarters, it should accelerate gradually as labour market conditions continue to improve. Against this background, the ECB staff projections published in March 2006 envisaged slightly higher growth in the euro area in 2006 and 2007 than in earlier projections. This largely reflected a more positive assessment of the implications of the pick-up in investment. Favourable financing conditions and improvements in corporate sector profitability are seen as key factors supporting investment. The projections anticipate that average annual real GDP growth will fall within a range between 1.7% and 2.5% in 2006, followed by growth of between 1.5% and 2.5% in 2007.

However, the risks associated with the possibility of higher future oil prices as well as those posed by persistently wide global imbalances could, if they were to crystallise, have adverse implications for euro area growth.

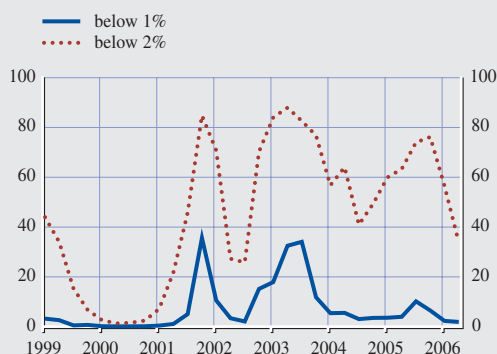
All in all, by early May, risks to euro area growth appeared to be broadly balanced over the shorter term. This view was reflected in the expectations of private sector forecasters, who assessed the likelihood of growth falling below 2% in the coming year as having significantly decreased in Q1 and Q2 2006 compared with the expectations they held in Q4 2005 (see Chart 2.1).

1 See for example C. Borio and P. Lowe (2002), "Asset prices, financial and monetary stability: Exploring the nexus", *BIS Working Paper*, No 114, July.

2 See G. J. Schinasi (2006), *Safeguarding Financial Stability: Theory and Practice*, International Monetary Fund.

Chart 2.1 Survey-based estimates of the downside risk of weak real GDP growth in the euro area

(Q1 1999 - Q2 2006, %)



Source: ECB.

Note: Measured as the percentage of the probability distribution for real GDP growth below the threshold of euro area growth of 1% and 2% in the ECB Survey of Professional Forecasters (SPF), one year ahead. The horizon for growth expectations at Q2 2006 corresponds to the period Q1 2006 - Q4 2006; the survey was conducted on 26 April 2006, at which point no GDP data were available for Q1 2006.

2.2 BALANCE SHEET CONDITIONS OF NON-FINANCIAL CORPORATIONS

The balance sheet conditions of non-financial corporations are a key element in determining the ability of firms to repay their debts and pay out dividends to stockholders. This means that they affect the risks that banks face in their lending to firms as well as securities pricing in credit and stock markets, and it makes the assessment of corporate balance sheets an important ingredient in a comprehensive assessment of the risks and vulnerabilities for financial system stability.

After the finalisation of the December 2005 FSR, the financing conditions faced by euro area non-financial firms in raising funds from banks and markets remained overall very favourable. Non-financial corporate sector balance sheets continued to benefit from low financing costs together with easy access to finance. This, in turn, facilitated a gradual pick-up in fixed capital investment and M&A activity.

In the short term, the main risks facing euro area non-financial firms relate to uncertainties regarding the global and domestic economic outlook in general. In addition, there are indications of heightened interest rate sensitivity, as firms tended to restructure rather than reduce their debt by increasingly relying on short-term rate debt; this, coupled with the relatively high indebtedness of the sector, may pose risks for the ability of firms to service their debts in the period ahead. These risks appear to have grown in importance over the past six months because there have been indications of a slowing down in the pace of corporate earnings growth, as well as signs of re-leveraging and some indications that the corporate credit cycle may be nearing a turning point (see Box 3). If concerns among banks and financial market participants about the possibility of deteriorating credit quality were to emerge, this could imply higher financing costs via increased credit risk premia, thereby hampering the ability of firms to honour their financial obligations.

Box 3

IS CORPORATE CREDIT QUALITY IN THE EURO AREA NEARING A TURNING POINT?

The overall credit quality of the non-financial corporate sector in the euro area has been very benign for the last couple of years, following substantial efforts on the part of firms to restructure their balance sheets. This, in parallel with a notable strengthening of profits, helped improve corporate sector balance sheets. Against this background, the frequency of corporate sector defaults declined, and an overall improvement in credit quality was acknowledged through declining credit spreads and improving credit ratings. As corporate credit quality tends to be cyclical and determined by factors such as leverage and the strength of profitability of firms,

the most recent cycle of improvement can eventually be expected to come to an end. With this consideration in mind, this Box examines whether corporate sector creditworthiness in the euro area is nearing a turning point.

In the aftermath of the substantial leveraging of non-financial firms in the late 1990s and 2000, which sowed the seeds of financial vulnerability, euro area firms responded to falling stock prices, tightening lending standards and widening spreads on corporate bonds by undertaking considerable efforts to repair and restructure their balance sheets. The restructuring process, together with recovery of stock prices, brought the debt-to-equity ratio – an important indicator of financial leverage – for the euro area corporate sector down from over 200% in early 2003 to around 130% by Q4 2005. Similarly, the debt-to-financial assets ratio of the sector declined by almost 10 percentage points between end-2002 and end-2005. At the same time, these restructuring efforts were complemented by a strong rebound in corporate earnings as well as by declining interest rates across the entire maturity spectrum, which markedly lowered the net interest burden of the corporate sector. This favourable confluence of factors brought about a significant improvement in credit risk assessments, which was not only reflected in ratings but also by the performance of firms' securities prices and the interest rate spreads applied by banks. By early 2005, BBB-rated long-term corporate bond spreads had reached their lowest levels since at least 1998. While it cannot be ruled out that part of the narrowing of spreads was attributable to the search for yield that pervaded global capital markets – especially credit markets – during much of this time, bank credit spreads also fell, while the standards applied by banks to loans to enterprises became less restrictive. Moreover, the frequency of corporate sector defaults declined to very low levels in 2004 and 2005. These positive developments were also reflected in an increasing ratio of credit rating upgrades to downgrades (see Chart 2.3 in the main text) and in declining expected default frequencies (EDFs) (see Chart 2.9 in the main text).

In recent quarters, some indications have emerged that non-financial corporate sector credit quality may have ceased to improve, which raises the question of whether the credit cycle in the euro area may be nearing a turning point. To some extent, this could be attributable to the fact that credit quality has already been enhanced to a great degree. Very favourable financing conditions and strong corporate earnings may have begun to reduce incentives for firms to continue with balance sheet repair, and may have encouraged them instead to start gradually re-leveraging their balance sheets. Very strong corporate loan growth in recent quarters is indicative of this, as have been a growing number of shareholder-friendly actions (such as an increase in share buybacks at the expense of creditors). Debt-to-GDP and debt-to-equity ratios also started to increase slightly in the last few quarters.

Although it is too early to be certain, there are indications that the long period of positive credit rating developments may have begun to peak in recent quarters (see Chart B3.1).¹ While low rates of default, low EDFs and tight credit spreads all underpinned a favourable credit risk assessment by early May 2006, several factors point to the potential for a deterioration in credit quality in the period ahead, of which four can be highlighted.² First, there have been indications

1 Despite the upward trend in the credit rating upgrades-to-downgrades ratio in recent years, the total number of western European non-financial corporate downgrades still far exceeded the number of upgrades observed from the beginning of 2001, i.e. roughly at around the time when the previous credit cycle turned. This may indicate that credit quality has remained below the levels seen in the late 1990s.

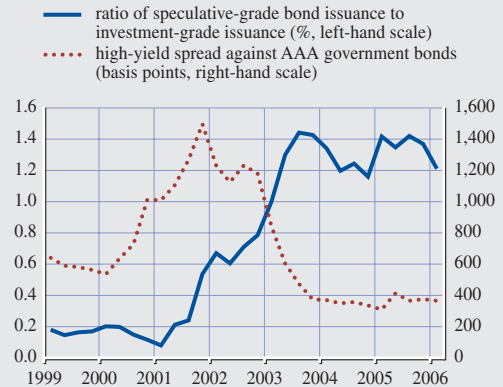
2 This deterioration has, to a somewhat lesser extent, also been reflected in euro area corporate bond spread patterns: spreads on long-term BBB-rated bonds and high-yield bonds widened by 25 and 70 basis points respectively between end-2004 and end-January 2006. Some of this widening was, however, related to a number of major firm-specific credit events that occurred in 2005; see Box 9 in ECB (2005), *Financial Stability Review*, December.

Chart B3.1 Credit rating drift and issuers placed under rating review



Sources: Moody's and ECB calculations.
 Note: These figures also include non-euro area western European countries. The "rating drift" is defined as the difference between the number of credit rating upgrades to credit rating downgrades over the total number of rated issuers (trailing 12-month). "Rating reviews" indicates the number of issuers put on review for upgrades and downgrades respectively (12-month moving sum). A high negative figure indicates that more firms are being put on review for downgrading than for upgrading.

Chart B3.2 Ratio of speculative-grade to investment-grade gross bond issuance and the high-yield corporate bond spread in the euro area



Source: Thomson Financial Datastream.
 Note: The ratio of speculative-grade (BBB-rated and below) bond gross issuance to investment-grade (A-rated and above) is calculated as a four-quarter moving average. The coverage of the data on gross issuance of corporate bonds is somewhat limited and hence the data only provides a partial assessment of corporate bond issuance in the euro area. The high-yield corporate bond spread is the spread between euro area high-yield bond yields to AAA-rated government bond yields.

that firms have changed their business strategies from cost-cutting and earnings accumulation to exploiting M&A opportunities and undertaking fixed capital investment, both of which should imply higher leverage ratios in the period ahead.³ Second, as reported in Section 2.2 of the December 2005 FSR, the interest rate sensitivity of the non-financial corporate sector may have increased somewhat in recent years owing to firms' increasing recourse to floating rate debt. Thus, while the net interest burden of non-financial corporations was historically low in the first months of 2006, it was also more sensitive to changes in interest rates than in previous periods. Third, the combination of a rise in shareholder-friendly actions (such as share buybacks and dividend payouts) and a surge in LBOs, predominantly by private equity firms, is also likely to lead to an overall increase in corporate sector leverage.⁴ Fourth, focusing on the corporate bond market, one notable development observed in recent years is that the issuance of lower than average quality corporate bonds picked up significantly (see Chart B3.2). After early 2003, the gross issuance of speculative-grade bonds exceeded that of investment-grade bonds: this may have been induced by investors' demand for yield in credit markets, but could have also reflected supply factors, as higher quality firms attempted to reduce their debts. The result of such high levels of issuance of lower quality credit may be that the credit quality of the overall stock of corporate bonds issued by euro area firms has been declining, which implies that default rates are likely to rise in the coming years (see Box 5).⁵

3 As mentioned in Section 2.2 in the main text, euro area M&A activity in 2005 reached its highest level since 2000. In addition, as noted in Box 10 of this FSR, in the April 2006 Bank Lending Survey, banks reported that the recent strength of firms' loan demand was, to a large extent, driven by their need to finance fixed investment, inventories and working capital, as well as M&A activity.
 4 According to Thomson Financial, the amount of European leveraged buyouts reached a record high in 2005. Concerning the growth in share buybacks in the US, see Box 1 in ECB (2005), *Financial Stability Review*, December. Share buybacks in the euro area amounted to around €27 billion in 2005, compared with an average of €18 billion in the period 2001-2005 (data from Thomson Financial Datastream).
 5 Indeed, a lagged positive relationship between speculative-grade issuance and default rates can be expected; see for instance Moody's (2005), "Default and recovery rates of European corporate bond issuers: 1985-2004", Special Comment.

All in all, the substantial efforts made by firms to repair their balance sheets in recent years seem to have markedly improved their financial condition. These efforts have been acknowledged in several indicators of corporate sector credit risk. Although the outlook still remains favourable, there are some indications that a turn in the credit quality cycle may be approaching. Unless this is carefully taken into account by banks and other financial investors, it may pose some financial stability concerns to the extent that banks and investors in corporate bond markets may face higher credit risk in the medium term.

Despite the strengthening of oil prices, which so far does not seem to have severely constrained corporate activity, the earnings of euro area corporations remained strong throughout 2005, driven by solid revenue growth and supported, for much of the year, by continued cost-cutting efforts that improved profit margins (see Chart 2.2).

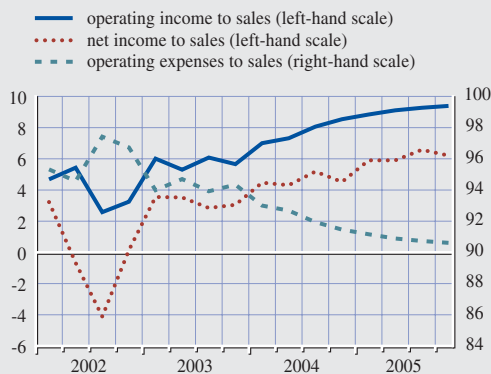
There are, however, indications that corporate earnings growth may experience a modest slowdown in the period ahead, although remaining at a relatively robust level (see Chart 2.3). Market expectations with regard to earnings over the short to medium term are

more moderate, on the one hand, being supported by upward revisions to GDP growth and, on the other, reflecting perceived adverse effects from a prolonged period of high oil prices, coupled with risks emanating from an appreciation of the euro and tighter financing conditions.

The financing conditions – especially the real cost of external financing – facing firms have been very favourable in recent years. The real cost of external debt financing was mainly driven by the level of interest rates, which despite increasing slightly in recent months remain very low (see Chart 2.4).

Chart 2.2 Profit ratios of euro area listed non-financial corporations

(Q1 2002 - Q4 2005, %)

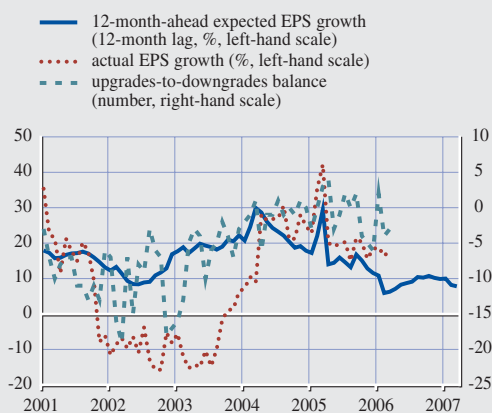


Sources: Thomson Financial (Worldscope) and ECB calculations.

Note: Calculations are based on an unbalanced sample of around 700 companies over time. Figures for Q4 2005 are based on a more limited dataset than in previous periods.

Chart 2.3 Earnings-per-share (EPS) and the credit rating upgrades to downgrades balance in the euro area

(Jan. 2001 - Mar. 2007)

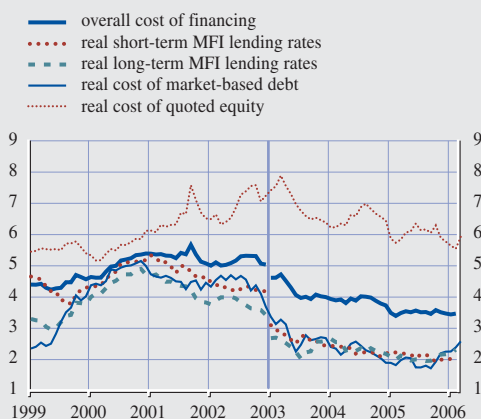


Sources: Thomson Financial Datastream and Moody's.

Note: The 12-month ahead expected EPS growth series has been lagged 12 months implying that in the above chart, it reflects the expected EPS 12 months prior to the date.

Chart 2.4 Real cost of external financing of euro area non-financial corporations

(Jan. 1999 - Mar. 2006, basis points)



Sources: ECB, Thomson Financial Datastream, Merrill Lynch, Consensus Economics Forecast and ECB calculations.

Note: The real cost of external financing is calculated as a 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 harmonised monetary financial institution (MFI) interest rate statistics at the beginning of 2003 led to a statistical break in the series.

Although the strength of profitability allowed firms to accumulate cash-flow, the persistently low cost of debt financing may also have induced firms to frontload debt by borrowing at cheap terms in their ongoing efforts to restructure their existing debt at more favourable terms.

Overall, profitability measures for euro area firms appear to be sound, which should support credit quality. However, credit quality, as measured by credit rating upgrades to downgrades, does not seem to have recovered to the same extent as profits in recent years. This suggests that the underlying improvement in the quality of corporate earnings after late 2002 may have been less robust than overall aggregated profit indicators suggest (see also Box 4).

Box 4

ASSESSING THE QUALITY OF CORPORATE EARNINGS IN THE EURO AREA

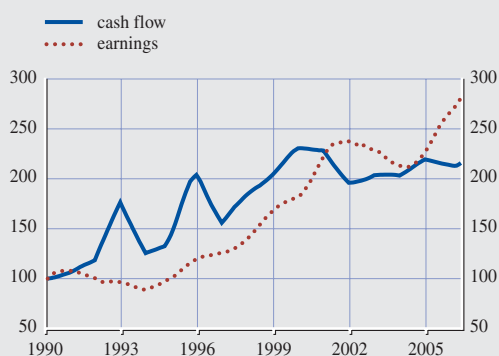
The balance sheets of euro area non-financial corporations improved greatly from 2003 onwards, partly owing to a significant improvement in aggregate profitability during this time, and corporate earnings are expected to remain robust throughout 2006 (see Chart 2.3 in the main text).¹ For a comprehensive credit risk assessment, it is important to analyse thoroughly the quality of earnings reported by firms. This Box attempts to shed some light on the quality of earnings reported by euro area firms listed on stock markets over recent years and it assesses the implications.

It is often difficult to evaluate earnings, because companies can highlight a variety of earnings figures: revenues, operating earnings, net income, and pro forma earnings. In addition, companies often calculate these figures rather differently. This means that their income statement alone may not be the most useful guide for evaluating their true earnings quality, which is an important aspect of an entity's financial health. Earnings quality refers to the ability of reported earnings to reflect a company's true earnings, as well as the usefulness of reported earnings in predicting future earnings. It also refers to the stability, persistence and degree of variability in reported earnings. One way of defining earnings quality is to consider how well

¹ Behind the aggregate improvement, there have been substantial differences in financial performance across different sectors of the economy. For credit risk assessment, it remains important to differentiate between sectors. This topic has been explored in Boxes 5 and 6 in ECB (2005), *Financial Stability Review*, December.

Chart B4.1 Earnings and cash flow of euro area stock market listed companies

(index: Jan. 1990 = 100, 12-month moving averages)

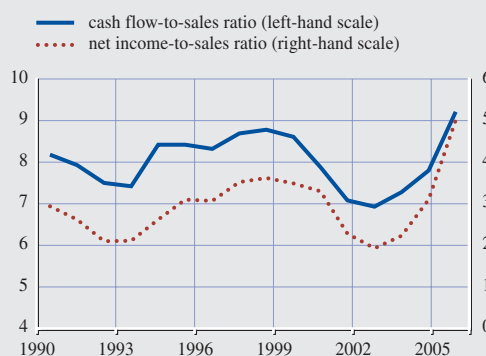


Sources: Thomson Financial Datastream and ECB calculations.

Note: Earnings and cash flow are calculated using the EMU stock price index and the price-earnings ratio and price-cash flow ratio. Cash flows are defined as funds from operations.

Chart B4.2 Cash flow to sales and net income to sales of euro area stock market listed non-financial corporations

(%, medians)



Sources: Thomson Financial Worldscope and ECB calculations.

Note: Varying but increasing coverage of about 2,000 firms from 1997 onwards, 2005 covers around 200 firms. Cash flows are defined as funds from operations.

accounting measures of earnings convey information about the underlying phenomenon. Assessing the earnings quality of firms is thus important for financial stability, since a misperception of the robustness of corporate profits and thus of the creditworthiness of borrowers could ultimately have implications for the soundness of the financial system through realised credit risk losses for financial institutions and investors.

At an aggregate level, one way of assessing the quality of euro area firms' profits is to compare the earnings they report and their net income, with their cash flows. Cash flows are defined as funds from operations, and basically consist of earnings before preferred dividends, plus depreciation on fixed assets. In recent years, the profits reported by euro area firms listed on stock markets have diverged significantly from their cash flows, with reported earnings reaching all-time highs in early 2006, but cash flows remaining below their 2000 peak (see Chart B4.1). Net income excludes extraordinary items and changes in working capital. A similar conclusion is reached on the basis of firm-level data, which show that in 2005, the ratio of net income to sales (a measure of a firm's profit margin) reached its highest level for 15 years (see Chart B4.2). By contrast, the operating cash flow-to-sales ratio only slightly exceeded below the levels observed in the latter part of the 1990s. The large and growing gap that had existed between the two profit measures after 2000 suggests that euro area companies faced some challenges in generating cash flow. These difficulties may have been related to a dearth of attractive business opportunities or an unwillingness to invest as firms restructured their balance sheets. Furthermore, the high level of corporate earnings reported by firms in recent years seems to have been largely driven by cost-cutting measures (see Chart 2.2 in the main text) as well as, more recently, an increasing use of earnings to buy back shares instead of investing.² While efforts to make operations more efficient were necessary to repair corporate balance sheets, efforts to introduce growth-enhancing, and hence cash-flow-generating, measures may have been limited in this process.

² See IMF (2006), "Awash with cash: Why are corporate savings so high?", *World Economic Outlook*, April, Chapter IV.

To conclude, there has been significant divergence between the profits reported by euro area firms and their cash flows since 2000. This divergence became even more marked after 2003, when reported earnings began to improve. The main explanation for this appears to have been a reluctance of firms in recent years to invest in cash-flow-generating projects. This may also partly explain why corporate debt levels were not significantly reduced despite the strong growth in reported earnings observed in recent years. To some extent, this therefore questions the quality of the earnings that have been reported by firms in the past few years and, especially, whether firms will be able to sustain high rates of profitability in the future. Caution is also called for when interpreting reported earnings figures, which for various reasons may sometimes overstate actual underlying developments in firms' ability to generate cash flow.

In the latter half of 2005, firms made increasing recourse to external sources of funds for financing both M&A and fixed investment, which gradually recovered to reach an annual growth rate of 2.9% in Q1 2006 compared with 2.3% in 2004 and 0.8% in 2003.³ Reflecting this, growth rates of debt financing by firms, especially for loans extended by monetary financial institutions (MFIs), increased considerably in 2004 and 2005 to reach their highest level since mid-2001 (see Chart 2.5). An increasing need for funds to finance inventories and working capital may also have boosted short-term debt financing, in particular, in recent quarters (see Charts S29 and S30).

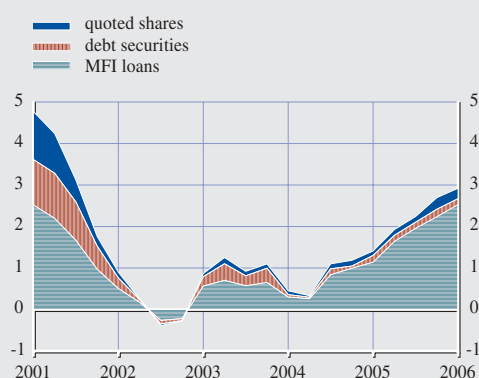
A breakdown of patterns of syndicated lending by purpose in the euro area suggests that two

main reasons can be advanced for the recent recovery in loan growth.⁴ The first was borrowing for refinancing purposes, i.e. paying off an existing loan from the proceeds of a new loan. The second and more recent was to cover financing needs related to M&A activity, a substantial part of which was carried out via LBOs (see Chart 2.6).⁵ Consistent with this, the

- 3 In 2005, expenditure on M&A activity where euro area non-financial corporations acted as acquirer reached €232 billion, the highest level since 2000. This compares with average annual expenditures of €145 billion over the period from 1990 to 2005.
- 4 According to Thomson Financial, syndicated lending to euro area non-financial corporations amounted to almost €700 billion in 2005, which accounted for around one-third of total new euro-denominated loans (excluding overdrafts) from euro area MFIs to non-financial corporations.
- 5 The category "Other" includes all financing purposes not specified in the chart, such as various types of financing for fixed capital investment and working capital needs.

Chart 2.5 Breakdown of the real annual rate of growth of external financing to non-financial corporations in the euro area

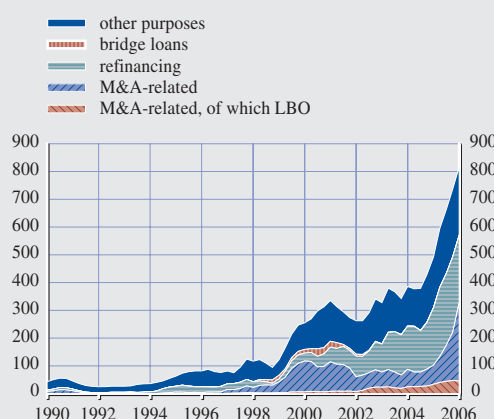
(Q1 2001 - Q1 2006, % per annum)



Source: ECB.
Note: The annual rate of growth is defined as the difference between the actual annual growth rate and the GDP deflator.

Chart 2.6 Euro area syndicated credits by purpose

(Q1 1990 - Q1 2006, €billions, four-quarter moving sum)



Source: Thomson Financial.

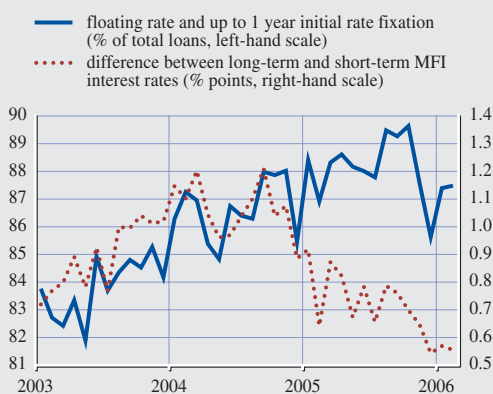
most recent findings from the ECB Bank Lending Survey (BLS) indicated robust loan demand, driven mainly by the needs of firms to finance M&A activity and by corporate restructuring, and more recently also by fixed investment (see Box 10).

As reported in earlier issues of the FSR, persistently low levels of short-term interest rates in the euro area encouraged firms to take on increasing amounts of debt fixed at floating and/or short-term interest rates (see Charts 2.7 and S29). This resulted in a marked reduction in the interest payment burden of non-financial corporations over the past two to three years. Nevertheless, unless firms used interest rate swap markets to convert short-term liabilities into fixed liabilities, this development probably heightened the sensitivity of the non-financial corporate sector to rising interest rates.

Even though the euro area yield curve began to flatten further after the finalisation of the December 2005 FSR, in part because of ECB interest rate increases, the recourse by firms to floating/short-term interest rate debt nevertheless continued. Hence, factors other than pure yield curve considerations were important in firms' decisions on the split between fixed and floating rate debt.⁶

Chart 2.7 New business loans to euro area non-financial corporations with short-term interest rates and term spreads

(Jan. 2003 - Feb. 2006)



Source: ECB.

Lending growth rates to firms increased in the second half of 2005, as did some corporate debt ratios, from already high levels (see Chart S27). As mentioned earlier, debt restructuring and low interest rates over recent years reduced the overall financing burden (in terms of interest payments) of the corporate sector. However, the persistently high level of debt may have left some companies vulnerable to any significant deterioration in earnings and/or tighter financing conditions. On the other hand, efforts to clean up corporate balance sheets and, in particular, positive valuation changes concerning companies' financial asset holdings over recent years brought the sector's debt-to-financial assets ratio down from 82% in Q4 2002 to below 75% in Q4 2005 (see Chart S28). This reinforced firms' ability to repay debt by liquidating financial assets, if needed.

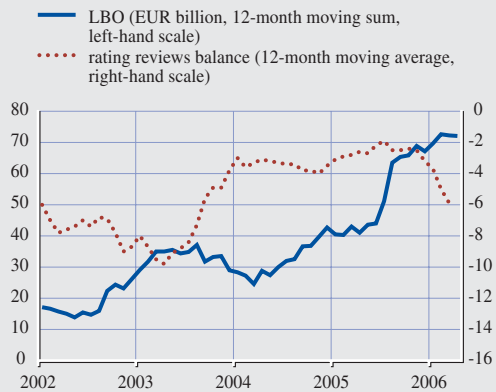
Concerning the overall credit risk assessment for the euro area corporate sector, indications that some firms began to re-leverage their balance sheets gave rise to expectations of a rise in default rates in the period ahead. Indeed, this was reflected in a fall of the credit rating upgrades-to-downgrades ratio into negative territory in late 2005 and early 2006 (see Chart 2.3).⁷ Moreover, an increasing number of firms were placed on review for a downgrade over the same period. Finally, an increased number of LBOs of euro area companies by private equity firms in 2005 is likely to have led to a deterioration in the position of corporate debt holders vis-à-vis equity holders, which may

⁶ Other factors deterring borrowers from taking on a greater proportion of fixed-rate debt, even as the yield curve has flattened, are possibly the costs of renegotiation, redemption penalties, and costs incurred through instituting an interest rate hedging programme. In addition, the high and increasing share of new business loans at floating rate and short-term rate fixation may to some extent reflect a considerable increase in recent years in the growth of loans at short-term maturity (see Chart S29). Since short-term loans are often "rolled over" it may have contributed to boosting the share of new loans at short-term initial rate fixation.

⁷ In terms of sectoral developments, Moody's reported a positive rating outlook for the telecommunications and technology sectors for 2006. At the same time, the retail and personal goods sectors, which are both mainly dependent on still sluggish domestic demand, were given a negative credit rating outlook; see Moody's (2006), "Credit quality trends", 8 February.

Chart 2.8 Credit rating reviews and leveraged buyouts (LBOs) of euro area non-financial corporations

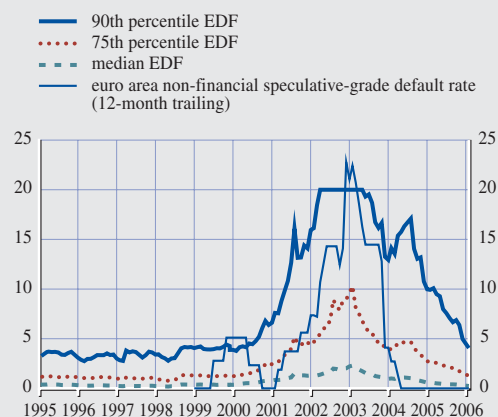
(Jan 2002 - Mar. 2006)



Sources: Moody's and Bureau van Dijk (Zephyr).
 Note: Data for LBOs refer to the 12-month moving sum of values in €billion. The data for rating reviews refer to the ratio of western European non-financial issuers placed on review for a credit rating upgrade, relative to the number of issuers placed on review for a credit rating downgrade.

Chart 2.9 Euro area non-financial corporations' expected default frequencies (EDFs) and speculative-grade default rates

(Jan. 1995 - Mar. 2006, % probability)



Sources: Moody's, Moody's KMV and ECB calculations.
 Note: Due to measurement considerations, the EDF values are restricted by Moody's KMV to the interval between 0.02% and 20%.

have contributed to reversing the trend of improving credit ratings (see Chart 2.8).

MARKET INDICATORS OF CORPORATE SECTOR FRAGILITY

Indicators based on the securities prices of firms can provide a cross-check against traditional credit risk assessments based on information contained in balance sheets and income statements. After the finalisation of the December 2005 FSR, market-based credit risk indicators continued to point to an overall benign assessment of corporate balance sheet positions (see also Section 3 on euro area financial markets), and the median of EDFs – an indicator of the probability of default over a 12-month horizon – for euro area firms remained low. At the same time, the distribution became denser between September and March 2006 (see Charts S31 and S32). Despite the declines observed over recent years, at the beginning of 2006 the EDFs of the most risky firms (as measured by firms in the 75th and 90th percentiles) still remained higher than those observed during the second half of the 1990s (see Chart 2.9). This could indicate that the least creditworthy companies may not yet have

completed their restructuring, and could therefore prove vulnerable to a significant deterioration in their operating environment. In the past, euro area EDFs for the more risky segments of firms have tended to provide leading indicator information about actual euro area non-financial speculative-grade default rates: EDFs rose before default rates between 2000 and 2003, and similarly improved before actual default rates did subsequently. However, given that after 2004 EDFs suggested higher rates of default than actually occurred, the predictability of the scale of corporate sector default rates may be questioned (see Box 5).

Box 5

GLOBAL AND EURO AREA CORPORATE DEFAULT RATES

The overall credit quality of the corporate sector improved considerably over recent years. An important reflection of this was a significant decline in corporate sector default rates in the euro area as well as around the world. The global speculative-grade default rate of issuers rated by Moody's, fell for the fourth consecutive year to 1.7% in March 2006, reaching the lowest level observed since 1997. In the euro area the default situation was even more benign: the default rate was 0% from June 2004 onwards. However, against the background of some evidence suggesting that corporate creditworthiness in the euro area could turn in the period ahead (see Box 3), this Box examines recent patterns in speculative-grade default rates, both in a global and a euro area context. Furthermore, the short-term outlook for euro area default rates is briefly discussed in light of the 12-month global speculative-grade forecast provided by Moody's.

In terms of long-term corporate debt, the bulk of outstanding issues is concentrated in the investment-grade segment, where the issuing firms have very low probabilities of default. The vast majority of all corporate defaults take place in the lower-rated speculative-grade segment, which accounted for 31% of Moody's global rating coverage in March 2006 (see Table B5.1). Within the speculative-grade segment, default rates differ widely depending on a firm's rating. For example, firms rated Caa or lower (constituting 14% of all speculative-grade-rated firms globally) experienced a default rate of 7.7% in March 2006, compared with 0.5% for firms rated B. The US dominates the speculative-grade market, representing 70% of global issues, compared with just 8% in the euro area.¹ For this reason there is a tight correspondence between global and US speculative-grade default rates (see Chart B5.1). Default rates in the euro area by contrast follow global developments less closely, indicating differences in corporate credit conditions between regions.²

Table B5.1 Global, US and euro area corporate bond market rating structure

(March 2006, % of total number of ratings)

	global		US		euro area	
	weight (%)	default rate (% 12-month trailing)	weight (%)	% of global	weight (%)	% of global
investment-grade	69	0.03	61	48	83	17
speculative-grade	31	1.65	39	70	17	8
of which:						
Ba	35	0.00	29	58	38	8
B	51	0.48	54	74	53	8
Caa-C	14	7.71	17	84	11	6

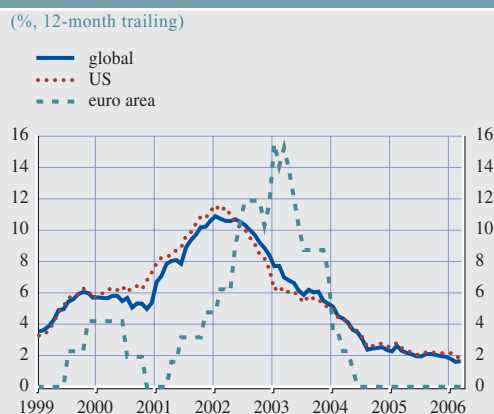
Sources: Moody's and ECB calculations.

Moody's provides monthly forecasts for the global speculative-grade default rate, which is a widely monitored indicator of corporate credit quality. The forecast model incorporates the

1 The US speculative-grade segment is also more important within its domestic market, representing a weight of 41% of the total US market, whereas the corresponding weight for the euro area accounted for only 17%. Since the late 1990s, when a market for corporate debt started to develop in the euro area (spurred by the introduction of the euro), market-based lending has continued to grow. In terms of size, however, the euro area corporate bond market is still small in a global context, with total bond accounting for less than 8% of total GDP in 2001, compared with roughly 30% in the US. See for instance L. Baele, A. Ferrando, P. Hördahl, E. Krylova and C. Monnet (2004), "Measuring financial integration in the euro area", *ECB Occasional Paper Series*, No 14.

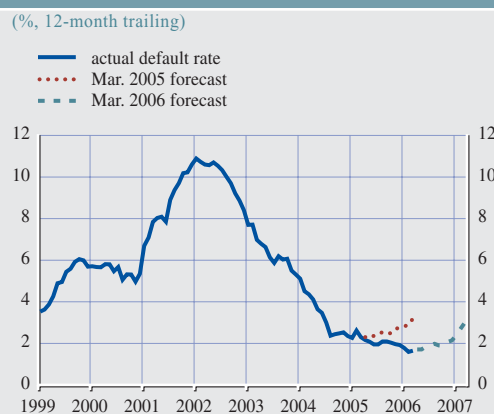
2 This difference might, at least to some extent, be explained by the limited number of speculative-grade issuers in the euro area.

Chart B5.1 Global, US and euro area speculative-grade default rates



Source: Moody's.

Chart B5.2 Actual and forecasted global speculative-grade default rates



Source: Moody's.

effect on default rates of changes in the pool of rated issuers (e.g. taking the age distribution of the debt outstanding into account), and of macroeconomic conditions (as measured by growth in GDP and interest rate variables).³ Besides constituting a benchmark in the overall assessment of global credit quality, this indicator complements other forward-looking indicators of corporate credit risk, such as the ratio of credit rating upgrades to downgrades and EDFs.

Since its introduction in 1999, Moody's 12-month ahead default rate forecast has performed rather well.⁴ Despite several macroeconomic developments that might have been expected to have had a negative influence on global corporate credit quality during the past year, e.g. the flattening of the US yield curve and other downside risks to growth in both the US and Europe, actual default rates continued to fall. As such, the forecast model tended to over-predict increasing rates of default after the beginning of 2005. The forecast prepared in March 2006 indicated a pick-up in the global default rate over the course of the year, to a level of around 3% by the beginning of 2007 (see Chart B5.2).

There are two good reasons why credit conditions for euro area speculative-grade debt might be stronger than at the global level in the short term, and why default rates might remain lower for somewhat longer. First, in contrast to the US, the growth outlook for the euro area has continued to be revised upwards since the December 2005 FSR was finalised, supporting corporate credit quality. Second, while the amount of new issuance in the most vulnerable segment of the stock of speculative-grade firms (rated Caa to C) increased sharply in the US in 2004, it has only picked up more recently in the euro area. This suggests that the so-called ageing effect will push default rates upwards somewhat later in the euro area, provided that the risk of credit default peaks about three years after first issuance.⁵

3 See Moody's (1999), "Predicting default rates: A forecasting model for Moody's issuer-based default rates", Special Comment, August.

4 See for instance Moody's (2006), "Default and recovery rates of corporate bond issuers, 1920-2005", Special Comment, January.

5 A large part of the euro area speculative-grade market defaulted between 2001 and mid-2004 (especially in volume terms). This probably left the speculative-grade segment in the euro area with a relatively higher share of higher-rated issuers compared to the US market. Only 11% of the speculative-grade issuers in the euro area are rated in the lowest Caa-C segments, whereas the corresponding figure for the US is 17%. Historically, a third of total Caa-rated issuance has defaulted after two years and 44% after three years. See for instance Deutsche Bank (2006), "What credit spread is required to compensate for historic default probabilities?", March.

The outlook for speculative-grade corporate defaults suggested by Moody's forecast, indicates a near turn in the global credit cycle. In line with global credit conditions, there is also some evidence suggesting that the credit cycle may be about to turn in the euro area as well (see Box 3). Nevertheless, the speculative-grade default rate might be expected to stay low for somewhat longer in the euro area, given the slightly improved growth outlook compared to the US (i.e. increasingly less divergent), together with more favourable interest rate conditions and a slightly higher-rated issuer composition. Although the fundamental conditions for speculative-grade corporate credit differ to a large extent between the euro area and the rest of the global (largely the US) market, there has been strong convergence in high-yield corporate bond spreads in recent years (see Charts S21 and S50). Overall, the conditions underlying euro area speculative-grade default rates examined in this Box therefore indicate that prospects for the euro area are slightly better in the short term in comparison with global financing conditions.⁶

6 The corporate bond spread, defined as the difference between the yield on a corporate bond and the yield on a risk-free instrument with comparable maturity, should in theory price in the expectation of corporate default over the full maturity of the bond (i.e. it should lead the actual default rate). Even though their cyclical patterns are not exactly contemporaneous, the global high-yield corporate bond spread and the global default rate tend to move in tandem over time. For a discussion of this topic, see Box 9 in ECB (2005), *Financial Stability Review*, June.

CORPORATE SECTOR RISKS

All things considered, the balance sheet position of the euro area non-financial corporate sector has strengthened significantly in recent years following a notable improvement in corporate sector profitability, in conjunction with restructuring efforts. These developments have been reflected in firms' securities prices and in the credit standards applied by banks to loans to enterprises. However, over the past six months there have been some indications that corporate sector credit risk has increased somewhat.

Looking ahead, there is some evidence that the strong growth in reported earnings observed in recent years may somewhat overstate the underlying improvement in firms' revenue-generating abilities (see Box 4). Further possible developments that could hamper the profitability of non-financial corporations include the possibility that oil prices could rise even further, and for a protracted period, as well as the possibility that the pace of economic activity may be turn out to be lower than expected in early May 2006.

In addition, it cannot be excluded that the assessment of corporate credit risks could

deteriorate somewhat as firms start re-leveraging their balance sheets in a situation of a significantly higher level of indebtedness than in previous recoveries. Moreover, firms' efforts to shorten the effective maturity of their debt may impair the ability of some of them to honour their obligations, should short-term interest rates rise further. The increasing demand of firms for funds to finance M&A activities and corporate restructuring efforts in general has fuelled the euro area private equity business, which among other things was reflected in a surge in LBOs that may have exacerbated balance sheet positions and hence increased the credit risk facing the incumbent creditors of the companies concerned.

A low probability event that could have a possibly extremely high impact is a severe outbreak of avian influenza. This could have the potential to affect corporate earnings adversely. However, it is difficult to ascertain the magnitude of this risk for euro area firms at this juncture.

While the overall balance sheet position of the euro area non-financial corporate sector remained sound, the above-mentioned factors may have worsened the sector's credit risk

assessment somewhat in recent months. This was reflected in various credit risk measures, which pointed to a rising probability of a turn in the credit cycle (see Box 3). Given the overall soundness of the corporate sector, however, a worsening of financing conditions in the period ahead will most probably be related to firm-specific events.

COMMERCIAL PROPERTY MARKETS

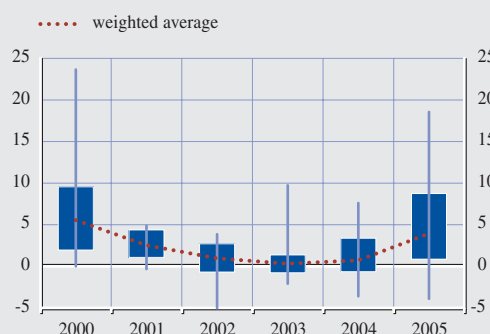
The euro area commercial property market is important for euro area financial stability for two main reasons. First, commercial property loans are an important component of financial institutions' assets. Because the size of the commercial property loans extended by banks depends upon the level of commercial property prices, banks can face income risk from fluctuations in these prices. Second, commercial property lending has also often proven to be the most volatile component in some bank loan portfolios. This is because commercial property market conditions tend to be more closely linked to business cycle conditions than the residential property market. These factors can create problems in a bank's commercial property loan book, which in turn can increase impairment charges and ultimately reduce profitability.⁸

Given that data of sufficient quality to be representative of the commercial markets across euro area countries and to make cross-country comparisons are generally unavailable, only a tentative assessment can be made concerning the financial stability risks arising from this sector.

A high level of investor demand for commercial property brought euro area direct real estate investment volumes to record levels in 2005. The total euro area transaction volume stood at €60 billion, which represented an increase of 15% over 2004. The surge in investment was mainly attributable to an increase in cross-border activity, defined as any transaction involving a non-domestic buyer or seller. Cross-border commercial property activity in the euro area accounted for 66% of total turnover in 2005, reaching over 80% in some euro area

Chart 2.10 Euro area country distributions of commercial property price changes

(2000 - 2005, capital values, minimum, maximum and inter-quartile distribution, % change per annum)



Sources: Investment Property Databank and ECB calculations. Note: The data cover eight euro area countries (representing around 90% of euro area GDP). The coverage of the total property sector within countries ranges between 40% and 85%.

countries.⁹ The main reason behind the overall higher investment volume and the increase in cross-border activity was the low interest rate environment, which allowed investors to finance investments cheaply and provided an alternative source of yield. In addition, further harmonisation of legal and reporting regimes across the euro area has reduced the barriers for cross-border activity.

Commercial property prices in the euro area changed, on average, little between 2002 and 2004, perhaps reflecting the sluggish pace of economic activity. During 2005, however, when direct real estate investment volumes reached record levels in many euro area countries, commercial property prices rose significantly in several euro area countries. However, there were differences across countries, with the range of price changes varying between 19%

⁸ Changes in commercial property prices may also affect banks' fixed assets and capitalisation directly if they own property, and indirectly through their impact on the macroeconomic environment. See E. P. Davies and H. Zhu (2005), "Commercial property prices and bank performance", *BIS Working Paper*, No 175.

⁹ Information from Jones Lang LaSalle. See Jones Lang LaSalle (2006), "European Capital Markets Bulletin, Full Year 2005", February, for a description of the conditions in the European commercial real estate market.

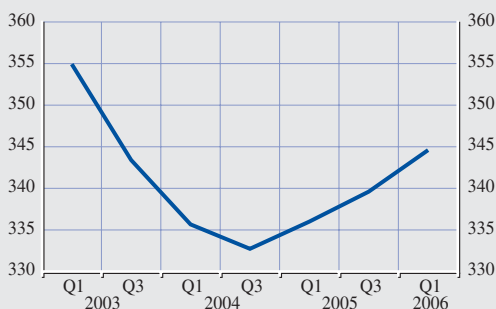
and -4% in 2005 (see Chart 2.10). These differences reflected not only different supply and demand characteristics of individual countries' commercial property markets, but also differences in general macroeconomic conditions across countries.

In addition to cross-country differences, there were also mixed developments within the various commercial property market segments in recent years. The large office space segment saw nominal price declines in both 2003 and 2004 in several countries; however, prices rose slightly, on average, during 2005. By contrast, properties for retail purposes recorded price increases of around 2-3% per annum, on average, between 2000 and 2004 and picked up to 9% in 2005 (see Chart 2.11).

Unlike residential property, which often serves as accommodation for its owners and has an intrinsic reservation value, the value and returns of commercial property are largely determined by expectations of the value of future rents. Commercial office property rents in 15 euro area cities had been declining for some years until late 2004, which in turn ensured sluggish property prices. After the third quarter of 2004, however, office space rents have begun to

Chart 2.12 Euro area commercial office property, prime rents

(Q1 2003 - Q1 2006, €per square metre and year, simple average)



Sources: Savills Research and ECB calculations.
Note: Data for 15 large euro area cities.

increase in a number of major euro area cities (see Chart 2.12). This upturn might explain the turnaround in office prices, and could also help to push office property prices upwards in the period ahead.

There is uncertainty about the outlook for euro area commercial property markets as to whether the high investor demand for commercial property recorded during 2004 and 2005 in the euro area will be maintained in the future. A potential slowdown in activity could affect property prices as well as the volume and quality of lending extended by banks for commercial property investments.

Chart 2.11 Euro area commercial property prices in different sectors

(2000 - 2005, capital values, % per annum)



Sources: Investment Property Databank and ECB calculations.
Note: The data cover eight euro area countries (representing around 90% of euro area GDP). The coverage of the total property sector within countries ranges between 40% and 85%.

2.3 BALANCE SHEET CONDITIONS OF THE HOUSEHOLD SECTOR

Lending to the household sector constitutes about a third of total euro area bank loans outstanding.¹⁰ Moreover, after the finalisation of the December 2005 FSR, it remained a fast growing segment of bank lending activity: the annual rate of growth in MFI loans granted to households stood at 9.7% in March 2006. An evaluation of the risks to the euro area banking system stemming from the household sector

¹⁰ This figure refers to the fourth quarter of 2005.

depends on two main factors: firstly, on the extent and nature of the banks' exposure to the sector through lending; and secondly, on the balance sheet situation of households, as this determines their resilience to financial shocks.

Against a background of rising house prices, lending to households for house purchase grew at annual rates of more than 10% after the end of 2004 (see Chart S35). If household balance sheets were to come under significant strain, this could cause borrowing for house purchase to decelerate, probably denting banking sector profitability (for example, this category of lending represented around 70% of total outstanding loans granted to households in the first quarter of 2006). As noted in Section 4 of this Review, in the past few years euro area banks were dependent on volume growth in mortgage lending in order to sustain interest income in a low interest rate environment.

Compared to mortgage credit, consumer credit granted by euro area banks represents a much smaller fraction of their total lending to households (around 13% of the total outstanding amount in the first quarter of 2006). However, after mid-2005, the growth rate of this type of lending also accelerated, reaching 7.8% in March 2006 (see Chart S35), driven by strong consumer demand and increasing competition among banks.¹¹ Consumer credit comprises several sub-categories of lending with different levels of risk.¹² Unsecured consumer credit, in particular revolving credit products and credit cards, carries higher credit risk for banks than secured mortgage lending. Hence, these types of loans typically have higher interest rates than mortgage loans and are usually granted at variable interest rates. Therefore, their servicing costs are especially sensitive to changes in short-term interest rates, and they have higher delinquency rates than mortgages.¹³ These product categories, while still only representing a moderate share of total consumer credit in the euro area, appear to have recently experienced strong growth in a number of euro area countries.

According to the results of the April 2006 ECB Bank Lending Survey, the net demand for consumer loans continued to remain positive in the first quarter of 2006 (see Box 10). The net demand for housing loans remained positive but at a lower level than in the previous quarter. The decline in demand, according to reporting banks, was due to less favourable housing market prospects and the use of alternative sources of finance (such as savings) by households. Against this background, there are some concerns that the credit risk facing banks in their lending to households may be increasing.

DEBT SUSTAINABILITY OF THE EURO AREA HOUSEHOLD SECTOR

In the fourth quarter of 2005, the total debt outstanding of the euro area household sector increased to 57% of GDP, up from 54% in the same quarter of 2004 (see Chart S33). By historical standards this level was unprecedented for the euro area, and it is difficult to assess whether or not such levels of indebtedness are sustainable over the medium term. One comforting fact is that on a cross-country comparison basis, household indebtedness in the euro area still appears rather moderate when compared with debt-to-GDP ratios of around 100% in the UK and 80% in the US.¹⁴

11 The significant increase in spending on durable consumer goods in the first quarter of 2006 was the main factor underpinning the growth in net demand for consumer credit during this period, according to the April 2006 Bank Lending Survey for the euro area.

12 Consumer credit can be classified into two categories according to the purpose of the loan contract: specific purpose loans (including vehicle financing loans and lending for the purchase of durable goods), which are mostly secured; and general purpose loans (including personal loans, revolving credit products, overdrafts and credit cards), which are mostly unsecured. Most types of loans are offered by universal banks, specialised financial institutions, and captive financial companies owned by non-financial parent companies. Furthermore, credit can be granted either directly or at the point of sale.

13 In the case of Spain, see S. Fernández de Lis, J. Martínez and J. Saurina (2000), "Credit growth, problem loans and credit risk provisioning in Spain", *Banco de España Working Paper*, No 18.

14 See Box 6 in ECB (2005), *Financial Stability Review*, June.

In 2004 the aggregate debt-to-assets ratios of the household sector reached their highest level in ten years (see Chart S34). Since the ratio remained below 100%, this meant that households were still in a position to repay their debts, and even more, out of their liquid assets. However, if it were to breach this threshold, this would be a cause for some concern about the sustainability of household balance sheet positions.

In general, the debt repayment ability of the household sector depends on the distribution of financial assets and liabilities across individual households. The most recent information available for this distribution for the euro area as a whole dates back to 2001.¹⁵ This showed that the bulk of mortgage debt was held by households in the highest income segments, which also held the highest proportion of financial wealth over the period 1994-2001. This notwithstanding, there are indications that the holding of non-mortgage debt was more widely distributed across income categories in 2001. There are some indications of a broadening in the customer base for this type of borrowing in some countries, potentially towards the lowest income categories.¹⁶ The April 2006 ECB BLS showed that concerns were increasing among banks about some borrowers' creditworthiness which contributed to a tightening of lending standards on riskier loans in the first quarter of 2006. However, on an overall basis, there was a net-easing for consumer and other credit in April compared to the previous quarter.

The credit risk outlook for the household sector depends mainly on the sector's ability to meet debt servicing obligations out of income. In aggregate terms, and even though short-term interest rates rose over the six months after the finalisation of the December 2005 FSR, the assessment of the sustainability of household sector debt in the euro area did not change significantly. According to ECB estimates, the total debt servicing burden – which comprises interest payments and repayments of principal – of the household sector represented a broadly

stable share of the sector's disposable income (around 12%) from 2000 onwards, thanks to an environment of persistently low interest rates (see Chart S36). Because of increased indebtedness, the repayment of principal slightly increased in 2005 compared with 2004 and it is likely that the interest component of the debt servicing ratio will also increase when the impact of increased lending rates feeds through to borrowers.¹⁷

HOUSEHOLD SECTOR RISKS

The probability of households experiencing debt repayment problems can be seen as being jointly determined by the prevailing condition of their balance sheets as well as the likelihood of shocks to income or interest rates. In this respect, the further rise in household indebtedness in the first quarter of 2006 could have increased the sensitivity of household balance sheets to adverse disturbances to financing conditions and/or house prices.

Risks to household income

According to the "ability to pay" theory of debt default, also known as "cash-flow theory", households fall into arrears with their debts when their income flow becomes insufficient to repay the next debt instalment without causing an undue financial burden.¹⁸ As it leads to a fall in household income, the probability of unemployment is generally found to be one of the main factors driving the probability of household arrears.¹⁹

Survey evidence collected by the European Commission tends to confirm that patterns of

15 See ECB (2005), "Assessing the financial vulnerability of euro area households using micro-level data", *Financial Stability Review*, December.

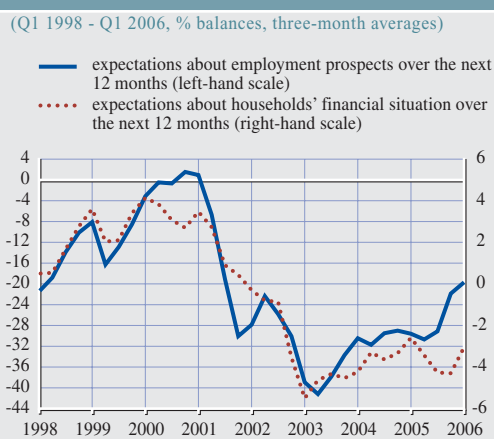
16 See for instance Mercer Oliver Wyman (2005), "Consumer credit in Europe: Riding the wave", November.

17 The estimate of interest payments for 2005 shown in Chart S36 does not incorporate the rise in ECB interest rates since the December 2005 FSR was finalised.

18 There is some empirical support for the ability-to-pay theory for the UK. See J. Whitley, R. Windram and P. Cox (2004), "An empirical model of household arrears", *Bank of England Working Paper*, No 214.

19 See for instance (for the UK) H. Cairns and G. Pryce (2005), "An analysis of mortgage arrears using the British Household Panel Survey", Department of Urban Studies, University of Glasgow, June.

Chart 2.13 Euro area households' financial situation and employment expectations



Source: European Commission Consumer Survey.
 Note: Expectations about employment prospects are obtained as the inverse of the balance of answers to the question "How do you expect the number of people unemployed in this country to change over the next 12 months?". An increase in the indicator corresponds to more optimistic expectations overall.

euro area households' expectations about their financial situation are closely connected with their perceptions of future employment prospects (see Chart 2.13). In the six months after the finalisation of the December 2005 FSR, households remained more pessimistic about their financial situation than might have been expected, given that they saw a less negative outlook for the labour market than in previous survey rounds.²⁰ This suggests that households became more sensitive to factors other than income in assessing their financial situation. For instance, the further strengthening of oil prices as well as the rise in ECB interest rates during this period may have caused some indebted households to reassess their financial position.

Interest rate risks of households

After the December 2005 FSR, the ECB raised interest rates by a total of 50 basis points. As this should ultimately increase debt servicing costs, it could create some strains on the balance sheets of the most heavily indebted households. The overall impact will depend on the sensitivity of the households' payment burden to interest rates. This depends first on the speed of the

pass-through to retail lending rates. Empirical evidence for the euro area suggests that over 25% of an interest rate change is passed through to mortgage loan rates within one month, while the entire process of adjustment takes about three months.²¹ The impact also largely depends on the contract features of the outstanding loans, which vary widely across countries. In this respect, the interest rate variability regime of the outstanding loans appears to be the most crucial feature. In the euro area, around 50% of outstanding mortgage debt is contracted at either fixed or quasi-fixed rates (with an initial interest rate fixation period of at least ten years).²² In January 2006, in most countries where a choice was possible, the share of these fixed-rate products reached the highest level observed in the three years for which such data have been available. However, for the same countries, a substantial share of new mortgage loans have an initial interest rate fixation period of up to one year, and will therefore be readjusted over the coming year. Moreover, in a number of countries where variable rate mortgages are predominant – and where house price rises were the strongest in recent years – concerns about the sustainability of further borrowing seem to have recently increased.

The impact of short-term interest rate rises on variable rate contracts could nevertheless be mitigated in the short run by other product features, allowing flexible repayment options such as accordion loans, payment holidays or interest-only repayment.²³ However, these products could have an impact on the long-run sustainability of debt; in addition, given the complexity of product innovations, households might not be fully aware of the total expected cost of borrowing over the life of the mortgage,

20 An alternative interpretation could be that households are more pessimistic about income than job security.

21 See G. de Bondt, (2005), "Interest rate pass-through: Empirical results for the euro area", *German Economic Review*, 6, 1, pp. 37-78.

22 See Box 6 in ECB (2004), *Financial Stability Review*, December.

23 See Box 7 in ECB (2005), *Financial Stability Review*, December.

therefore underestimating the total financial commitment in their budget.

Therefore, it is likely that the interest rate risk facing households rose after the finalisation of the December 2005 FSR. This is because debt servicing burdens will increase for households with variable rate mortgages and eventually for those households facing repricing when the fixed rate period in their mortgage contracts comes to an end.²⁴

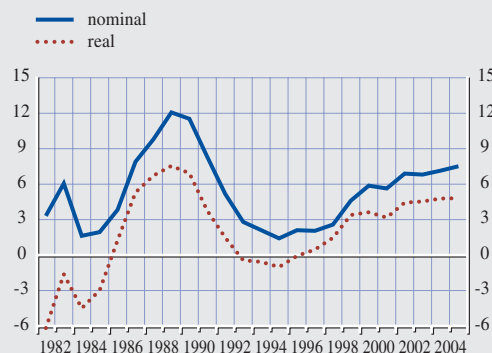
Risks to residential property prices

Identifying the various direct and indirect channels through which a significant change in property prices would affect banking sector performance is complex.²⁵ In this regard, three main channels can be identified. First, a drop in house prices could have an indirect effect on banks via the macro-environment: a fall in housing wealth could lead to consumer retrenchment and weaker economic activity, and therefore higher unemployment with consequences for the ability of households to service their debts. Second, a decrease in house prices, while not triggering a rise in mortgage default rates itself, could nevertheless aggravate the consequences for banks of mortgage loan distress owing to an interest rate or income shock. This impact would ultimately depend on the ratio of the amount of loans outstanding to the current value of housing assets, as well as on the efficiency and cost of the repossession procedure. Third, a decrease in the amounts borrowed for house purchase, arising from a drop in average house values, may reduce bank earnings (see Section 4). It is noteworthy that banks themselves regard house prices as important for their future performance. A recent survey showed that 61% of respondent banks felt that a possible house price bubble would represent a major risk to their profits.²⁶

Following five years of house price increases of more than 5% per annum, euro area residential property prices not only continued to rise, but accelerated in 2005. Average property prices rose by 7.5%, up from 7.0% in 2004 as a whole (see Chart 2.14). However, despite overall

Chart 2.14 The residential property price growth rate in the euro area

(1982 - 2005, % per annum)



Sources: National sources and ECB calculations.
Note: The real price series has been deflated by the Harmonised Index of Consumer Prices (HICP).

strength in the residential property markets, there was considerable diversity at the country level.

The data for 2005 show some convergence in the rate of house price inflation with respect to 2004: price increases were less buoyant in Spain, Ireland and Finland, while prices accelerated in Greece, the Netherlands and Portugal (see Table 2.1). In 2005, the data available for France pointed to some stabilisation in the very dynamic pace of house price inflation compared with 2004.

The strength of residential property prices in recent years can mainly be explained by strong housing demand that was met by only a modest increase in supply. The strength of demand appears to have been supported by very favourable mortgage financing conditions, although possibly also investors' expectations of further price rises.

²⁴ It is also important to bear in mind that some households with high savings will stand to benefit from rising short-term interest rates through increased income from savings. However, data on the net worth of euro area households do not yet exist. This constitutes a source of additional uncertainty in the assessment of the risks to financial stability from this source.

²⁵ See UK Financial Services Authority (2005), *Financial Risk Outlook*.

²⁶ See Box 2 in ECB (2005), *Financial Stability Review*, December.

Table 2.1 Residential property price growth rates in the euro area countries

(% per annum)									
	average	2003	2004	2005	2005				2006
	1999-2004				Q1	Q2	Q3	Q4	Q1
Germany ²⁾	-0.6	-1.6	-1.4	-0.9	..	..	..	..	..
France ¹⁾	9.8	11.7	15.2	15.2	15.7	15.3	15.5	14.2	-
Italy ²⁾	7.5	9.9	9.1	9.9	..	..	..	..	..
Spain ^{2);4)}	15.4	17.6	17.3	14.0	15.7	13.9	13.4	12.8	..
Netherlands ¹⁾	9.7	2.6	4.0	4.5	3.5	3.8	4.4	6.4	6.3
Belgium ¹⁾	6.6	7.8	7.8	..	..	..	..	..	..
Austria ²⁾	-1.4	0.9	-0.6	..	..	..	..	..	..
Finland ²⁾	5.9	6.2	7.1	6.1	4.0	4.7	6.7	9.0	..
Greece ²⁾	9.7	5.7	5.7	8.9	7.3	10.4	..	..	..
Portugal ²⁾	3.5	1.6	0.4	1.9	0.5	3.2	..	..	..
Ireland ²⁾	13.6	15.2	11.4	9.2	11.1	10.5	11.5	..	..
Luxembourg ³⁾	11.0	13.3	..	..	..	..	..	..	..
Euro area ²⁾	6.1	7.1	7.0	7.5	7.2	8.4	7.2	7.2	..

Sources: National sources and ECB calculations.

Note: The data differ substantially between countries in terms of coverage and calculation methods. Data for 2005 refer to the average of the available quarters.

1) Existing dwellings (houses and flats), whole country.

2) All dwellings (new and existing houses and flats) whole country.

3) New and existing houses, whole country.

4) For Spain there is a statistical break, so that annual percentage changes from Q1 2005 onwards are not comparable with those before.

More recently, however, supply-side indicators such as building permits and residential investment strengthened (see Chart S37). If the recent favourable developments in supply indicators were to continue, they could play a role in alleviating some pressure in the market and contribute to lowering house price increases in countries where strong house price increases were experienced in the recent past.

Valuation measures for property prices based on house price-to-rent ratios remained above their historical averages after the finalisation of the December 2005 FSR, continuing to point to vulnerabilities from possible overvaluation in some Member States (see Chart S38).²⁷ However, it cannot be excluded that these high ratios also reflect expectations of stronger growth in rents over the coming years.

All in all, the risks of residential house price reversals appear to have risen since the finalisation of the December 2005 FSR, but this risk continues to remain unevenly distributed across euro area countries.

ASSESSMENT OF HOUSEHOLD SECTOR RISKS

Overall, risks to the euro area financial sector originating from the household sector remain low, although they have risen over the past six months for several reasons. Household indebtedness continued to increase from already historically high levels. Moderate increases in the monthly payment burdens triggered by higher interest rates may lead to an increase in the risk of financial distress, in particular for the most heavily indebted households. That being said, the risk of a significant deterioration in the average household's ability to service its debt appears to remain relatively moderate in the near term. This is, however, conditional on the macroeconomic environment remaining benign.

House prices have risen in the euro area as a whole, with substantial increases in some Member States. Prolonged and rapid increases may imply a greater risk of overvaluation and

²⁷ See also ECB (2006), "Assessing house price developments in the euro area", *Monthly Bulletin*, February.

correction over time. In particular, household vulnerability might have increased in some euro area countries where house price increases have been large and where variable rate contracts are the prevailing mortgage product.

Finally, there may be higher risks to other parts of household financial assets. This depends on the possible triggers that could cause an end to the search for yield in financial markets. An unwinding of asset price misalignments could trigger declines in bond and stock prices, thereby having a negative impact on mutual fund savings and pensions.



III THE EURO AREA FINANCIAL SYSTEM

3 EURO AREA FINANCIAL MARKETS

After the December 2005 FSR was finalised, euro area money markets continued to function smoothly, with perceptions of counterparty credit risk remaining low. The secured segment of the money market continued to grow relative to the unsecured segment, although in the former the use of lower quality collateral rose. Moreover, liquidity and issuance conditions in the euro area money market remained favourable. Long-term government bond yields rose but this had no significant impact on the euro area capital markets. In the euro area corporate bond and credit derivatives markets spreads remained highly compressed and equity markets continued to perform well with prices reaching all-time highs in the small and mid-cap segments. However, since there are concerns about asset price misalignments arising from an ongoing search for yield, vulnerabilities to a sudden reappraisal of risks remain which could imply a disorderly adjustment of pricing in the credit and equity markets.

3.1 KEY DEVELOPMENTS IN THE MONEY MARKET

From a financial stability viewpoint, the smooth functioning of the euro area money market is important because it is in this market that banks usually secure the bulk of their liquidity needs. If conditions in the money market were to turn disorderly, to the point where banks found it difficult to raise funds, this could pose risks for the stability of the banking system as a whole.

With regard to Eurosystem monetary policy decisions taken after the finalisation of the December 2005 FSR, the ECB twice raised interest rates by 25 basis points, first on 1 December 2005 and then on 2 March 2006, the first increases since June 2003. By early May, the minimum bid rate for the main refinancing operations stood at 2.5%. Looking forward, by early May money market derivatives prices indicated that market participants were expecting at least three additional interest rate

increases of 25 basis points, with a small possibility of a fourth hike by the end of 2006.

The increase in ECB interest rates and expectations of further rises contributed to increased trading volumes in both over-the-counter (OTC) and exchange-traded money market derivatives (see Box 6). Furthermore, the implied volatility of interest rates derived from money market options prices also rose from historically low levels, although it still remained relatively low (see Chart 3.1).

Overall, from a financial stability viewpoint, the conditions in the euro area interbank money market remained favourable after the finalisation of the December 2005 FSR for the following three reasons. First, perceptions of counterparty credit risk, which can be detected in patterns of interest rate spreads between uncollateralised and collateralised interbank lending rates, remained rather low (see Chart S39). However, in addition to a seasonal spike at the turn of the year, spreads in the short-term maturities recently drifted somewhat higher. This could be related to somewhat greater uncertainty about counterparty credit risks. However, technical factors such as the scarcity of collateral could have also played a role.

Second, activity in the secured money (or repo) market segment – the largest money market segment in the euro area – continued to grow

Chart 3.1 Implied option volatility of three-month EURIBOR futures

(Apr. 1999 - May 2006, %, 60-day moving average)



Source: Bloomberg.

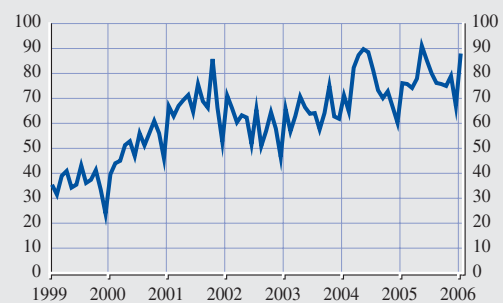
relative to the unsecured segment (see Box 6). This is a positive development from a financial stability viewpoint, as it suggests that money market counterparties increasingly preferred to limit their counterparty risks. This notwithstanding, the greater use of lower quality collateral in secured money market operations raises some concerns, and thus should be monitored more closely (see Box 7).

Third, liquidity conditions in the euro area money market – gauged by the bid-ask spreads on various money market instruments – remained favourable. For instance, in the six months after the finalisation of the December 2005 FSR, bid-ask spreads on EONIA swap rates remained low, although at slightly higher levels, following a seasonal spike at the turn of the year (see Chart S40).

For non-financial corporations, the conditions for accessing the money market have also remained favourable. Even though the gross

Chart 3.2 Gross issues of short-term securities (other than shares) by euro area non-financial corporations

(Jan. 1999 - Jan. 2006, EUR billions, gross issues, maturities up to one year)



Source: ECB.

issuance of short-term securities (other than shares) by non-financial corporations declined somewhat from its peak in May 2005, issuance recovered and remained at relatively high levels (see Chart 3.2). This suggests that euro area non-financial corporations did not experience difficulties in issuing money market securities.

Box 6

STRUCTURAL TRENDS IN THE EURO MONEY MARKET

On 20 January 2006, the ECB published its sixth study of the structure and functioning of the euro money market. A new feature of the study is that it also covered the 10 Member States which joined the EU on 1 May 2004. Similar to earlier studies, the 2005 study was based on data collected from banks, and it covered the second quarters of 2004 and 2005. To keep the results comparable with earlier studies, the study was split into two parts, the first analysing data from banks residing in countries, which were EU Member States prior to 1 May 2004 and the second focusing on data from banks located in the other EU Member States. This Box reports on some of the main findings of the first part of the study. Overall, four main developments can be identified.

First, the aggregated turnover of the euro money market increased in the year to Q2 2005, returning to levels similar to those seen in 2003. Activity increased in most of the money market segments, while the estimated turnover in unsecured, cross-currency swaps and forward rate agreement (FRA) segments declined slightly from the levels seen in the second quarter of 2004.

Second, the secured (repo) market continued to grow and, at around 35% of the aggregated money market turnover, remained the largest of the money market segments. Increasing turnover in secured markets over recent years has been linked to several factors, including a general increase in securitisation in financial markets, an increasing desire among market participants to limit their counterparty risks, and a further deepening of financial market integration in the

euro area. Another development related to the increase in the secured market segment was a substantial increase in tri-party repo activity.¹ This development is welcome from a financial stability point of view, as it reduces counterparty and operational risks related to settlement.

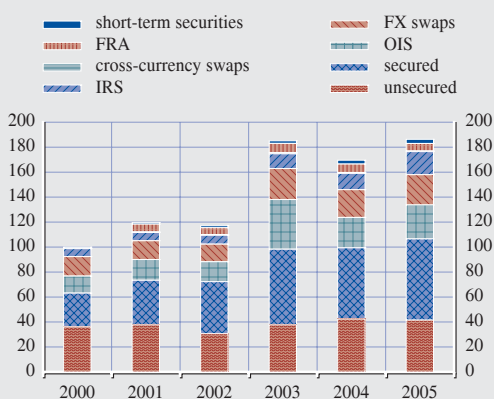
Third, activity in OTC money market derivatives picked up in the year to Q2 2005, especially in the overnight index swap (OIS) and other interest rate swap (IRS) segments. However, total turnover in the OTC derivatives markets still remained lower than in Q2 2003. One of the reasons for the increase in interest rate swap activity in the first two quarters of 2005 was that market participants' expectations that the ECB would raise interest rates had intensified.

Furthermore, in the OIS and IRS segments, the use of electronic trading platforms also increased compared with the previous year.² From a financial stability viewpoint, the increase in derivatives trading activity can have both positive and negative impacts. On the one hand, these instruments can be used to hedge interest rate risks, and therefore can have a positive impact on financial stability. On the other hand, they can also be used for speculative purposes, which might raise some concerns from a financial stability viewpoint if this were to lead to a build-up in significant derivatives positions.

Fourth, there were no large changes in measures of concentration and efficiency in different money market segments between Q2 2004 and Q2 2005. For instance, the OTC derivatives markets and short-term securities markets remained the most concentrated money market segments (with the ten largest institutions accounting for around 70-80% of the total turnover), while lending and borrowing in both secured and unsecured markets remained far less concentrated (here the ten largest institutions accounted for around 50-55% of the total turnover).

1 A tri-party repo involves a third party, commonly a custodian bank, acting as an agent to exchange cash and collateral for one or both counterparties with new positions.
2 According to the survey, secured (repo) and FRA products are most often traded on electronic trading platforms, while other money market instruments are more often traded either directly with a counterparty or through a voice broker.

Chart B6.1 Aggregated euro money market turnover by market segment in the countries that joined the EU before 1 May 2004



Source: ECB (2006), *Euro Money Market Survey 2005*.

Box 7

THE WIDENING OF THE COLLATERAL POOL FOR SECURED LENDING IN THE EURO AREA

Trading in the euro area secured money market has been growing significantly in recent years. According to the ECB's Euro Money Market Survey,¹ by 2002 the secured market had already become the largest segment in the euro area money market. In addition, according to the International Capital Markets Association (ICMA) European repo market survey, outstanding

1 According to the survey, the secured market saw growth rates of 142%, compared to 15% in the unsecured market between Q2 2000 and Q2 2005 (see also Box 6 on structural trends in the euro money market).

repo transactions in the European market saw annual growth of around 16% between December 2004 and December 2005, mirroring growth rates seen in surveys in previous years.² As the recourse to secured borrowing has been increasing, so too has market participants' need for more collateral. While a shift from unsecured to secured borrowing should be positive from a financial stability viewpoint, there have been some concerns that the quality of the collateral used in these transactions has been deteriorating. This Box describes some of the more important developments in the collateral pool for secured lending in the euro area and it assesses their implications for financial stability.

Because government debt issuance in the euro area has, in recent years, been growing at a slower pace than the repo market, there has been a pressing need to find alternative securities to serve as collateral. The ICMA survey has found, for example, that the share of collateral issued by EU governments in total EU collateral steadily declined from about 92% in December 2001 (according to the first repo survey) to 86% in December 2005. By comparison, the share of US Treasury securities in outstanding repo business has ranged between 56% and 66% over the past five years, with agency and mortgage-backed securities (MBS) accounting for about 15% each, and corporate bonds making up the rest.³ While the share of government bonds in the European repo market is higher than in the US, the alternatives to government bonds in Europe now include not only high-quality corporate and covered bonds, but also financial securities such as equities, junk bonds and asset-backed securities (ABS) – assets that would not have been used as collateral just a few years ago. The use of such assets in Europe is more significant in the tri-party repo business than in bilateral repo transactions.⁴

The structure and quality of collateral used in European tri-party repos, as shown for example in the ICMA survey,⁵ reflects the changing quality of the collateral used in European repos. It also reveals differences in the use of tri-party repos between the European and US markets. In Europe, tri-party repos are more often used by banks and dealers as a tool for financing positions in securities that would otherwise be difficult to use in bilateral repos, owing either to their high trading frequency, small size or lower credit quality. Investors' decisions to use tri-party repos in Europe may sometimes be driven more by the extra yield offered by banks and dealers in return for accepting riskier collateral. In the US, on the other hand, tri-party repos are a standard instrument for cash investors, and are used by banks and dealers to finance their holdings in Treasury securities. In the European markets, government bonds are more frequently used in bilateral repo transactions.

An additional feature that may support the more extensive use of private sector bonds in the European repo market is that the ECB accepts a wide spectrum of collateral from various types of issuers in its refinancing operations, including corporate bonds, covered and uncovered bank bonds and ABS. This may add another incentive for market participants to accept such collateral in their secured cash lending, as they have little uncertainty of obtaining liquidity for such collateral in the ECB's refinancing operation. The increasing use of lower quality collateral in repos does however pose the problem of proper collateral valuations. Individual assets, even whole asset classes, are frequently difficult to value. Additional uncertainty may come from

2 See ICMA (2006), "10th European repo market survey, December 2005". The survey also estimates the total size of the European repo market at more than €5,800 billion.

3 Data were obtained from Federal Reserve Bank of New York weekly reports on transactions and financing by primary dealers.

4 In tri-party repos, collateral management functions are delegated by the two counterparties to a third-party agent, usually to ease the burden of back office functions on the cash investor and to allow a more efficient use of collateral by the cash-taker in the repo.

5 The survey found that the share of government bonds used in tri-party repos fell significantly to 23% in December 2005, down from 26% in June 2005 and 44% in December 2004.

the fact that for some assets, prices may be available but are subject to large fluctuations because the market in such assets is rather illiquid. Without proper collateral valuations, the collateral-taker will be exposed to the risk that in the case of a default of the collateral provider, the amount of collateral may not be sufficient to cover the value of the cash investment. This risk increases as the credit quality and liquidity of the assets decreases.

The growing use of private sector securities as collateral in repo transactions has also been reflected in the growing prime brokerage business that banks and dealers now offer to the hedge fund industry. As the prime brokerage business began to become more competitive with the entrance of new banks, collateral quality criteria became the subject of competition as banks attempted to obtain new business from hedge funds. In this respect, a study by Greenwich Associates⁶ found that in Europe, dealers were lowering credit quality requirements for collateral on their hedge fund repo business. According to the survey, in 2004 just under 55% of dealers would have accepted collateral of lesser quality than government or agency securities; by 2005, this number had risen to 70%. The size of haircuts (an extra amount of collateral or cash given by one party to the other in order to smoothen the effects of changes in the market price of the collateral) on repo collateral, which are frequently used to manage banks' credit exposures to their customers, have also come under pressure from competition between banks in the prime brokerage business. Because of this, concerns have been expressed that the haircuts applied may not always accurately reflect the risk associated with the customer or the quality of the collateral.

The implementation of the Basel II Accord should have some impact on the repo market. The Accord's emphasis on the quality of collateral may result in changes in the relative pricing of collateral, and could eventually also influence its pricing in the cash market. As lower-rated collateral will become less attractive, there may be an increase in the use of some higher-quality asset types.

All in all, the increasing use of collateral in borrowing and lending transactions is to be welcomed because it enhances legal certainty and credit protection of lenders. As a result, credit events with a systemic impact can be more easily avoided. An additional benefit is that more liquid money markets can develop, allowing a more efficient allocation of capital. However, this needs to be monitored closely, as collateral quality may have a significant impact on the position of the collateral-taker should a credit event occur. As valuations of more exotic collateral are, in most cases, difficult owing to the unavailability of prices and often low secondary market liquidity, especially in stressed markets, collateral-takers may find themselves in a less secure position than they thought when entering into the trade.

⁶ Greenwich Associates (2006), "In Europe, hedge funds compete for assets while dealers compete for hedge funds", 24 January (press release).

3.2 KEY DEVELOPMENTS IN CAPITAL MARKETS

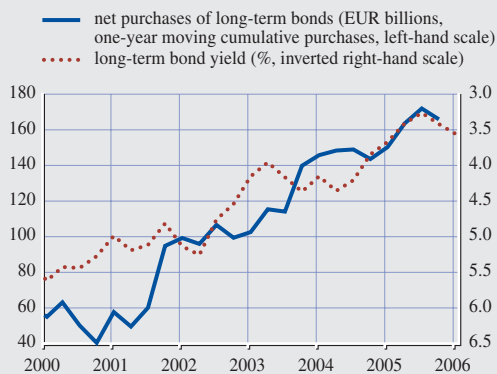
GOVERNMENT BOND MARKETS

In the six months after the finalisation of the December 2005 FSR, short-term interest rates generally increased at a faster pace than long-term yields, causing the euro area market yield

curve to flatten. However, ten-year government bond yields in the euro area subsequently rose by a total of 60 basis points, reaching a level of 4.1% in early May 2006 (see Chart S41). Although they rose significantly, long-term yields still remained low, especially real long-term yields. Several factors contributed to the

Chart 3.3 Net purchases of long-term bonds by euro area insurance corporations and pension funds, and euro area long-term bond yields

(Q1 2000 - Q1 2006)

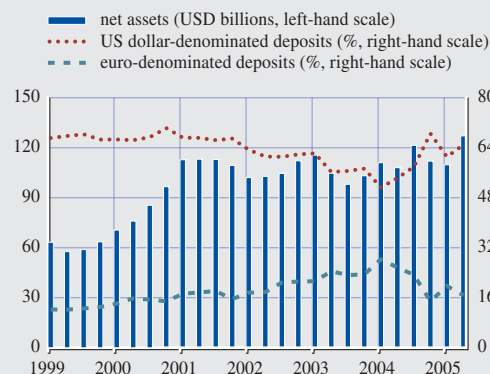


Source: ECB.

strength of demand that kept euro area real long-term bond yields at low levels. Encouraged by a change in the regulatory environment as well as in accounting rules, the demand for bonds – including those with ultra-long maturities – by institutional investors with balance sheet mismatches was high. Lower long-term interest rates can widen these mismatches if the decline increases the net present value of liabilities by more than that of assets. This may explain, at least in part, why the decline in long-term bond yields in the previous years went hand in hand with increased purchases of long-term bonds by institutional investors (see Chart 3.3). In addition, insurance corporations might further shift from equities to bonds and thus exert downward pressure on bond yields in order to reduce the expected volatility of their investment portfolios owing to the implementation of International Financial Reporting Standards (IFRS). The latter development implies that the assets of insurance companies are marked-to-market, whereas liabilities are not. Insurance corporations might also prefer bonds to equities in order to reduce investment risk and “save” on regulatory capital after the anticipated implementation of the Solvency II framework for insurance corporations (see also Section 5.1). At the same time, the windfall revenue gains of oil-exporting countries

Chart 3.4 OPEC's net assets and the currency share of its deposits

(Q1 1999 - Q2 2005)



Sources: Bank for International Settlements (BIS) and ECB calculations.

resulting from the surge in global energy prices can also represent an additional source of demand for euro-dominated bonds (see Chart 3.4).

Another factor supporting demand for euro area long-term bonds has been the growing diversification of Asian and other central banks' foreign exchange reserves away from the US dollar. Additionally, another structural development that might have played an important role in the strength of demand for long-term bonds, and thus for lower bond yields, has been the ageing of the population and increasing life expectancies.

Even though several factors potentially explain the low level of long-term yields, several indicators of the balance of risks for the future direction of euro area long-term bond yields have continued to convey concerns about the possibility of an ongoing rise in long-term bond yields. The so-called German market indicator – also known as the G-Mind – for bonds remained at historically low levels in early 2006 (see Chart 3.5).¹ This reflected a high degree of

¹ This is a qualitative indicator of the expected German bond market performance six months ahead according to about 350 financial experts, and is derived from the Zentrum für Europäische Wirtschaftsforschung (ZEW) financial market test.

pessimism among respondents about the near-term potential for bond price developments. A similar picture emerged from the option-implied skewness coefficient for German ten-year bond yields – a measure of the degree of asymmetry in the probability distribution of likely outcomes – as this remained significantly positive in the first few months of 2006 (see Chart S42).

Although these indicators suggest risks of further rises in long-term bond yields, there is no compelling evidence of mis-pricing of long-term yields in the euro area. For instance, assuming that in the long run, nominal ten-year government bond yields are closely linked – though not necessarily identical given risk premia – to long-term real economic growth and inflation expectations, long-term bond yields have remained close to fundamentals. The level of nominal ten-year government bond yields in early May 2006 was similar to that of Consensus Economics forecasts for average nominal GDP growth ten years ahead of about 3.75%. Looking ahead, the risk of an unexpected and significant further rise in euro area bond yields would appear to be lower than in the US. Nevertheless, it seems unlikely that an ongoing further upturn in long-term bond yields in the

US would leave euro area bond markets unaffected. In fact, this may explain why indicators of the balance of risk point to the possibility of an upturn, despite a lack of strong evidence for a pricing misalignment.

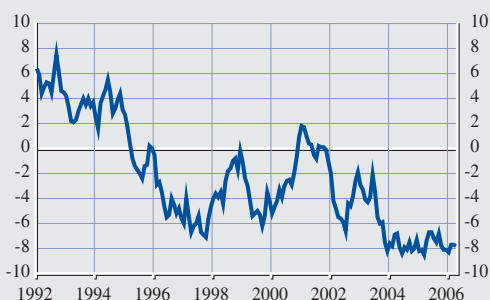
CREDIT MARKETS

During the six months after the finalisation of the December 2005 FSR, investment-grade corporate bond spreads in the euro area increased slightly (see Chart S49), whereas speculative-grade bond spreads declined somewhat (see Chart S50). These increases in investment-grade corporate bond spreads could be explained by some indications that the euro area credit cycle may be turning (see Box 3). At the same time, the decline in high-yield bond spreads may indicate that an aggressive search for yield seems to have continued. This is also suggested by further corporate bond spread compression in the auto and telecom sectors, two important corporate sectors regarding bond issues, which saw spreads narrow close to all-time lows by early May 2006 (see Chart 3.6).

Besides the cash market, prices of credit derivatives products can provide useful insights into the degree of credit risk prevailing in the

Chart 3.5 Survey-based indicator for the near-term bond market outlook in Germany (G-Mind bonds)

(Jan. 1992 - Apr. 2006)

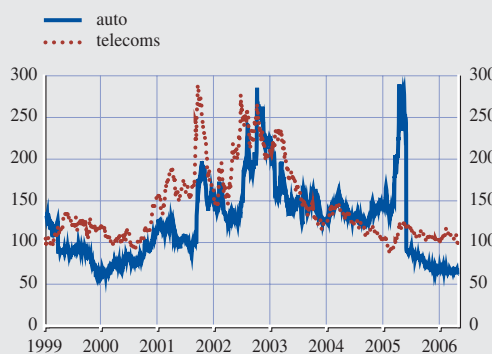


Source: Zentrum für Europäische Wirtschaftsforschung (ZEW).

Note: This is a qualitative indicator of the expected German bond market performance six months ahead according to financial experts. High and low levels reflect respectively an optimistic or pessimistic near-term bond market outlook.

Chart 3.6 Corporate bond spreads in the euro area

(Jan. 1999 - May 2006, basis points)

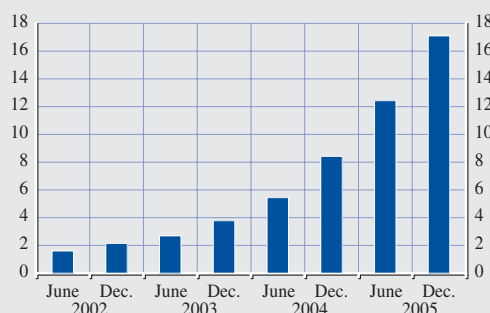


Source: iBoxx.

Note: The spread is between the corporate bond yield on investment-grade issues of more than €500 million and the three- to five-year government bond yield.

Chart 3.7 Notional principal outstanding in the global credit default swap (CDS) market

(June 2002 - Dec. 2005, USD trillion)



Source: ISDA.

Chart 3.8 iTraxx Europe five and ten-year indices

(July 2004 - May 2006, basis points)



Sources: iTraxx and Bloomberg.

economy.² Compared to conventional credit spreads on corporate bond yields, credit default swap (CDS) levels have an advantage in that they are not sensitive to the credit risk-free benchmark yield. In addition, the return on a corporate bond portfolio depends on its duration and its sensitivity to changes in interest rates.

In May 2004, the Bank for International Settlements (BIS) started publishing statistics on the market for CDS as part of its semi-annual OTC derivatives statistics. According to these data, globally the notional amounts outstanding of CDS rose by 60% from USD 6.4 to 10.2 trillion between December 2004 and June 2005. Growth was particularly strong in multi-name contracts, whose notional amounts more than doubled to USD 2.9 trillion. Single-name CDS increased by 43% to USD 7.3 trillion. The most recent International Swaps and Derivatives Association (ISDA) market survey, which started collecting data in June 2002 when the global notional principal outstanding on CDS was USD 1.6 trillion, also confirmed substantial growth, marking an increase from USD 12.4 trillion in June 2005 to USD 17.3 trillion in December 2005 (see Chart 3.7). This confirms that the size of the market has increased significantly in nominal terms, also because it does not include a substantial amount of CDS

contracts that have been terminated before maturity by triOptima.³ However, owing to the low level of transparency of non-price data, it is currently not possible to assess the real trading activity for each single-name CDS, the “quality” of prices at which trades take place, or the extent to which the corporate bond market is affected by CDS activity. This makes it more or less impossible to assess on the basis of available information the amount of credit risk being transferred through this market, and indeed the amount of credit risk held by counterparties.

In the European CDS market, premiums⁴ have declined since the finalisation of the December

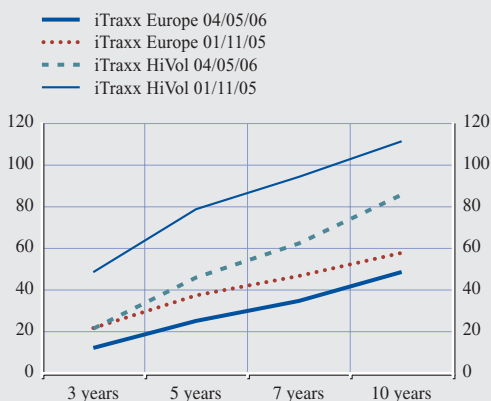
2 See Deutsche Bundesbank (2004), “Credit default swaps – functions, importance and information content”, *Monthly Bulletin*, December; and J. Hull, M. Predescu and A. White (2004), “The relationship between credit default swap spreads, bond yields and credit rating announcements”, *Journal of Banking and Finance*, 28, pp. 2789-2811.

3 Since its inception in November 2004 until February 2006, this has totalled at around USD 4.5 trillion. For a more detailed description of the triOptima service, see Box 17 in ECB (2005), *Financial Stability Review*, June.

4 A CDS is a contract in which a protection buyer accepts to pay a periodic fee (called premium) in exchange for a payment by the protection seller in the case of a credit event (such as a default) on a reference entity. The market price of the premium is therefore an indication of the perceived risk related to the reference entity. CDS indices are tradable portfolios consisting of the most liquid single-name CDS. The most popular CDS indices are the iTraxx indices in Europe and the CDX indices in the US.

Chart 3.9 iTraxx Europe and HiVol curves

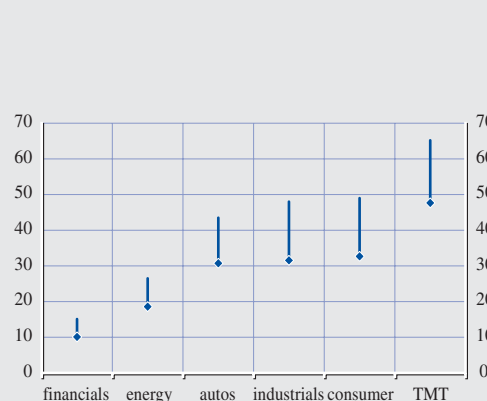
(basis points)



Sources: iTraxx and Bloomberg.

Chart 3.10 iTraxx sector indices: current levels compared to their lowest and highest levels

(Nov. 2005 - May 2006, basis points)



Sources: iTraxx and Bloomberg.

2005 FSR (see Chart 3.8) to relatively low levels, close to those seen before the May 2005 downgrading of Ford and GM to sub-investment grade.

Other financial market-based indicators of corporate sector credit risk have mirrored the patterns seen in CDS markets. For instance, the levels of expected default frequencies (EDFs), a market-based indicator of credit risk for stock market-listed companies, changed little after early November 2005 (see Chart 2.9 in Section 2). This overall favourable assessment by market participants may reflect the fact that corporate bankruptcy rates in the euro area remained low in 2005 compared with 2004.⁵ Using GDP-weighted country averages, the frequency of business insolvencies in the euro area stood at around 1% in 2005.

Some market-based indicators do point towards concerns that credit risks may be increasing at longer horizons. For instance, CDS curves slightly steepened after the finalisation of the December 2005 FSR, especially the iTraxx High Volatility Index (which includes the top 30 highest spread names from iTraxx Europe; see Chart 3.9). The apparent desire of investors to reduce credit duration may have been related to concerns about the implications for

bondholders of the pick-up in M&A activity and of slower corporate earnings growth.

Patterns in CDS prices have varied across different economic sectors over the last six months. For instance, CDS premia for companies in the technology, media and telecommunications (TMT) sector remained at relatively high levels because of expectations of slowing profit growth and because market participants negatively assessed the implications for bondholders of a pick-up in M&A activity. By contrast, CDS premia for financial firms, which were already low, fell even further, mostly because of the strength of profitability in the sector (see Chart 3.10).

Concerning the outlook for credit markets in the euro area, there is a risk that spreads and premia could be pushed wider in the period ahead, as some of the factors that held spreads tight have unwound somewhat. Both short and long-term risk-free interest rates have increased over the past six months, and the risk of a credit event may have risen, given acceleration in M&A activity, including large debt-financed

⁵ See Creditreform (2006), "Insolvencies in Europe 2005/06: A survey by the Creditreform Economic Research Unit". This survey covers companies of all sizes, and predominantly measures insolvencies of small and medium-sized companies.

acquisitions, and because of a pick-up in LBO activity. The increased credit event risk also highlights the importance of proper documentations of all trades and the need to solve confirmation backlogs which became a focus of regulators' attention in 2005. Some of the market responses to these threats are described in Box 8.

Another important risk posed by credit markets is that the interaction between cash and derivatives credit instruments has made it more difficult to monitor either investor behaviour or the building up of concentrations of positions, which could be facilitating the accumulation of systemic risks. On the positive side, some initial attempts are being undertaken to gauge the spreading of risk as well as to assess its concentration among the largest financial institutions (for example, by the Fitch Ratings surveys). However, the importance of these risks is difficult to assess, given shortcomings in available data.⁶ More and improved data on

net credit risk exposures and on the concentration of positions – which tend to build up easily in highly leveraged and opaque markets – could be of considerable benefit in mitigating important shortcomings in liquidity risk management. In fact, such data could aid market participants and competent authorities in better valuing, managing and pricing the increasing risks posed when investors behave in a homogeneous way (which can cause trades for instance to become crowded, potentially threatening systemic liquidity in the event of market stress).⁷

6 See Fitch (2005), "Global Credit Derivative Survey", November, which highlights the fact that "existing standards of financial disclosure do not provide sufficient insight into firm level positions and exposures, particularly with reference to how credit derivatives and credit structured products are used to either mitigate, diversify or take on additional risks".

7 See, for instance, Recommendations 1, 3, 46, 47 and Guiding Principle 45 in Counterparty Risk Management Policy Group (2005), "Toward greater financial stability: A private sector perspective", July. See also IMF (2006), *Global Financial Stability Report*, April; and Joint Forum of the Basel Committee on Banking Supervision (2005), "Credit Risk Transfer", March.

Box 8

DEVELOPING MARKET SOLUTIONS TO IMPROVE THE FUNCTIONING OF CREDIT DERIVATIVES MARKETS

Some large corporate bankruptcies in 2005 had the potential to create adverse disturbances in credit risk transfer (CRT) markets, as some of the affected corporations had been used as reference entities in numerous credit derivatives transactions. The credit events following on from these defaults resulted in early settlement or renegotiation of a large number of credit derivatives contracts across many segments of the CRT markets. The fact that the eventual impact of these credit events was not as severe as might have been expected can, to an extent, be attributed to some recent innovations that have taken place in the credit derivatives market. Some of the most important of these innovations are described in this Box, which also draws some implications for market functioning.

Tradable Credit Fixings

Since the inception of the credit derivatives market, the industry has repeatedly called for more reliability in, and transparency of, pricing in the market. The market was seen as being extremely opaque, with no reliable prices generally available. Potential investors had to rely solely on the dealers' pricing, with little possibility to check their quotes against a market standard. As the traded volumes and market exposures grew and the end-investors' involvement increased, the need for an unbiased market price reference acceptable to all market participants became increasingly obvious. A solution came in March 2005 with the advent of Tradable Credit Fixings

("Credit Fixings") covering the European 5Y iTraxx CDS indices. These were developed by Creditex, Inc. ("Creditex") and Markit Group Limited ("Markit"), in cooperation with major credit derivatives dealers. Similar in concept to interest rate fixings used in other financial markets, such as EURIBOR and LIBOR, they are calculated from quotes submitted by a number of participating dealers. An important feature of Credit Fixings that makes them different from traditional fixings is that the published quotes are not mere indications, but instead represent a price at which a contributor is ready to trade. The fixing procedure includes a provision according to which transactions up to regularly traded market size can be executed during the auction process using the submitted price quotes. This provision aims at discouraging potential attempts by the fixing contributors to manipulate the fixings results, and makes the resulting prices more reliable.

Creditex and Markit worked closely together with a panel of seven dealers to develop and refine the Credit Fixings methodology. Dealers electronically contribute executable, two-way prices on the Creditex platform which are used to determine bid, mid and offer fixings and the resulting transactions. Markit oversees the process and disseminates the official fixing levels. The Credit Fixings take place each Friday with an additional fixing made on each of the quarterly International Monetary Market (IMM) roll dates.¹ Since the first official Credit Fixing on 21 March 2005, Credit Fixings have established their place in the market, providing a variety of immediate as well as potential uses. They can be used, for example, not only for pricing and marking-to-market credit derivatives positions, but also for pricing second-generation derivatives based on CDS indices (at present, an iTraxx futures contract is being developed by Eurex, probably to be launched during the second half of 2006).

Standardisation of cash settlement after credit events

The Credit Fixings methodology has also proven useful in the settlement process of several credit events recently. For some time, market participants had been calling for an efficient solution to the issue of settling outstanding credit derivatives contracts in the case of a default of the reference entity. When a credit event occurs, in order to be able to benefit from purchased protection, the buyer of protection needs to deliver the appropriate amount of the defaulted reference entity's obligation to the original protection seller. There are often mismatches, sometimes very large ones, between the amount of protection bought and the volumes outstanding of the underlying debt instruments that could potentially be delivered.² As corporate bonds issued by entities which have defaulted are often sought after by specialised distressed debt funds as well as by uncovered protection buyers (investors who bought protection but do not own any obligations of the reference entity, and have to find such deliverable obligations after the credit event), peculiar situations can arise whereby the prices of defaulted debt can soar to levels well above any reasonable recovery rate. Not only are such situations not welcomed by the parties involved, but they can also have broader negative implications, as they may distort the fundamental valuations of defaulted assets and create problems with the physical settlement of derivatives contracts. One solution to this issue is for credit derivatives contracts to be settled

1 The standard rollover dates for Chicago Mercantile Exchange (CME) financial futures contracts are in March, June, September and December each year.

2 For instance, Delphi, a major car parts maker and supplier to General Motors, defaulted on its debts in 2005. As the company held an investment-grade rating until end-2004, it was referenced in a large number of CDS indices and CDO transactions. It was also one of the most frequently traded names in the CDS market. A challenge was created by the fact that the amount of protection bought was estimated at more than USD 25 billion, while the volume of outstanding Delphi obligations including loans and bonds amounted to less than USD 5 billion.

in cash following a credit event. This makes the amount of bonds outstanding no longer relevant, and settlement can take place at fairer prices based on fundamentals.

Even though the possibility to opt for cash settlement is present in every bilateral credit derivatives contract, it has so far not been used to any great extent, mainly because of the difficulties in determining the market value of the contracts. Hence, a solution based on transparent and reliable pricing acceptable to most market participants was needed. The ISDA, an industry association, came up with a solution in the form of ISDA Protocols, which use the above-mentioned Credit Fixings methodology as an integral part of the process. Parties adhering to the Protocol join a multilateral agreement soon after a credit event to settle their credit derivatives contracts in cash, rather than by physically delivering bonds. The price used is determined by a Credit Event Fixing algorithm devised within the Protocol. Initially, the Protocols were only used for the cash settlement of contracts that formed part of a CDS index.³ Single-name CDS contracts were not included in the cash settlement process, and still had to be settled physically. This meant that investors holding offsetting positions in single-name and index contracts were exposed to the risk that the value of the cash settlement could differ substantially from the price of the bonds used for physical settlement, known as basis risk. The Protocols and the price-setting procedure were therefore updated to address this issue. The amended version of the ISDA Protocol was used for the first time in November 2005 to settle obligations arising from the default of Delphi Corp. Under the new version, in addition to entering a tradable bid and offer price as in previous Credit Event Fixings, auction participants also submitted their market and limit orders to buy and sell cash bonds. The algorithm then produced a final settlement price at which the signatories of the Protocol would buy and sell bonds to be used in the physical settlement of the single-name contracts, and which would also be used for cash settlement of index components. In addition, corresponding buy and sell orders were matched and actual bond trades were executed during the auction. The new methodology could potentially reduce the overall basis risk between cash and physically settled contracts, as the transparent and fair bond price determination should make market participants indifferent with regard to which of the two settlement methods they should use for all contracts covered by the Protocol. By permitting bond trading during the Credit Event Fixings, the Protocols also help ease the heavy burden imposed by credit events on the settlement operations of the banks involved.⁴ The ISDA work on the Protocols, integrating the physical and cash settlement procedures after credit events, continues with the aim of making the whole process smoother and even more attractive to the widest possible array of market participants.

Settlement Backlog

With the volume of trading growing exponentially, and back-office systems only being able to catch up slowly, many credit derivative trades have remained unconfirmed for weeks after being executed. In such a situation, if a credit event were to occur, it may prove very difficult to determine anyone's true exposure to the defaulted entity within the deadlines envisaged in the contracts.⁵ Regulators, in particular the UK's Financial Services Authority (FSA)⁶ and the

³ In such cases, the index must be readjusted because the defaulted entity component must be taken out and settled separately.

⁴ Another important contributor is the triReduce contract termination service provided by triOptima. For example, more than 5,800 single-name and 42,000 index contracts referencing Delphi have been terminated, with the bulk of terminations occurring close to the credit event (for a more detailed description of the triOptima service, see Box 17 in ECB (2005), *Financial Stability Review*, June).

⁵ This situation has been made worse by the common practice, especially among hedge funds, of reassigning trades to another counterparty without the original party's consent.

⁶ See the "Dear CEO letter" from February 2005, which may be found at http://www.fsa.gov.uk/pubs/ceo/derivatives_22feb05.pdf.

Federal Reserve Bank of New York (the Fed), have expressed their concerns about the number of unconfirmed trades on several occasions. Such concerns have also been voiced and addressed by the industry itself.⁷ Eventually, in October 2005, the Fed took a rather unprecedented step by making the largest credit derivatives dealers commit themselves to addressing this problem within several months. In a follow-up meeting in February 2006, the dealers were able to report that the number of trades remaining unconfirmed for more than 30 days had been cut by 54%, a larger improvement than the initial target of 30%. It was also reported that the share of electronically confirmed trades had risen to 62% of the entire trade volume, up from 46% in September 2005. Indeed, electronic confirmations, trade reconciliations and matching are on their way to becoming the industry standard, as most active investors as well as dealers now match their CDS trades using the Depository Trust & Clearing Corporation (DTCC) or LCH. Clearstream services.

Some of these innovations and developments that have been taking place in the credit derivatives market with a view to improving market functioning are also positive from a financial stability viewpoint. By providing transparency in, and enhancing the reliability of, the pricing of credit derivatives, Credit Fixings help the price discovery process. In turn, this should improve market liquidity and work towards reducing the risk of panic behaviour, a common characteristic of an opaque market environment. The ISDA Protocols using Credit Event Fixings should help in determining the fundamental recovery value after default by reducing, and indeed eliminating, the risk of market squeezes that can significantly influence the final settlement price. In so doing, investors' confidence in the results of bankruptcy processes should be enhanced. Furthermore, electronic confirmations, trade reconciliation and matching services should further facilitate improvements in straight-through processing, making manual intervention in the settlement of trades unnecessary. As the use of credit derivatives has become widespread, a smooth settlement process without significant backlogs should help prevent single counterparty problems from escalating into systemic threats.

⁷ See Counterparty Risk Management Policy Group (2005), "Toward greater financial stability: A private sector perspective", July (<http://www.crmpolicygroup.org>).

EQUITY MARKETS

Euro area stock prices continued to rise after November 2005, reaching five-year highs by early May 2006 (see Chart S43). The small and mid-cap segments of the euro area stock markets rose to new all-time highs, whereas large cap stocks had still not fully recouped losses endured after March 2000, remaining about 20% below their peak.

The strength of equity prices after early November 2005 was notable in view of the fact that there were some indications that earnings growth may have peaked. This was explained in part by the fact that equity markets continued to be supported by low risk-free interest rates. Other factors

supporting stock price valuations included earnings estimates by stock market analysts and by companies which were continuously revised upwards on a net basis, optimism about the implications for profits of greater M&A activity, and a high degree of risk appetite among investors, especially in early 2006 (see Box 9).

Among the supporting factors was also a significant pick-up in euro area mutual equity fund inflows, which increased by 50% in 2005 compared with 2004, according to European Fund and Asset Management Association (EFAMA) net sales statistics. These inflows were in 2005 1.4 times (2004: 1.2 times) those of bond funds domiciled in the euro area,

reflecting a high degree of risk tolerance among euro area mutual fund investors.

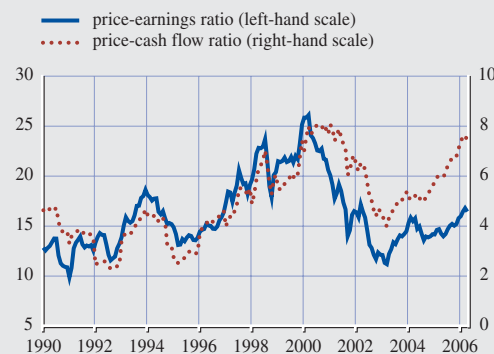
Looking at the stock market valuation, several valuation metrics suggest that euro area stock prices may have become quite expensive given the fundamentals. For the stock market as a whole, the price-earnings (P/E) ratio, based on ten-year trailing earnings, has remained historically rather high (see Chart S44). Another metric of stock price valuation commonly used by investment analysts is the price-cash (P/C) flow ratio. Unlike the P/E ratio, the P/C ratio relies on cash flows, defined as funds from operations. Cash flow or operating earnings is a trustworthy profitability measure that cuts through much of the arbitrariness of reported earnings. Regardless of whether a cash outlay is counted as an expense or turned into an asset on the balance sheet, the cash flow tracks the money left over for investors, and shows cash flows into and out of a company as a result of its main operations. For most of the time since the early 1990s, the price-cash flow ratio has rather closely co-moved with the P/E ratio based on reported earnings (see Chart 3.11). However, after early 2000 the two ratios started to diverge, reflecting the difficulties faced by some euro area companies in generating cash out of earnings. By early May 2006, the P/C ratio had reached very high levels, both historically and compared to the P/E ratio, that closely resembled those seen just before the bursting of the dot-com bubble after 2000.

Within the euro area stock market, valuations have differed, with those for small and mid-cap stocks reaching very high levels. P/E ratios based on 12-month trailing earnings for small and mid-caps in early May 2006 were about 20 and, when based upon projected earnings, stood at 17. These levels were higher than the P/E ratios for the euro area large cap stock sector in terms of trailing and projected earnings, at 14 and 13 respectively.

High valuations in euro area stock markets may explain the continued buoyancy of initial public offering (IPO) and secondary public offering

Chart 3.11 MSCI euro area price-earnings and price-cash flow ratios

(Jan. 1990 - Apr. 2006, %)



Source: Thomson Financial Datastream.
Note: Cash flows refer to funds from operations.

(SPO) activity in the euro area in early 2006 (see Chart S48). The average sizes of both IPOs as well as SPOs had in 2005 already reached higher levels than those seen around the time of the inflation caused by the dot-com bubble.⁸

Looking at the risks to equity markets, the perception of near-term risks, as reflected in implied stock market volatility, remained low (see Chart S45). Stock market uncertainty derived from the distribution of options prices did not change much by April 2006. In particular, the option-implied probability distribution of the Dow Jones EURO STOXX 50 index remained broadly unchanged (see Chart S46).

Looking further ahead, the risk of a reappraisal of pricing in euro area equity markets has increased since the December 2005 FSR. Several factors point towards greater downside risks. Risk-free interest rates have risen, and there have been increasing indications that the corporate earnings cycle may have started to turn. It also appears unlikely that the high frequency at which earnings estimates for euro area companies have been revised upwards will be sustained. Furthermore, optimism about the implications of high M&A activity, together

⁸ See ECB (2006), "Equity issuance in the euro area", *Monthly Bulletin*, May.

with a high degree of risk appetite, cannot be expected to provide ongoing support to stock prices. Finally, valuation metrics for euro area stock prices, especially the P/C ratio for the market as a whole, point towards greater downside risks.

Box 9

HOW RISK-TOLERANT ARE INVESTORS?

The possibility of a reappraisal of the pricing of a wide array of financial securities prices has over the past couple of years been considered to be one of the major risks to global financial stability. Since this assessment has been largely based on questions about whether investors have perceived risks as being very low and/or whether they have been prepared to accept less compensation for holding risky assets, the degree of risk appetite in global and euro area financial markets needs to be assessed in order to shed some light on this question. From a financial stability viewpoint, excessively high risk appetite may push asset prices beyond their intrinsic value and, if it persists, could sow the seeds of financial market stress if it leads to a misallocation of capital in the economy and disorderly conditions in financial markets. This Box assesses recent patterns in two risk appetite indicators.

Conceptually, the degree of risk appetite prevailing in financial markets is unobservable. The inverse of risk appetite (or risk tolerance) is also known as risk aversion. Risk aversion is a concept that explains the behaviour of investors under uncertainty, and refers to the reluctance of an investor to accept an investment with an uncertain return rather than another investment with a more certain but possibly lower expected return.

Broadly speaking, two different practical concepts can be applied to measure the degree of risk appetite in financial markets.¹ The first approach is to examine a wide set of financial market variables that have historically shown a high degree of sensitivity to swings in risk appetite. The second is to interview financial market participants about their views on the pricing of a risky asset, such as equity, or about their degree of risk appetite. An example of the first approach is the risk aversion indicator developed by Merrill Lynch, which tracks weekly changes in global risk aversion on the basis of eight components. Each component is expressed in terms of the number of standard deviations from its 52-week moving average.² An example of the second approach, applied to Germany, is the so-called G-Mind Stocks constructed by the Zentrum für Europäische Wirtschaftsforschung (ZEW) in its Financial Market Test. On a monthly basis, the ZEW asks about 350 German analysts about their qualitative views on whether the likely direction of German stock price markets over the subsequent six months is up, unchanged, or down. A value of +10 indicates unlimited optimism among the respondents about the near-term stock market outlook and thus a very high degree of risk appetite, whereas a value of -10 indicates extreme pessimism and thus a very high degree of risk aversion. Between December 1991 and April 2006, the historical average for this indicator stood at about 6, indicating that, on average, financial market experts tended to be optimistic about the return performance of risky equity over this period.

1 For a more extensive overview, excluding survey-based measures, see M. Illing and M. Aaron (2004), "A brief survey of risk-appetite indexes", *Bank of Canada Financial System Review*, June, pp. 37-43.

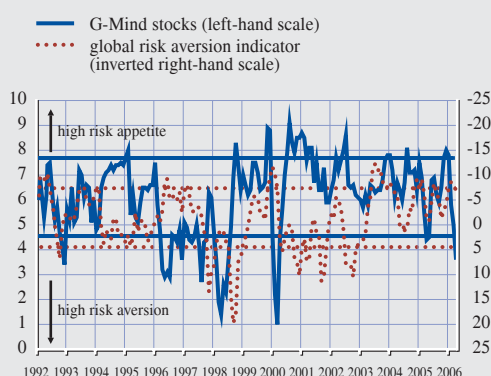
2 The composite indicator is constructed by summing the standard deviations of the US high-yield spreads (see Chart S21), US ten-year swap spreads, implied US stock market volatility (see Chart S15), TED spreads (see Chart 1.15), emerging market bond spreads (see Chart 1.27) and the trade-weighted Swiss franc, while subtracting those of emerging market equities (see Chart S23) and US small cap stocks.

Since the finalisation of the December 2005 FSR, risk appetite appears to have increased well above average levels, especially in early 2006 (see Chart B9.1). Nevertheless, it is important to bear in mind that these indicators frequently send conflicting messages, a fact that most likely reflects conceptual differences in their construction. Hence, a wide array of different indicators should be considered when assessing the degree of risk appetite prevailing in the financial system. In this vein, other risk appetite indicators, such as the global risk appetite indicator developed by Credit Suisse First Boston based on historical risk/reward across a broad spectrum of global asset classes, and the survey-based risk appetite indicator as published in the Merrill Lynch Global Fund Manager Survey, also suggest that the level of risk appetite was very high in early 2006. This could mean that in their search for yield, investors have become increasingly willing to accept less compensation for holding risky assets. To the extent that this is the case, this could leave some markets vulnerable to a reappraisal of underlying risk in the period ahead.

For a comprehensive assessment, it is important to verify whether global risk appetite tends to co-move with euro area stock price developments, especially across sectors with different sensitivities to risk appetite. Euro area sectors which tend to be most sensitive to swings in global risk appetite, such as the financial sector, have outperformed since the December 2005 FSR sectors that are comparatively unaffected by changes in risk appetite, such as the healthcare sector (which contains non-cyclical consumer goods) (see Chart B9.2).

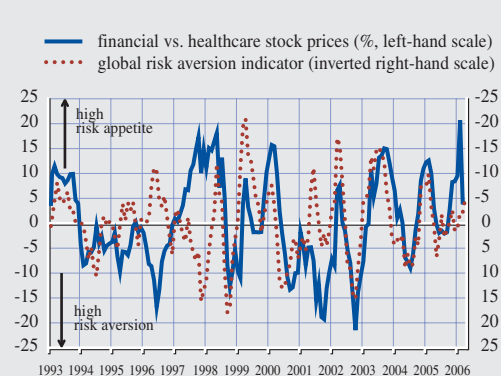
All in all, several risk appetite indicators suggest that investors became very risk tolerant in early 2006. Given that such levels of risk appetite have rarely been sustained in the past, it cannot therefore be excluded that a reappraisal of the pricing and risks of financial assets may take place in the period ahead.

Chart B9.1 Global asset prices-based and German survey-based risk appetite indicators



Sources: Merrill Lynch, ZEW and ECB calculations.
Note: Horizontal lines refer to the sample average plus or minus one standard deviation.

Chart B9.2 Six-month changes in the euro area financial vis-à-vis healthcare stock prices and in the global risk aversion indicator



Sources: Merrill Lynch, Thomson Financial Datastream and ECB calculations.

4 THE EURO AREA BANKING SECTOR

The financial results of large euro area banks that became available after the December 2005 FSR was finalised painted a picture of a profitable euro area banking sector with comfortable solvency ratios. In several euro area countries, profits were driven by continued strength in the demand for loans for house purchases that more than offset declining margins resulting from intense competition in the mortgage lending market. Banks in the euro area also successfully continued to widen their income base, by expanding their lending to the non-financial corporate sector and by expanding various sources of non-interest revenue. Behind the buoyant financial results, impairment charges (or provisioning) remained at very low levels, which could herald downside risks for future profitability should the prevailing benign credit environment reverse.

In the six months after the finalisation of the December 2005 FSR, the financial condition of the euro area banking system improved further: profitability strengthened further while solvency ratios remained comfortable. The financial results for large euro area banks showed that, on average, banks' profits continued to be supported by cost-cutting and declining loan loss provisioning flows (or loan impairments following International Financial Reporting Standards, IFRS, terminology), which reflected the benign credit environment in which banks operated. Looking ahead, some risks and vulnerabilities remain both in the operating environment of banks and within banking institutions themselves but the shock-absorbing capacity of banks in the euro area appears to be more than adequate.

Despite persistently low long-term interest rates, strong volume growth in lending allowed banks in several euro area countries to raise their income from their core maturity transformation businesses. While the growth of interest income in several Member States was sustained by the strength of lending to the household sector, especially mortgage lending,

a recovery of corporate sector loan demand in most Member States provided banks with improved income diversification.

Nevertheless, there are indications that intense competition among banks – particularly in the mortgage market – could have contributed to a narrowing of margins and a gradual easing of banks' lending standards in several euro area countries. Since this may risk the building up of future vulnerabilities for banks, especially if lending standards ultimately prove to have been too easy, it calls for more widespread and frequent stress-testing of banks mortgage loan portfolios. In addition, there are some indications that cost-cutting could have abated in several euro area countries, and that recent low provisioning levels could have started to reverse in several Member States where banks' exposures to credit risk is relatively higher.

In order to compensate for tight lending margins in their core business in 2005, banks in the euro area increasingly sought out non-interest sources of income, including fees and commissions, and larger banks expanded trading revenues. Although the diversification of banks' income bases with larger shares of non-interest sources should, on the face of it, be seen as a positive development, some non-interest revenue sources, such as trading income, tend to be rather volatile. This means that greater reliance on income from such business lines may – unless it is sufficiently negatively correlated with other income sources – generate additional volatility in banks' earnings in the future.¹

¹ See Box 11 in ECB (2004), *Financial Stability Review*, December, which shows only a weak negative correlation between trading income and interest income for a sample of euro area banks during the period 1996-2003. R. Smith, C. Staikouras and A. Wood (2003), "Non-interest income and total income stability", *Bank of England Working Paper*, No 138, find that non-interest income stabilised profits in most but not all EU bank categories from 1994-1998. They find that non-interest income is not invariably more stable than interest income. K. Stiroh and A. Rumble (2005), "The dark side of diversification: The case of U.S. financial holding companies", Federal Reserve Bank of New York, mimeo, find for US institutions that diversification gains are more than offset by the costs of increased exposure to volatile activities.

Looking further ahead, merger and acquisition (M&A) activity picked up in the euro area banking sector during 2005, where additional consolidation gains are still foreseen. However, past experience has shown that cross-border mergers in particular are complex to execute and do not necessarily create substantial value in the short term.

All in all, the risks facing the euro area banking sector need to be considered against the background of improved risk management practices, which has mostly been facilitated by credit risk transfer techniques and the adoption of more advanced tools and methods for stress-testing. Nevertheless, in the case of those banks that have recently expanded into new business areas, there is some doubt as to whether the tools and practices being applied are adequate. This is due to the increasing complexity of financial market instruments; the growing presence of unregulated financial institutions as counterparts to banks; and the risk that the clearing and settlement system capacities of banks may prove to be insufficient when trading volumes spike at times of stress. In addition, stress-testing practices – as commonly applied both at the bank level and at the systemic level – do not always manage to capture adequately all macroeconomic feedback or second-round effects. More work is therefore required to improve standards and practices in this area.²

In theory, indicators derived from financial asset prices should contain information not only about the financial condition of banks but also about their capacity to weather adverse disturbances. In the six months following the finalisation of the December 2005 FSR, most of these indicators suggested that market participants continued to assess positively the shock-absorption capacity of euro area banks. However, there have been indications that uncertainties about the resilience of the banking sector in the short term increased, partly reflecting the general increase in financial market volatility in early 2006.

4.1 FINANCIAL CONDITIONS IN THE BANKING SECTOR

Despite a generally slow pace of economic activity in the euro area, banking sector profitability strengthened further in 2005.³ In fact, even in those Member States that could be characterised as having had a weak economic environment in 2005, there were indications that their banks managed to improve their performances.

The pace of lending growth to the private sector – which was already very strong in 2004 – accelerated in 2005. The acceleration was due to a recovery of lending growth to the corporate sector while strong lending growth to households was sustained. The recovery of lending to firms may have been due, at least to some extent, to strong growth in the private equity business, namely by financing leveraged-buy-outs (LBOs), in which some large banks appear to be significantly involved, as well as from a pick-up in M&A activity. In spite of a further decline in the interest rate margins of banks in the euro area, their net interest income increased in some countries and remained broadly stable in others owing to increasing lending volumes. At the same time, banks became increasingly dependent on market-based funding (e.g. bond issuance), as deposits were insufficient to cover lending growth. This may in turn lead to higher structural funding risk.

Growth in non-interest income remained strong in most euro area countries during 2005, mainly because of significant increases in fee and commission income and, to a lesser degree, favourable trading results, reflecting the overall very favourable conditions in financial markets.

2 The Special Feature article on “Country-level macro stress-testing practices” in this Review provides an overview of current practices in stress-testing at a systemic level.

3 This Section draws heavily on information on banking systems collected by the Banking Supervision Committee (BSC) at the national level. It refers to 2005 as a whole and to conditions in individual countries. Since it has a different coverage its main conclusions may not be fully reflected in the data for the set of large banks discussed later in this section.

Cost-cutting proved to be a less important contributor to the strength of profitability for euro area banks in 2005 than in the previous year, suggesting that the opportunities for reducing costs further could be nearing exhaustion. In some euro area countries, there was even a slight rise in operating costs, mostly due to increasing staff expenses, coupled with a rise in administrative expenses. However, in other countries cost-cutting was still seen as an important driver for the strength of profitability. Overall, even for countries with higher costs compared to 2004, cost efficiency as measured by cost-to-income ratios continued improving, but this was mostly driven by income growth.

A progressive lowering of provisioning for loan losses by banks over recent years was an important contributor to the recovery of banking sector profitability from 2003 onwards. However, there are indications that it began to abate in most euro area countries in 2005. In some countries there were even increases in impairment charges in the second half of 2005, although in most cases from very low bases. Although the IFRS accounting rules may have an impact on impairment charges, there is as yet no clear evidence that the adoption of the new rules has significantly affected the flow of asset impairment charges. Nevertheless, a further decrease in impairment costs was observed in most countries, possibly owing to the favourable credit environment and the still relatively greater focus of banks on their household businesses (as opposed to corporate lending). Looking forward, from a financial stability viewpoint, further declines in impairment charges would seem undesirable, and a gradual rise in impairment charges and non-performing loan ratios appears to be anticipated by banks in most euro area countries.

Another important factor contributing to the improved performance of large euro area banks has been their international orientation. This allowed them to benefit from strong performances in their foreign operations (mainly in the UK, the US, Latin America and central and eastern Europe). Favourable global equity

market developments boosted commissions and produced realised and unrealised capital gains in banks' equity portfolios.

There are indications that the solvency levels across euro area banking systems were rather heterogeneous in 2005. The Tier 1 capital ratio of some euro area banking systems could have come under downward pressure throughout the year, due to an increase in risk-weighted assets, or to idiosyncratic factors related to specific bank mergers. At the same time, this ratio remained broadly stable or even increased in a few countries where increases in risk-weighted assets were, to some extent, offset by increased profitability to varying degrees, as well as through the issuance of hybrid capital in a few cases. Nevertheless, own funds and core capital ratios remained on aggregate comfortably above the minimum regulatory requirements.

FINANCIAL CONDITIONS OF LARGE EURO AREA BANKS

With the introduction of new IFRS accounting standards, it has become challenging to assess the recent financial performances of banks from a historical perspective.⁴ Moreover, the challenges are aggravated by the fact that some reporting institutions availed themselves of the various carve-out options available under IFRS when preparing their financial statements for 2005 and in preparing comparable sets of financial statements, on a pro forma basis, for 2004.⁵ This lowers comparability both for individual banks over time and across banks. Therefore, it is necessary to interpret the financial results discussed in this sub-section with a high

4 The sample of 16 large banks included in the set of large euro area banks report their accounting results under IFRS accounting standards. Data for 2004 and 2005 are included for all banks. This sample of large banks should not be confused with the large bank group based on the annual consolidated banking data in the December 2005 FSR. The latter group is based on annual data that cover the entire reporting population. One of the banks reports under US GAAP, but is included because of its importance in terms of size and its presence in euro area retail and capital market activity, and also due to the similarity between US GAAP and the IFRS.

5 For example, banks in some countries have chosen to apply the 'carve-out' option relating to IAS 32 and IAS 39. Alternatively, banks can apply IAS 32 and 39 to full-year data for 2005, but to for the restated (IFRS) data for 2004.

degree of caution until the standards have been fully implemented and adequate time series of data are available. It should be noted that despite these short-term implementation problems, the differences in figures between reporting institutions over time are expected to decrease, and the expected positive benefits of the new accounting standards will be fully realised.

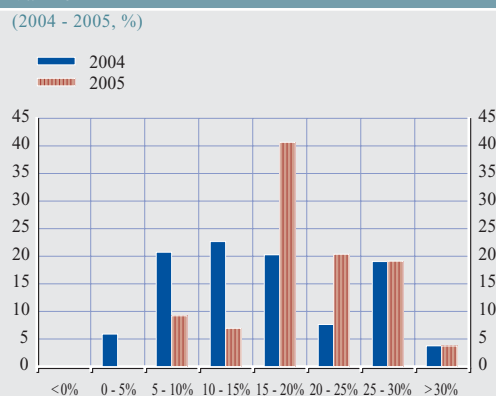
Overall, in 2005 there was a broad-based improvement in the profitability of the set of large euro area banks under consideration. Underlying the strengthening of profitability, interest income increased slightly and non-interest income continued to grow at a greater pace than interest income, reflecting increased fee and commission income and trading income. The strengthening of profitability was further supported by a reduction in loan impairments among the set of large banks, owing to the benign credit environment prevailing throughout 2005.

Profitability strengthened further

The profitability of large euro area banks increased throughout 2005, making it the third consecutive year of improvement. In 2005, the weighted average return on equity (ROE) rose to just under 20%, up from 16.5% in 2004. At the same time, the degree of dispersion (measured by the interquartile range) of performances around the average ROE narrowed considerably in 2005 compared with 2004 (see Table S5). Moreover, those banks that had the lowest ROE in the sample in 2004 managed to increase their ROE in 2005, thereby shifting the ROE distribution to the right (see Chart 4.1).

It cannot be ruled out that the new financial reporting standards may have had an impact on headline profitability and associated financial performance measures.⁶ For instance, some banks recorded one-off income gains, arising from the sale of equity investments, that fed through their profit and loss accounts. These gains might have been related to the banking business, such as divesting strategic shareholdings, as well as to realised gains on available-for-sale portfolios.

Chart 4.1 Frequency distribution of return on equity for a sample of large euro area banks



Sources: Published financial statements of individual institutions and ECB calculations.

Notwithstanding the uncertainties concerning the impact of the new accounting standards, most banks recorded broad-based growth in underlying profitability. This growth was mainly organic, i.e. involving increased loan growth, and generally positive performances of 'home' retail markets and/or a presence in fast-growing non-domestic retail markets both inside and outside the euro area. Many of the large banks in the sample considered have substantial activities outside the euro area, including in North and South America, southern and eastern Europe, and Asia. Not only has this added an additional layer of income diversity to their operations but margins have tended to be higher and the variety of business opportunities from these geographic areas have been greater mainly because of more buoyant economic developments in these countries than at home.

On a consolidated basis, the risk-weighted assets of the sample of banks considered increased by about 12% between 2004 and 2005, indicating a continuing expansion of activity into retail markets located in 'home' markets and in other geographic areas. Concerning banks operating in less dynamic retail markets, the return to

⁶ One bank in the sample experienced a slight drop in equity due to the introduction of the standards. This led to a small increase in the overall return on equity (ROE) ratio for the bank in question.

profitability from the losses made in previous years was mainly the result of past restructuring and the fact that no major asset write-downs took place during 2005.

Operating income increased

Lending to the household sector in 'home' markets remained an important driver of banks' favourable performances in 2005. Strong loan demand for house purchase and consumer credit provided them with ample opportunities to increase their loan volumes in these markets still further (see Chart S35). While conditions in local retail markets varied throughout the euro area, loans to the household sector provided banks in most countries with both a steady source of volume growth and an opportunity for cross-selling additional products, which is one way of increasing non-interest income.

An additional factor contributing to the improvement in profitability among large banks was a marked recovery of corporate loan demand. Lending growth to firms in the euro area almost doubled between early 2004 and the end of 2005, increasing from around 4% in 2004 to reach 8% (see Chart S56). Although in some Member States non-financial corporates continued to repay their debts on a net basis,

evidence from the April 2006 Bank Lending Survey suggests that for the euro area as a whole, corporate loan demand is expected to remain firm in the near future (see Box 10).

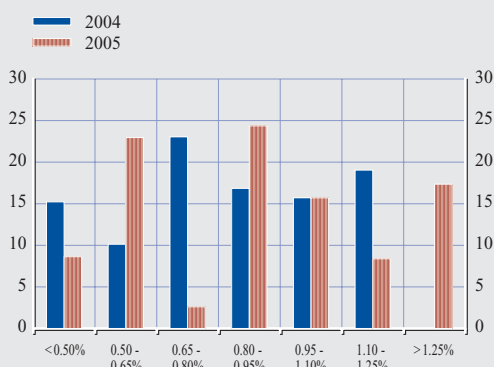
The average net interest income of large euro area banks, as a percentage of total assets, increased slightly to just over 0.9% in 2005, compared with 0.8% in 2004 (see Chart 4.2 and Table S5). In Member States where economic growth remained sluggish there were indications of somewhat more risk-averse pricing by banks which may have contributed to a slight increase in margins (see Table S5).⁷

While average margins may have increased slightly, the sample of euro area banks considered continued to show a retail funding gap, whereby more retail (non-bank) loans were being granted than could be funded out of retail

⁷ As mentioned in the introductory section of this sub-section, the introduction of the new accounting standards creates challenges in the interpretation of results. 'Core' interest income is recorded in the profit and loss account. Under the IFRS, interest income from 'available-for-sale securities', portfolios and other sources are also recorded under the interest income item, possibly distorting the overall net result. Where possible, only core interest income is used but not all banks provide a detailed breakdown of this item in their earnings reports. Furthermore, under IFRS, interest on impaired loans is also recognised under this item.

Chart 4.2. Frequency distribution of net interest income for a sample of large euro area banks

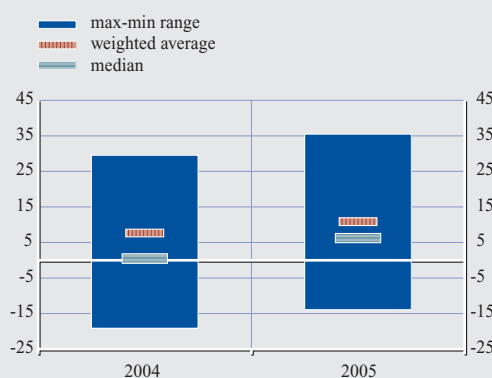
(2004 - 2005, % total assets)



Sources: Published financial statements of individual institutions and ECB calculations.

Chart 4.3 Retail funding gap for a sample of large euro area banks

(2004 - 2005, % total loans)



Sources: Published financial statements of individual institutions and ECB calculations.
Note: The retail funding gap is defined as non-bank loans-non bank deposits expressed as a percentage of loans. A positive

deposits. The difference had to be made up by resorting to more expensive market funding, which contributed to continued pressure on interest margins. This gap increased slightly between 2004 and 2005 (see Chart 4.3).

The growth of non-interest income in 2005 was much larger than that of interest income and it underpinned the overall growth of profits. Reflecting this, the share of net interest income in operating income decreased slightly to around 45% in 2005, compared with about 48% for 2004 (see Chart 4.4 and Table S5). Underlying this, fee and commission income remained the most important source of non-interest income for large euro area institutions, followed by income from trading activities. The income stream from fees and commissions includes a wide variety of sources ranging from commissions on securities transactions to fees for advisory work on corporate finance and investment banking activity. The buoyancy of equity markets in 2005 boosted commissions, while the strong recovery in restructuring and M&A business in the euro area and the EU generated more advisory fees for some banks.

While some individual banks in the sample have sizeable capital markets and trading operations, the importance of this more volatile income

stream should not be overstated. The average share of trading income in total income increased slightly from around 13% in 2004 to about 15% in 2005 (see Table S5).

Finally, although certain individual banks recorded sizeable realised gains on their available-for-sale portfolios, the average contribution as a percentage of total income was still relatively small. The largest sales tended to be related to the sale of equity holdings, while in other cases banks reported sales of minority shareholdings in various operations. This was related to their efforts to refocus activities on core business.

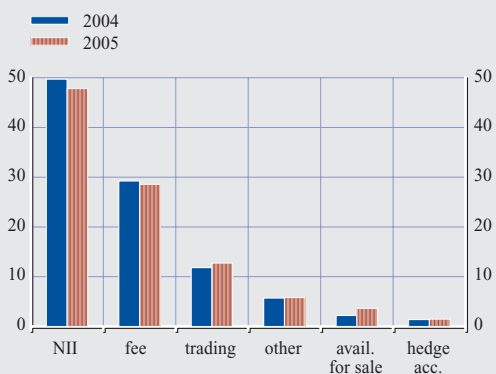
Loan impairment costs were reduced further

The new IFRS accounting standards have changed the definition of non-performing or “impaired” loans. An impaired loan should only be recorded under the IFRS if there is objective evidence that the bank will probably not receive payment of interest and principal according to the original contract.⁸ Loans may either be assessed for impairment individually, or on a combined basis.

Given that there are only two years of comparable data, caution must be exercised when analysing trends, as there is evidence which suggests that provisions have been cyclical in the past.⁹ With this qualification in mind, in 2005 most banks reduced loan impairment charges owing to the benign environment for credit quality experienced over the year (see Chart 4.5). On average, loan impairment charges fell from 0.10% of total assets in 2004 to 0.07% in 2005. In addition, net impairments may also be low because of sales of distressed loan portfolios by those banks that had previously reported high levels of problem loans. While the overall distribution of banks’ impairment charges shifted to the left – indicating a broad-based

Chart 4.4 Contributions of income sources to operating income for a sample of large euro area banks

(2004 - 2005, average value, %)



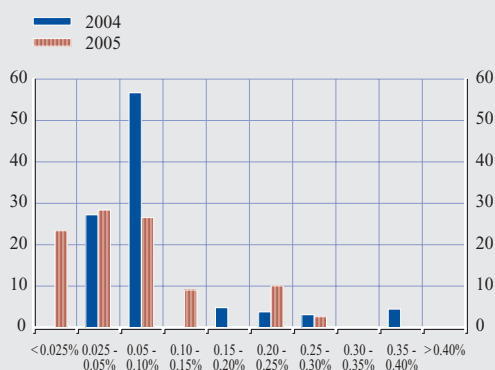
Sources: Published financial statements of individual institutions and ECB calculations.
Note: NII denotes net interest income.

⁸ For additional detail see ECB (2005), “Main effects from the new accounting framework on banks”, *Financial Stability Review*, December.

⁹ For empirical evidence on the pro-cyclicality of loan loss provisions, see for example L. Laeven and G. Majnoni (2003), “Loan loss provisioning: Too much, too late?”, *Journal of Financial Intermediation*, Vol. 12.

Chart 4.5 Frequency distribution of loan impairment charges for a sample of large euro area banks

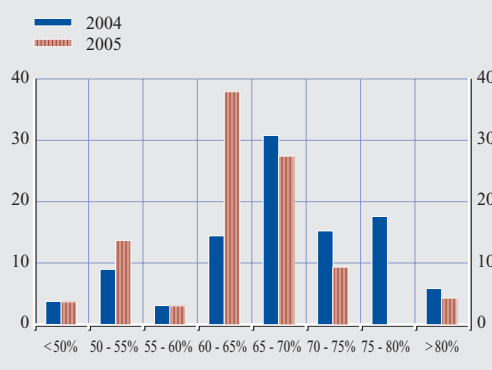
(2004 - 2005, % total assets)



Sources: Published financial accounts of individual institutions and ECB calculations.

Chart 4.6 Frequency distribution of cost-to-income ratios for a sample of large euro area banks

(2004 - 2005, %)



Sources: Published financial accounts of individual institutions and ECB calculations.

decline in impairments – some institutions in the right tail of the distribution still had a comparatively higher proportion of impairments than their peers.

Notably, in the commentaries accompanying their published financial statements for 2005, several banks noted that impairment charges were already quite low. In some cases, individual institutions expected these charges to pick up in the foreseeable future.

Costs remained under control

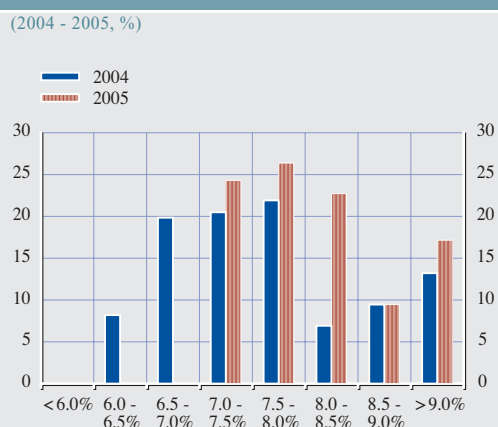
Even though large euro area banks' balance sheets expanded thanks to organic growth, costs remained broadly in check. This, combined with the increase in operating income, led to a decline in the overall cost-to-income ratio, with the weighted average cost-to-income ratio decreasing from about 69% in 2004 to just over 64% in 2005 (see Chart 4.6). The best-performing institutions in the lowest quartile managed to reduce their cost-to-income ratios from about 61% in 2004 to 57% in 2005, while institutions in the third quartile managed a reduction over the same period from about 71% to about 67%. This reflects the continued implementation of restructuring efforts initiated in previous years. It has also become apparent that in terms of cost management, euro area banks were dividing into

two categories: those with lower cost-to-income ratios, and those that had made some progress but still remained above the weighted average for the group. The banks in the latter group were continuing to implement cost control plans that had been drawn up over the last years, including a reduction in and redeployment of personnel between various business lines to reduce costs. Finally, several institutions were centralising their IT processes in order to benefit from economies of scale.

Solvency ratios increased slightly

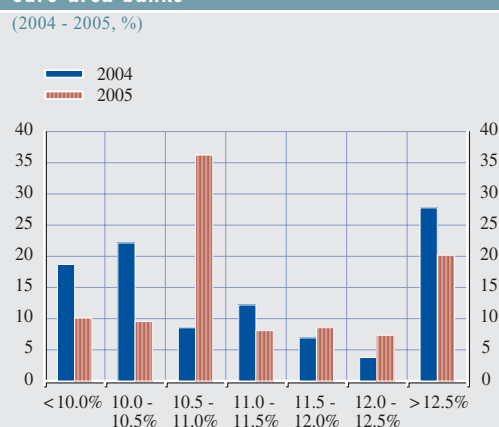
The broad-based increase in profitability, combined with a benign operating environment, fed through into improved bank solvency ratios. Some institutions embarked on capital management programmes to reduce their exposures in areas with higher capital requirements, and instead concentrated more on retail exposures. In this context, the Basel II capital requirements may to some extent have contributed to intensifying competition in the retail lending market, as banks were targeting low risk-weighted assets in their loan portfolios. All in all, the average Tier 1 ratio for large institutions increased slightly to over 8.0% in 2005, up from 7.9% in 2004 (see Chart 4.7). More importantly, capital ratios also improved among the poorer performing institutions (first

Chart 4.7 Frequency distribution of Tier 1 ratios for a sample of large euro area banks



Sources: Published financial accounts of individual institutions and ECB calculations.

Chart 4.8 Frequency distribution of total capital ratios for a sample of large euro area banks



Sources: Published financial accounts of individual institutions and ECB calculations.

quartile) to 7.6% at the end of 2005. This led to a shift to the right in the overall distribution and to reduced dispersion around the mean.

The large euro area banks' total capital ratio also improved between 2004 and 2005: the weighted average ratio increased from about 11% to 11.5%. Similar to developments in the Tier 1 ratio, institutions with the lowest overall capital ratios in the sample managed to raise their ratios in 2005 compared with 2004. This resulted in a shift to the right of the distribution (see Chart 4.8). The increase in both solvency ratios is a positive sign for financial stability, as it enhances the shock-absorption capacity of the large banks within the euro area banking

system, and therefore contributes to the overall stability of the euro area financial system.

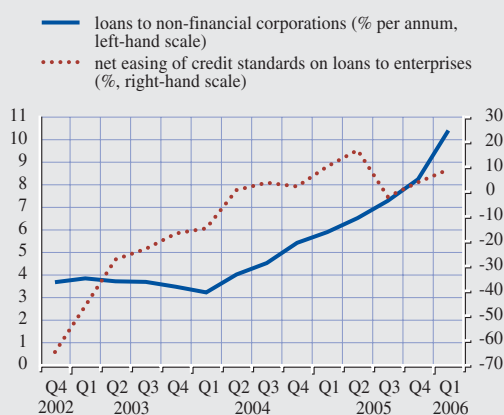
However, it is important to note that despite the improvement in the capital ratios of the worst-performing institutions, the distribution for the total capital ratio remains bimodal. This reflects, on the one hand, the fact that a limited number of large institutions were not performing well, while some institutions were showing very high capital ratios relative to the peer group. The performance gap between the banks did not narrow significantly in 2005. Looking ahead, those institutions with the lowest capital ratios could be an area of vulnerability for the euro area banking sector.

Box 10

ASSESSING THE FINANCIAL STABILITY IMPLICATIONS OF RECENT FINDINGS FROM THE ECB BANK LENDING SURVEY

The ECB's Bank Lending Survey (BLS) provides timely qualitative information about the credit standards being applied by euro area banks on loans to enterprises and households. In addition, the BLS provides early evidence on the contributing factors behind changes in credit standards as well as the conditions and terms applied to banks' lending activity. This may help in detecting turning points in the credit cycle, and thus contributes to a comprehensive financial stability assessment. With this perspective in mind, this Box examines the results of the BLS since the finalisation of the December 2005 FSR.

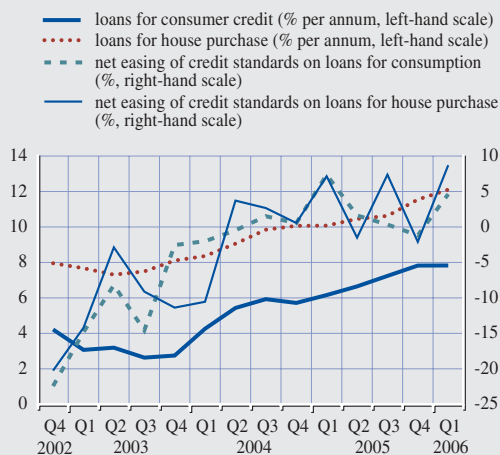
Chart B10.1 Changes in bank credit standards applied to loans and credit lines to enterprises, and the annual growth rate of loans to non-financial corporations



Source: ECB.

Note: See footnote 1 for the definition of net easing.

Chart B10.2 Changes in bank credit standards applied to loans to households and the annual growth rate of loans to households



Source: ECB.

Note: See footnote 1 for the definition of net easing.

In recent years, credit standards applied to loans to enterprises and households have been substantially eased, supporting the strong rebound in loan growth to the private non-financial sector over the past two years (see Charts B10.1 and B10.2).¹ In recent quarters, however, there have been some indications that banks have started to bring the easing cycle to a halt, which might suggest growing concerns about credit quality in an environment of booming credit growth and strong loan demand.

Concerning credit standards vis-à-vis the non-financial corporate sector, the April 2006 BLS revealed that banks applied a slight net easing in the first quarter of 2006 compared to the previous quarter. The net easing² was somewhat more subdued in the most recent quarters compared to the first half of 2005, and might partly reflect rising loan demand, as firms are increasingly seeking financing to fund investment and M&A (see Chart B10.3). In terms of the factors contributing to this net easing, banks reported that the main drivers were competition from other banks and, more recently, also improved economic prospects (see Chart B10.4). At the same time, the industry-specific outlook and banks' capital position pulled credit standards toward a net tightening, which might suggest increasing concerns about corporate credit quality in the period ahead (see also Box 4). Perhaps reflecting these credit risk concerns, banks reported that while credit standards had primarily been eased by relaxing margins on average loans, margins on riskier loans have become more restrictive. Thus, in recent quarters banks appear to have become more discriminating in their credit risk assessment.

With regard to the household sector, in the first quarter of 2006 banks reported a slight net easing of credit standards on both loans for house purchase and for consumption. This seemed on the one hand to reflect strong competition from other banks, as well as to some extent from non-

1 "Net easing" is defined as the difference between banks reporting that credit standards were eased compared to the previous quarter and those banks reporting that credit standards were tightened, i.e. a positive figure indicates a "net easing".

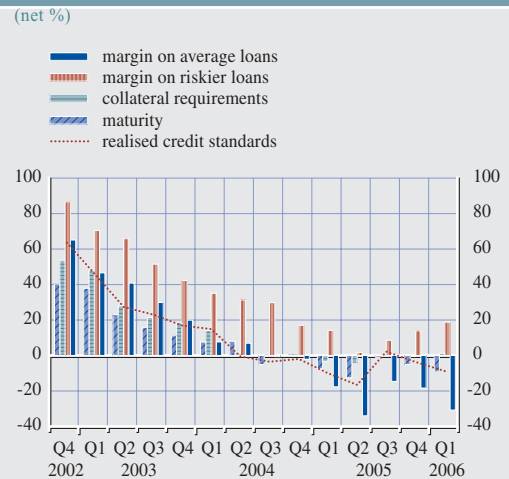
2 The net percentages refer to the difference between the sum of the percentages for "tightened considerably" and "tightened somewhat" and the sum of the percentages for "eased somewhat" and "eased considerably". The net percentages related to the factors are defined as the difference between the percentage of banks reporting that the given factor contributed to tightening and the percentage reporting that it contributed to easing.

Chart B10.3 Changes in bank credit standards applied to loans and credit lines to enterprises and contributing factors



Source: ECB.
Note: See footnote 2 for the definition of net percentages.

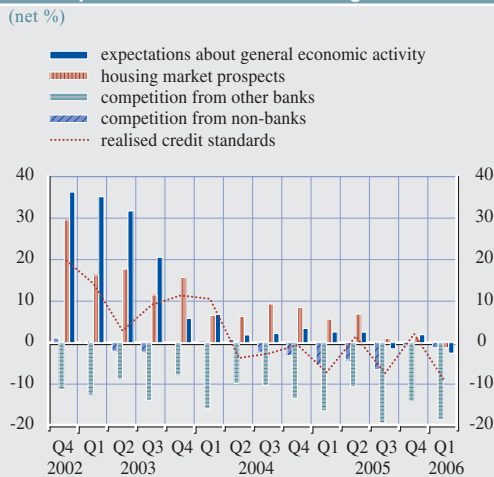
Chart B10.4 Changes in bank credit standards applied to loans and credit lines to enterprises, including terms and conditions



Source: ECB.
Note: See footnote 2 for the definition of net percentages.

banks too (see Chart B10.5). On the other hand, it reflected some concerns about the creditworthiness of borrowers (especially concerning consumer loans, which are typically less collateralised). While some apprehensiveness remains about housing market prospects and the general economic outlook, these seem to have abated somewhat in recent quarters. As in the corporate sector, the broadly unchanged credit standards applied on loans to households in recent quarters occurred against a background of strong and still rising loan demand. This was perceived by the banks to be driven by households' positive expectations regarding housing market developments, coupled with rising consumer confidence. Banks also recently seem to have started to differentiate their pricing of risk more, as credit standards applied to loans to

Chart B10.5 Changes in bank credit standards applied to loans to households for house purchase and contributing factors



Source: ECB.
Note: See footnote 2 for the definition of net percentages.

Chart B10.6 Changes in bank credit standards applied to consumer credit loans to households and contributing factors



Source: ECB.
Note: See footnote 2 for the definition of net percentages.

households for both house purchase and for consumption were eased via lower margins on average loans, while margins on riskier loans were increased (see Chart B10.6).

All in all, credit standards applied on loans to enterprises and households seem to have been relaxed over recent years and supported the private sector's access to bank finance. This was also reflected in very strong loan growth especially over the past two years. Nevertheless, in recent quarters some indications appeared that banks were becoming more concerned about their risk-taking, as they gradually slowed down the net easing of credit standards. They also became more discriminating in their treatment of borrowers of different credit quality.

4.2 RISKS FACING THE BANKING SECTOR

The financial results of large euro area banks for 2005 continued to show that the banking sector was highly profitable, with comfortable solvency ratios. At the same time, however, several risks facing the sector can be identified – some internal to the sector, others external.

The continuing benign credit environment and the cautiously favourable macroeconomic outlook suggested that the outlook for credit risks remained moderate. The income and diversification vulnerabilities created for banks by the protracted period of increasing indebtedness among the household sectors in several Member States could also have been mitigated more recently by the pick-up in lending to the non-financial corporate sector. Indeed, increasing lending to the corporate sector, and in particular to the small and medium-sized enterprise (SME) sector, could provide welcome diversification benefits for the banks, both in terms of revenue sources and credit risk exposures. However, there are signs that lending margins for loans extended to the non-financial corporate sector have been getting narrower, which suggests that the gains for banks in terms of additional interest income could be limited. Looking further ahead, however, the possibility of a less beneficial credit environment could bring with it increasing credit losses for euro area banks, in a situation where loan impairment charges may not be sufficient to reflect such risks adequately.

It should be noted that substantial differences remain in household and corporate sector

vulnerabilities across euro area countries. The recent signs of increasing impairments (provisioning) by banks in some euro area countries suggest that banks could be becoming aware of growing credit risk exposures. Moreover, banks in some economic areas with more advanced cyclical positions relative to the euro area already started applying higher impairment charges for non-secured lending. This could suggest that banks in general could see risks that tighter monetary conditions will pass through relatively quickly in the current environment characterised by high household indebtedness.

The market risks faced by euro area banks are mainly related to the various possibilities for yield curve developments as well as the counterparty risks arising from banks' non-interest business lines. With regard to the former, although the balance of risks tilts in the direction of further increases in long-term interest rates, the possibility of a more protracted period of relatively low long-term rates and the challenges this would imply for banks' core maturity transformation business, while less likely, cannot be fully excluded. In addition, large euro area banks' exposures to hedge funds and to the private equity sector could pose potential risks should banks discover weaknesses in their ability to manage appropriately risks incurred from activities with such unregulated financial institutions.

As an introduction to the analysis of the current risks facing euro area banks, Box 11 reports on the views of banks themselves on the determinants of and challenges for the EU banking sector landscape in the future.

Box 11

SURVEY ON EU BANKS' PERCEPTION OF THE FUTURE EU BANKING LANDSCAPE

The assessment of the EU banking landscape over the next five to ten years critically depends on expected changes in banks' operating environment. This Box describes the results from a survey of major EU banks concerning the factors that EU banks considered to be of higher importance in shaping their business environment over this time period, and then outlines the main challenges that they identified.

The survey was conducted simultaneously through February and March 2005 in all EU Member States, with a maximum of five banks participating per Member State. It aimed at identifying a) what the participating banks perceived to be the major factors likely to determine the banking industry in their country, and b) what major challenges they expected to affect the banking landscape over the next five to ten years. Responses were received from 99 banks (see the notes to Table B11.1 for a more detailed description of the sample).

Most banks surveyed considered that the most important factors in determining the future course of banking would be the competitive environment, regulatory changes and risk management (see Table B11.1). Regarding the first of these, the competitive environment has changed substantially in the past. National banking sectors have experienced significant consolidation and have generally become more concentrated, with the share of the 25 largest banks in the euro area banking sector growing from 37% in 1997 to 45% in 2004 (see

Table B11.1 Survey of EU banks on major changes in the banking environment over the next five years

(% of respondent banks)

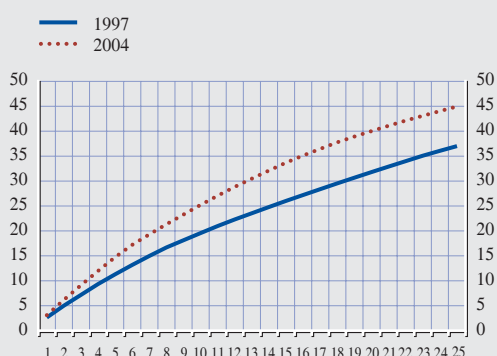
	euro area			non-euro area		
	percent of sample	very important	medium – somewhat	percent of sample	very important	medium – somewhat
Changes in the external environment						
Regulations	86	60	32	70	59	41
Economic growth	60	38	62	32	50	50
Technological innovation	40	12	88	45	10	90
Demand factors/financing households	58	12	88	41	26	74
EMU	12	40	60	52	10	90
Changes in the banking sector						
Competition	77	33	67	96	43	57
Consolidation	72	68	32	59	42	58
Concentration	47	45	55	39	55	45
Outsourcing	49	0	100	29	6	94
New players	26	0	100	30	29	71
Changes at the firm level						
Changes in risk management	79	65	35	75	67	23
Business model	51	27	73	45	24	76
Distribution model	53	30	70	43	17	83
Income	33	21	79	43	29	71

Source: BSC survey of EU banks held in February-March 2005.

Notes: The table shows the percentage of banks mentioning a specific factor in their top three lists, as well as the distribution (in % of answers) over the top rank (*very important*) and second and third rank combined (*medium-somewhat*). Total number of respondents = 99, of which 43 were from the euro area and 56 from non-euro area countries. Not shown are factors identified by less than 25% of the surveyed banks. No answers were received from banks in Ireland. Two answers were received from banks in Slovakia, three from banks in Belgium, Denmark, Finland, France, Greece, Luxembourg, the Netherlands and Estonia, four from Sweden and Portugal, and five from other EU Member States.

Chart B11.1 Cumulative share of the 25 largest euro area banks

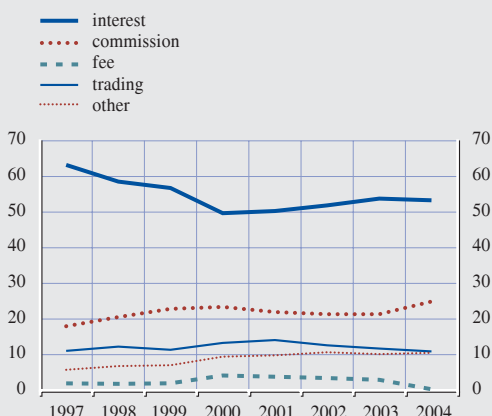
(% of total euro area banking sector assets)



Sources: Bureau van Dijk (Bankscope) and ECB calculations.

Chart B11.2 Evolution of euro area banks' operating income

(% of total operating income)



Source: Bureau van Dijk (Bankscope).

Note: The sample consists of all banks with consolidated statements, without dependency on another entity. The number of banks in the sample differs across years. Reported figures are weighted averages.

Chart B11.1). In the coming years, additional M&A activity can be expected, possibly on a pan-European basis (see also Charts S51 and S52). The second identified factor, regulation, is by definition very important for banks. In the past ten to twenty years, the EU banking sector has changed dramatically as a result of deregulation, financial liberalisation and the process of European integration. In the future, further regulatory changes are expected, including the transposition of the Basel II Capital Adequacy Directive into EU law, the execution of and follow-up on the EU Financial Services Action Plan (FSAP), as well as a possible revision of corporate governance principles for banks. Finally, banks' risk management has changed very rapidly in recent years, in part as a consequence of the rapid pace of technological and financial innovation. Most banks seem to expect that changes in risk management will have a further impact, e.g. leading to more accurate predictions of losses, better credit risk assessment of customers and, subsequently, higher profitability.

Furthermore, changes in business and distribution models and challenges related to the economic environment and to technology were mentioned by around half of the respondent banks as significant issues affecting the EU banking landscape. The impact of Economic and Monetary Union (EMU) was mentioned by around one-third of the banks (mainly those outside the euro area). Two additional factors identified by about a third of the banks were the financial behaviour of households and the impact of demographic trends. The latter may have more significant effects for banks' business strategies and performances over the longer run. For instance, it may lead to a more dramatic change in banks' income patterns, resulting in an increase in non-interest income (commissions from insurance and pension provisions and asset management fees), instead of interest income from deposit-taking and lending (see Chart B11.2).

In the second part of the survey, respondent banks were asked to assess the importance of several sector-wide developments in more detail (see Table B11.2). On the whole, euro area banks did not see broad structural issues as representing a major challenge, except to a certain

Table B11.2 EU banks' assessment of the importance of specific changes expected over the next five years

(% of respondent banks)

	euro area			non-euro area		
	very high	high	lower importance	very high	high	lower importance
Competition	16	7	16	30	23	14
Mergers and acquisitions (M&A)	0	23	19	2	14	48
Inward/outward internationalisation	14	7	23	2	14	48
Changes in the number of banks and branches	5	9	28	14	11	36
Changes in funding patterns	0	14	35	0	29	36
Changes in business lines	2	7	33	11	9	41
Diversification of activities	0	7	33	7	7	45
Conglomeration and cooperation	7	5	28	0	4	59
Relationship versus transaction-based banking	0	9	28	2	13	46
Risk transfer	0	14	28	0	7	54

Source: BSC survey of EU banks held in February-March 2005.

Notes: The table shows the percentage of banks mentioning a specific issue in their top three lists, as the top priority (*very high*), second and third rank combined (*high*), or ranked as medium or low (*lower importance*). See also notes to Table B11.1.

extent changes in competition, M&A and internationalisation. Non-euro area banks, by contrast, generally regarded most issues as representing greater challenges than their euro area counterparts, except the further pace of internationalisation and M&A activity (which could be considered as more advanced already), and conglomeration and risk transfer (both of which could perhaps increase in relevance in the future).

Most banks felt that competition could become more intense, especially in retail and commercial banking and asset management. To the extent that banks' interest margins are eroded or credit standards lowered, this might lead to some financial stability concerns.¹ Likewise, more M&A activity was expected to take place, mainly in retail banking, asset management and the insurance business. These were also the business lines that banks indicated as being major growth areas. More detailed evidence also showed that over half of the banks believed that further consolidation would go hand in hand with the development of looser forms of cooperation between institutions, as opposed to maintaining full control over services in-house. Furthermore, many banks expected funding to become less deposit-based, and more reliant on subordinated debt and securitisation. Banks' opinions on the use of equity and flows from parent companies were balanced, with around a quarter expecting these either to increase or to decrease. Finally, when asked explicitly, around 75% of the respondent banks felt that the banking industry would increasingly rely on risk transfer techniques.

The findings of this survey are broadly in line with other recent studies on this topic, although the coverage and time frame in some cases differ.² They are also in line with a similar exercise held in 1999 at the launch of EMU, although the emphasis on the different developments has changed since then.³

1 ECB (2005), "EU banking structures", October, analyses in more detail competitive conditions in EU mortgage markets and the structure of EU consumer lending markets.

2 See for example Mercer Oliver Wyman (2004), "The future of financial services: Future industry scenarios", December; FDIC (2004), "The future of banking in America", *FDIC Banking Review*, Vol. 16 (1); PricewaterhouseCoopers (2005), "Piecing the jigsaw: The future of financial services", Connected Thinking.

3 See ECB (1999), "Possible effects of EMU on the EU banking system in the medium to long run", February. This report predicted that EMU was likely to reinforce the reduction of excess capacity, geographical diversification, internationalisation and increased M&A activity. Competition was anticipated to increase considerably, putting banks' profitability under pressure.

CREDIT RISK EXPOSURES

Banks' exposures to the household sector continue to increase

The favourable financing conditions in the euro area over the past five years stimulated growth in banks' lending to the household sector. Household sector borrowing increased further in the first quarter of 2006 (see Chart S35), while at the same time it seems to have become more broad-based with regard to borrowing for house purchase and for consumer credit. The strong overall growth in the volume of banks' lending to households continued to support euro area banks' income, offsetting the impact of narrowing interest rate margins. At the same time, the steadily increasing burden of household debt, together with the possibility of tightening financing conditions, may have increased banks' credit risks, especially since the cost of credit appears to have reached its lowest point.

One way of interpreting the occurrence of household defaults is to see them as a jointly determined process that depends on financial fragility measures (such as debt burdens) on the one hand, and shocks to household income and asset valuations on the other. Taken together, a higher level of indebtedness tends to increase the vulnerability of households to an abrupt discontinuation in favourable employment and/or financing conditions. Against this background, the fact that household sectors in several euro area countries have continued to accumulate debt poses a growing risk to lenders should unforeseen shocks contribute to a marked deterioration in the macroeconomic environment.

There is also the additional possibility that the quality of borrowers could have declined amid intense competition among lenders in some parts of the euro area, which means that the degree of shock needed to trigger a wave of defaults would be smaller for a given level of indebtedness. Nevertheless, even though the household debt-to-financial assets ratio has increased for a number of years, it still suggests that on average, households' financial

buffers remain rather comfortable (see Chart S34).

As reported in the latest ECB BLS (see Box 10 and Chart S35), demand for loans for house purchase has continued to accelerate strongly since the publication of the December 2005 FSR. A new factor supporting the demand for mortgage loans was a sharp increase in consumer confidence reported in several parts of the euro area. This further accentuated the demand pressures created by historically low mortgage rates, rising residential property prices, demographic changes, and innovation and competition among lenders.

The positive relationship between house price increases and the demand for new mortgages is supported by evidence showing that in the euro area, the highest growth rates in borrowing for house purchase have been reported in countries with the largest house price increases. The negative effects of a potential fall in house prices would therefore probably be felt by banks in the euro area through slower income growth due to a slowdown in new mortgage lending. This could become particularly important given that banks have in the past depended greatly on volume growth in retail lending to sustain interest income. However, a correction in house prices does not necessarily imply that banks' credit risk from mortgage lending would immediately increase. As long as households remain employed, they are likely to generate sufficient cash flow to service their mortgages without the need to realise the loss in the value of their house.

In this context, a noteworthy observation is that banks in the euro area seemed to have a lower perception of risk regarding future housing market developments. As discussed in detail in the BLS (see Box 10), in the first quarter of 2006 banks in the euro area reported a further slight net easing of credit standards on average loans for house purchase, reflecting a somewhat more favourable perception of the future economic outlook, in the context of fierce competition both from other banks and non-

banks. However, banks tightened margins on riskier loans further.

Banks can also protect themselves against fluctuations in the mortgage credit cycle by controlling loan-to-value (LTV) ratios and extending the maturity of new loans. Moreover, by granting more loans in variable rate terms, banks can shift interest rate risk to borrowers. The average LTV ratios in the euro area remain rather conservative, although substantial differences remain among different Member States. While to some extent these probably reflect different conventions in measuring property values, there are signs that in some countries where competition among banks for new mortgage borrowers has been particularly intense, LTV values could have risen beyond levels that can be considered reasonable. Stiff competition in most countries also contributed to increasing the size of loans, to extending maturities or to launching repayment schedules that are more attractive to borrowers, and thus possibly increasing banks' risk exposures to households. Regarding variable rate and/or extended maturity loans, it is important to note that banks' credit risks could still increase in the longer term if borrowers become more sensitive to unexpected interest rate increases. Credit risks may also rise if borrowers fail to realise the implications of the more drawn-out future repayments of real debt because of permanently low inflation rates, making the overall financial stability implications somewhat ambiguous.

Turning to developments in unsecured consumer credit, improving consumer confidence and recent signs of a pick-up in spending on durable goods may have supported the rising demand for consumer credit in the euro area, although growth rates remained below the peaks observed in 1999. More generally, changes in consumer credit often coincide with cyclical economic developments, as they tend to be closely linked to fluctuations in private consumption. In the same vein, arrears in consumer credit could herald more widespread household financial distress, as individuals tend to default on this

type of loan before they default on their housing loans.

Looking forward, the quality of credit granted to consumers on an unsecured basis is therefore rather strongly conditional on the current favourable macroeconomic conditions remaining in place. Given that several of the risk scenarios discussed in this Review could materialise either in the form of higher long-term interest rates, slower GDP growth, or a combination of the two, the likelihood that such adverse developments could contribute to a worsening of credit quality cannot be ruled out, especially among highly indebted households. This is potentially the case despite the fact that the estimated total debt servicing burden of the euro area household sector (repayment of the principal, plus interest payments) remained broadly unchanged after 2000 at around 12% of disposable income (see Chart S36).

To sum up, there are currently few signs that household sector credit risks could cause problems for the euro area banking sector as a whole in the near term, as the shocks that could trigger more widespread household sector financial distress would have to be extremely large. However, even in the absence of an increase in default rates, a slowdown in lending to households would negatively affect banks' income growth and potentially drive them to seek revenues from more risky sources, which could in turn lead to problems in the form of potential credit risks in the medium term. Moreover, even though banks' individual stress-testing procedures may suggest that their balance sheets could deal with a sudden deterioration in household credit risk, such tests often fail to account for the collective impact of tighter credit conditions by ignoring macroeconomic feedback effects.

Authorities in some countries with supervisory responsibilities have expressed discomfort with regard to the possible adverse effects of rapid credit growth. As a result, besides moral suasion exerted through official communications, some prudential measures have been taken to address

the issue both from a financial stability perspective (e.g. increasing capital requirements for mortgages with higher LTVs, or increasing the provisioning coefficients of delinquent mortgages) and from a consumer protection point of view.

Recovery of banks' exposures to the corporate sector

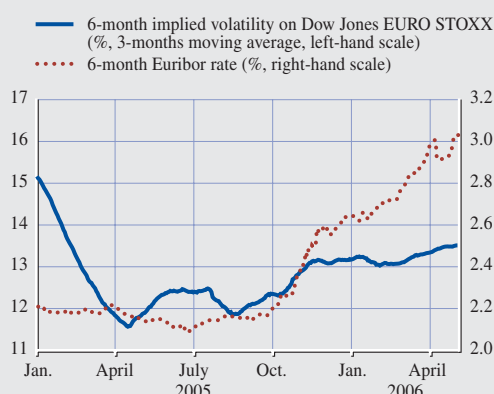
The pace of lending to the corporate sector quickened in 2005 and in early 2006. This mitigates some of the concerns that banks' interest income could have become too dependent on revenues derived from lending to the household sector. The recovery of lending to the corporate sector also indicates that the rather protracted period of divergence between conditions of corporate and household sector balance sheets may be coming to an end, should it become broad-based and sustained.

It should be stressed that at the country level, there remains a rather substantial dispersion in the development of business sentiment, corporate profitability, default rates and loans to non-financial corporates. Loan growth has generally been higher in the faster-growing economies, while the corporate sectors in many countries with more sluggish economic growth continue to experience negative loan growth, i.e. net repayment of loans.

In the near term, the increasing benefits from the diversification of banks' lending between the corporate and household sectors should positively contribute to banks' resilience to sector-specific shocks. Looking further ahead, however, the pick-up in corporate sector leverage, together with the possibility of a turn in the euro area credit cycle, could contribute to an increase in corporate sector default rates and hence banks' credit risk. In this context, it is notable that both six-month forward Euribor interest rates and six-month implied Dow Jones EURO STOXX stock market volatility increased after the last quarter of 2005 (see Chart 4.9). Both indicators could contribute to an increase in expected default rates in the euro area in the future (see also Box 5 in Section 2 of this Review).¹⁰

Chart 4.9 Dow Jones EURO STOXX volatility and the Euribor rate

(Jan. 2005 - May 2006, %)



Source: Bloomberg.

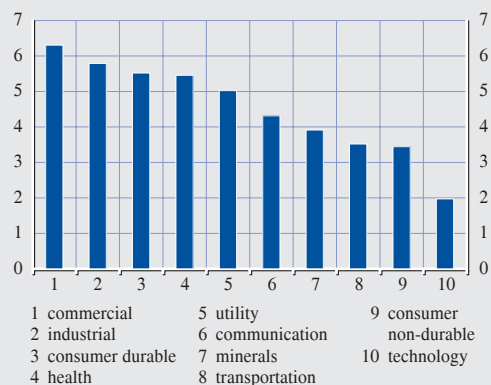
In addition to the sharp increase in demand for longer-term financing, banks in several euro area countries are also facing robust demand for short-term loans. Given that banks have stated that M&A and corporate restructuring activities have been positively contributing to the demand for loans, these activities may have fuelled corporate sector borrowing, particularly for shorter maturities, as M&A deals are often initially financed by bridge loans of shorter maturities that are later converted into securities issues.

Over the past year, the demand for funds for M&A and corporate restructuring activity in the euro area has coincided with a surge in activity in the private equity business. The net impact on euro area banks of increased buyout activity could depend on whether banks' relationships with the targeted companies are dominated by investment and advisory roles or bond holdings (or direct investment in buyout funds). Banks with the former type of exposures could benefit from firms' improved performance as well as from advisory fee income, whereas banks with the latter type of exposures could suffer losses if LBO deals leave incumbent

¹⁰ Implied stock market volatility and forward short-term interest rates are positive pricing factors for credit default swap (CDS) contracts. CDS prices can be interpreted as illustrating the probability of default of the underlying entity.

Chart 4.10 Risk of re-leverage in different euro area corporate sectors

(Jan. 2006 - Mar. 2006, score between 0 and 10)



Sources: Lehman Brothers and ECB calculations.
 Note: The LEVER score ranges between 0 and 10 and is a quantitative framework for measuring the relative risk of an LBO or of leveraged re-capitalisation. Companies that score above 7.5 are seen to be particularly at risk.

corporate bond holders or other creditors bearing substantially increased credit risk.

Quantitative indicators developed by market participants to measure the relative risk of LBOs and leveraged re-capitalisation capture the likelihood that a sector will experience leverage events. Applied to the euro area non-financial corporate sectors, the LEVER score measure of risk of LBO or leveraged re-capitalisation indicates that certain sectors – e.g. commercial services, industrial activities (mainly construction and building materials) and consumer durables – could have been more highly exposed to such activities as of Q1 2006 (see Chart 4.10).

Regarding the supply of loans, there are signs that euro area banks have eased credit standards

on a net basis applied to loans to the non-financial corporate sector, responding to the strong competitive pressures accentuated by the surge in demand for corporate loans (see Box 10). Indeed, lending margins continued to fall in late 2005, although at a somewhat moderating rate (see Chart S59). Looking at the developments in the pricing of loans of different sizes by banks in relation to the credit risks being priced in by the markets, bank spreads did not always reflect market developments (see Chart S69). While euro area BBB-rated corporate bond spreads first increased in the second half of 2005 and subsequently broadly stabilised, the spreads on large loans to non-financial corporates temporarily decoupled from market prices: they declined quite sharply before widening again in the first quarter of 2006. At the same time, spreads on small loans continued to decline. The divergence between the opinions of banks regarding smaller loans and credit market participants might suggest that banks identify fewer risks of smaller firm defaults in the future. Alternatively, banks could be easing their credit standards to gain market share or to benefit from diversifying their loan portfolios more effectively.

Given that competitive pressures in the corporate loans market have been intensifying, the quality of banks' corporate loan books could be subject to risks in the medium term. Such vulnerabilities would be accentuated by any unforeseen slowdown in general economic activity. Against this background, monitoring banks' exposure to large single-name borrowers is very important for financial stability purposes. Box 12 reports on the findings of a recent survey of such exposures at the EU level.

Box 12

SURVEY ON EU BANKS' LARGE EXPOSURES TO SINGLE-NAME CORPORATES

In the aftermath of the default of Parmalat, a relatively large Italian corporation, those EU banks with large exposures to the firm remained resilient, thereby mitigating the potential stresses on the financial system that could have arisen from such a large corporate failure. However, the episode raised the question of whether such resilience was actually an isolated event or a more

general feature of the EU banking system. To address this issue, the BSC undertook a survey in August and September 2005 to assess whether the idiosyncratic risk of large exposures to single-name corporates could be of concern from the perspective of the stability of EU banks, and to shed some light on prevailing risk management practices with respect to these exposures. This Box summarises the main findings of the survey. In view of the caveats in the survey's data and its limited and uneven sample, the survey findings can however only be considered as indicative, and any conclusions drawn are of necessity relatively provisional.

The survey was restricted to cover large exposures to single-name corporates of large EU banks. It considered an exposure to be large if in net terms it exceeded 5% of a bank's own funds. Respondents were asked to report all large exposures, on a consolidated basis and in net terms¹, for June 2004 and June 2005. In addition, a distinction was made between large exposures to non-financial corporates (NFC) and to non-bank financial corporates (NBFC). Large exposures to other banks, governments and public firms were excluded. The survey covered 38 large banks from seven EU Member States, with a total of 111 large exposures to NFC and 100 large exposures to NBFC.

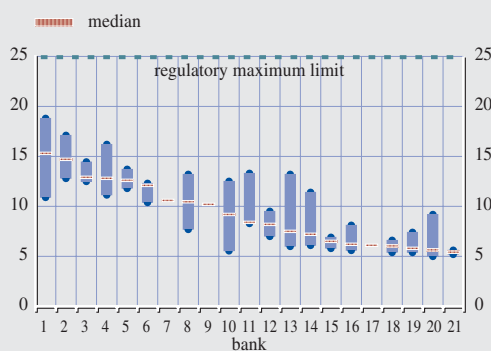
The main finding of the report is that, measured in net terms, the bulk of EU banks' large exposures to single-name corporates falls substantially below the EU regulatory maximum limit of a large exposure (see Charts B12.1 and B12.2). This implies that EU banks, on average, set conservative limits for large exposures, which is generally recognised as an important precautionary measure in order to reduce the risk of an unacceptable increase in losses in the event of a large borrowing debtor default. In addition, most large EU banks, in preparation for the New Basel Accord, are developing and implementing economic capital models in order to measure and price large exposure risks on a systematic basis.

Even though the results may seem rather reassuring, complacency should nevertheless be avoided in assessing the risks of large exposures for large EU banks, for four reasons. First,

¹ In the report, a net exposure is defined as a "gross exposure net of collateral, guarantees and bad debt provisions against gross exposures, and after risk weighting" (cf. the Large Exposures Directive).

Chart B12.1 Distribution of large EU banks' large exposures to non-financial corporates

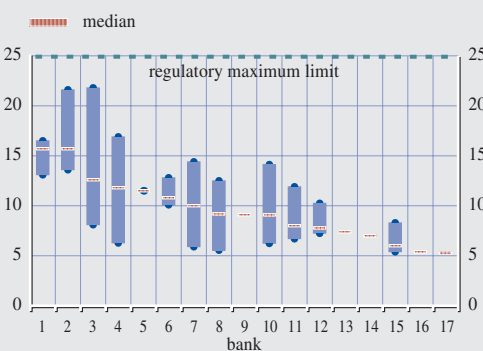
(June 2005, % of banks' own funds)



Source: BSC
Note: Based on 21 large banks from five EU Member States with in total 111 large exposures to NFC.

Chart B12.2 Distribution of large EU banks' large exposures to non-bank financial corporates

(June 2005, % of banks' own funds)



Source: BSC
Note: Based on 17 large banks from six EU Member States with in total 100 large exposures to NBFC.

significant differences exist among the sizes of large exposures across EU banks. While many banks have moderate or even zero large exposures, others were found to have very large exposures – net of collateral and guarantees – equalling or exceeding 15% of own funds. Second, there is some tentative evidence that certain banks are only marginally hedging their unsecured exposures, leaving them exposed to potentially large credit risks. However, the extent to which large EU banks in general are hedging large exposures using credit derivatives remains unclear, and these findings may point instead to some potential sources of risk at the individual institution level. Third, there are also some tentative signs that counterparty discipline might be under pressure as banks are keen to gain access, or maintain their positions, in the large lending market. Fourth, the analysis was restricted by data limitations, which for instance make it impossible to consider the extent to which large exposures of banks could be concentrated in the same counterpart, sector or region, or the impact of potential spillover effects.

In December 2005, Standard & Poor's² also called attention to the potential risks arising from high exposures to single-name firms at some European banks. The conclusions of this study were much more alarmist, citing “a number of instances in Europe where large single-name exposures to corporates are too high and could expose banks to unexpected shocks. This risk is even more acute when there is sector concentration among the top 20 exposures. Large single-name corporate exposures continue to weigh, therefore, on many bank ratings in Europe.” However, the results of this study and the BSC survey are not directly comparable owing to differences in the definitions, sample of banks and data sources used.

2 See Standard & Poor's (2005), “Lending concentrations linger at potentially risky levels at banks around the globe”, December.

The broadly positive message from the expansion of lending by euro area banks to the corporate sector is further enhanced by the fact that in several euro area countries, lending seems to be particularly concentrated on the SME sector, which was showing signs of recovery after experiencing severe difficulties following the decline of European stock markets (which started in 2000). The continuation of this recovery could, however, be conditional on a more sustainable recovery in consumer demand in the euro area.

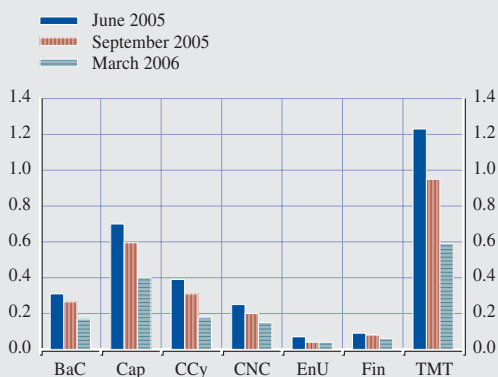
In addition to the various risks that the banks face on their exposures to different-sized firms, vulnerabilities stemming from sectoral exposures continue to differ as well. Persistently high oil prices have depressed profit margins, particularly in the transportation and tourism sectors. Looking forward, these same industries could remain vulnerable to threats of renewed terrorist attacks and the effect of a possible influenza pandemic. The latter risk could also have a substantial negative impact on the euro area food industry, as witnessed by the spread

of BSE in the 1990s. All in all, notwithstanding accelerating credit growth to non-financial corporates, banks' near-term exposures at risk should have remained contained owing to the further decline in sectoral median EDFs (see Chart 4.11).

Euro area banks' exposures to commercial real estate markets continue to vary substantially across countries. In most countries, exposures have remained rather stable due to the still higher yield provided by investments in the sector relative to long-term bond yields. However, in those countries where commercial property yields have been falling, lending secured on commercial property could be vulnerable. In one large Member State in particular, problems related to so-called open-ended investment funds surfaced in early 2006. Such fund structures could be particularly vulnerable to liquidity problems, as investors can redeem their unit certificates on a daily basis, whereas real estate assets usually cannot be liquidated at short notice.

Chart 4.11 Expected default frequency for different euro area industrial sectors

(% probability, medians)



Sources: Moody's KMV and ECB calculations.
Note: The sectors are as follows: basic materials and construction (BaC), capital goods (Cap), consumer cyclicals (CCy), non-cyclicals (CNC), energy and utilities (EnU), financial (Fin), and technology and telecommunications (TMT).

Market indicators of default for euro area banks developed very favourably after the finalisation of the December 2005 FSR. Both EDF and CDS spreads returned to levels last seen prior to the temporary market turbulence of May 2005 (see Charts S63 and S65). However, as discussed elsewhere in this Review, there is the risk that these historically very low CDS spread levels could reflect the fact that pricing in these markets does not properly incorporate all the risks going forward, especially the possibility of a deterioration in the currently very benign credit conditions.

MARKET-RELATED RISKS

Country-level information provides no evidence of increased market risk exposures of banks in 2005 compared with 2004. In some countries, however, banks' exposure to interest rate risk appears to have increased, either at the expense of other types of market risk, such as exposures to exchange rates and emerging markets, or indirectly through their exposures to counterparties active in the fixed income markets.

Interest rate risk

At the time of finalisation of this Review, long-term interest rate options were pricing in the

risk of an increase in long-term interest rates in the period ahead. Many financial market participants also attached a high likelihood to a slight increase in short-term interest rates before the end of 2006. However, given the recent increases the magnitude of further rises could be lower than feared when the December 2005 FSR was finalised. Depending on the timing of prospective changes in short-term and long-term interest rates, interest rate risk scenarios may include either a steepening or a parallel upward shift of the yield curve, or, conversely, a flattening of the yield curve. All these scenarios would have different impacts on banks, depending on the composition of their business. However, they all share one common characteristic, namely that they could affect banks both directly – via interest rate-sensitive positions in their banking and trading books – and indirectly through credit risk. The likely effects on banks of the various yield curve movements are discussed below, although the relative probability of a further upturn in long-term interest rates seemed the most likely scenario at the time of finalisation of this Review.

Banks would benefit from a steeper yield curve via higher interest margins and thus increased interest revenues from maturity transformation on new loan businesses. However, rising interest rates could also put pressure on the net interest margins banks earn on their existing loan businesses via repricing effects, if these positions are not hedged.¹¹ In the short term, the impact of such changes in interest rates on interest income (the pricing effect) is unclear. In addition, increases in long-term interest rates could also affect interest revenues by lowering the demand for credit. This so-called volume effect has become more relevant with regard to banks' interest income, given the expansion in household lending and the gradual decline in lending margins in 2005 (see Chart S59).

¹¹ Repricing risk is the risk that banks' interest expenses could increase by more than interest receivables upon a rise in interest rates. It exists because assets normally have a longer maturity than liabilities.

Increases in long-term interest rates could also adversely affect the value of fixed income portfolios, which for some euro area banks can be as large as 20% of total assets. However, country-level information suggests that banks appear to be well placed to cope with the adverse effects of long-term interest rate increases. This is mainly due to proper balance sheet management in the light of long anticipated interest rate increases, hedging activities and banks' management of the interest rate risk in their bond portfolios as part of their overall asset/liability management.

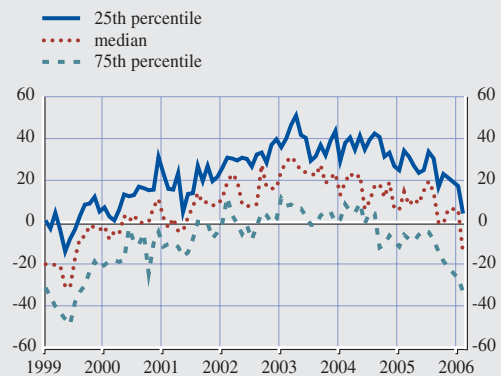
Higher long-term interest rates could also have important indirect effects for banks insofar as they coincide with or lead to a deterioration in credit quality, or trigger a decline in asset prices. These effects are more likely to be stronger if the rise in interest rates is unanticipated, large or derives from external rather than from domestic factors (e.g. improved domestic economic conditions in the euro area). In addition, abrupt and sudden increases in long-term interest rates could trigger a substantial widening of credit spreads. This may impact banks with material holdings of corporate and emerging market-related loans and bonds.

A parallel upward shift associated with a simultaneous increase in both short-term and long-term interest rates, could affect banks even more than a steepening of the yield curve. In such circumstances, banks would not only be affected by repricing effects, possible losses on their fixed income portfolios and a potential deterioration of credit quality and lower credit demand, but would also be unable to counterbalance these effects by increasing interest revenues from maturity transformation on new loan businesses.

Finally, a flattening of the yield curve although it has become a less likely scenario since the publication of the December 2005 Review, could also impact banks directly via reduced net interest margins on both existing and new loan businesses. Nevertheless, the adverse

Chart 4.12 Unhedged portfolios of investors in euro area markets

(Jan. 1999 - Feb. 2006, exposure as a % of the benchmark exposure)



Source: Russell/Mellon Analytical Services
 Note: The lines show the percentage deviation from the JP Morgan benchmark index (the horizontal line) by the universe of investors. A higher absolute reading indicates a more substantial deviation from the benchmark.

effects of the past decline in interest margins, coinciding with a period where the euro area yield curve was relatively flat, may have been largely offset by the buoyant growth in household lending volumes and by the growing use of interest rate derivatives designed to limit banks' exposures to interest rate risk.¹² Other effects of narrowing margins, such as banks being encouraged to seek revenues from higher yielding, and thus riskier, activities, could therefore have been more relevant from the perspective of the stability of EU banks.

The scale of banks' interest rate risk exposures and changes therein may be gauged by the interest rate VaR figures that some large EU banks publish. Between 2004 and 2005, changes in this indicator for a small sample of large EU banks did not suggest a uniform pattern with regard to changes in interest rate risk-taking. More generally, the behaviour of investors holding euro area fixed income assets suggests that they could have reduced their level of risk in 2004 and 2005 by moving closer towards the benchmark portfolio (as the movement in aggregate positioning towards the straight horizontal line in Chart 4.12 suggests).

12 See Box 12 in ECB (2005), *Financial Stability Review*, June.

Foreign exchange rate exposures

Owing to a further widening of persistently large global current account imbalances, the risks for euro area banks related to increased volatility in the foreign exchange market may have increased. This is not least because roughly 60% of the euro area banks' foreign exchange rate exposures are denominated in US dollars (see Chart S58).

During 2005, euro area banks expanded some of their US dollar-denominated asset and liability exposures (see Chart 4.13). However, these exposures still fell below the levels seen in 2000-2002, and may not be considered substantial relative to euro area banks' total assets.

Nevertheless, the US dollar-denominated net assets of euro area banks with substantial activities in the US could well be larger, thereby enhancing the potential direct impact of changes in the US dollar-euro exchange rate on banks' balance sheets and profitability. Such direct effects could arise from currency mismatches or from translation effects.¹³ However, banks normally hedge the bulk of their foreign exchange rate risk. Moreover, country-level information confirms that potential losses on remaining open foreign exchange positions appear to be very small relative to banks' own funds.

Banks can also be indirectly exposed to foreign exchange rate risk through changes in the competitiveness or creditworthiness of their debtors resulting from exchange rate movements. The former type of indirect effect would have a particular impact on more open economies with a substantial export sector. The latter type would mainly affect those firms and households with substantial borrowings in foreign currencies; this risk however remains rather small in the euro area context.

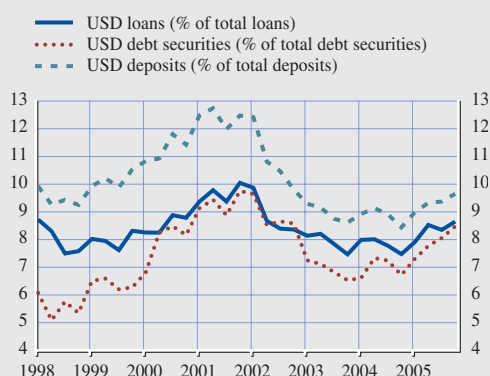
Equity risk exposures

Continuing a pattern noted in the December 2005 FSR, the exposures of some large EU banks to equity market risk showed a slight increase as measured by the equity VaR figures published by these banks. After December 2005, the stock markets further strengthened, and banks seem to have expanded their trading activities, which may feed into further increases in banks' equity exposures. The rather persistently low levels of equity market volatility could also have encouraged banks with constant VaR targets over time to stretch their equity market exposures. These developments, however, should be seen against the background of gradually declining equity holdings of banks relative to their total assets in 2003 and 2004 (see Chart 4.14).

13 The conversion of profits denominated in a specific currency to the banking group's accounting currency.

Chart 4.13 Euro area MFIs' US dollar-denominated assets and liabilities, selected balance sheet items

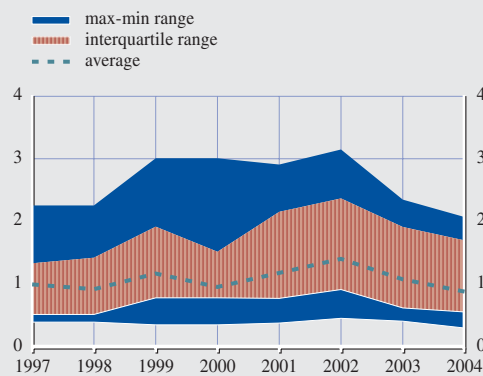
(Q1 1998 - Q4 2005)



Source: ECB.

Chart 4.14 Distribution of the equity exposure for a sample of large euro area banks

(1997 - 2004, % of total assets)



Sources: Bureau van Dijk (Bankscope) and ECB calculations.

Banks' involvement in credit risk transfer markets

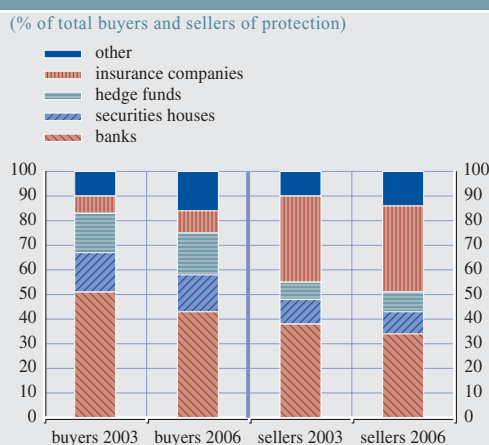
The increasing possibility for banks to trade credit risk in financial markets has helped disperse risks across the financial sector. CRT instruments, such as credit derivatives and structured credit products, allow banks to buy credit risk protection to reduce their risk concentration. Banks are, however, also active in these markets as protection sellers. In addition, some banks act as market-makers in the CRT markets by actively trading, mainly with the objective of generating fee income.¹⁴

When banks act as CRT protection sellers, they are, among other things, exposed to credit risk as well as model and pricing risks. As protection buyers, banks are, for example, exposed to counterparty risk and correlation risk (the risk of a correlated deterioration of the credit counterparty and the underlying reference entity). The importance of these potential risks has increased, as the overall size of CRT markets has grown rapidly over the last few years (see Chart 3.7 in Section 3).

Banks are the predominant participants in CRT markets, in particular on the protection buyer side. Banks' share of the seller side is somewhat lower and comparable to that of insurance companies. The share of banks acting as protection sellers and buyers is, however, expected by some to decrease (see Chart 4.15). This is mainly due to the growing participation of hedge funds, mutual funds and pension funds, both as protection buyers and sellers, and not so much because of an expected decrease in the volume of CRT instruments bought or sold by banks.

In recent years, the transfer of credit risk from banks to the insurance sector via credit risk derivatives is believed to have improved the ability of the banking sector to absorb adverse credit disturbances. For insurance companies, their position as a net seller of credit protection allowed them to diversify efficiently the risk in their portfolios and to gain some credit risk exposures. Regulatory arbitrage, which is fuelled

Chart 4.15 Market participants in credit derivatives markets



Source: British Bankers' Association.
Note: Data for 2006 are estimates.

by lighter regulatory requirements for insurance than for banks, is considered to have played an important role in driving this risk transfer. However, regulatory arbitrage opportunities and incentives for insurers to absorb further credit risk from the banking sector may significantly decline in the period ahead with the implementation of the future solvency regime for EU insurance companies, the so-called Solvency II. This is scheduled for 2009/2010, and should lead to greater convergence in the regulatory environment for European financial institutions. As a result, risk-sharing between the banking and insurance sectors may be reduced, with possibly negative implications for the banking system unless banks can find other counterparties.

At the same time as a possible retrenchment of insurance companies from CRT activity, the involvement of hedge funds in credit derivatives markets has been rising. This has raised the concentration of exposures of EU banks to opaque financial institutions, which could prove prejudicial to financial stability in the medium term.

¹⁴ For a more detailed discussion about the role of banks in CRT markets, see ECB (2004), "Credit risk transfer by EU banks: activities, risks and risk management", May.

Exposures to hedge funds

By the end of 2005, inflows into hedge funds had slowed down, particularly after most strategies suffered synchronous and substantial losses in October 2005 (see Chart 4.16). In the last quarter of 2005, net flows turned negative for the first time since 2002. This could have encouraged hedge fund managers to monitor funding liquidity risk stemming from higher investor redemptions more carefully, particularly because the share of illiquid investments was also reportedly increasing. Some banks may also have found it prudent to review the funding flexibility of their hedge fund clients when setting appropriate limits and collateral levels, even if intense competition may have been hampering banks' ability to achieve higher credit protection cushions.

In determining whether to continue or terminate transactions with hedge funds, such as financing, banks usually apply some trigger levels for the decline in their hedge fund clients' net asset value (NAV) that refer to the percentage decline of a fund's total NAV.¹⁵ Such measures capture the joint impact of negative performance and investor redemptions. However, some hedge funds could also have negotiated NAV-per-share decline triggers that only consider negative performance. There are indications that the share of single-manager funds breaching total NAV decline

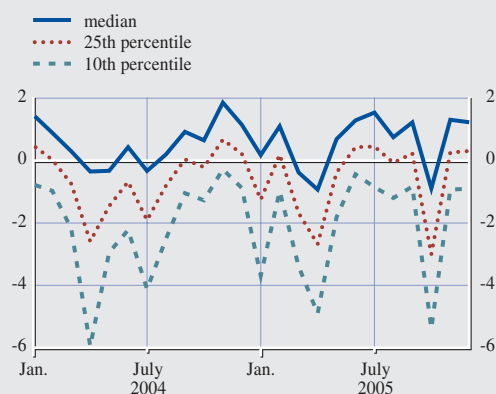
triggers slightly increased in the second half of 2005 (see Chart 4.17). Moreover, in the case of funds of hedge funds, the increase was particularly large, although these funds can have a different set of trigger values to single-manager hedge funds. If outflows from the hedge fund sector were to increase, these shares could rise further in 2006, if investment returns were insufficient to compensate for outflows, and banks' risk managers would be increasingly confronted with decisions as to whether they should terminate transactions with particular hedge funds and seize the collateral held. Against this background, it should also be recognised that the hedge fund industry proved rather resilient to the outflows registered towards the end of the year (as was also the case earlier with respect to the deterioration in return performances following downgrades of the US car manufacturers and the bankruptcy of Delphi).

The fact that hedge fund managers tend to use the services of several prime brokers complicates banks' ability to monitor the whole fund investment portfolio. However, the wider application of portfolio-based margining provides incentives for hedge fund managers to work with only one prime broker.¹⁶ It should also be noted, however, that hedge fund managers have a fiduciary duty to their investors and hence, by dealing with several prime brokers, they reduce the fund's credit risk for the benefit of investors. Against this background, the failure in 2005 of Refco, which served as a prime broker for many hedge funds, could have prompted some hedge funds to establish additional prime brokerage relationships.

Backlogs of unconfirmed credit derivatives trades between banks, hedge funds and other players reached critical levels in the autumn of 2005. This prompted urgent remedial action by the US authorities and some European regulators with the aim of spurring major dealers, including some

Chart 4.16 Distribution of global hedge fund returns

(Jan. 2004 - Dec. 2005, %, in USD terms, net of all fees)



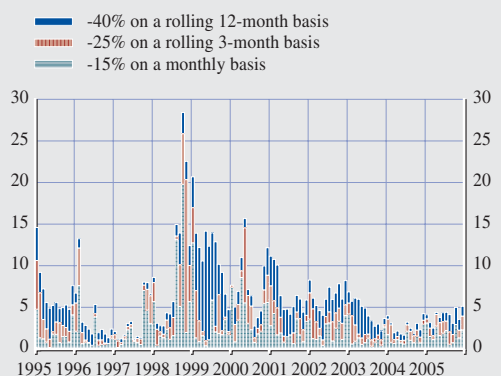
Sources: Lipper TASS database and ECB calculations.
Note: Excluding funds of hedge funds.

¹⁵ Net asset value is the total value of a fund's investments less liabilities. It is also referred to as capital under management.

¹⁶ Portfolio-based margining can be defined as margin offsets based on past correlations of positions. The addition of a hedging (risk-reducing) position would give back the initial margin, although individual haircuts on products would remain additive.

Chart 4.17 Share of hedge funds breaching triggers of net asset value (NAV) cumulative decline

(Jan. 1995 - Dec. 2005, % of total NAV)



Sources: Lipper TASS database and ECB calculations.
 Note: Excluding funds of hedge funds. NAV is the total value of a fund's investments less liabilities; it is also referred to as capital under management. If several assumed total NAV decline triggers were breached, then the fund in question was only included in one group with the shortest rolling period.

large euro area banks, to eliminate accumulated post-trade processing delays as quickly as possible. Intermediate results in 2006 indicated that banks had made good progress in this, and that they were adhering to the pre-agreed timetable. Hedge funds, as key counterparties, will also have to upgrade their systems in order to comply with existing standards for confirmations, thereby lowering risks for banks as well as for themselves, and alleviating at least some of the concerns related to the rapid growth of the credit derivatives market.

Exposures to the private equity business

Contrasting with the slowdown and reversal of inflows into hedge funds, 2005 was a record year for fundraising by the private equity industry. This was driven mostly by exceptional growth in the leveraged buyout market. The private equity business has gradually become an important source of funds for the European corporate sector. Market sources indicate that in 2004 and 2005 approximately equal amount of funds – in terms of LBO loans – were raised by European and US borrowers, in contrast to earlier years when the US played the dominant role.

While expected returns have been on the rise, the levels of debt in private equity buyout deals have

reached rather high proportions. Banks are directly exposed to the private equity business through the financing and underwriting of LBO operations and also through their own account investments in LBO funds and in hedge funds that take part in LBOs. A private equity market downturn would also affect banks indirectly, through the impact that a decline in fees and commissions earned on advisory and underwriting activities could have on non-interest income.

Major private equity houses in the US and the UK, and large US and global banks seem to be the most involved in private equity deals. However, interest in the European buyout market may also be fostering the involvement of European banks. Banks have been increasingly acting as distributors rather than as holders of credit risk. This process of originating and distributing loans or bonds normally involves the exposure being temporarily held on banks' balance sheets. These flow exposures can become very large, and if market conditions were to deteriorate rapidly, banks could find themselves unexpectedly holding substantial, potentially overvalued credit exposures. The leverage and illiquidity inherent in the private equity market further justify the need for supervisors and regulators to monitor developments in this area closely.

Emerging market exposures

With regard to the economic outlook of EMEs, there are two major downside risks: a possible disorderly correction of global imbalances, and borrowers' vulnerability to a sharper than expected upturn in mature economy interest rates. As long as the economic performance of most EMEs remains positive, the likelihood of a sudden increase in credit risk seems limited. However, insofar as the search for yield may have contributed to a narrowing of spreads on EME bonds, the risk premia of these countries may be sensitive to sudden changes in interest rates or unexpected credit events. Should this happen, pockets of vulnerability may be exposed in some euro area financial institutions, with more significant risk-taking in these regions.

Concerning the exposures of euro area banks, available evidence suggests that their already large consolidated claims on Brazil and Mexico expanded further at the beginning of 2005 (see Table S4 and Chart S61). At the same time, claims on other regions in Latin America remained broadly constant. In the first half of 2005, euro area banking sector exposures to India, China and South Korea also rapidly increased (see Chart S62), although exposures to other selected regions in Asia remained fairly similar to those reported in the December 2005 FSR.

4.3 ASSESSMENT OF THE SHOCK-ABSORPTION CAPACITY OF THE BANKING SECTOR ON THE BASIS OF MARKET INDICATORS

MARKET INDICATORS CONTINUED TO SUGGEST A POSITIVE SHORT-TERM OUTLOOK, BUT SOME UNCERTAINTY SURFACED

After the finalisation of the December 2005 FSR, market-based indicators continued to suggest that the short-term outlook for banking sector performance remained positive. Although stock market analysts still saw favourable earnings prospects for banks in the first quarter of 2006, they had revised these downwards when compared with two quarters before (see Chart 4.18). This may have reflected the upturn in short-term interest rates since then as well as

the rise in oil prices. In fact, market participants continued to assess positively euro area banks' shock-absorption capacity, but uncertainty over how this will develop in the near future also increased.

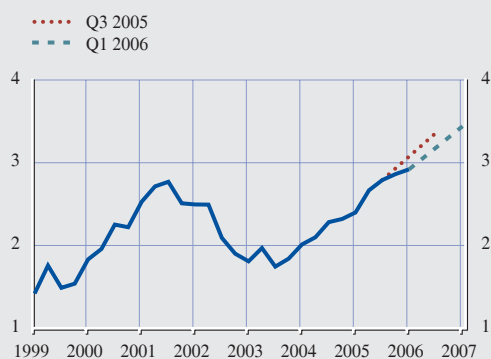
The euro area bank stock market index continued to rise after early November 2005 (see Chart 4.19). The rise was larger than that of the general stock market, suggesting that expectations for profitability remained favourable. It may have also reflected market expectations of further M&A activity among banks in certain countries.

Accompanying the rise in bank stock prices, however, was an increase in the degree of market uncertainty surrounding banks' expected profit. This was indicated by a rise in the standard deviation of a risk-neutral density (RND) function derived from option prices on the Dow Jones EURO STOXX bank index, after the publication of the December FSR (see Chart 4.20)

Historical volatility is a fundamental input into the computation of VaR measures and is often used as an indicator of market risk from an investor's point of view. As discussed in Box 13, estimates of the VaRs of a portfolio composed of the stocks of the largest euro area banks in

Chart 4.18 Earnings per share (EPS) and 12-month-ahead forecasts for a sample of large euro area banks

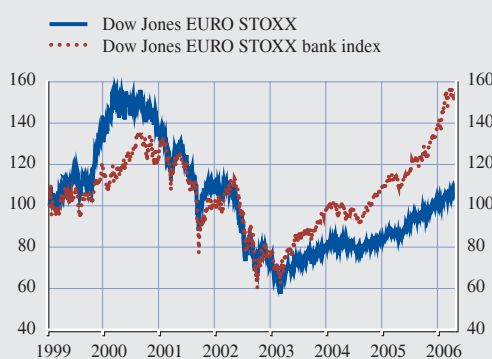
(Q1 1999 - Q1 2007, weighted average, %)



Sources: Thomson Financial Datastream, I/B/E/S and ECB calculations.

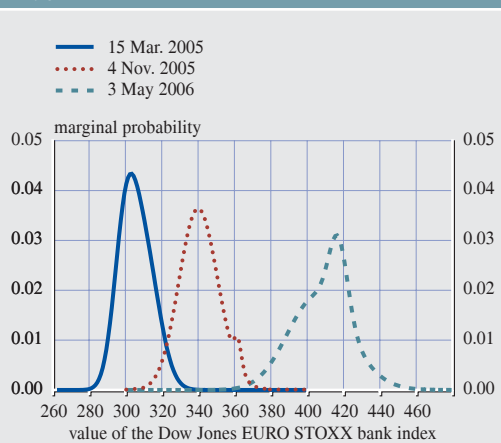
Chart 4.19 Dow Jones EURO STOXX total market and bank indices

(Jan. 1999 - May 2006, index: Jan. 1999 = 100)



Source: Bloomberg.

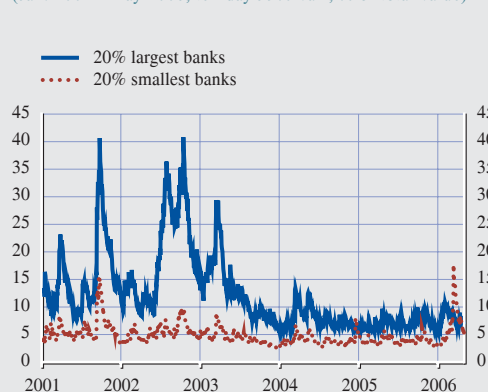
Chart 4.20 Risk-neutral probability density function on the Dow Jones EURO STOXX bank index



Sources: Bloomberg and ECB calculations.
 Note: The methodology used to estimate the risk-neutral probability density functions is explained in Box 13 of the June 2005 FSR. The full range of strike prices needed to calculate the function can generate a measure of standard deviation which can from time to time slightly deviate from the index implied volatility figures that are also provided by Bloomberg.

Chart 4.21 Value-at-Risk (VaR) of banks' stocks according to size

(Jan. 2001 - May 2006, ten-day 99% VaR, % of total value)



Sources: Bloomberg and ECB calculations.
 Note: The chart shows the ten-day VaR with a 99% confidence level calculated for two different equity portfolios.

general remained above those of the same metric for smaller banks' stocks in the sample (see Chart 4.21).¹⁷ This may reflect structural differences in the nature of the business conducted by banks of different size and in their loss-absorbing capacity. For example, several of the larger banks have substantial capital market operations; however, they also have a much larger consolidated equity base when it comes to absorbing unexpected losses.

The shape of the RND function yields additional information beyond that of the standard deviation. The right-skew of this distribution for bank stock prices recorded in early November 2005, possibly because of strong financial results reported by several large banks, had

turned into a slightly left skew by early May 2006. The combination of an increase in the degree of uncertainty and the disappearance of the slightly optimistic bias embedded in the right-skew prevailing in late 2005 may indicate not only a rise in concerns about general uncertainty regarding the overall macroeconomic and financial environment, but also concerns about the ability of various banks to react to sources of risk and vulnerabilities facing the sector.

¹⁷ The VaR measure reported in Chart 4.21 differs from the one reported by the banks themselves on their own market exposures. The spike in the VaR for the portfolio of small banks in March 2006 is related to increased volatility following an exceptionally strong performance in these stocks.

Box 13

DOWNSIDE RISK IN EURO AREA BANK STOCKS

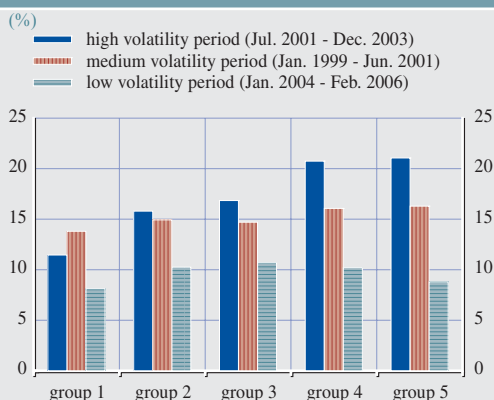
One way of gauging information about the robustness of the financial system on a continuous basis is to analyse developments in bank stock prices. From a financial stability viewpoint, knowledge of how the market behaves under extreme conditions is central. As such, it is important to take into account the well-established fact that stock returns often exhibit both

excess kurtosis and skewness, which also tend to depend on actual market conditions.¹ The degree of non-normality in stock returns may also be related to firm size. By using data on individual bank stocks included in the Dow Jones EURO STOXX banking sector index, this Box investigates the downside risks associated with euro area banks from an institution-size perspective.

To assess the importance of non-normality in the distribution of observed returns in recent years, a parametric specification for conditional dependence beyond the mean and variance was estimated.² As expected, the aggregate bank index exhibited both strong kurtosis and negative skewness, implying a higher probability of large negative returns. The strength of these distribution features also changed across time and under various market conditions. At the individual stock level, the distributional properties of returns appeared to be quite different, depending on the size of the institution. For illustrative purposes, the set of banks was divided into five groups according to size, and for each group a VaR³ measure was calculated over three distinct time periods: a high-volatility period (“high”), a period of volatility close to the historical averages (“medium”), and a period of low volatility (“low”).

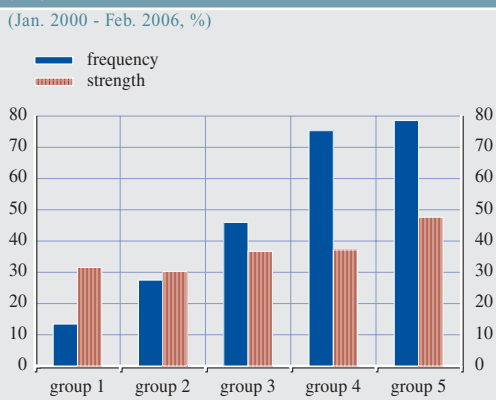
Three main characteristics can be identified. First, large banks displayed a higher level of volatility on average compared to smaller banks in times of high market volatility. These features were less pronounced in more tranquil periods, and even reversed in the most recent low volatility environment. Second, the largest banks showed a tendency toward negative skewness, i.e. a higher probability of large negative returns, whereas small and medium-sized

Chart B13.1 Value-at-Risk across size clusters under different market conditions



Sources: Bloomberg and ECB calculations.
Note: The chart shows a ten-day VaR with a 99% confidence level calculated from the non-central t-distribution. “Group 1” represents the smallest 20% of banks and “Group 5” the largest 20% of banks included in the Dow Jones EURO STOXX bank index.

Chart B13.2 Extreme-value dependence across euro area banks, sorted according to size



Sources: Bloomberg and ECB calculations.
Note: “Frequency” represents the percentage of all pairs in the group where extreme value dependence was detected based on the sample data. “Strength” represents the average dependence as measured between 0 and 100, where 100 reflects full asymptotic dependence.

1 A distribution with excess kurtosis is more peaked and has fatter tails than the normal distribution. Higher kurtosis indicates a greater probability of very large and very small returns at the expense of the probability associated with moderate returns.
2 A generalisation of the student’s t-distribution, capable of handling skewness, was found to represent a reasonable approximation to the data. See B. E. Hansen (1994), “Autoregressive conditional density estimation”, *International Economic Review*, Vol. 35, No 3, August, pp. 705-30.
3 The VaR represents the maximum portfolio value an investor is likely to lose with a certain probability, given a specific time horizon. In this example, a VaR with a confidence level of 99% and a horizon of 10 days is applied: $VaR_{99} = PortfolioValue_i * a_i * \sigma_i * \sqrt{10}$, where the *PortfolioValue* associated with bank *i* is normalised to 1, a_i represent the estimated 1% cut-off value for the non-central t-distribution, and σ_i is the stock volatility.

banks in fact displayed positive skewness, irrespective of market conditions. Third, the degree of kurtosis appeared to fall with institutional size. The results show substantially higher probabilities of large negative returns than the normal model would predict. All in all, these characteristics – the volatility, kurtosis and skewness – translate into the VaR measures presented in Chart B13.1. The strongly elevated VaR for larger institutions during the period of high volatility suggests that large banks, which arguably might matter more from a financial system stability perspective, could move more closely together during extreme conditions.

Given these tentative findings for each stock return series analysed in isolation, extreme value analysis was applied in order to assess the dependence between pairs of bank stocks at times of extreme negative shocks.⁴ Hence, instead of describing the full distribution of returns, the focus of the analysis was exclusively on the left tail. For each pair of banks included in the index, the occurrence of asymptotic dependence was tested and, if present, estimated by strength.⁵ Chart B13.2 shows that the occurrence of tail dependence appeared to be most pronounced among pairs of larger banks; tail dependence was detected in less than 15% of all pairs among the smallest banks, compared to almost 80% among the largest banks. The strength of dependency also seemed to slightly increase depending on the size of the institution. This result suggests that the valuations of larger – and thus potentially systemically more important – euro area banks might be more prone to move together in times of stress than their smaller counterparts.

Taking the non-normal features of euro area bank stock returns into account, this rudimentary analysis shows that the risks stemming from larger banks decreased compared to their smaller counterparts in the most recent low volatility environment. The level of risk as measured by the VaR appears to be no different, or even lower, for large banks in times of more moderate market conditions, supporting an optimistic risk outlook for the euro area banking system as a whole as long as volatility remains low. On the other hand, the level of risk seems to increase with the size of the institution in times of turbulence. As extreme-value dependence between large institutions tends to be high during these periods, this underlines the importance of monitoring the conditions of larger banks on an ongoing basis since they are more likely to be sources and conduits of systemic risk.

4 See also the Special Feature in this Review on “Assessing banking system risk with extreme value analysis”.

5 The method applied in this exercise is the same as in J. Danielsson and C. G. de Vries (1997), “Tail index and quantile estimation with very high frequency data”, *Journal of Empirical Finance*, 4, pp. 241-57. Intuitively, asymptotic dependence between a pair of banks could be described as a case in which the number of times that the returns from the banks jointly exceed a high threshold (represented by large negative returns) decreases slowly with the threshold.

Taking a longer-term view, a measure of the asymmetry of the RND function can be gauged from risk reversal quotes (see Box 16). Looking at developments since the beginning of 2005, the positive asymmetry in the RND for bank stock prices in the first half of the year gave way to a rather sharp reversal around August, with moderately and increasingly negative levels after November. When the information on the asymmetry in the shape of the RND function is coupled with the assessment of the

existence of fat tails in the same distribution (see Box 16), the conclusion points towards a negative fat tail, given the positive sign in the second indicator for much of the period after August 2005, notwithstanding a dip in early 2006.

Regarding other indicators of banking sector risk, the distance-to-default (DD) of large euro area banks, which was range-bound in the first half of 2005 at relatively high levels, further

increased in 2006 (see Chart S64).¹⁸ Notwithstanding a short-lived disruption in mid-2005, prompted by global credit events, the DDs of the weakest banks recovered shortly afterwards. More recently, DDs increased markedly for the stronger banks.

Information on the spreads on offers to buy and sell protection on European financial institutions' debt confirms the positive market assessment of European banks. Against a background of substantial supply (see Box 14), spreads on both senior and subordinated debt declined after early 2003, with the exception of the short-lived turbulence in spring 2005 (see Chart S65). Furthermore, CDS spreads declined to lows last seen in 2002.

Overall, the behaviour of financial market indicators suggest a broadly positive short-term outlook for euro area banks. Indicators of increasing downside risk to bank stock prices may reflect some concerns about the implications of growing vulnerabilities for banking sector profits. Nevertheless, indicators of banking sector credit risk continued to point towards rather little concern about the outlook for banking sector solvency.

¹⁸ The DD measures the distance between the market value of a firm's (a bank's) assets and the point at which it is insolvent. For more details, see Box 14 in ECB (2005), *Financial Stability Review*, June.

Box 14

SUBORDINATED DEBT ISSUES BY EURO AREA BANKS

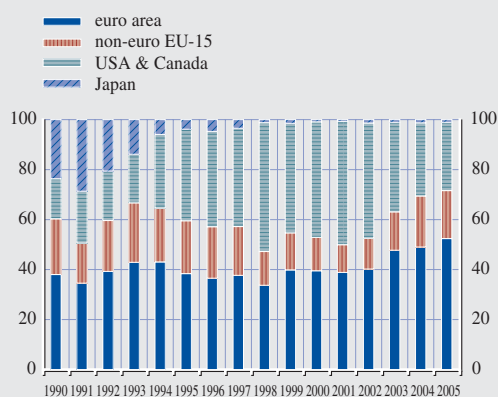
The size and complexity of several euro area financial institutions make it difficult for supervisors and analysts to make an accurate assessment of individual institution risk. At the macro-prudential level, this presents a challenge in determining forward-looking risks to financial stability that originate from the banking sector. Public accounting information can be used for these purposes, but its value tends to be limited by reporting lags and the backward-looking nature of the data. The third pillar of the Basel II accord clearly recognises the positive role that market discipline can play in reducing the risks to financial stability.¹ Against this background, the prices of securities when issued on the primary market may also influence bank management. There are also advantages in using secondary market information in addition to accounting information, due to the ability of markets to process a large amount of information rapidly and to reflect this information in securities prices under normal market conditions. Subordinated debt holders might exercise more discipline than depositors or equity holders because depositors may be covered by deposit insurance, whereas equity investors may benefit from the bank taking on more risk under certain conditions.² Monitoring the subordinated debt market segment therefore adds to the set of indicators on banking system stability that are capable of conveying information on future systemic risks. This is because wide spreads may indicate concerns of increasing risk. This Box provides a brief overview of the structure of the euro area bank subordinated debt market, comparing the euro area banking sector to other major economies, and it briefly analyses some data on individual issues by euro area banks.

¹ Information concerning the level of risk taken by each institution and how this changes over time is reflected in their securities prices. Previous research on European banks found that for banks, a combination of market (subordinated debt spreads and equity-based measures) and accounting/institutional data is useful for predicting distress – in the form of financial strength rating downgrades – at horizons of 18 months or so. See R. Gropp, J. Vesala and G. Vulpes (2006), "Equity and bond market signals as leading indicators of bank fragility", *Journal of Money, Credit, and Banking*, 38, No 2.

² This discipline could potentially take two forms: direct market discipline, which would result in banks that are perceived as riskier by the market facing increased funding costs in primary markets; and indirect market discipline, which could be based on the market prices of the outstanding securities issued already by these institutions and trading in secondary markets. However, in practice it may be difficult for subordinated debt holders to influence management actively.

Chart B14.1 Contribution to volume of subordinated debt issuance by geographic region

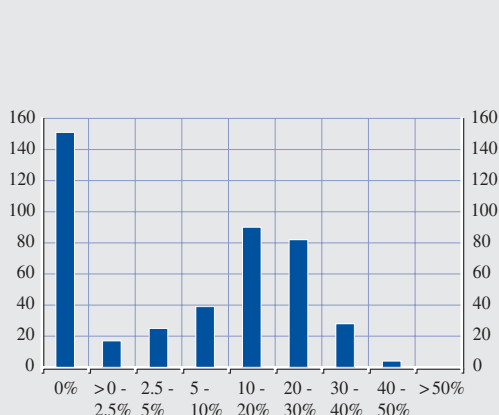
(% of total euro and euro-equivalent volume)



Sources: Dealogic (Bondware) and ECB calculations.
Note: Data include fixed and floating issues by financial institutions that are placed on domestic, euro or global markets. The data exclude warrants and shares.

Chart B14.2 Frequency distribution of subordinated debt in capital funds

(number)



Sources: Bureau van Dijk (Bankscope) and ECB calculations.
Note: Capital funds are defined in Bankscope as the sum of equity, hybrid capital and subordinated debt.

Previous work conducted by the Basel Committee on Banking Supervision (BCBS), based on data ending in 2001, found that European banks tend to be among the most frequent issuers of subordinated debt securities, compared to banks in the US and Japan.³ The BCBS also found that in terms of volume, US financial institutions tended to have larger individual issue amounts than euro area or EU institutions. However, this pattern was reversed in 2003 (see Chart B14.1). While non-euro area EU issuers tend to issue significant amounts of subordinated debt in terms of both volume and number of issues per year, the euro area banking sector as a whole remained the largest issuer of this type of debt among the geographic areas reported.

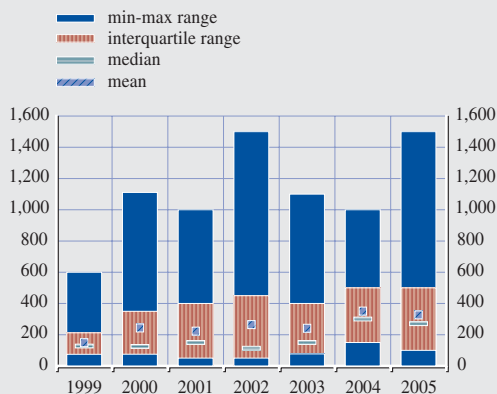
While euro area banks, as a whole, have been the largest issuers of this type of debt, not every euro area bank was an issuer of subordinated debt. Some banks may have chosen not to issue this kind of debt for reasons such as the availability of adequate funding from retail sources, taxation, and avoidance of the transaction costs associated with debt issuance. Chart B14.2 shows the average amount of subordinated debt issued over the period 1997-2004 as a percentage of the total capital funds of euro area banks. While some banks did not have any subordinated debt over this period, just under 300 banks out of a total of over 400 had some form of subordinated debt as part of their capital funds, suggesting that this has been an important component of bank capital for euro area banks.⁴

³ See Basel Committee on Banking Supervision (BCBS) (2003), "Markets for bank subordinated debt and equity in Basel Committee Member Countries", *BIS Working Paper*, No 12.

⁴ However, as this is a relative measure, it does not say whether it reaches the regulatory maximum allowed or the amount of subordinated debt outstanding. For example, subordinated debt may be included in banks' regulatory capital requirements in Tier 2 capital as hybrid capital (perpetual subordinated debt instruments in the so-called upper Tier 2 capital, and in lower Tier 2 if they have a minimum maturity of greater than five years). The main difference between both is that payments associated with upper Tier 2 are deferrable, and principal, and interest can be written down to make the instrument loss-absorbing. The amount of lower Tier 2 subordinated debt allowed is equivalent to 50% of Tier 1 capital. Subordinated debt may also be used in Tier 3 capital to cover the market risk capital requirement on a bank's trading book with a limit of 250% of Tier 1 capital for market risks. Due to the limited coverage of regulatory capital requirements and their constituent components in Bankscope, the broader ratio of subordinated debt to capital funds is used in Chart B14.2.

Chart B14.3 Size of individual subordinated debt at time of issuance by euro area banks

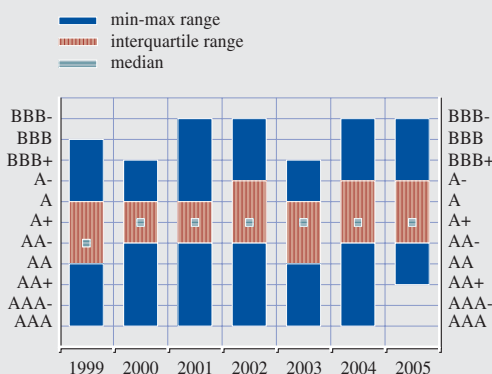
(EUR millions)



Sources: Dealogic (Bondware) and ECB calculations.
Note: The data include issues by banks and financing vehicles owned directly or indirectly by banks.

Chart B14.4 Ratings of individual subordinated debt at time of issuance by euro area banks

(rating scale)



Sources: Dealogic (Bondware) and ECB calculations.
Note: The effective ratings from Bondware are assigned numerical values ranging from AAA = 1 to BBB minus = 11.

The size of individual subordinated debt issues has varied somewhat since 1999. Micro-data illustrate that there has been an increase in the mean size of individual issues over time (see Chart B14.3). This increase may have reflected the desire of some banks to strengthen their capital bases, as well as greater investor demand, tighter pricing at a time of low long-term rates, and access to a substantially wider investor base following the introduction of the euro. The variation of the size of the issued amount differs widely, with both very small and very large issues coming onto the market. The latter (greater than €1 billion) tended to be made by repeat issuers. The majority of these securities are issued in euro, although there are some very large USD and GBP issues by euro area financial institutions.

Rating on issuance decreased slightly in recent years, reflecting the comparatively difficult conditions faced in parts of the euro area banking sector over the period 2001-2003 (see Chart B14.3). The decrease in the highest ratings value in 2005 reflected the withdrawal of state guarantees for certain specialised government credit institutions.

Empirical work for US banks has found that subordinated debt securities tend to be illiquid when issued in small amounts, and the closer they are to maturity.⁵ Hence, the prices of these securities are likely to be less informative than those of newer and larger issues. Secondary market signals have also been found to be limited in terms of their forward-looking ability for US banks. Despite this finding in US data, recent work for EU banks finds that spreads on subordinated debt securities have some power for predicting financial distress.⁶ The increase in average issuance size of euro area banks since 1999, combined with the fact that practically all of the large euro area financial institutions have outstanding subordinated debt suggests that these securities prices should contain useful forward-looking information for financial stability.

5 For US banks, see U. Birchler and D. Hancock (2004), "What does the yield on subordinated bank debt measure?", *Finance and Economics Discussion Paper* No 19, Federal Reserve Board of Governors.

6 For EU banks, see A. Sirioni (2003), "Testing for market discipline in the European banking industry: Evidence from subordinated debt issues", *Journal of Money, Credit, and Banking*, Vol. 35, No 3; R. Gropp and J. Vesala (2004), "Deposit insurance, moral hazard, and market monitoring", *Review of Finance*, 8, No 4; and Gropp et al. (2006), op. cit.

THE UPWARD MIGRATION IN CREDIT RATINGS STRENGTHENED IN 2005

The continued broadly positive market assessment of euro area banks' conditions is also reflected in the overall ratings actions by the three major rating agencies. In 2005, positive outlook changes outnumbered negative ones, so that for most of 2005 the credit quality of western European banks improved.

Taking a closer look at rating changes for a large sample of euro area banks for the period September 2005-February 2006 across the three major rating agencies, there was a 2-1 ratio of upgrades to downgrades. Upgrades throughout 2005 and in the first few months of 2006 affected banks in the mid and lower-A rating categories, compared with a larger number of upgrades in the upper B category in 2004, as indicated by the lower numerical equivalents of the average downgrades and upgrades in the latest period relative to 2004 (see Table S6). This may suggest that further scope for substantial upgrades is limited.

Considering 2005 as a whole, the rating agencies justified their positive assessments on the grounds of the favourable operating environment, which allowed banks to combine dynamic revenue growth with progress in their efforts to improve efficiency and risk management, work out legacy problems, and implement successful diversification strategies. By the end of 2005, rating agencies expected large western European banks to maintain robust credit strength and sound profitability levels in the year ahead, although a less benign operating environment was envisaged on account of a possible turn in the interest rate and credit cycles, and potentially less favourable capital market conditions. In addition, if the economic recovery in Europe were to prove weaker than currently expected, corporates' renewed borrowing appetite could taper off and potentially translate into some deterioration in banks' credit quality.

4.4 OVERALL ASSESSMENT

By early May 2006 the euro area banking sector had become highly profitable and comfortably solvent. Moreover, as banks have been diversifying their income base and improving their risk management practices, they are expected to continue to perform relatively well for the foreseeable future, even if the macroeconomic environment were to develop in a slightly less favourable way than currently envisaged.

The current healthy state of the euro area banking sector is all the more remarkable given that a variety of factors could have contributed to a less impressive performance. These challenges included a past sluggish macroeconomic performance in several large euro area countries, an unwinding of past overinvestment by the corporate sector, a substantial correction in equity markets at the beginning of the millennium, a protracted period of low long-term interest rates, and intense competition among banks, particularly in the mortgage lending market. In these circumstances, euro area banks were particularly successful in identifying new sources of revenue, such as raising the volume of lending to households for house purchase, developing foreign banking operations further, and raising income derived from various non-interest sources (such as fees, trading and commissions).

Looking forward, most macroeconomic forecasts suggest that economic growth in the euro area should gradually gain traction. If the current favourable investment environment continues in the period ahead, the recent developments in banks' lending patterns towards increasing lending to the non-financial corporate sector could expand further, providing welcome diversification benefits, especially for those banks that have substantial exposures to the household sector.

At the same time, market indicators have already been pricing in, for some time, a higher

likelihood of a further rise in long-term interest rates. As this scenario is starting to materialise, despite the prospects for increasing interest income in the short-term, lending to corporations could prove to be a more risky source of revenue for banks over the medium term if higher funding costs were to trigger a deterioration in credit quality. In addition, those banks which have expanded aggressively into non-interest income activities could see their income becoming more volatile if liquidity in the G3 economies tightened further.

Given that euro area banks' solvency buffers appear comfortable, banks should be able to cope with most of the sources of risks and vulnerabilities identified in this Review. Nevertheless, in most euro area countries, banks' impairment charges for expected losses still remained exceptionally low, although there are tentative signs in some euro area countries that impairment charges may have gradually started to rise. Should the currently favourable credit quality environment deteriorate, however, some profit erosion could follow in the period ahead through a more broad-based increase in impairment charges. By reacting to the combination of low levels of impairment charges and continuing rapid growth in lending, central banks and supervisors in some euro area countries have already resorted to moral suasion and to various prudential measures in an attempt to control credit expansion in their jurisdictions.

Market-based indicators suggest that market participants continue to assess positively the shock-absorption capacity of the euro area banking sector. Nevertheless, the degree of uncertainty about near-term developments has also increased, as indicated by some forward-looking indicators.

5 OTHER EURO AREA FINANCIAL INSTITUTIONS

5.1 THE EURO AREA INSURANCE SECTOR

2005 was a positive year for the euro area insurance sector, despite significant losses incurred by reinsurers as a result of the damage caused by hurricanes. Improved investment income together with positive underwriting results strengthened the overall financial performance of the industry. As 2005 was a record year for losses from natural catastrophes, the reinsurance sector displayed rather volatile financial results and poor equity price performance. However, as judged by the strength of stock prices, prospects for the euro area non-life insurance sector remain favourable. The outlook for the life industry has also been improving since the finalisation of the December 2005 FSR, owing to the upturn of euro area long-term bond yields that began in September 2005, coupled with more encouraging premium growth prospects.

FINANCIAL CONDITIONS IN THE INSURANCE SECTOR

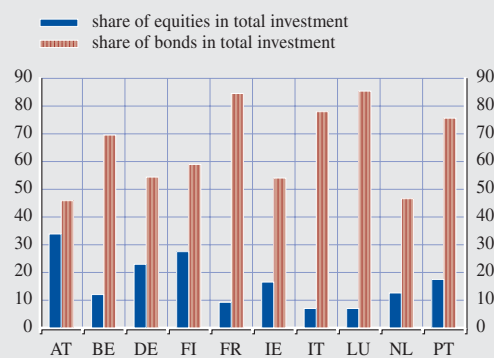
The life insurance sector

The overall profitability of the euro area life insurance sector improved slightly in 2005 when compared with 2004, although the amounts outstanding of life insurance policies contracted at high guaranteed rates, together with the relatively low level of long-term interest rates, continued to weigh on earnings in this sub-sector.

Considering individual revenue-generating items for life insurers, investment income benefited from the rise of bond prices associated with the overall decline in long-term interest rates in 2005.¹ The strength of global stock markets in 2005 also underpinned the improvement in investment income. However, because firms in the sector divested large amounts of equities in their portfolios after the three-years stock market correction that began in 2000, and replaced them with bonds in order to close duration gaps between their assets and

Chart 5.1 Share of bonds and equity in total investment portfolios of euro area life insurers

(2004, %)



Source: Committee of European Insurance and Occupational Pensions (CEIOPS).

Note: No data are available for Greece or Spain.

liabilities (see Chart 5.1), they enjoyed only limited investment returns from the rebound of equity prices. In 2005 portfolio reallocations in the sector mainly consisted of shifting from real estate, loans and short-term securities towards ultra-long maturity bonds.

During 2005, the life insurance sector saw moderate growth in premium written, essentially owing to changes in tax and pension reforms in some euro area countries. The pace of growth in sales of traditional life policies with guaranteed rates was rather sluggish. This appears to have been mainly because the prospective returns on such products remained unattractive: maximum returns offered in 2005 fell within a range between 2.5% in Italy up to a maximum of 4.0% in Portugal. Reductions in guaranteed rates of return on new products were implemented in January 2006 in Spain, Italy and Austria in order to dampen the cost of servicing products with still relatively high guaranteed rates, in an environment of persistently low long-term interest rates.

¹ From 2005 onward, the implementation of the new accounting rules (IFRS) for the EU listed companies means that bonds that are accounted as "held-for-trading" have to be marked-to-market- unlike bonds "held-until-maturity".

While sales of guaranteed return products weakened, preliminary information regarding the sales of unit-linked products indicates strong growth rates for 2005 in many euro area countries, similar to those observed in 2004 (see Chart 5.2). The strength of demand appears to have been mainly explained by the strong performance of stock markets, even in countries where the share of unit-linked and index-linked products in the total investment portfolio was already very high, such as Ireland and Luxembourg.² On the other hand, in Spain, Germany, Belgium, France and Finland, the bulk of premium continued to be generated by traditional life policies.

The financial strength and solvency positions of life insurers were enhanced in 2005, albeit to a limited extent. Looking ahead, the structural backdrop of the euro area life insurance industry has been improving. The reduction in guaranteed returns of traditional life policies is likely to facilitate margin rebuilding and, therefore, should improve the profitability outlook. In the run-up to Solvency II, life insurers have focused more on achieving a better risk-based pricing of products with bonuses and guarantees, so that unprofitable guarantees have been removed

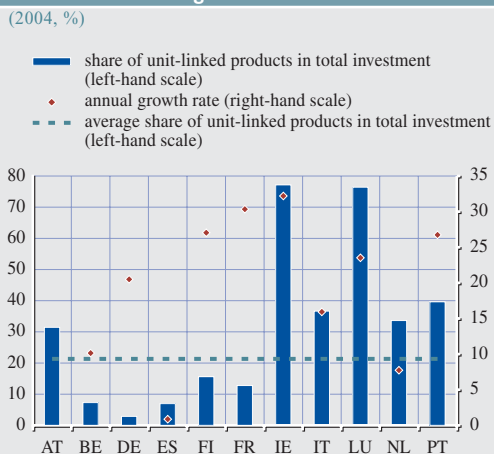
from new business. Finally, structural solvency prospects should also benefit from strong growth in the sale of unit-linked products, as capital requirements tend to be much lower for these products than for traditional life policies. This is because policyholders bear the investment risk of unit-linked products.

The non-life insurance sector

The overall improvement in profitability in the non-life insurance sector throughout 2005 was driven by both higher investment income and positive underwriting results. Gains on investment portfolios resulted from the strong performance of equity markets as well as from rising bond prices. Non-life insurers benefited from the equity rebound to a greater extent than life insurance companies, as non-life firms hold a higher proportion of equity in their investment portfolios (see Chart 5.3). While the vast majority of non-life insurers continued to increase their bond holdings throughout 2005, there were in a few cases some indications that

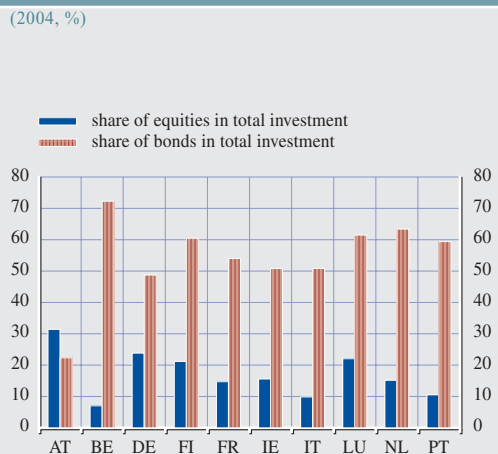
2 Premium written in index-linked and unit-linked products are recorded in separate accounts in the balance sheets of life insurers. On the liability side, they are accounted for in an item called "Reserves for linked contracts", and the corresponding invested proceeds are recorded as "Linked assets".

Chart 5.2 Unit-linked products as a share of the total investment portfolio of euro area life insurers and growth rates



Source: CEIOPS.
 Note: The investment risk of unit-linked and index-linked products is fully borne by policyholders. No data are available for Greece. The Austrian growth rate does not appear in the chart owing to its higher level: it reached more than 500%.

Chart 5.3 Share of bonds and equity in the total investment portfolio of euro area non-life insurers



Source: CEIOPS.
 Note: No data are available for Greece or Spain.

they had increased their equity holdings as well.

In 2005 underwriting results continued to contribute positively to profitability as in the previous two years. The core business profitability of non-life insurers, as measured by combined ratios, improved further in 2005 compared with 2004. In anticipation of Solvency II, non-life insurers became more focused on core business, efficient operational practices, sound risk management and risk-adjusted pricing. The resulting improved pricing discipline prevented premium rates from being significantly reduced below technically profitable levels. The amplitude of the pricing cycle has therefore been dampened somewhat and only a slight decline in insurance prices was observed in some euro area countries.³ Looking ahead, it is less likely that the search for higher market share will lead to sharply declining insurance prices similar to past episodes when capital positions were strong and competition was intense. Hence, overall profitability may increasingly be driven by core business activities rather than purely by strong investment returns as previously, when insurance companies used to rely on investment income to cover losses arising from their underwriting activities.

In 2005, the solvency positions of non-life insurers remained at relatively high levels.⁴ Securitisation together with significant issuance of hybrid capital and subordinated debt, allowed insurers to reduce their cost of capital. This may be beneficial for profitability and solvency in the period ahead.

Looking forward, underwriting risk may have increased as non-life insurers decided to retain more risk in their balance sheets during the reinsurance renewal season in January 2006, in an environment of rising reinsurance prices. As non-life firms tended to restrict the coverage of their reinsurance contracts to losses arising from extreme events, this may result in higher amounts of claims in the period ahead together with higher volatility of earnings and equity.

The reinsurance sector

Despite an improvement in investment income, the overall profitability of the euro area reinsurance sector remained subdued in 2005. The main reason for this was that the reinsurance industry, not only in the euro area but also globally, incurred unprecedented catastrophe losses in 2005 both in terms of frequency and severity (see Chart 5.4). Losses incurred by euro area reinsurance companies related to Hurricanes Katrina, Rita and Wilma had a significant adverse impact on core business profitability, albeit to a far lesser extent than was the case for US reinsurers.

The amount of losses caused by catastrophes put an end to the trend of declining reinsurance prices worldwide since 2003 (see Chart 5.4). In the immediate aftermath of large and costly natural catastrophes, reinsurers usually tend to raise their prices, often sharply to counterbalance capital depletion. Nevertheless, the increase in reinsurance prices during the renewal season in

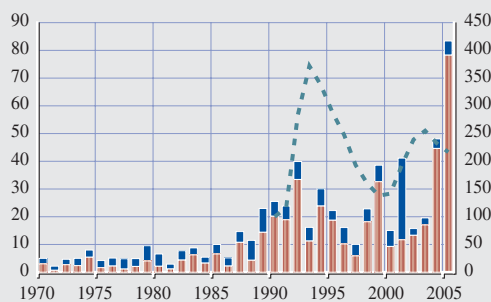
3 See Committee of European Insurance and Occupational Pensions (2006), "Report on financial conditions and financial stability in the insurance sector, the occupational pension fund sector and the reinsurance sector", CEIOPS Committee on Financial Stability, May.

4 As non-life insurers do not discount their liabilities, their solvency margins were not affected by the decline in long-term interest rates.

Chart 5.4 Insured losses in the global reinsurance industry and world rate-on-line

(1970 - 2005, 2005 price levels)

■ man-made disasters (USD billions, left-hand scale)
 ■ natural catastrophes (USD billions, left-hand scale)
 - - - rate-on-line index (index: 1990 = 100, right-hand scale)



Sources: Swiss Re and Guy Carpenter.
 Note: The rate-on-line index captures the evolution of reinsurance prices worldwide.

January 2006 was rather moderate compared to expectations and historical trends. There was also significant discrimination in repricing patterns globally. In the US, reinsurance prices rose in January 2006 within a range of 35-125% on a nationwide basis. By contrast, the euro area saw much smaller changes in reinsurance prices (see Chart 5.5). To a certain extent, this reflects the fact that the exposures of European reinsurers to US natural catastrophes were much lower, and also reveals their well-diversified balance sheets, both geographically and operationally. This may also be the result of stricter underwriting discipline on the part of European reinsurers, which were more reluctant to contract at lower than technically profitable prices to gain market share. Anticipation of Solvency II has probably already encouraged more risk-based pricing approaches, prompting insurers to revise their catastrophe modelling and risk management.

Unlike the traditional rush to reinsurance that often takes place after significant catastrophe losses have occurred, and despite the lower than expected increase in reinsurance prices during the January 2006 renewal season, the volume of premium written by euro area reinsurance companies has diminished. The decline in reinsurance volumes may be attributed to primary insurers retaining more risk on their balance sheets, as well as to the fact that barriers

to entry in the reinsurance business have so far remained rather low.⁵

At the same time as gross premium written declined, reinsurers also faced higher reinsurance costs in the retrocession market,⁶ which have further weighted on underwriting results. These price upswings, which were mainly driven by a shortage of cover arising from the exit of several Bermudan companies from the retrocession market, were uneven across geographical areas. Retrocession programmes related to the US saw the highest pure price increases of about 35%, as the majority of retrocession contracts with US exposures suffered a loss in 2005, leading to severe market dislocation. By contrast, price increases for non-US cover ranged between 15% and 20%.

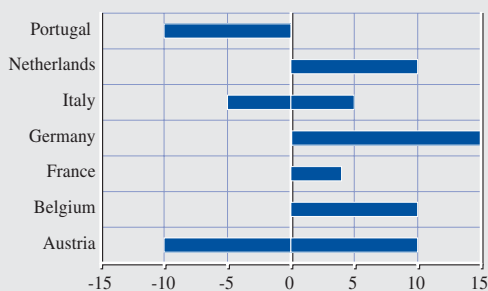
Despite the losses incurred by euro area reinsurers from catastrophes, which may still be revised upwards, their solvency positions proved to be sufficiently comfortable to withstand the shock. The fact that they remained resilient can be ascribed to two factors. First, the capital bases of reinsurers, which were rebuilt after the events of September 2001, were much stronger in 2005 compared with earlier episodes of natural catastrophes. Second, the balance sheets of European reinsurers tend to be well diversified.

RISKS FACING THE INSURANCE SECTOR

The main risk identified in the December 2005 FSR – regarding the usual cyclical pattern of prices in the reinsurance and non-life insurance sector – did not materialise. In the period ahead, it is rather unlikely that reinsurance prices will undergo sharp declines motivated by insurers seeking to expand their market share. Indeed,

Chart 5.5 Reinsurance price changes from the January 2006 renewal season

(annual changes, %)



Source: Guy Carpenter.

Note: The bars in the chart refer to the range of reinsurance price changes across business lines.

5 Against the background of expectations of rising reinsurance prices, and because existing reinsurers were seeking to limit their exposures, the creation of twelve new start-up reinsurers was announced in 2005. The additional capacity that may be brought to the global reinsurance sector, from mostly private equity funds, would be about USD 8-12 billion.

6 The retrocession market refers to reinsurance companies transferring part of the risk they do not want to keep in their balance sheets to other reinsurers, which are then called the retrocessionnaires. This transfer of risk between reinsurance undertakings takes place in the same way as primary insurers retrocede risk to the reinsurance companies.

significant losses from damage caused by hurricanes have somewhat eroded reinsurers' capital bases, and reinsurers have focused on maintaining profitable core business by keeping prices at technically correct levels. A greater focus on underwriting discipline, internal models and better risk-adjusted pricing have helped dampen the amplitude of the pricing cycle in the reinsurance sector, which should be beneficial for financial stability.⁷ Looking forward, the risk of significantly declining insurance prices in the non-life sector appears more relevant, as companies may not fully manage to transmit the rising costs of reinsurance to their policyholders. Notwithstanding an overall improvement in the financial condition of euro area insurance companies, some external and internal sources of risks do remain in the period ahead.

Risks within the insurance sector

Two sources of risk appear to lie ahead for the insurance sector. First, one potential source of risk is related to the implementation of the new market-based accounting rules (IFRS) for EU listed companies. From 2005 until at least 2007, only assets on insurers' balance sheets will be marked-to-market, while their liabilities will be accounted at amortised/historical costs according to national rules. This mismatch in the accounting treatment of assets and liabilities brings with it the possibility of greater volatility in the investment portfolios of firms, as well as in their earnings and shareholder equity.

A second source of risks arises from the future implementation of the new EU solvency regime – the so-called Solvency II project.⁸ For instance, the reinsurance sector may become more vulnerable to liquidity risk on the liability side owing to increased incentives on the part of primary insurers to require the inclusion of rating triggers in their reinsurance contracts (see Box 15). Furthermore, small life and monoline insurers – ones focusing on a single product line such as property – may also be negatively affected, as the new regulatory capital regime is expected to provide some benefits in terms of capital relief to well-

diversified insurance companies, and as it will recognise internal models used by large undertakings to manage their risk and capital. This may therefore favour large insurers, as the amount of capital relief will give them some competitive advantage compared to smaller firms.

Although the new regulatory and accounting environment for the European insurance industry is likely to promote financial stability in the medium term because of the increased transparency of the insurance business,⁹ better risk management and enhanced market discipline, it does nevertheless carry with it two main risks in the short term. First, there is a potential risk for the European financial market from the possibility of large portfolio reallocations by insurers shifting from equities to bonds. Such shifts may aim at reducing both the volatility of assets that might be expected from the implementation of IFRS and investment risk in order to save regulatory capital in the run-up to Solvency II.¹⁰ As insurance companies are the largest institutional investors in most euro area countries, significant portfolio reallocation could have impacts on market prices. Second, Solvency II may also potentially have adverse consequences on the European

7 This could create disincentives for potential new entrants seeking quick excess profits during the phase of the cycle when reinsurance prices are rising. Barriers to entry could become stronger in the medium term, possibly impeding future capital inflows from private equity funds and hedge funds, and thus limiting downward pressures on reinsurance prices.

8 The European Commission is currently revising the solvency standards for EU insurance undertakings. One of the key objectives of the Solvency II project is to provide a solvency regime that better matches the true risk profile of insurance companies, and which reflects market developments.

9 The increased transparency expected from IFRS and Solvency II may facilitate the acquisition of small insurance companies by large insurers or banks. The smaller life companies may be the most affected, as some could experience solvency difficulties with the potential upward revision of technical reserves needed to price guarantees and bonuses efficiently and accurately in the new solvency regime. See Swiss Re (2006), "Getting together: Globals take the lead in life insurance M&A", Sigma No 1/2006.

10 Non-listed companies and mutual insurers may also have an incentive to adopt the new accounting rules, as the new EU Solvency regime will introduce market-based valuation for both assets and liabilities, which will have to be compatible with the expected outcome of IFRS. Hence, the magnitude of portfolio reallocation related to IFRS may be significant.

banking sector as insurers may face declining incentives to absorb credit risk from banks owing to the removal of regulatory arbitrage opportunities (see Section 4 on banks' involvement in the credit risk transfer market).

Box 15

RATING TRIGGERS IN THE REINSURANCE SECTOR

The reinsurance sector contributes positively to financial stability by providing a safety net for the primary insurance industry. Reinsurance companies typically absorb the most volatile part of the risk corresponding to peak exposures (i.e. the risk of substantial losses arising from events occurring with a low probability) which primary insurers are not willing to keep in their balance sheets. By pooling insurance risk, reinsurance firms can achieve superior risk diversification, both in term of business lines and geographically and after a catastrophe event, they tend to be able to endure losses transferred by the primary sector. As a result, risks and capital in the insurance industry tend to be better managed, making the primary insurance sector more resilient when it takes out reinsurance. Furthermore, despite their central role in the worldwide insurance markets as “insurers of last resort” and their very high business concentration, reinsurance undertakings are often not perceived as being a source of systemic risk. The low potential of financial market disruption¹ and the limited counterparty risks for banks on the credit derivatives markets² support the view that reinsurance undertakings are not systemic core institutions.³ This Box aims at questioning this view by analysing some of the ways in which the reinsurance sector may constitute a vulnerability or weak-spot for the stability of the financial system. In particular, it examines how the likely widespread inclusion of rating triggers in reinsurance contracts in the run-up to implementation of Solvency II may increase the vulnerability of reinsurers to liquidity risk in the same way as runs can take place on banks.

A rating trigger can be defined as “any clause in a contract or agreement between two parties that allows one party to take protective action against deteriorating creditworthiness of the other party once a pre-determined rating threshold is breached.”⁴ Concretely, in the case of a downgrade of a reinsurer below a certain level, such as BBB, its customers (i.e. primary insurers that ceded risk) may require the reimbursement of part of the premiums they paid, in exactly the same way as in the case of bank runs, where depositors ask for their money back. As a result, reinsurers are vulnerable to a possible loss of confidence on the part of their customers. This means that the logic of “first-come, first-served” may also affect the reinsurance business, once a rating breaks the threshold activating the triggers. Hence, the liabilities of reinsurers may potentially become liquid, albeit perhaps less quickly than for banks.

In 2004, the activation of rating triggers destabilised the financial position of several reinsurers: as their ratings fell below security thresholds, these companies had to return large amounts of premium to customers.⁵ This eventually led to further downgrades. The losses of business

1 See IMF (2002), “The financial market activities of insurance and reinsurance companies”, *Global Financial Stability Report*, Chapter III, May; Swiss Re (2003), “Reinsurance: A systemic risk?”, *Sigma* No 5/2003; G30 (2006), “Reinsurance and international financial markets” and G. L. Reuber (2000), “International financial stability: What risks arise from the reinsurance industry in offshore centers and how might these be reduced”, Office of the Superintendent of Financial Institutions, Canada.

2 See International Association of Insurance Supervisors (IAIS), (2005), *Global Reinsurance Market Report 2004*, December, and Fitch Ratings (2005), “Global credit derivatives survey: Risk dispersion accelerates”, November.

3 See G30 (1997), “Global institutions, national supervisors and systemic risk”.

4 See Moody's (2005), “Rating triggers in the mortgage insurance industry – 2005 update”, Special Comment, December.

5 PMA, Atlantic Mutual, Centre Group and Converium Reinsurance all breached the rating threshold.

endured by these reinsurance firms were furthermore aggravated by implicit triggers: brokers and distributors apply minimum rating requirements as one of the criteria in the placement of reinsurance, so that if a reinsurance company fails to maintain a certain minimum financial strength rating, then they will no longer market its products. Although implicit triggers are not built into contracts, both implicit and explicit triggers may substantially hamper the capacity of reinsurers to withstand any negative shocks and to recover afterwards. In 2005, more than half of the reinsurance contracts outstanding included such an explicit clause.⁶ Rating triggers tend to be included more often in contracts involving small reinsurance companies with rather low ratings. This is because their bargaining power tends to be limited by the closeness of their position to the trigger points.⁷ However, some large reinsurers have also accepted such clauses in their contracts, and the implementation of Solvency II may potentially lead to widespread inclusion of rating triggers in reinsurance contracts.

Under the new regulatory regime, more capital relief may be expected from primary insurers' use of reinsurance, so that EU primary insurers may face a stronger incentive than in the past to transfer risk to the reinsurance sector. This will raise the credit risk exposures of primary insurers vis-à-vis reinsurers. In Solvency II, credit risk will be explicitly included in regulatory capital requirements. Hence, any financial problem faced by a reinsurer will result in rising credit risk and also higher capital requirements for the primary insurers. The propagation channel between the two sectors may therefore be enhanced. To avoid this, primary insurers may face a stronger incentive than in the past to seek rating triggers in reinsurance contracts in order to protect themselves against any significant deterioration in the creditworthiness of their reinsurers. To a certain extent, the primary sector could achieve greater stability, as rating triggers should shelter them against solvency pressures arising from their credit risk exposures to reinsurance companies. However, this may have adverse consequences in the reinsurance sector, especially for those companies involved in the retrocession market.

Indeed, in a slightly similar way that banks participating in a payment system are interconnected within the interbank market, the retrocession market links the majority of reinsurance companies worldwide. For reinsurers, retrocession is part of any risk management strategy, as reinsurance companies rarely keep all the risks they underwrite: they typically transfer most of the risk they do not want to bear to those reinsurance undertakings that participate in the retrocession market. Only a small fraction of the risk is by contrast transmitted to the financial markets through securitisation. Such retrocession of risks between reinsurance companies splits up large and unique risks and distributes them in the international reinsurance market. This allows cover to be obtained even for risks which are too large for the largest individual reinsurers. Such spirals of risk retrocession within reinsurers links them in a tight network via a multitude of reinsurance contracts. Retrocession leads to a significant level of credit risk for all companies, as these contracts may not be fully collectible in the case of insolvency risk. On average, about 15% of the total reinsurance premiums written in 2004 were subsequently retroceded. As not all reinsurance companies participate in the retrocession market, the average exposures of retrocessionnaires are therefore much higher.

6 About 51% of the reinsurers surveyed by Moody's in 2005 responded that they had rating triggers within their reinsurance contracts, compared with 41% in 2004, 35% in 2003 and 26% in 2002; see Moody's (2005), "Rating triggers in the property & casualty insurance industry – 2005 update: widespread, but unlikely to result in industry-wide downgrades", Special Comment, December.

7 See Fitch Ratings (2004), "Mid-year 2004 global reinsurance outlook", Special Report, Insurance, September.

If a systemic event were to occur, which in the reinsurance sector could be the confluence of several major natural catastrophes⁸ to which a critical mass of reinsurers are exposed and whose impact on claims are much larger than expected, then the mechanism of shock propagation between reinsurers would involve credit risk.⁹ Each reinsurance company participating in the retrocession market would have to absorb the repercussions of the initial systemic shock as well as the potential withdrawal of its customers, and would additionally face significant credit risk from their reinsurers' counterparties. Indeed the counterparties could also be affected by the initial shock and by liquidity shrinkage from runs of their own primary insurers. With Solvency II, the increase in credit risk should lead to higher capital, and all reinsurers may therefore potentially face the need to raise regulatory capital at the same time. As reinsurance companies are very often part of large conglomerates, such pressures on capital requirements may well spread to other parts of the financial system such as the banking sector.

Finally, it is unlikely that the increased supervision and harmonisation of regulation that may be expected from the implementation of the Reinsurance Directive¹⁰ and of Solvency II will reduce the incentive to include rating triggers in reinsurance contracts. This is because the information of regulatory authorities is not public, which ensures that the information conveyed by rating agencies in the choice of reinsurance companies by primary insurers will continue to be valuable. Furthermore, even if regulators were publicly to disclose some of their information, it would not enjoy some of the characteristics of the information revealed by ratings (e.g. being directly understandable, readily available and regularly updated). The new regulatory environment is therefore unlikely to push the role of rating agencies together with rating triggers into the background.

8 Owing to climatic changes, whose influence on natural catastrophes is currently very difficult to predict, the probability of systemic events for the reinsurance industry has been increasing.

9 Liquidity risk as a propagation mechanism between reinsurers is much less relevant when compared to the banking sector, as pressures on liquidity cannot materialise quickly from one reinsurer to another; however, liquidity may be exacerbated by banks refusing to extend some credit lines to reinsurers facing financial stress.

10 The Reinsurance Directive was approved by the European Parliament on 7 June 2005 and adopted by the EU Council on 7 November 2005. Following its adoption, Member States have two years to implement it.

Risks outside the insurance sector

There are two main exogenous risks to the euro area insurance sector which, if they were to crystallise, could affect the financial condition of insurers. The interest rate risk remains the most important; an additional potential risk is that of an influenza pandemic.

Despite higher credit risk arising from the rising likelihood of an adverse turn of the credit cycle, the main concern for the insurance sector, especially for life insurers, is interest rate risk. On the one hand, low levels of long-term interest rates weigh on profitability and solvency positions, especially for life insurers that have to pay high guaranteed returns on life policies

sold in the past. On the other hand, an abrupt rise in long-term interest rates could also weigh on profitability in two ways. First, from 2005 onwards, assets must be marked-to-market, and therefore rising interest rates will decrease the present value of the bond holding, while liabilities will continue to be accounted at the amortised cost at least until 2007. Second, beyond the pure accounting mismatch, a sharp increase in bond yields could lead to significantly higher than expected surrenders: policyholders may no longer find their life policies attractive if they continue to pay a very low level of guaranteed return. This could be relevant for countries such as Italy, Spain, Austria and Luxembourg, where guaranteed

returns currently range between 2.0% and 2.5%. Although such interest rate risk on the liability side is usually hedged, the liquidity risk associated with higher than forecasted early withdrawals may well be less easily managed than in the past. This is because of a “tainting rule” in IFRS 4. According to this rule, an insurer that has to sell a held-to-maturity investment in response to an unexpected event should reclassify all the company’s other held-to-maturity assets as “available for sale” for the two subsequent financial reporting years. As a result, this may encourage insurers to hold more bonds accounted as “for trading”, which will be marked-to-market and whose value will therefore decline with rising long-term interest rates.

A second risk, especially for the life insurance industry, is that avian influenza could turn into a pandemic. So far, there has been little impact on the euro area insurance sector as no cover has been offered against such a disease, and avian influenza has been excluded from the conditions attached to new insurance contracts taken out in January 2006. Instead, governments, if they choose, must compensate farmers in the case of poultry being severely affected by avian influenza. By contrast, an influenza pandemic

affecting humans in addition to birds could seriously affect the insurance industry. Depending on the scenario – ranging from moderate, such as the influenza outbreaks in 1957 and 1968, to severe, along the lines of the 1918 epidemic – death claims for life insurers could range anywhere between USD 31 billion and USD 133 billion.¹¹ These estimates do not include claims that could be made against other insurance products, and it is likely that non-life insurers would also have to pay claims for business interruption and healthcare.

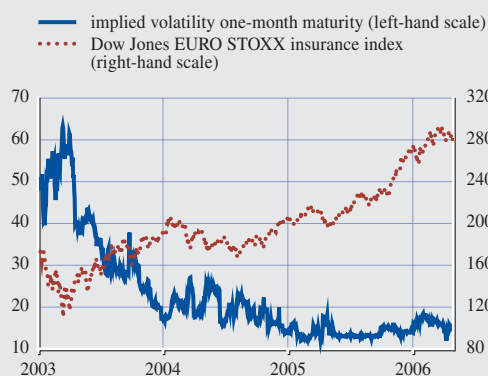
Market-based indicators of the insurance sector's shock-absorption capacity

Since November 2005, euro area insurance stock price indices have performed strongly, especially in the non-life sector (see Chart 5.6). This improvement has been associated with a slight increase in implied volatility, revealing greater uncertainty about future prospects for the stock indices and/or rising risk premia attached to the insurance sector. As this pattern is common across all stock markets, this tends to point to the presence of some

11 See S. Weisbart (2006), “Can the life insurance industry survive the avian flu?”, Insurance Information Institute, January.

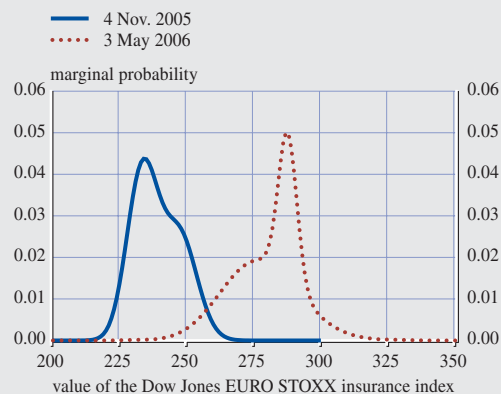
Chart 5.6 Dow Jones EURO STOXX insurance index and its implied volatility

(Jan. 2003 - May 2006)



Source: Bloomberg.
Note: The Dow Jones EURO STOXX insurance index comprises the 19 largest insurance companies in the euro area. The implied volatility is the average of the volatility extracted from call and put options with a 50 delta.

Chart 5.7 Risk-neutral probability density function on the Dow Jones EURO STOXX insurance index



Sources: Bloomberg and ECB calculations.

ASYMMETRY AND FAT TAILS OF THE DENSITY OF THE EURO AREA INSURANCE AND BANKING STOCK INDICES

The risk-neutral density (RND) extracted from financial options prices facilitates direct insights into the entire distribution of market expectations regarding the future price of an underlying asset at a given point in time. In the monitoring of the euro area insurance and banking sector, high-frequency indicators can be useful as part of the ongoing assessment of perceived risks. This Box aims at analysing two indicators that can be extracted from options market prices and which provide information on the degree of asymmetry and the fatness of the tails of the RND. These indicators are commonly known as risk-reversals and strangles respectively in foreign exchange markets.

When investors perceive a downside risk for a certain stock index, then options betting on a sharp decline in the index will become more expensive than options betting on an increase in the index of the same size. The price of out-of-the-money (OTM) call options – options whose strike price is higher than the current value of the stock index – reflects information on the upper tail of the RND, the upside risk. The price of OTM put options – options whose strike price is lower than the value of the stock index – reveals information about the lower tail of the density, i.e. the downside risk. Hence, the difference in the prices of OTM calls and puts with strike prices symmetrically spaced around the mean can provide a measure of the skewness of the distribution.¹ Risk-reversal quotes measure precisely this difference in options prices, with the options values expressed in terms of implied volatility.² By convention, the risk-reversal is calculated as the difference between the implied volatility of an OTM call and that of an OTM put, with both options having the same so-called delta of either 10 or 25.³ It can thus be used to ascertain whether the risk regarding future movements of an index lies on the upside or on the downside. However, it does not provide a particular prediction regarding the future direction of the stock price; it simply reflects the distribution of the future price as expected by market participants, which may prove wrong. Chart B16.1 displays a time series of this risk reversal indicator, which conveys information about both the direction and the magnitude of expected changes in the euro area insurance and banking stock indices. Negative values point to the fact that market participants assess the risk of a sharp fall of the stock indices as being more likely than a rise of the same magnitude.

It is worth noting that this interpretation of the directional views as perceived by market participants is only valid conditional on large stock index fluctuations. Indeed, for small variations when risk reversals are negative, the more likely event perceived is an increase in the stock index. Let us consider a situation where the probability of a large decline is much higher than the probability of a large increase in the stock index of the same size: there will be a fatter tail on the left hand side of the density than that on the right hand side (see Chart B16.2). For small changes in the index around the mean (vertical line with a value of 172), the more

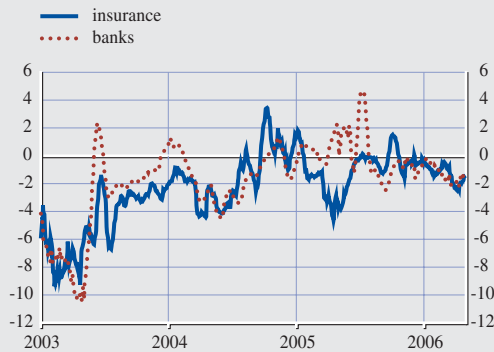
1 Although in-the-money options could theoretically also be used to gauge the asymmetry in the density, these options are too thinly traded to reveal representative information about market expectations.

2 The options value can be expressed either in prices or in implied volatility, using the Black and Scholes (B&S) formula as a way to convert one into the other – which is different as using the B&S formula as a pricing tool.

3 The delta is a measure of the moneyness of an option. The lower the delta, the lower the probability that the option may be exercised at maturity. Options with 25 delta have been used to calculate the skewness and kurtosis indicators, given that the liquidity of these options is greater than that with 10 delta.

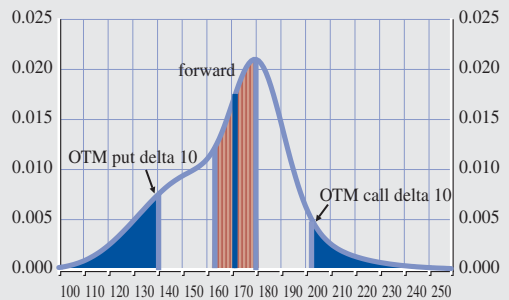
Chart B16.1 Risk reversals of the Dow Jones EURO STOXX insurance and banking stock indices (skewness indicator of the RND)

(implied volatility, %, 20-day moving average)



Sources: Bloomberg and ECB calculations.
 Note: The risk-reversal indicator is calculated as the difference between the implied volatility of an OTM call with 25 delta and the implied volatility of a OTM put with 25 delta.

Chart B16.2 Negatively skewed RND: difference in probability attached to small versus large variations in underlying price

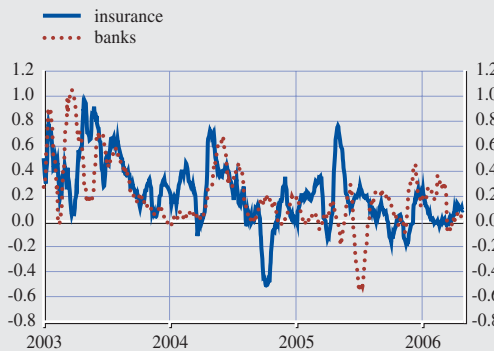


Sources: Bloomberg and ECB calculations.
 Note: OTM European calls reflect conditions in the upper tail of the risk-neutral density, while OTM put reflects conditions in the lower tail.

probable scenario expected by market participants is one of a rise in the index: for a small upward variation of the index from the forward rate, the area on the right-hand side of the mean is greater than the area corresponding to a small downward change. This arises because in any negative skewed distribution with a fat tail on the left, the forward, i.e. the mean of the distribution, is always lower than the median and the mode. Conversely, if the risk reversal is positive, reflecting a perception that the probability of a large rise is greater than that of a large fall of the same size, the most probable event is a limited decline in the stock index.⁴

Chart B16.3 Strangles of the Dow Jones EURO STOXX insurance and banking stock indices (indicator of the fatness of the RND tails)

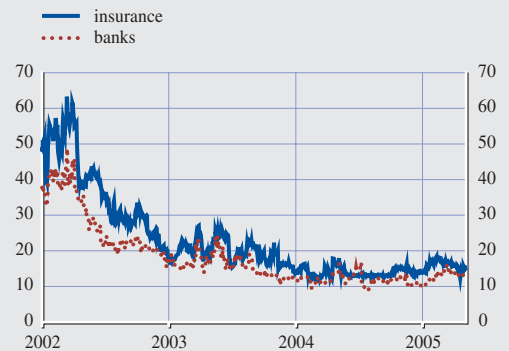
(implied volatility, %, 20-day moving average)



Sources: Bloomberg and ECB calculation.
 Note: The strangle is calculated as the difference between the average implied volatility of OTM calls and puts, both with 25 delta, and the average at-the-money volatility of calls and puts, with 50 delta.

Chart B16.4 Implied volatility of the Dow Jones EURO STOXX insurance and banking stock indices

(implied volatility, %)



Source: Bloomberg.
 Note: The implied volatility is calculated as the average of at-the-money calls and puts, with 50 delta.

4 As a risk reversal is measured as the difference in options prices, it reflects not only the conditional probability of the option being exercised at maturity, but also its expected payoff. Theoretically, it may happen that the probability of the call expiring in-the-money exceeds the probability of the put expiring in-the-money at maturity, although the risk reversal is negative. This is because a higher expected payoff of the put than that of the call may offset the difference in probability.

Chart B16.3 displays a time series of the kurtosis indicator that measures the thickness of the tails of the distribution. It is calculated as strangle quotes, e.g. as the difference between the average implied volatility of an OTM call and an OTM put with 25 delta, and the average volatility of an at-the-money call and put. A strangle quote would be zero for a normal distribution. A positive value indicates a more peaked density with fatter tails, which implies a higher probability of extreme variations, whether upside or downside, compared to a normal distribution. The information conveyed therefore differs from that in implied volatility of at-the-money options, which pertains to the expected variability of asset prices.

The expected variability of the insurance and banking stock index appears to be driven by some common systematic factors, as the two series have more or less moved in parallel since early 2003 (see Chart B16.4). The higher implied volatility for insurance equities would tend to suggest that market participants consider the insurance sector as being somewhat riskier than the banking sector. The skewness and kurtosis indicators for the two sectors also seem to have been driven by some common factors until September 2004. Since then, idiosyncratic factors seem to have been more relevant in accounting for the rather different short-term dynamics of the two industries.

common systematic factors, rather than purely idiosyncratic influences affecting only the insurance sector.

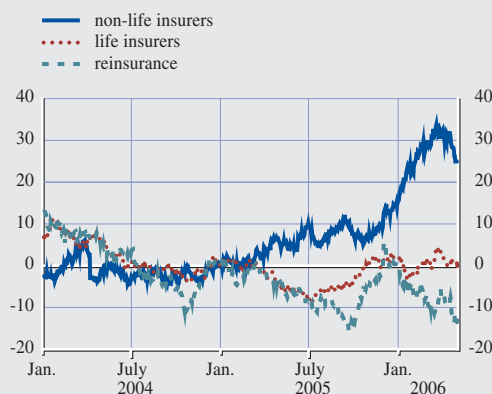
Reflecting this higher perceived uncertainty, the risk-neutral density function (RND) of the EURO STOXX insurance index displayed a fatter tail on the left and revealed more dispersed expectations in May 2006 when compared to that prevailing in early November 2005 (see Chart 5.7). After the finalisation of the December 2005 FSR, the asymmetry of the RND turned from positive to negative as revealed by the value of the risk reversal on the insurance stock index; this was also accompanied by rising fat tails of the RND as indicated by the strangle value (see Box 16). Despite this evidence supporting increasing perception of risk, the revision of market expectations was not priced into either subordinated debt spreads or expected default frequencies (see Charts S70 and S71). To some extent, this may have reflected the fact that stock prices had risen in the meantime, and these uncertainties surrounded an overall better central expectation.

Over the last six months, the relative performance of the insurance sub-sectors has displayed a high degree of dispersion (see Chart 5.8). In

the non-life insurance sector, the improved discipline in risk pricing was recognised and rewarded by the stock market: the outperformance of the stock index with respect to the EURO STOXX index was notable after November 2005. This mainly reflected very significant improvements in combined ratios. Notwithstanding rather strong premium growth prospects, the upward trend in equity prices

Chart 5.8 Cumulative change in the euro area insurance stock indices relative to the Dow Jones EURO STOXX

(Jan. 2004 - May 2006, % points, base: Jan. 2005 = 0)



Source: Thomson Financial Datastream.

could be tested in the period ahead if market expectations regarding further drops in combined ratios are not realised.

Performance in the life insurance industry was rather modest after November 2005, despite the improving outlook regarding growth in life policies sales, both in terms of volume and margins. In the run-up to Solvency II, heightened concerns about potential important adjustments in technical reserves arising from a better risk pricing of guarantees and bonuses may have weighed on the valuation of life insurance share prices. Asset-liability management strategies may also have been perceived as targeting reduced investment risk, potentially leading to the erosion of profitability and of capital positions in the medium term.

The reinsurance sector has underperformed the wider European insurance sector since November 2005, as reinsurers have seemed unable to generate sufficient returns to offset high earnings volatility. Other factors such as the still rather low barriers to entry into the industry, as well as the potential for adverse reserve developments related to recent natural catastrophes, are also likely to affect reinsurance stock prices in the period ahead.

OVERALL ASSESSMENT

An important development in 2005 common to the three insurance sub-sectors has been greater focus on risk management, risk-adjusted pricing and core profitability. Better asset-liability has been achieved, together with an optimisation of the capital structure, with rising levels of issuance of hybrid capital and subordinated debt. Such improvements to operational practices are in line with the requirements of the new regulatory and accounting regime in Europe. However, not all companies are in a position to meet the challenges posed by the implementation of IFRS and Solvency II. This is especially the case for small firms, which face potential M&A threats in the short to medium term, as the industry becomes increasingly transparent. Regarding the large listed companies, they may experience higher

volatility over the period 2005-2007 in their investment portfolios, as well as in earnings and shareholders' equity with the implementation of the new accounting rules.

Core business profitability in the euro area non-life sector was reinforced in 2005, so that overall profitability does not rely as much as in the past on investment income as the main source of income. Given the current focus on underwriting, no major deterioration in combined ratios is expected in the period ahead. Notwithstanding the increased discipline in pricing, insurance prices may start to decline somewhat, as non-life insurers will potentially not fully pass on the rising reinsurance premium to their policyholders.

In the life insurance industry, profitability remained subdued in 2005 in an environment of relatively low long-term interest rates. For 2006 the outlook for this sector is skewed towards a positive outcome, fuelled by increasing volumes in unit-linked products and rising life margins as long-term rates have risen somewhat. Furthermore, the risks arising from an influenza pandemic in the euro area appear increasingly unlikely to materialise in the period ahead.

Finally, the euro area reinsurance sector suffered from hurricane-related losses in 2005, which saw a string of unprecedented insured losses for reinsurance worldwide. Despite these losses that impinged on earnings, the capital position of the euro area reinsurance companies remains comfortable enough to withstand a major natural catastrophe in the period ahead. However, the medium-term prospects appear rather gloomy owing to the current relatively high volatility of earnings that characterises this sub-sector, as well as to the increasing challenge of predicting the magnitude of natural catastrophe losses.

5.2 HEDGE FUNDS

This new Section of the FSR describes the main global developments in the hedge fund sector and the risks posed by largely unconstrained hedge fund activities. The pace of growth of capital under the management of hedge funds moderated after the finalisation of the December 2005 FSR, partly due to poor return performances across most strategies in October 2005. The possibility of tighter global liquidity conditions in the period ahead has raised investor redemption risk for hedge fund managers, particularly as the share of less liquid assets has reportedly been increasing. The correlations of returns within some hedge fund investment strategies and among strategies have remained high or have even increased, raising the risk of disorderly synchronous exits from similar trades.

The hedge fund industry continued to expand in size in 2005. According to one recent estimate, in 2005 there were 6,900 active single-manager hedge funds (excluding commodity trading advisors and managed futures funds) and roughly

3,600 funds of hedge funds (FOHFs) worldwide, managing in total nearly USD 1.35 trillion and around USD 0.7 trillion respectively.¹² Based on this and other estimates,¹³ FOHFs accounted for over half of the capital provided to single-manager hedge funds. Various investor surveys have also reported increases both in absolute and relative allocations to hedge fund strategies by institutional investors, predominantly pension funds and insurance companies, including some European ones. Market participants have also noted an increasing concentration of capital under management in the sector. Consolidation has been particularly prominent among FOHF managers owing to strong competition and the potentially high benefits these funds can derive from economies of scale.

The capital under management of the European segment of the global hedge fund industry is

12 See Strategic Financial Solutions, LLC (2006), "2005 Hedge Fund Database Study", January. The study is based on data combined from 12 commercial hedge fund databases and this particular estimate includes only funds that reported performance in 2005.

13 See InvestHedge (2006), "Assets in hedge funds of funds continue to grow in 2005", 20 February (press release).

Table 5.1 Mapping the hedge fund industry by domicile and location of managers

(Dec. 2005, %, structure by capital under management)

		managed from				US	Total
		Europe	offshore	other	US		
domiciled in	Europe	6.0	0.2	0.4	0.5	7.1	
	offshore	19.2	9.0	3.0	37.3	68.6	
	other	0.0	-	0.4	0.1	0.5	
	US	0.5	0.3	0.1	23.0	23.9	
Total		25.7	9.5	3.9	60.9	100	

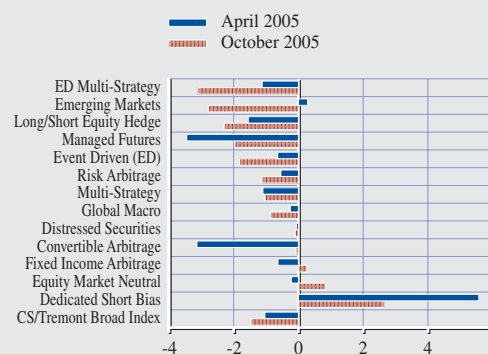
(Dec. 2004 and Dec. 2005, %, annual changes in structure)

		managed from				US	Total
		Europe	offshore	other	US		
domiciled in	Europe	0.5	-0.0	-0.2	-0.1	0.2	
	offshore	0.9	0.5	0.3	-1.5	0.3	
	other	0.0	-	0.1	-0.1	-0.1	
	US	0.2	-0.0	0.0	-0.5	-0.4	
Total		1.5	0.4	0.2	-2.2		

Sources: Lipper TASS database and ECB calculations.
Notes: Excluding FOHFs. Europe includes EU25 and other European countries.

Chart 5.9 Hedge fund performance in April and October 2005

(%, in USD terms, net of all fees)



Source: Credit Suisse Tremont Index.

estimated to have increased by more than 25% during 2005 to reach USD 325 billion.¹⁴ Information from one commercial hedge fund database confirms that the share of European single-manager hedge funds continued to rise in 2005 (see Table 5.1), irrespective of whether it is measured by the legal domicile of funds or by the location of managers.

Final hedge fund returns in 2005 were lower than longer-term averages (see Charts S74 and S75). The only strategies that outperformed their annual long-term averages were ones aimed at emerging markets and dedicated short bias. In addition, two months during 2005, namely April and October, proved particularly difficult for many hedge fund managers (see Chart 5.9). The main explanatory factor behind losses in April was the downgrading of GM and Ford by rating agencies; however, the reasons behind the poor performance recorded in October were less obvious.

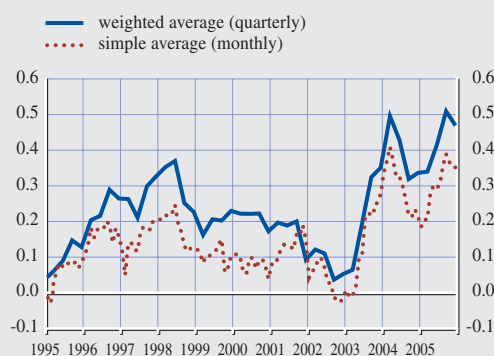
CORRELATIONS

At the end of 2005, when the losses incurred in October were disclosed, financial market participants questioned whether this was simply a normal fluctuation in performance, or whether it signified something more significant for the future of the hedge fund industry. These losses again sparked concerns about capacity constraints and diminishing returns as hedge funds exploit most, if not all, available arbitrage opportunities. By historical standards, the average decline in October 2005 of 1.46 percent ranked as the 14th lowest monthly return (10th percentile) since the beginning of CS/Tremont Broad Index series in January 1994.

A key concern, however, was that returns in October were negative across most hedge fund strategies, even though these strategies were not expected to be so jointly correlated, given significant differences in the nature of the strategies pursued. Indeed, the correlations among hedge fund strategies tended to increase more or less continuously after mid-2003, reaching an all-time peak in 2005 (see Chart 5.10). In fact, the levels reached in late

Chart 5.10 Correlations among hedge fund strategies

(Jan. 1995 - Dec. 2005, 12-month moving window, average pairwise correlation coefficients among ten CS/Tremont hedge fund indices)



Sources: Credit Suisse Tremont Index, Tremont Capital Management and ECB calculations.

Notes: Ten CS/Tremont indices include Multi-Strategy, Equity Market Neutral, Convertible Arbitrage, Fixed Income Arbitrage, Event Driven, Managed Futures, Emerging Markets, Global Macro, Dedicated Short Bias, Long/Short Equity Hedge indices. The weighted average correlation is calculated according to the formula:

$$\text{weighted average} = \frac{\sum_{i < j} \text{corr}_{ij} \times (w_i + w_j)}{\sum_{i < j} (w_i + w_j)}, \text{ where } \text{corr}_{ij} \text{ is a pairwise}$$

correlation coefficient between 12 monthly returns of strategies i and j . Weights w_i and w_j refer to the shares of capital under management of strategies i and j at the end of the 12-month window.

2005 exceeded those that had prevailed just before the near-collapse of Long Term Capital Management (LTCM), a very large hedge fund, in September 1998. Higher correlations among strategies can complicate the attempts made by FOHF managers to diversify their hedge fund portfolios, and explain why median pairwise correlation coefficients of FOHF returns are so high (see Chart 5.10).

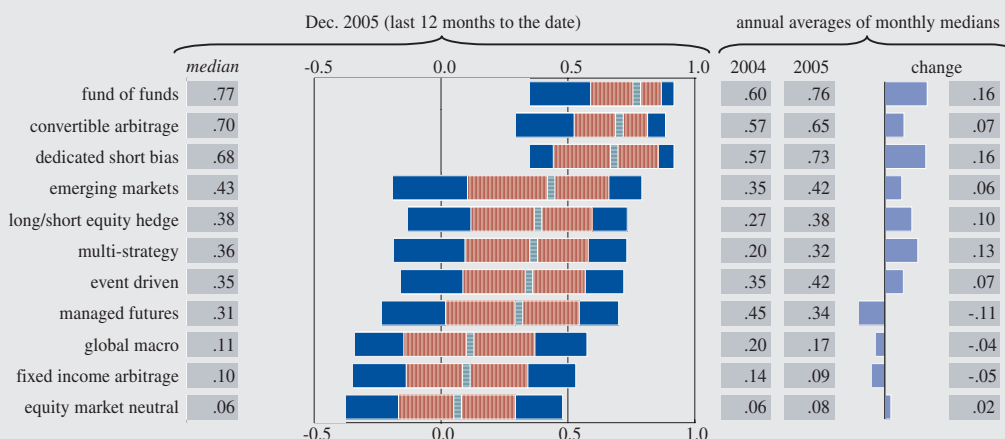
The median pairwise correlation coefficients of monthly hedge fund returns within some strategies remained high and even increased in 2005 (see Charts 5.11 and 5.12). Capacity constraints and forced liquidations prompted by investor redemptions led to further increases in correlations among convertible arbitrage funds. Correlations among long/short equity

¹⁴ See EuroHedge (2006), "Global hedge fund assets surge to USD 1.5 trillion according to HedgeFund Intelligence research", 27 March (press release).

Chart 5.11 Distribution of pairwise correlation coefficients of monthly hedge fund returns within strategies

(Jan. 2004 - Dec. 2005, monthly net of all fee returns in USD, moving 12-month window)

■ 10th-90th percentile range
■ interquartile range
■ median



Sources: Lipper TASS database and ECB calculations.

Notes: For every moving 12-month window, only hedge funds with 12 monthly observations were included. Values are probably slightly biased (normally up to around ± 0.03), since time series of hedge fund returns in the database were not adjusted for sub-fund structures, which represent counterpart onshore and offshore funds or different classes of shares with different fee structures, lock-up periods and other technical differences, and which basically correspond to the same pool of money managed in a highly correlated or nearly identical way.

hedge and multi-strategy funds also rose significantly.

The risks posed by the crowding of hedge fund trades were already highlighted in the June 2005 FSR,¹⁵ as well as by the Counterparty Risk Management Policy Group, which recently noted that “the concept of crowded trades [has] entered the lexicon as one of the most significant risks to be identified and mitigated”.¹⁶ The fact that correlations are trending higher not only within some strategies, but also among strategies, raises concerns that a triggering event could lead to highly correlated exits across large parts of the hedge fund industry.

FLOWS

The GM/Ford episode in April 2005 and the October 2005 experience of correlated negative returns seem to have weighed on net money flows into the hedge fund industry. According to Tremont Capital Management, single-manager hedge funds suffered net outflows in the last quarter of 2005 on aggregate, and for the first

time since 2002 (see Charts S73 and 5.13). These outflows were not spread across all strategies, and the strategies that suffered the most had already become less popular before the fourth quarter. Convertible arbitrage strategy stood out again owing to concerns about capacity constraints, since funds in this strategy lost about 40% of capital under management in 2005, while their share in total capital under management dropped from 6% to 3% (compared with their peak in 2003 at almost 9% of the hedge fund industry).

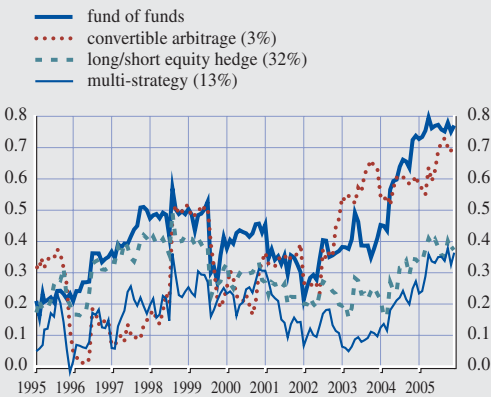
The picture for FOHFs, according to Hedge Fund Research, was even bleaker, with these funds experiencing net outflows in both the third and fourth quarters of 2005 of USD 1.2 billion and 2.1 billion respectively. Moreover, the prospects for FOHFs may become more uncertain, as larger institutions, which are now

¹⁵ See Box 2 in ECB (2005), *Financial Stability Review*, June.

¹⁶ See Counterparty Risk Management Policy Group (2005), “Toward greater financial stability: A private sector perspective”, July, p. 48.

Chart 5.12 Medians of pairwise correlation coefficients of monthly hedge fund returns within strategies

(Jan. 1995 - Dec. 2005, monthly net of all fee returns in USD, moving 12-month window)



Sources: Lipper TASS database, Tremont Capital Management and ECB calculations.

Notes: Numbers in the parentheses after strategy names indicate the share of total capital under management (excluding FOHFs) at the end of 2005, as reported by Tremont Capital Management. For every moving 12-month window, only hedge funds with 12 monthly observations were included. Medians are probably slightly biased (normally up to around ± 0.03), since time series of hedge fund returns in the database were not adjusted for sub-fund structures, which represent counterpart onshore and offshore funds or different classes of shares with different fee structures, lock-up periods and other technical differences, and which basically correspond to the same pool of money managed in a highly correlated or nearly identical way.

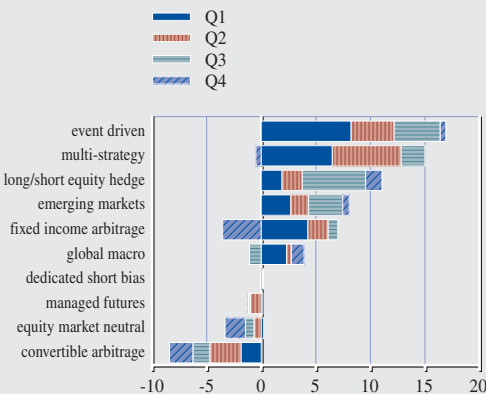
increasingly becoming key capital providers to the hedge fund sector may, after undergoing a learning phase with FOHF structures, eventually start investing directly in order to avoid the second layer of fees.¹⁷ The diversification advantage is also being increasingly diminished by multi-strategy funds and investable hedge fund indices.

Owing to declining inflows, the pace of growth of total capital under management in the hedge fund sector continued to decelerate, although it still exceeded 20% on an annual basis at the end of 2005, largely due to the strong contribution of investment returns over the entire year (see Chart 5.14). After mid-2003, when the global search for yield reportedly got underway and when hedge fund inflows surged, hedge funds benefited from persistently low short-term interest rates globally and increased risk appetite among investors. However, changes in these factors may have led to unexpected outflows, as their impact on investor redemptions

17 For their services, FOHFs charge another layer of fees (usually a 1% management fee and a 10% performance fee) on top of fees charged by underlying single-manager hedge funds.

Chart 5.13 Global hedge fund quarterly net flows by strategy in 2005

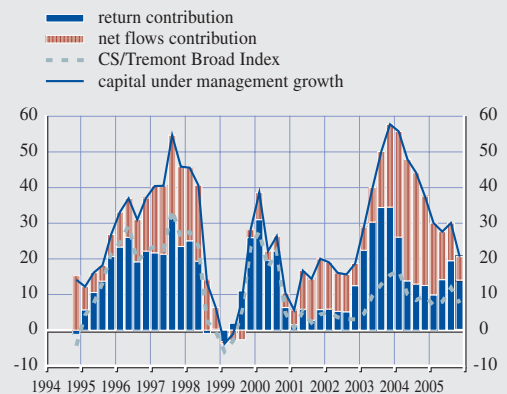
(Q1 2005 - Q4 2005, USD billions)



Source: Tremont Capital Management.

Chart 5.14 Decomposition of the annual rate of growth of hedge fund capital under management

(Q4 1994 - Q4 2005, %, 12-month changes)



Sources: Tremont Capital Management, Credit Suisse Tremont Index and ECB calculations.

Notes: Excluding FOHFs. The estimated quarterly return to investors equals the difference between change in capital under management and net flows. In this dataset, capital under management totalled USD 813 billion at the end of 2005.

is not so apparent at the level of individual hedge funds (see Box 17). Indeed, as monetary conditions become tighter globally, this is likely to increase the relative attractions of holding cash, and to raise the cost of financing leveraged positions.

LIQUIDITY ISSUES

Less liquid investments and “side pockets”

The liquidity of hedge fund investments may be decreasing, as recently hedge funds have reportedly been acquiring less liquid assets. Most strategies aimed at liquid financial assets have come under some pressure due to higher competition and lower profitable trading opportunities across common strategies. Hence, more funds have been turning to increasingly exotic strategies and less liquid markets in order to earn the associated liquidity premium. The taking of positions in illiquid and sophisticated OTC derivatives and private equity-style investing are good examples of this trend.

The move of some hedge funds into private equity territory and other less liquid markets raises at least four key issues. First, the valuation of such holdings is difficult and is often based on a manager’s best estimates, which means that it can rest upon some highly subjective assumptions. Second, some hedge fund managers may deliberately favour less liquid investments, as this could help them to lower artificially the volatility of returns of their portfolios. Third, in comparison with private equity funds, hedge funds provide investors with better redemption possibilities. This makes them more vulnerable to redemption risk as the share of illiquid investments increases. Fourth, relative to private equity funds, a hedge fund structure provides hedge fund managers with an edge related to the compensation structure. Hedge fund managers are paid their performance fees every year on realised and unrealised gains, whereas private equity managers receive them only several years later when the value of investment is realised.

These issues, at least to some extent, are being tackled by the increasing use of “side pockets”,

which represent a separate class of capital in a hedge fund to account for illiquid holdings. Side-pocketed assets usually do not earn performance fees and are non-redeemable until the assets are finally sold. However, in this way the returns on a fund’s most volatile assets do not contribute to its returns, and can thereby dampen the overall volatility of hedge fund performance.

Lock-up periods

Some market observers have noted a tendency for hedge funds to offer longer lock-up periods, which, from a risk management point of view, is a welcome development, given the increasingly lower liquidity of hedge fund assets. Most institutional investors tend to be unwilling to lock up their money for more than one year, but the acceptance of longer lock-up periods seems to be increasing. In 2005, some high-profile start-ups were able to command three-year lock-up periods, but other less-known new entrants struggled to find investors and had to concede shorter lock-ups.

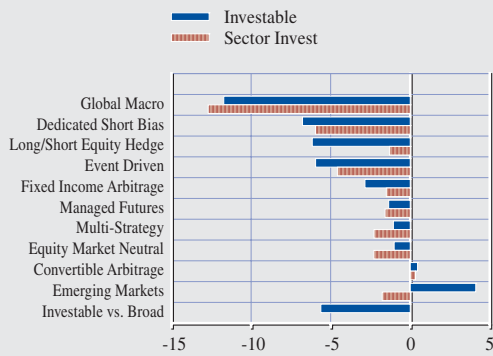
By 1 February 2006, hedge fund managers (investment advisers) meeting certain criteria had to register with the US Securities Exchange Commission (SEC). One of the criteria was a shorter than two-year lock-up period, which was aimed at excluding private equity funds that tend to have longer lock-up periods. This criterion could also have encouraged some managers to lengthen their lock-up periods to at least two years in order to avoid registration with the SEC and the associated regular reporting and other requirements. However, lock-up periods are specified at the launch of a fund, and investors may react with unease to any attempted changes later on.

The use of “side letters”

Another development that has recently attracted attention is the increased use of “side letters” within the hedge fund sector. Side letters can provide specific, usually the largest, investors with a variety of advantages such as preferential withdrawal terms, access to information on adverse developments ahead of other investors,

Chart 5.15 Investable vs. non-investable hedge fund indices by strategy

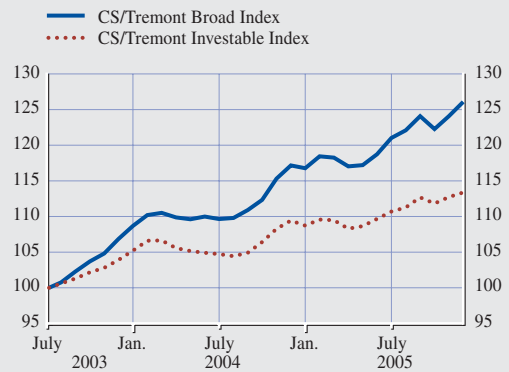
(Oct. 2004 - Dec. 2005, %, in USD terms, net of all fees, accumulated differences by strategy)



Sources: Credit Suisse Tremont Index and ECB calculations.
Notes: The chart shows accumulated differences by strategy between two versions of investable indices, CS/Tremont Investable and CS/Tremont Sector Invest, and CS/Tremont Broad Index. Investable was launched in August 2003; Sector Invest in October 2004.

Chart 5.16 Investable vs. non-investable hedge fund indices

(July 2003 - Dec. 2005, index: July 2003 = 100, in USD terms, net of all fees)



Sources: Credit Suisse Tremont Index and ECB calculations.
Note: CS/Tremont Investable Index was launched in August 2003.

lower fees and other volume discounts. These commitments are not however revealed in funds' prospectuses, and thus discriminate against other uninformed and usually smaller investors. Such side letters also create a misleading impression of a fund's resilience to investor redemptions.

Institutions that create structured hedge fund products or administer investable hedge fund index platforms normally seek to establish separately managed accounts with hedge fund managers, or ask for side letters in order to ensure greater transparency and monthly, weekly or even daily redemption possibilities. Some FOHFs also prefer managed accounts or side letters instead of investing along with other investors, and may favour more flexible redemption terms that would be more aligned with their own liabilities to investors.

The illiquidity premium: investable vs. non-investable hedge fund indices

By construction, most investable hedge fund indices tend to focus on larger, open and more liquid funds. Selected funds should be open to new money and ready to pay back funds to investors relatively often, usually monthly.

Thus, they must either operate in liquid markets or hold larger liquidity reserves. Given these constraints, comparisons of returns of investable and non-investable hedge fund indices could provide an indication of the illiquidity premium to investors associated with less flexible redemption terms, which can allow hedge fund managers to invest in less liquid assets. As illustrated in Charts 5.15 and 5.16, this liquidity premium can be substantial, although part of the disparity could also be due to size and selection effects. The size effect is related to the larger average size of hedge funds in selected investable indices,¹⁸ coupled with the fact that larger funds tend to underperform smaller, usually younger ones. The selection effect is linked firstly to the potentially incomplete or biased sample of eligible funds available to and used by the creators of investable indices, and secondly to cases when funds that are more successful are closed to new investment and are thus, by definition, excluded from investable indices.

¹⁸ For each of ten strategies, CS/Tremont Investable and CS/Tremont Sector Invest indices include respectively the six and 10-25 largest hedge funds from the eligible investable universe.

THE GLOBAL SEARCH FOR YIELD AND FUNDING LIQUIDITY RISKS FOR HEDGE FUNDS

In the three years prior to the end of 2005, net inflows into the hedge fund sector were particularly strong, averaging USD 20 billion per quarter. However, net outflows in the last quarter of 2005 warned many hedge fund managers of the possibility of higher withdrawals in the future. This also raised questions about the factors that drive money flows into the hedge fund industry. It has frequently been suggested that the main drivers of inflows were the global search for yield, against a background of persistently low interest rates globally, coupled with high risk appetite among investors. This Box tests this hypothesis by discussing the funding liquidity risks faced by hedge fund managers and by analysing the determinants of aggregate money flows into single-manager hedge funds.

Hedge funds face two types of funding liquidity risk: asset/liability mismatches related to short-term financing provided by banks, and investor redemption risk. Most financing is usually obtained in the (re)repo market, where overnight, term, callable, open and other forms of repo contracts exist both for long and short positions in securities. Strains in this market, rollover difficulties, short squeezes on borrowed for short-selling securities or banks' unwillingness to accept lower-grade collateral could lead managers to resort to asset sales in possibly already frail markets. To protect against such a scenario, a careful selection of financial instruments is needed for a particular economic exposure. For example, a short position in either corporate bonds or CDS would have different implications for current liquidity buffers due to different margin requirements, underlying instrument liquidity and other factors. Generally, the build-up of leverage via derivatives provides current liquidity (cash) savings relative to other arrangements. However, then the management of margin calls on losing leveraged positions comes into play. Moreover, creditors' stances can change dramatically under stressed conditions. This explains why some hedge fund managers try to negotiate margin lock-ups,¹ fixed haircuts and other arrangements aimed at safeguarding their funding flexibility.

Unexpected investor redemptions or even runs constitute another major funding liquidity risk. Strong absolute performance, of course, is the best defence against investor outflows, although investor withdrawal risk, at least to some extent, can also be mitigated by a combination of arrangements including initial lock-ups, penalties for early redemptions, redemption frequency, redemption notice and payout periods that properly reflect the liquidity of the underlying investment portfolio.

Owing to a lack of data, information about the sensitivity of money flows to various relevant factors by investor type is missing. Thus, it is not clear whether, on average, FOHFs or institutional investors are more sensitive than high-net worth individuals (HNWIs). According to some market observers, HNWIs can have more short-term attitudes and can be more susceptible to the "headline" risk related to the negative coverage of selected funds or the whole hedge fund industry in various media channels. On the other hand, it could also be argued that FOHFs probably tend to rebalance their allocations among hedge fund strategies depending on market conditions more frequently than HNWIs. For these reasons, some funds deliberately

¹ These are term margin commitments involving fixed margin terms for a specified period of time (e.g. holding correlations fixed in the case of portfolio level margining).

attempt to diversify their investor structure in order to avoid the risk that related or too-similar investor groups might behave in the same fashion, or appear to be exposed to similar constraints, making them withdraw their money at the same time. Furthermore, the emergence of secondary markets for locked-up hedge fund investments is a welcome development for both hedge funds and investors. For investors, these markets provide additional early exit possibilities, whereas hedge funds can obtain some indication on the build-up of redemption pressures through the analysis of existing supply and demand.²

In academic studies, the relation of flows to past performance of individual hedge funds was found to be convex at annual horizons, i.e. investors display higher sensitivity to good performance and lower sensitivity to poor performance.³ However, at quarterly horizons the flow-performance relationship can be more or less linear, owing to redemption restrictions that limit investors from actively shifting their capital in search of superior return, and the fact that divestment and investment decisions may be driven by different evaluation horizons.⁴ Costly and time-consuming manager due diligence processes may lead to lower responsiveness on the part of investors to recent positive performance, particularly as more weight is attached to the historical track record. At the same time, an active monitoring that characterises post-investment behaviour may result in higher sensitivity to recent poor return performance.

At the hedge fund level, in addition to performance relative to peers, there are a myriad of other hedge fund-specific factors that can affect investor money flows, such as size, age, lagged flows, volatility of returns, redemption restrictions and the option-like compensation structure of hedge fund managers. However, most of these factors are unlikely to have an impact on aggregate flows into the hedge fund sector as a whole and, therefore, hedge fund managers may underestimate redemption risk by not taking into account the influence of the general macro-financial environment.

Some of the macro factors that could affect money flows into hedge funds include monetary conditions and the degree of risk aversion among investors. To test this idea, aggregate quarterly net flows into single-manager hedge funds from 1994 to 2005, as reported by Tremont Capital Management, were analysed with a linear regression that included aggregate flows as a dependent variable and four explanatory variables (see Table B17.1 for details). The selection of US short-term interest rates as a proxy for global short-term interest rates can be justified by the fact that US managers still account for about two-thirds of total hedge fund capital under management globally, as well as the dominant role played by the US financial markets in the global financial system.

Regression results (see Table B17.1 and Chart B17.1) show that, in addition to lagged aggregate net flows and returns, contemporaneous changes in global risk appetite and US short-term interest rates appear to be statistically significant determinants of aggregate net flows. The persistence of net flows indicates the presence of inertia among investors, whereas the significance of lagged performance implies a high degree of sensitivity to recent poor returns and a chasing after recent good performance.

2 See Economist (2005), "Online matchmaking", 4 August.

3 See, for example, V. Agarwal, N. Daniel and N. Naik (2004), "Flows, performance, and managerial incentives in hedge funds", *Georgia State University Working Paper*, July.

4 See G. Baquero and M. Verbeek (2005), "A portrait of hedge fund investors: Flows, performance and smart money", *ERIM Report Series Research in Management*, August.

Table B17.1 Determinants of net aggregate flows into the hedge fund sector

(Q1 1994 - Q4 2005)

variable	sign	significance ¹⁾	description	calculation
Dependent variable				
<i>Flows %_t</i>			Quarterly aggregate net flows as a percentage of the sum of CUM ²⁾ at the end of the previous quarter and aggregate return in the current quarter. An assumption has been made that net flows take place at the end of each quarter. ³⁾ Time series seasonally adjusted.	$Flows \%_t = \frac{Flows_t}{CUM_{t-1} + Return_t}$
Explanatory variables				
<i>Constant</i>	+	no	Constant or intercept.	
<i>Flows %_{t-1}</i>	+	yes (99%)	Lagged quarterly aggregate net flows.	
<i>Return %_{t-1}</i>	+	yes (99%)	Lagged quarterly aggregate return as a percentage of CUM at the end of the previous quarter. The estimated aggregate return to investors is the difference between the change in CUM and net flows during the respective quarter.	$Return \%_t = \frac{Return_t}{CUM_{t-1}}$, where $Return_t = (CUM_t - CUM_{t-1}) - Flows_t$
Δ <i>Risk aversion_t</i>	-	yes (97%)	Change in quarterly average of Merrill Lynch global risk aversion indicator. ⁴⁾	
Δ <i>Short-term interest rates_t</i>	-	yes (98%)	Change in quarterly average of US short-term interest rates, defined as the average of the Fed Funds target rate and US Treasury two-year nominal yield (front-end of the yield curve) during the respective quarter.	
Adjusted R ²		52%		

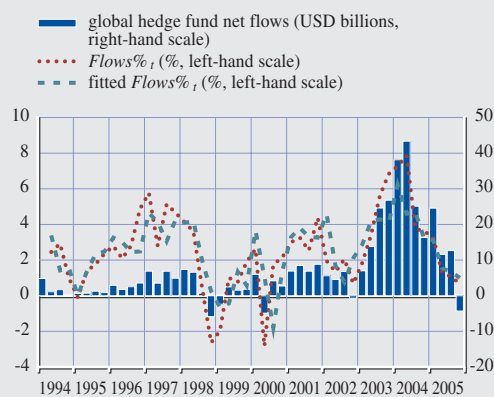
Sources: Tremont Capital Management, Merrill Lynch, Thomson Financial Datastream and ECB calculations.

Note: 1) Confidence levels are provided in parentheses. 2) CUM – capital under management, data start from 1993 Q4. 3) A contrary assumption that net flows take place at the beginning of each quarter does not change results, but complicates the interpretation of contemporaneous interaction with some explanatory variables. 4) For a description of the indicator, see Box 9 in this Review and Merrill Lynch (2006), “Updating the Merrill Lynch macro indicators”, 18 January.

The dynamics of contributions of individual factors to resulting money flows are depicted in Chart B17.2. The chart shows that the contribution of increasing risk appetite was particularly strong in 2003, when the global search for yield reportedly got underway. However, later on, risk appetite had little impact. At the same time, as the level of short-term interest rates in the US rose, it was associated with lower hedge fund inflows. Nevertheless, it seems that the most important factor driving hedge fund inflows in 2004 and 2005 was persistence in investor behaviour. This would not, therefore, exclude the idea that investor behaviour became herded.

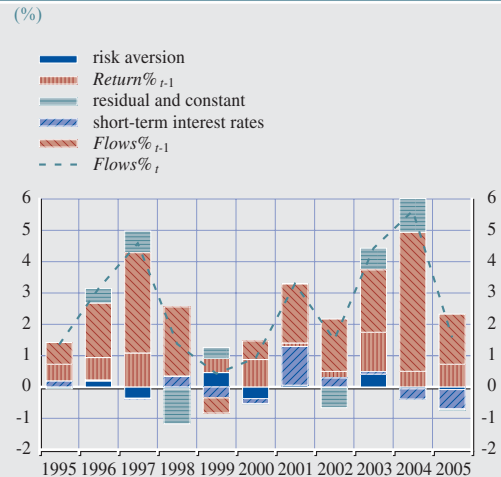
All in all, the findings provide some support for the view that the hedge fund industry has benefited from the recent global search for yield, as aggregate net flows appear to be sensitive to investor risk appetite and to the level of short-term interest rates. This also raises the risk that hedge fund managers may have underestimated investor redemption risk arising from global financial conditions that is not so apparent at the level of individual hedge funds. An

Chart B17.1 Regression results



Sources: Tremont Capital Management, Merrill Lynch, Thomson Financial Datastream and ECB calculations.
 Note: See Table B17.1 for a description of the dependent variable. Global hedge fund net flows exclude FOHFs.

Chart B17.2 Annual averages of quarterly aggregate net flow rates and factor contributions



Sources: Tremont Capital Management, Merrill Lynch, Thomson Financial Datastream and ECB calculations.
 Note: See Table B17.1 for a description of the variables. A positive contribution of risk aversion indicates a decline in risk aversion.

unexpected end of the recent global search for yield could cause investors to withdraw their money abruptly, thereby exerting funding liquidity pressures on individual hedge funds. This could trigger substantial sell-offs and challenge perceptions regarding the degree of liquidity prevailing in affected markets. Moreover, hedge funds could flood their prime brokers with large and simultaneous credit demands at a time when brokers themselves could be suffering from corrections in over-extended markets.

OVERALL ASSESSMENT

As the hedge fund industry keeps on growing, its expansion continues to raise questions about capacity constraints and the impact of hedge funds' largely unconstrained investment strategies on financial markets. In addition to potentially high leverage, the increasingly similar positioning of individual hedge funds within broad hedge fund investment strategies is another major risk for financial stability which warrants close monitoring despite the essential lack of any possible remedies. This risk is further magnified by evidence that broad hedge fund investment strategies have also become increasingly correlated, thereby further increasing the potential adverse effects of disorderly exits from crowded trades.

It is difficult to gauge what could cause correlated sell-offs and how damaging these could be, but one possible trigger could be an abrupt end of the recent global search for yield possibly induced by the tightening of global liquidity conditions. A further slowdown of inflows into hedge funds or even widespread redemptions could also exert pressures on individual hedge funds to liquidate increasingly less liquid holdings, as more hedge funds seem to be venturing into less liquid markets in order to earn the associated liquidity premium. Since the valuation of such investments is often arbitrary, investors may not always be presented with an accurate picture of fund positions and performance.

6 STRENGTHENING FINANCIAL SYSTEM INFRASTRUCTURES

Key financial infrastructures have remained operationally robust since the finalisation of the December 2005 FSR. As far as payment systems are concerned, the most important development over the past six months has been the preparation of a mechanism to transfer intraday liquidity between TARGET and EURO1. Regarding the securities clearing and settlement systems, no significant developments have emerged over the last six months.

6.1 PAYMENT SYSTEMS

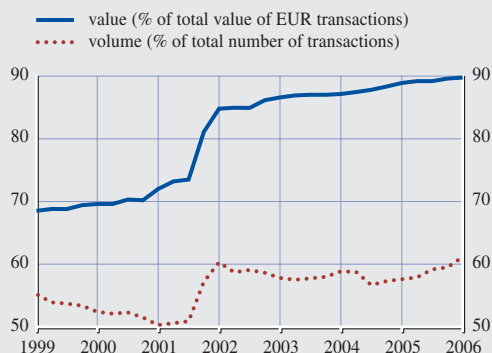
Payment systems are essential for the functioning of the financial system. They are the networks which allow market participants to settle their financial and business transactions, and their reliable and secure functioning is essential for the efficient flow of goods, services and financial assets in the economy. While market participants have a strong business interest in the smooth functioning of payment systems, central banks generally bear an important public policy – and sometimes also regulatory – responsibility in this field. Through their oversight function, they try to safeguard payment systems against instability and against the materialisation of systemic risks. Payment systems oversight is one of the Eurosystem's main tasks. By overseeing payment systems, in particular those that are systemically important, such as TARGET and EURO1, the Eurosystem contributes to maintaining and strengthening the stability of the financial system of the euro area and – to some extent – in other regions as well.

SETTLEMENT OF LARGE-VALUE PAYMENTS IN EURO

Since its start on 4 January 1999, an increasing number and amount of payments have been settled through TARGET. TARGET offers immediate finality of payment in central bank money, thus eliminating credit exposures between participants (see Chart 6.1).

Chart 6.1 Large-value payments processed via TARGET

(Q1 1999 - Q1 2006)



Source: ECB.

In the six months of data available since the December 2005 FSR (between October 2005 and March 2006), TARGET settled an average daily value of €2,006 billion.

Of the large-value payment systems settling transactions only in euro, EURO1 continued to be the second most important both in terms of value and volume, although considerably smaller than TARGET. Between October 2005 and March 2006, it settled an average daily value of €170.1 billion.

DEVELOPMENTS IN TARGET

Within the TARGET system, the German RTGSplus¹ system remains the most important component, and 28.3% of all TARGET payments were initiated through RTGSplus in 2005.

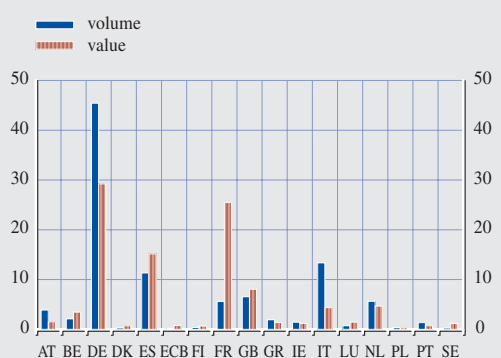
In general, the bulk of TARGET traffic continues to be concentrated in a handful of components, i.e. national RTGS systems, three of which had a collective share of 70.1% in terms of volume and 68.1% in terms of value of all transactions sent via TARGET (see Chart 6.2).

As a result, a severe incident affecting these components could have a considerable impact on the TARGET system as a whole. It is

1 RTGSplus is the name of the German TARGET component.

Chart 6.2 Large-value payments processed via TARGET by country

(Q4 2005 - Q1 2006, % of the NCB/ECB shares in terms of value and volume)



Source: ECB.

therefore critical that these systems are well protected against operational risks.

The most significant development to have taken place over the past six months in the TARGET system was the connection of new TARGET components in view of the enlargement of EMU. Those countries that envisage joining the euro area at the beginning of 2007 must be connected to the current TARGET system in order to ensure that their financial systems are fully integrated into the euro financial market. However, these countries are not obliged to implement their own TARGET components in order to connect to the current TARGET system. A number of options have been made available, out of which the NCBs in question (in coordination with the national banking community) can choose the one most appropriate to their specific situation. In any case, every extension of TARGET beyond its current geographical scope is subject to an oversight review, in order to ensure that the system continues to be secure and reliable.

DEVELOPMENTS IN EURO1

A new liquidity management feature (“liquidity bridge”) is scheduled to be introduced into the EURO1 system in the second half of June 2006. This feature is part of the stepwise introduction of a flexible settlement capability, and will

allow banks to transfer liquidity from TARGET to EURO1 throughout the business day, enabling them to adapt their processing capacity in EURO1 to their individual payment needs. At two predetermined times (14:00 and 15:00 CET), payment capacity that is no longer needed in EURO1 will automatically be retransferred back to TARGET. This flexible settlement capability aims at enabling the earlier processing of EURO1 transactions during the day, and facilitates banks’ liquidity management across systems by largely eliminating the need for intersystem liquidity swaps, which can imply a certain degree of credit risk. It is also intended to make EURO1 end-of-day settlement smoother.

Thus, the flexible settlement capability should contribute positively to financial stability.

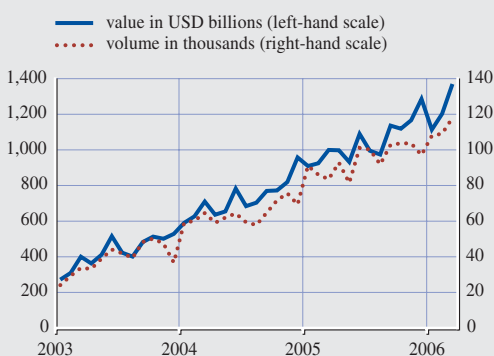
CONTINUOUS LINKED SETTLEMENT (CLS)

The CLS system is the private sector response to a G10 strategy to reduce foreign exchange (FX) settlement risk. The system settles both legs of FX transactions simultaneously, and only after sufficient positive funds are available. CLS Bank, which runs the CLS system, is a single-purpose bank that is only allowed to perform one activity: to provide settlement services. It therefore cannot encounter risks from any other banking services, which means that CLS settlement assets carry very little credit risk. The continuous stability of CLS is of prime importance to the Eurosystem, because incidents in the system could have severe implications throughout the euro area and beyond.

The CLS multi-currency system is, in terms of value, the second largest payment system settling euro transactions after TARGET (markedly exceeding the value of transactions settled through EURO1). The settlement values of FX transactions processed via the CLS system have continued to increase since the finalisation of the December 2005 FSR (see Chart 6.3). In March 2006, CLS settled the equivalent of USD 2.7 trillion, thus eliminating FX settlement risk of an equivalent USD 2.6 trillion. The euro values settled via CLS

Chart 6.3 Volumes and values of foreign exchange trades settled via CLS in USD billion equivalent

(Jan. 2003 - Mar. 2006)



Source: ECB.

amounted to €454 billion in March 2006, eliminating FX settlement risk of approximately €434 billion.²

BUSINESS CONTINUITY AND RESILIENCE

The development of sound and efficient business continuity plans within the financial sector is of common interest to financial authorities, financial institutions and market infrastructure providers. To ensure that sufficiently robust and consistent levels of resilience are achieved across all systemically important payment systems, the Eurosystem consulted the general public in 2005 regarding a proposed set of business continuity expectations. These expectations aim at providing guidance to the operators of such systems on how to review and test business continuity plans, and to reassess their adequacy under extreme scenarios.

The Eurosystem will shortly publish these expectations and in due time evaluate their application.

One particular threat that has emerged over the past six months is the possibility of an outbreak of an avian influenza pandemic. Unlike physical disasters that may affect people and infrastructures, a pandemic incident is typically characterised by a temporary, but possibly severe, lack of human resources over a large geographical area, affecting all types of

businesses. As a result, not only may the operators of payment systems be affected, but also the service providers they rely upon, such as those related to IT support, power supply, data networks, etc.

In general, the oversight reviews of the business continuity plans of operators of systemically important payment systems have shown that these plans already anticipate a certain level of temporary unavailability of staff. Nevertheless, the particular threat of a pandemic has, in many cases, triggered a review of these plans in order to increase the likelihood of containing its impact should such a threat crystallise.

² The reduction in FX settlement risk is smaller than the values actually settled in CLS because participants can trade down their positions in CLS via swaps, whereby two participants conclude two opposite trades, one to be settled in CLS and the other one to be settled outside CLS (e.g. via correspondent banking). Because the latter reintroduces FX settlement risk, the value of these swaps is deducted from the values settled in CLS to obtain the real reduction in FX settlement risk.



IV SPECIAL FEATURES

A COUNTRY-LEVEL MACRO STRESS-TESTING PRACTICES

Just as banks are increasingly using stress-testing to assess risk at the institution level, macro stress tests are becoming an increasingly important tool for financial stability analysis by central banks. These tools can be used by central banks to assess the capability of the financial system, especially the banking system, to weather extreme but plausible shocks to its operating environment. Given the importance of credit risk for banks, this Special Feature discusses various conceptual aspects of designing macro stress-tests for the banking system, with a special emphasis on credit risk.

INTRODUCTION

Stress tests are commonly used to quantify the impact of some extreme but plausible shock to a financial institution or a country's entire financial system. More narrowly defined, macro stress-testing is a way of quantifying the link between macroeconomic variables and the health of either a single financial institution or the financial sector as a whole.¹ In particular, in this Special Feature macro stress-testing refers to determining the resilience of the financial system.

Using stress tests has become an increasingly common practice for both financial institutions and central banks.² Considering the latter, several euro area NCBs have adopted stress tests as a tool for assessing the strength of the financial sector, focusing primarily on banks. For many of these countries, the practice was spurred on by the introduction of macro stress tests as part of the Financial System Assessment Programs (FSAPs) conducted by the International Monetary Fund (IMF).³ The fact that IMF FSAPs in many cases constituted a starting point for country practices in several euro area countries may have also contributed to creating a common set of basic elements in terms of stress-testing methodologies. Nonetheless, an established procedure or "state of the art" for conducting stress tests is still missing.

Central banks use stress-testing as one part of their financial stability assessments. The tool can provide a framework for discussion about risks, enabling progress to be made in quantifying the likely impact of risks. This can also facilitate a ranking of risks by their importance, thereby better focusing surveillance work more generally.

Looking forward, as advances are made in quantifying the importance of various sources of risk, stress tests are likely to become increasingly common. This is because the increasing complexity of financial markets and financial institutions requires new and better tools for risk measurement. Moreover, forthcoming regulatory changes – in particular Basel II – are expected to affect all credit institutions in the EU starting from 2007,⁴ potentially enhancing progress in this area.

The rest of this Special Feature describes what components could be considered when designing a macro stress test. This involves reviewing practices adopted at the country level and taking stock of the experience gained by euro area NCBs.

- 1 For an extensive review of the literature on macro stress-testing, see M. Sorge (2004), "Stress-testing financial systems: an overview of current methodologies", *BIS Working Paper*, No 165.
- 2 See, for instance, Committee on the Global Financial System (2005), "Stress testing at major financial institutions: Survey results and practices". Supervisory authorities are also increasingly using stress tests, but given that their analysis in most cases has a different focus in this context, they are not covered in this Special Feature.
- 3 The following euro area countries have undergone IMF FSAPs including stress tests: Belgium (2006), Germany (2003), Greece (2006), Spain (2006), France (2005), Ireland (2000 and 2006), Italy (2006), Luxembourg (2002), the Netherlands (2004), Austria (2004), Portugal (2006) and Finland (2001). Some countries do not publish the full results of the stress tests incorporated in the FSAP. For an overview of the IMF approach to stress-testing, see M. Jones and P. Hilbers (2004), "Stress testing financial systems: What to do when the governor calls", *IMF Working Paper*, 04/127.
- 4 In particular, banks adopting the internal ratings-based approach of Basel II will be required to implement stress tests for credit risk under Pillar II. See Basel Committee on Banking Supervision (2004), "International convergence of capital measurement and capital standards".

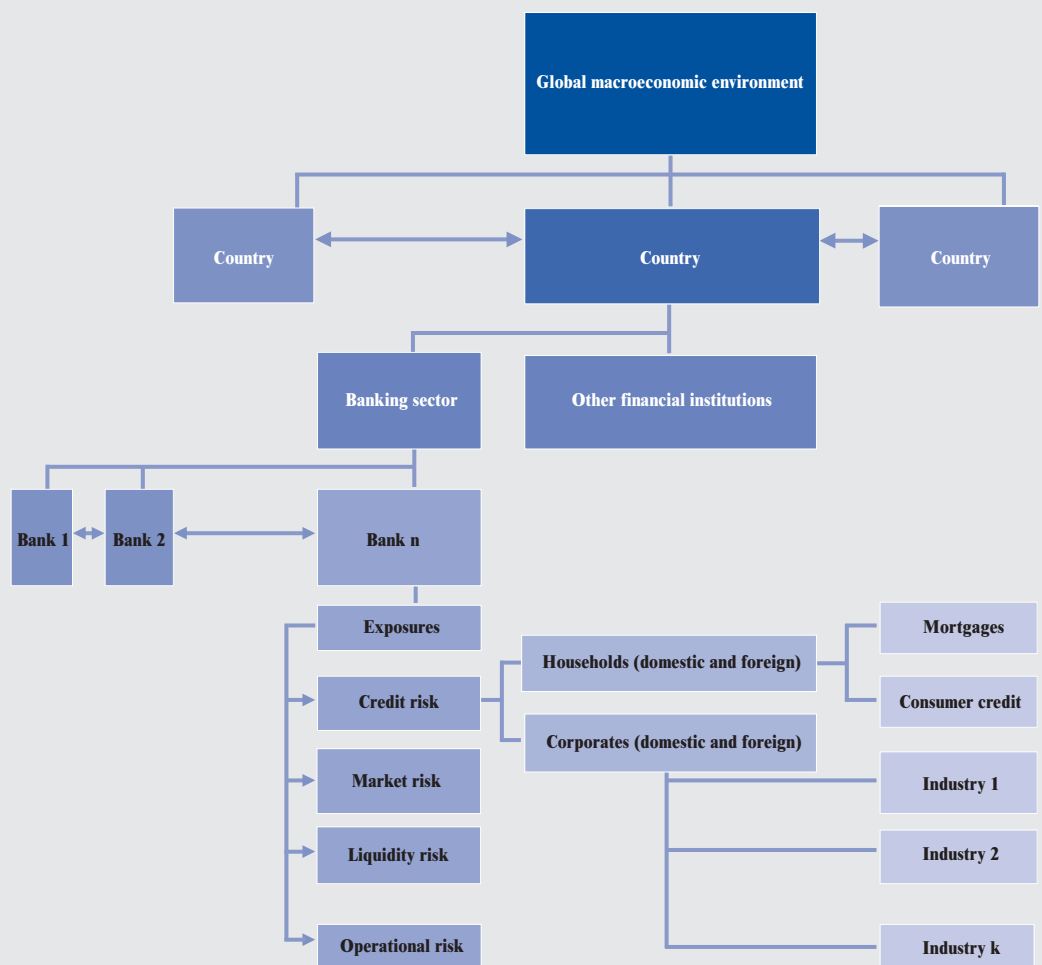
FEATURES OF STRESS-TESTING PRACTICES

When designing a macro stress test, it is first necessary to identify the most important channels across the various parts of the economy that would be affected by a shock, and to examine how they are linked together. The level of detail in the design of a stress test must be guided by the ultimate purpose of the exercise. As mentioned above, central banks are mostly concerned with systemic stability, i.e. those events that are likely to impair the functioning of the financial system to the point where costs are likely to be imposed on the economy. For

this reason, the focus on aggregate costs of risks may justify a certain degree of approximation, not only to the extent that aggregate figures need to be used, but also in relation to the number of interlinkages to be considered.

The number of potentially important channels is inevitably very large, thus making the practice of stress-testing subject to some feasibility constraints. As an example of this, Figure A.1 illustrates a largely simplified structure of the banking sector of an economy. For each country, there are several banks linked to each other, and

Figure A.1 Example of relevant interlinkages



Source: ECB.

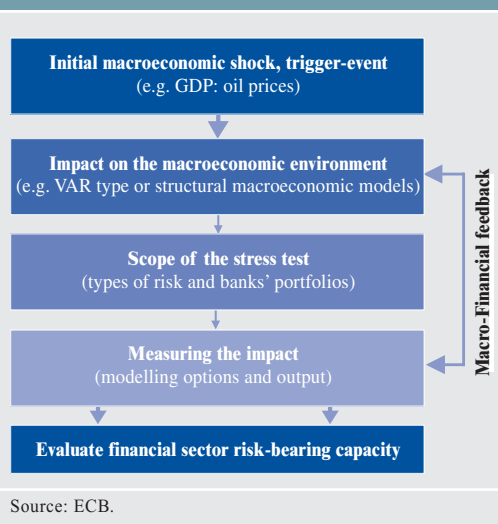
for each of them a lending portfolio composed of lending to households (consumer and mortgage loans) and lending to the corporate sector (broken down at the industry level).

Although this schematic representation is already rather simple, the conduct of stress tests requires additional simplifications in the structure under consideration. Country experiences suggest that ultimately, when conducting stress tests, it is best to pursue a parsimonious specification, based on an empirical assessment that identifies the essential components to be included for a meaningful analysis of a financial system under stress. The degree of complexity of the exercise can then be increased at a later stage, depending on feasibility constraints.

In conducting stress-testing at the country level, two possibly complementary approaches have been used. One is the “bottom-up” approach, in which banks are requested to run an identical stress scenario using their own in-house modelling infrastructure, with the central bank subsequently aggregating the results at the systemic level. Alternatively, a “top down” approach can be used, in which the central bank designs and calculates the test in-house. As bottom-up stress tests tend to be very costly in terms of aggregation, and only allow limited flexibility with regard to adjustment or fine-tuning of the exercise as it proceeds, many central banks tend to restrict themselves to a top-down approach. While the latter approach has a central disadvantage in that it does not benefit from institution-specific information, and is therefore less precise, for pragmatic considerations this level of approximation nevertheless often proves necessary.

Having identified the main operational features of a macro stress test for the banking sector, the next requirement is to design the stress test itself. As shown in Figure A.2, a few basic elements in this process can be defined, following five main steps. The first step is to design a scenario and the initial shocks, e.g. a decline in GDP or a spike in oil prices. Second,

Figure A.2 A simple structure of a macro stress test



a macroeconomic engine may be introduced to describe the impact of the initial shock on the macroeconomic environment. Third, the scope of the stress test should be defined, i.e. by addressing the different types of risks affecting banks’ portfolios. Fourth, modelling options to measure the impact of the shock on the banking sector are investigated and a quantitative output is produced. Fifth, the output of the stress test can be combined with other pieces of information to assess the strength of the financial sector. Each of the first four points are addressed in the following sections, on the basis of how they have generally been addressed by euro area NCBs.⁵

SCENARIOS AND SHOCKS

The starting point of any stress test exercise is the initial shock, which is the materialisation of a risk affecting the financial sector. Depending

5 Several contributions have been made by euro area NCBs to the area of stress-testing. For examples of EU NCBs publications discussing stress test-related conceptual issues, see A. Kearns (2004) “Loan losses and the macroeconomy: A framework for stress testing credit institutions’ financial well-being”, *Central Bank of Ireland Financial Stability Report*; O. De Bandt and V. Oung (2004), “Assessment of ‘stress tests’ conducted on the French banking system”, *Banque de France Financial Stability Review* (5), November; and P. Bunn, A. Cunningham and M. Drehmann (2005), “Stress testing as a tool for assessing systemic risks”, *Bank of England Financial Stability Review*, June.

on whether single shocks are examined one at a time or whether a combination of two or more shocks simultaneously is being considered, the exercise can be classified as a sensitivity analysis or a scenario stress test. In terms of euro area NCB practices, scenario stress tests have been applied to a greater or lesser extent depending on the level of sophistication of the respective countries' practices and the type of risk underlying the initial shock. In general, sensitivity analysis has been the most common approach used to assess market risk, whereas for credit risk, which is closely linked to business cycle conditions and spreads through more complex channels of transmission, scenario stress tests have been more frequently applied by euro area NCBs.

The initial shock (or shocks) is (are) collected in a scenario, the type of which can vary according to the methods employed. Scenarios can take four forms: historical (i.e. designed to replicate historical episodes of stress, such as the 1987 stock crash or the 1998 emerging markets crisis); hypothetical (i.e. they do not match historical events and are not quantified according to either of the two following methods); probabilistic (i.e. constructed on the basis of the empirical distribution of the relevant risk variable, corresponding to extreme percentiles in this distribution); or reverse-engineered to match a predefined amount of losses to be endured by the financial sector.

The design of scenarios typically differs across countries, but in general historical and hypothetical scenarios have been more frequently used, possibly on account of their more straightforward interpretation. In addition, due to data limitations, some euro area NCBs have tended to work more with hypothetical scenarios. Indeed, short time series and insufficient data coverage often make the use of historical scenarios impossible. In addition, structural breaks and rapidly changing economic environments in some European countries have further limited the scope for drawing lessons from earlier episodes of stress.

In designing scenarios in practice, euro area countries adopting either historical or hypothetical scenarios have generally employed one of the following three approaches. In some cases, a set of assumptions in line with a former IMF FSAP has been applied.⁶ Alternatively, the set of original assumptions in the IMF FSAP was modified according to the current circumstances. The possibility of designing scenarios in this way, however, depends on the modelling capacity of the country in question.⁷ The third option has been to let the NCB's most recent macroeconomic projections determine the size and type of shocks to be considered. The standard procedure has been to assess misalignments on the basis of regular macroeconometric models usually adopted for forecasting for monetary policy purposes.

Irrespective of the type of scenario adopted, it is important that the underlying shock is plausible, extreme and of systemic relevance. While the first requirement is self-explanatory, the other two may benefit from clarification. Financial stability analysis does not focus on baseline scenarios, which by construction are assigned a high probability. Meaningful stress scenarios must incorporate low-probability shocks, which necessarily represent extreme realisations of the underlying risk factor. Finally, not all extreme shocks may put the financial system under stress when overall conditions are particularly benign, which means that it is the extreme realisation of shocks capable of putting the financial system under stress that matter for stress testing. However, information on such extreme realisations of shocks is normally not available *ex ante*, but is only learned after the stress test has been carried out.

6 The usual procedure followed at the time of the FSAP was for the central bank to propose a scenario, which was then discussed with IMF staff before being implemented.

7 The strong growth in house prices, for example, has recently been a cause for concern in some euro area countries, and was in some cases accounted for in the projections of bank losses. However, there are still limitations in the analytical framework regarding the possibility of including these sources of risks in stress-testing.

INTRODUCING A MACROECONOMIC ENGINE

In a macro stress test the initial shock affects the macroeconomic environment in which banks operate. In order to ensure consistency across various macroeconomic variables, the design of the stress test should include some sort of macroeconomic engine.⁸ For doing this many central banks have, for instance, used their structural macroeconometric models, which were originally designed as forecasting tools for monetary policy purposes. These models benefit from their exhaustiveness by providing a comprehensive picture of the macroeconomy, and they allow a policy reaction to the initial shock to be modelled. They also permit an internally consistent representation of the full economy under stress, and enable the authority to “tell a story” about the interpretation of the results of the exercise.

A second option has been to use Vector Autoregressive (VAR) models, where a set of macroeconomic variables is jointly affected by the initial shock, so that the combined impact on this set of variables rather realistically depicts the reaction of banks’ operating environment, and can be used to study their resilience to shocks.⁹ An explicit macroeconomic engine has, however, not been employed in all cases, and in some instances the dynamics of the macroeconomic variables have been obtained from simple unconditional historical correlations.

TYPES OF RISK

When a macroeconomic risk materialises, the financial system is exposed to financial shocks. For banks, the main sources of risks can be broadly categorised as credit risk, market risk, liquidity risk and operational risk. Of these, *credit risk* represents the largest source of risk for banks, and for this reason has received closer attention in central bank stress tests. In addition, in the context of a macro stress test, given the fluctuations in the macroeconomic

variables underlying the stress scenario at business cycle frequencies, changes in credit risk tend to move more closely with the business cycle. For these reasons, a study of macro stress tests based on credit risk more closely matches the initial purpose of running stress tests for a financial stability analysis that assumes, as a starting point, swings in macroeconomic variables.

Market risk is generally regarded as the second most important risk category facing banks. Adapting market risk to the analytical framework discussed in the previous section may be less straightforward than for credit risk, as the former (generally represented by some form of asset prices) adjusts over a much shorter time frame (usually days or months). This also implies that the joint treatment of market and credit risk is problematic, and further work is probably needed in this area.¹⁰ For these reasons, and unlike the case of credit risk, various sources of market risk have been in general treated separately in sensitivity-type stress tests, without the need for a macroeconomic engine.

Liquidity risk and *operational risk*, on the other hand, have not been as extensively considered in macro stress tests at the country level to date. In those cases where stress-testing involved shocks to liquidity, the ratio between liquid assets and short-term liabilities has been commonly used as an indicator against which the initial shock has been evaluated, conditional on some initial assumptions regarding the

8 The macroeconomic variables to be considered in a macro stress test include: domestic variables (short-term and long-term interest rates, inflation, GDP and unemployment) and external variables (external demand, foreign interest rates, exchange rate fluctuations, etc.).

9 More recently, a global VAR (GVAR), which explicitly models the interaction between the economy under study and the rest of the world, has been considered for use in stress tests (see for example S. Dees, F. di Mauro, M. H. Pesaran and L. V. Smith (2005), “Exploring the international linkages of the euro area: A global VAR analysis”, *ECB Working Paper*, No 568).

10 See M. Sorge (2004), *op. cit.*

withdrawal of interbank deposits and other market developments.¹¹

MODELLING CREDIT RISK

Several options are available when modelling risks for macro stress-testing. For the sake of simplicity, some selected examples are offered in this section, taking into account euro area NCBs' experiences.

Focusing on credit risk, its impact, as measured with some indicator of default, together with some (usually ad hoc) values for recovery rates, has been assessed against either loan loss provisions or non-performing loans. Concerning modelling options, various techniques and approaches at different levels of aggregation have been applied in modelling credit risk in macro stress-testing so far, mostly depending on data availability.¹² One approach has been based on the use of micro-level data covering either the household or the corporate sector.¹³ Data on corporate balance sheets and credit registers have, for instance, been used to estimate models for default probabilities under different economic conditions.¹⁴ A similar analysis has also been applied to survey data on households, employing Probit-type models.¹⁵ Alternatively, when micro-level data are not available, macro stress tests have addressed more aggregated measures of borrower default either at an industry or a sectoral level. These models have recently received particular attention in national practices across the euro area.¹⁶

As a final output of macro stress tests, several indicators have been used. For an NCB with supervisory responsibilities, for instance, the effects on capital adequacy ratios (CARs)¹⁷ are generally considered to be particularly useful.¹⁸ When central banks have no supervisory powers, and when the objective is to assess financial stability conditions more generally, stress-testing of single banking indicators (e.g. loan losses) in a partial framework might be sufficient. In the same vein, the effects of macroeconomic shocks on banks' earnings have

been modelled, taking factors such as growth in lending and credit conditions into account.¹⁹

REMAINING CHALLENGES

While substantial progress has been made in the development of macro stress-testing techniques, current practices still suffer from some important limitations. If current stress-testing practices are to advance from an art towards a science, progress is required on two main fronts: data availability, and the modelling of financial system interlinkages.²⁰

Concerning data availability, a first limitation is that country practices have frequently been moulded by data availability, which differs

11 See M. Boss, G. Krenn, M. Schwaiger and W. Wegschaider (2004), "Stress testing the Austrian banking system", *Österreichisches Bankarchiv*, November; Deutsche Bundesbank (2004), "Stress tests at German banks – methods and results", *Monthly Report*, October; and C. Corcóstegui, L. González-Mosquera, A. Marcelo and C. Trucharte (2003), "Analysis of procyclical effects on capital requirements derived from a rating system", Bank of Spain, mimeo.

12 Concerning examples from euro area publications, see for instance M. Boss et al. (2004), op. cit.; and Deutsche Bundesbank (2003), "Stress testing the German banking system", *Monthly Report*, December.

13 The availability of this type of data differs from country to country, and therefore implies differences in country practices.

14 For applications utilising accounting-based credit scoring models (pooled as well as country-specific) and performing panel regressions, see for instance ECB (2005), "Assessing the determinants of financial distress in French, Italian and Spanish firms", *Financial Stability Review*, June.

15 Household micro-data have recently received increasing attention by central banks; see for instance O. May and M. Tudela (2005) "When is mortgage indebtedness a financial burden to British households? A dynamic Probit approach", *Bank of England Working Paper*, No 277, October.

16 See for instance M. Boss (2003), "A macroeconomic model for stress testing the Austrian credit portfolio", *Österreichisches National Bank Financial Stability Review*, 4, and K. Virolainen (2004), "Macro stress-testing with a macroeconomic credit risk model for Finland", *Bank of Finland Working Paper* No 18.

17 The use of CARs as an output of macro stress tests is not specific to credit risk only.

18 For an approach modelling CARs using transition probabilities, see O. De Bandt and V. Oung (2004), op. cit.

19 An explicit example of direct modelling of bank profitability in the literature is a dynamic panel targeting the net interest margin on banks. See O. De Bandt and V. Oung (2004), op. cit.

20 For additional considerations on the limitations of presently available tools for financial stability analysis, see ECB (2005), "Measurement challenges in assessing financial stability", *Financial Stability Review*, December.

substantially across countries, concerning both banks and borrowers, not only in terms of aggregate figures, but also at the micro level. In addition, there is often a lack of sufficient historical data, which limits the scope for drawing accurate insights from previous episodes of stress. This is problematic when it comes to studying credit risk, as relatively long time series are needed, containing data over a complete business cycle.²¹ Furthermore, even when relatively long time series are available, changes in macroeconomic conditions – for example following the transition to inflation targeting or the introduction of the euro – may also give rise to limitations.

At the current state of development in stress-testing practices, where partial equilibrium models are mostly being used at an aggregate level, access to micro data could be perceived as a second-order concern. However, using disaggregated data would in many instances improve modelling capacities and substantially enrich the stress test analysis.

Concerning modelling shortcomings, possibly the most important limitation associated with existing approaches concerns the absence of feedback effects inside the financial sector, from banks to other financial institutions²² and to the financial markets, and between the financial and the real side of the economy. In addition, interbank linkages have typically been considered separately from the original model for credit risk.²³ These limitations imply that the potential second-round effects of the initial shock tend to be ignored in the design of scenarios. Nonetheless, these feedback effects are complex to model, and at this stage there is no established practice. Similarly, another practical challenge is related to the inclusion of an appropriate policy response following a shock, and work is still ongoing in order to overcome this limitation.²⁴

Another modelling shortcoming is related to the macroeconomic engine used in the modelling process. Macroeconometric models produced for regular forecasting purposes might not be

best suited for stress-testing because they have not been specifically designed for financial stability purposes. For instance, financial transmission channels are usually not included. In addition, these linear models are unable to capture the fact that the relationships between macroeconomic variables may become non-linear at times of stress.²⁵

CONCLUDING REMARKS

Macro stress-testing frameworks at the country level, such as those often applied in the context of IMF FSAPs, are increasingly being used to make quantitative assessments of the resilience of financial systems to adverse disturbances. Owing to existing limitations (e.g. the exclusion of macro-financial feedback effects), further work in this area still needs to be conducted.

One possible direction for further work on stress-testing that is specific to the euro area could take the form of stress-testing at the level of the euro area. There are various good reasons for considering such an extended geographical scope for a macro stress test. For instance, the

21 Low data quality is also a concern, together with the problem of interpreting changes in reporting standards. In addition to limitations associated with data quality, difficulties in matching credit register data with balance sheet information are often present.

22 Other parts of the financial sector have also been considered in euro area stress tests and, depending on country-specific characteristics, may have to be included in order to paint a realistic picture of the strength of the national financial sector. See, for instance, the French FSAP, in which the insurance sector was combined with the banking sector in the model of the financial sector for stress-testing (O. De Bandt and V. Oung (2004), *op. cit.*). Similarly, in the Dutch FSAP pension and insurance funds were included in the stress test exercise, although separately from the banking sector (see DNB (2004), “Stress testing the Dutch financial sector”, *Quarterly Bulletin*, September). Finally, an additional drawback in considering only banks could arise because of the emergence of instruments to transfer credit risks between banks and other financial institutions, which is changing the activities and risk profiles of financial institutions.

23 On the modelling of interbank linkages, see C. Upper (2006), “Contagion due to interbank credit exposures: what do we know, why do we know it, and what should we know?”, BIS, mimeo.

24 Policy reactions have been modelled before in various contexts using Taylor-rule specifications. See for instance P. Bunn et al. (2005), *op. cit.*

25 For an example of a study on the introduction of non-linearities in VARs, see M. Drehmann, A. J. Patton and S. Sorensen (2005), “Corporate defaults and large macroeconomic shocks”, mimeo.

increasing degree of cross-border economic and financial integration might imply a higher level of dependency between national banking systems, and as such, there may be potentially negative externalities across euro area countries in times of stress that cannot be fully captured by stress tests applied at the country level.

B ASSESSING BANKING SYSTEM RISK WITH EXTREME VALUE ANALYSIS

The literature has proposed a number of approaches how to assess the stability of banking systems. In this Feature a novel approach is described that is based on extreme value theory (EVT). EVT is particularly suitable for the analysis of financial instabilities, as it is designed to deal with the occurrence of extremely rare events (“tail risk”). For example, it has been used to examine the severity of stock market crashes, the pricing of catastrophic loss risk in reinsurance or the extent of operational risk in banks. The present application to systemic risk in banking derives a parameter from market returns that can capture the exposure of an arbitrary large number of banks to each other and to aggregate risk. The 25 systemically most important banks are analysed for the euro area and the United States, respectively, between 1992 and 2004. The results suggest that multivariate spill-over risk among banks may be more pronounced in the United States than in the euro area. One explanation for this finding seems to be that cross-border linkages are still weaker in Europe. Exposure to extreme systematic risk, however, is rather similar in the two banking systems. On both sides of the Atlantic the two forms of banking system risk increase during the second half of the 1990s. Increases in spill-over risk in Europe are, however, very gradual. The findings raise interesting policy questions about the relationship between financial integration as well as financial consolidation and the stability of banking systems.

INTRODUCTION

Assessing banking system risk is an essential element in the monitoring of financial stability. This applies to both more bank and more market oriented financial systems. Widespread instability in the banking sector has been associated with depressions and hyper-inflations in economic history.

The present Special Feature briefly reviews in the first section the main literature on sources

of banking system instability. The second section describes a novel approach how to assess banking system risk, which is based on extreme value theory. The third section presents an application of this technique to a group of main euro area banks and juxtaposes the results with the ones for a comparable group of banks from the United States. The fourth section discusses some strengths and caveats in the methodology used. The last section concludes.

LITERATURE ON BANKING SYSTEM RISK

Banks are widely regarded as more fragile than other firms. In the economic literature this has been explained with their vulnerability to bank runs, which emerges from their balance-sheet structure that features short-term demandable deposits and long-term illiquid loans.¹ In modern financial systems the fragility of individual banks has been dealt with through regulation and supervision as well as the insurance of retail deposits.

The risk of wider banking system problems is associated with an observed vulnerability of banks to macroeconomic fluctuations and with a number of channels that raise the possibility of contagion among banks. The vulnerability to macroeconomic shocks has been explained by the fact that the value of loan books can fluctuate sharply with the business cycle, while the value of many deposits is not marked to loan book revaluations or states of the business cycle.² It has been confirmed in many empirical studies.³

- 1 See e.g. J. Bryant (1980), “A Model of Reserves, Bank Runs, and Deposit Insurance”, *Journal of Banking and Finance*, 4, pp. 335-344; D. Diamond and P. Dybvig (1983), “Bank Runs, Deposit Insurance, and Liquidity”, *Journal of Political Economy*, 91 (3), pp. 401-419; or V. Chari and R. Jagannathan (1988), “Banking Panics, Information, and Rational Expectations”, *Journal of Finance*, 43, pp. 749-761.
- 2 See M. Hellwig (1994), “Liquidity Provision, Banking, and the Allocation of Interest Rate Risk”, *European Economic Review*, 38 (7), pp. 1363-1389.
- 3 See e.g. G. Gorton (1988), “Banking Panics and Business Cycles”, *Oxford Economic Papers*, 40, pp. 751-781; A. Demirgüç-Kunt and E. Detragiache (1998), “The Determinants of Banking Crises in Developing and Developed Countries”, *IMF Staff Paper*, No. 45, pp. 81-109; B. Gonzalez-Hermosillo (1999), “Determinants of Ex-ante Banking System Distress: A Macro-Micro Empirical Exploration of Some Recent Episodes”, *IMF Working Paper*, WP/99/33, March.

The risk of bank contagion results from physical exposures among banks, either direct ones through money or other interbank markets or indirect ones through payment and settlement systems, and from asymmetric information among creditors or managers about the health of banks.⁴ The prevalence of bank contagion risks is more controversial in the empirical literature. Based on diverse approaches and data samples in terms of time and geographical coverage, some studies find limited or no evidence of bank contagion during crises,⁵ whereas other studies point to statistically significant contagion episodes or risks.⁶

There is no space to review these different perspectives and the underlying approaches in greater depth in the present Special Feature, whose main purpose is to present a new avenue of empirical research in this field.⁷

A NEW APPROACH TO ASSESS BANKING SYSTEM RISK

This novel approach is based on statistical methods of extreme value theory (EVT). EVT has been applied to a number of financial stability issues already, because they relate inherently to “tail risk” (very small probability events). Univariate EVT e.g. has been applied to estimate the likelihood of financial market crashes⁸ and multivariate EVT to measure the risk of financial market contagion.⁹ In the management and pricing of insurance and reinsurance risks EVT has an even longer history, as the distributions of the adverse events covered by this industry tend to be particularly heavy tailed.¹⁰ More recently, it has also been applied to the evaluation of operational risk in financial institutions, such as required e.g. in the new Basel II capital adequacy standards.¹¹

ABOUT EXTREME VALUE THEORY

Why is EVT particularly suitable for the analysis of financial stability problems? Widespread instabilities are extremely rare events. For example, stock market crashes that have the severity of Black Monday in 1987 have been

estimated to happen only once or twice a human lifetime. This means that usual data sample sizes are way too small for assessing the likelihood, severity or determinants of widespread crises with regular econometric techniques, as there

4 See Y. Chen (1999), “Banking Panics: The Role of the First-come, First-serve Rule and Information Externalities”, *Journal of Political Economy*, 107 (5), pp. 946-968; F. Allen and D. Gale (2000), “Financial Contagion”, *Journal of Political Economy*, 108 (1), pp. 1-33; and X. Freixas, B. Parigi and J.-C. Rochet (2000), “Systemic Risk, Interbank Relations and Liquidity Provision by the Central Bank”, *Journal of Money, Credit, and Banking*, 32 (3/2), pp. 611-640.

5 See e.g. M. Smirlock and H. Kaufold (1987), “Bank Foreign Lending, Mandatory Disclosure Rules, and the Reaction of Bank Stock Prices to the Mexican Debt Crisis”, *Journal of Business*, 60 (3), pp. 349-364; I. Hasan and G. Dwyer (1994), “Bank Runs in the Free Banking Period”, *Journal of Money, Credit, and Banking*, 26, pp. 271-288; C. Calomiris and J. Mason (1997), “Contagion and Bank Failures during the Great Depression: The June 1932 Chicago Banking Panic”, *American Economic Review*, 87 (5), pp. 863-883; C. Calomiris and J. Mason (2003), “Consequences of U.S. Bank Distress During the Depression”, 93, *American Economic Review*, pp. 937-947; or H. Elsinger, A. Lehar and M. Summer (forthcoming), “Risk Assessment for Banking Systems”, forthcoming in *Financial Management*.

6 See e.g. A. Saunders and B. Wilson (1996), “Contagious Bank Runs: Evidence from the 1929-33 Period”, *Journal of Financial Intermediation*, 5 (4), pp. 409-423; or C. Upper and A. Worms (2004), “Estimating Bilateral Exposures in the German Interbank Market: Is there a Danger of Contagion?”, *European Economic Review*, 48 (4), pp. 827-849. ECB (2004), “Cross-border bank contagion risk in Europe”, *Financial Stability Review*, December, presented evidence of relevant bank contagion risks among contemporaneous European banks.

7 For a comprehensive survey, see O. De Bandt and P. Hartmann (2002), “Systemic Risk in Banking: A Survey”, in C. Goodhart and G. Illing (eds.), *Financial Crises, Contagion, and the Lender of Last Resort*, Oxford, Oxford University Press, pp. 249-297.

8 See e.g. D. Jansen and C. de Vries (1991), “On the Frequency of Large Stock Returns: Putting Booms and Busts into Perspective”, *Review of Economics and Statistics*, 73, pp. 18-24; or F. Longin (1996), “The Asymmetric Distribution of Extreme Stock Market Returns”, *Journal of Business*, 69 (3), pp. 383-408.

9 See ECB (2005), “Financial market contagion”, *Financial Stability Review*, December.

10 See e.g. P. Embrechts and N. Veraverbeke (1982), “Estimates for the Probability of Ruin with Special Emphasis on the Possibility of Large Claims”, *Insurance: Mathematics and Economics*, 1, pp. 55-72; J. Beirland and J. Teugels (1992), “Modeling Large Claims in Non-life Insurance”, *Insurance: Mathematics and Economics*, 11 (1), pp. 17-29; or T. Mikosch (2006), *Non-Life Insurance Mathematics: An Introduction with Stochastic Processes*, Berlin, Springer Verlag.

Heavy or fat tailed distributions refer to statistical distributions in which extreme events, such as large losses or financial crises, are much more frequent than under the widely used normal distribution.

11 See P. de Fontnouvelle, J. Jordan and E. Rosengren (2005), “Implications of Alternative Operational Risk Modeling Techniques”, *NBER Working Paper*, No. 11103, February.

are no or only a few relevant observations of the main phenomenon of interest.

EVT is precisely geared towards overcoming this problem. It is a discipline in statistics that analyses the behaviour of tails of statistical distributions, i.e. the probabilities and sizes of the most extreme and rare outcomes. A central result of this discipline is the fundamental theorem of extreme value theory.¹² It describes the families of distributions to which the behaviour of minimum and maximum outcomes (here financial returns) of other distributions converge asymptotically. These results can be used e.g. to assess the probability and size of the most extreme negative outcomes of financial variables. The left tails or minima are the relevant area where to look for crises. As the tails display certain regularities under quite weak assumptions, this assessment can be done even if crises are not in the sample or only a small number of times. The reason is that these regularities allow determining the shape of the tail in its entirety. Once one has estimated the tail, it is easy to calculate the probability or severity of specific crisis situations.

In economics and finance the use of EVT has emerged with the fundamental contributions of Mandelbrot and Fama.¹³ These authors detected that the frequency of stock returns does not follow a Gaussian normal distribution, as it exhibits “fat tails”. The fact that the tails of those distributions are thicker than for the normal means that very large and very small returns are more frequent. For example, there is an over-proportionate occurrence of crashes (crises). This observation is not limited to stock returns, but characterises a wide range of financial data. The potentially drastic consequences of severe financial crises for consumption, investment and growth, underlines the importance of techniques such as EVT that allow to analyse these extreme outcomes.

MEASURING BANKING SYSTEM RISK WITH EVT

In the present Special Feature the application of EVT to banking system stability is presented, following the novel approach by Hartmann,

Straetmans and de Vries (2005).¹⁴ In line with previous literature, it uses changes in market valuations of banks to assess system risk. In contrast to the previous banking literature, however, it does so focusing entirely on extreme downturns in banks’ market values, large crashes in their stock prices, so that there cannot be any doubt about the critical nature of the situations considered. Moreover, since system risk is to be assessed a multivariate approach has to be chosen.

Suppose a system is composed of N banks. The conditional probability that any subset of these N banks faces a critical situation given that other banks face a critical situation (*extreme spill-over* or contagion *risk*) is based on the ratio of the two joint crash probabilities for the two subsets of banks considered.¹⁵ These joint probabilities can be described with tail dependence parameters η that can be calculated for any number of banks. The η parameter captures any dimension of dependency between the respective N banks for which it is estimated (bivariate, trivariate and up to N -dimensional). The η can also be used to describe *extreme systematic risk*, bivariate conditional probabilities of bank crashes given that the market as a whole crashes; these are the so called tail- β s.¹⁶ In the present Special Feature

12 It was proven by B. Gnedenko (1943), “Sur la distribution limite du terme maximum d’une serie aleatoire”, *Annals of Mathematics*, 44, pp. 423-453.

13 See B. Mandelbrot (1963), “The Variation of Certain Speculative Prices”, *Journal of Business*, No. 36, pp. 394-419; and E. Fama (1965), “The Behavior of Stock Market Prices”, *Journal of Business*, 38, pp. 34-65.

14 P. Hartmann, S. Straetmans and C. de Vries (2005), “Banking System Stability: A Cross-Atlantic Perspective”, *NBER Working Paper*, No. 11698, October. This approach builds on the theoretical work by A. Ledford and J. Tawn (1996), “Statistics for Near Independence in Multivariate Extreme Values”, *Biometrika*, 83 (1), pp. 169-187; and G. Draisma, H. Drees, A. Ferreira and L. De Haan (2001), “Tail Dependence in Independence”, EURANDOM report 2001-014.

15 This simple characterisation holds under the assumption of a common crisis percentile across banks, but a similar one can be found for a common crisis quantile. Percentiles refer to the probabilities of certain outcomes, here extreme negative returns, and quantiles to their sizes. Once one of the two are fixed, the others follow from the observed or estimated distribution.

16 S. Straetmans, W. Verschoor and C. Wolff (2003), “Extreme US Stock Market Fluctuations in the Wake of 9/11” (paper presented at the American Finance Association Meetings 2004, San Diego CA, 3-5 January) introduce the concept of tail- β in relation to asset pricing theory.

these two types of η s are used as the basic summary statistics for the assessment of banking system risk.

The tail dependence parameter η has some advantageous properties. It varies between 0 and 1. $1/N$ describes the case of asymptotic independence (low system risk) and 1 describes the case of asymptotic dependence (high system risk). Moreover, it can be estimated with well-known univariate techniques.¹⁷ As the resulting estimator for the tail dependence parameter η is asymptotically normally distributed, it is relatively straightforward to define confidence intervals and conduct structural stability and cross-sectional tests. With these tests one can determine whether banking system risk has changed over time or whether it is different across different banking systems.

AN APPLICATION TO THE EURO AREA AND THE US

The above approach is applied to the systemically most important listed banks of the euro area and the US. Systemic importance is assessed on the basis of different measures for size and interbank lending for the period 1992 to 2004. This procedure leads to the selection of overall 25 euro area and 25 US banks, which account for similar shares of the two respective banking systems.

Tail dependence parameters η are estimated from daily bank stock returns. For robustness different percentiles of the return distribution are tried to describe critical situations, but only the results for the percentile $p=0.0005$ are displayed in the Feature. The associated crisis quantiles correspond to 10 to 20% daily crashes in the bank stocks considered.¹⁸ Such levels are close to the worst negative outturns for those banks over the whole sample. The sample covers a number of individual bank crises and a number of more general situations of financial turmoil, but this would not be necessary with the chosen approach.

MULTIVARIATE EXTREME SPILL-OVERS

First consider tail dependence among all euro area banks and all US banks, as indicators of spill-over risk. The 25-dimensional parameter estimates for both cases over the whole sample period are $\eta_{EA}=0.17$ and $\eta_{US}=0.39$. Given that independence would imply $\eta=1/25=0.04$, there seems to be some system risk from extreme spill-overs in both cases, but it is higher in the US than in the euro area. A cross-sectional test rejects the null hypothesis that both tail dependence parameters are equal at the 1% level, so that the difference is statistically significant. It is interesting to note that estimates of tail dependence parameters for some single euro area countries are of a similar order of magnitude as the estimate for the US. This result suggests that most of the difference in extreme banking spill-over risk between the euro area and the US is explained by lower cross-border risks in Europe.

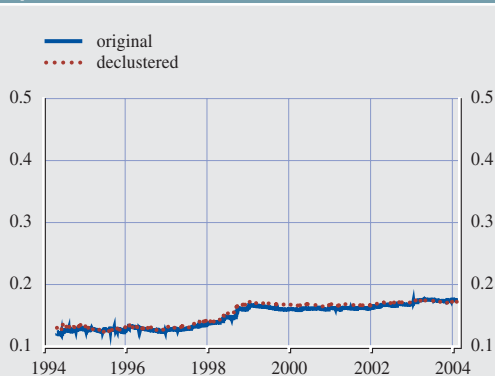
Let us turn to the evolution of banking system spill-over risk over time. Chart B.1 and B.2 show recursive estimates of tail dependence parameters between 1994 and 2004 for the euro area and the US, respectively.¹⁹ The dashed lines refer to estimates from data that are cleaned from the clustering of volatility (GARCH effects), which are typical for financial return data, whereas the solid lines are for original data.²⁰

17 See B. Hill (1975), "A Simple General Approach to Inference about the Tail of a Distribution", *The Annals of Statistics*, 3 (5), pp. 1163-1173.

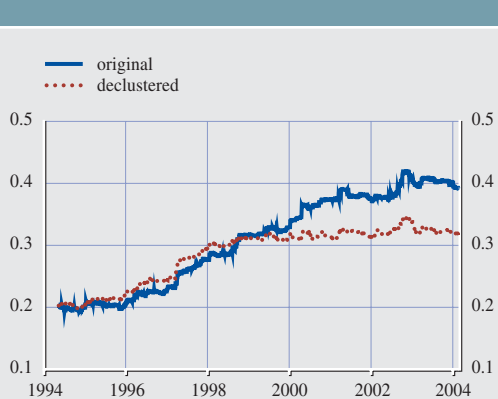
18 For daily (weekly) data a 0.0005 percentile means that a critical situation occurs on average every 2,000 days (weeks) or every four (forty) years. Compare this to the 0.1 or 0.05 percentiles that have to be used in standard econometric approaches, where a crisis is assumed to happen every 10 or 20 days (weeks).

19 Recursive estimates mean that η is first derived for a (small) data window at the start of the sample, and then further points on the curves are derived for ever larger data windows until the end of the sample is reached.

20 In the specific case of Chart B.1 the two lines are so close that they are basically indistinguishable.

Chart B.1 Evolution of multivariate extreme spill-over risk in the euro area banking system

Source: Figure 1 of P. Hartmann, S. Straetmans and C. de Vries (2006), "Banking System Risk: A Cross-Atlantic Perspective", in M. Carey and R. Stulz (eds.), *Risks of Financial Institutions*, Chicago IL, Chicago University Press and National Bureau of Economic Research. Reprinted with kind permission by the Chicago University Press.

Chart B.2 Evolution of multivariate extreme spill-over risk in the US banking system

Source: See Chart B.1.

The euro area shows a slight increase of multivariate spill-over risk among the systemically most important banks. This process is very gradual, exhibiting a weak acceleration in the second half of the 1990s.

The charts reflect the higher level of system risk in the United States. But also the dynamics is stronger, as extreme spill-over risk increases somewhat more forcefully for most of the sample period. De Nicolo and Kwast (2002) draw similar conclusions based on a more standard correlation analysis and suggest that strong banking consolidation may in part explain the increase in risk.²¹ The same explanation may not be as relevant for Europe as it is for the US, as consolidation has been less extensive and exhibited only a limited cross-border dimension.

The application of structural stability tests confirm that the changes observed in Charts B.1 and B.2 constitute statistically significant upward breaks in systemic risk.²² They also indicate that no further increases of η_{EA} happens at the time of the introduction of the euro when a common euro area money market was created. If anything, the tests suggest a slight decrease in multivariate spill-over risk at that time.

EXTREME SYSTEMATIC RISK

Next consider the exposure of euro area and US banks to extreme systematic risk, as approximated by crashes in measures of aggregate risk (tail- β s). In this Feature the results for the general stock indices of the euro area and the US are reported,²³ but other indicators of aggregate risk give very similar results. We focus on the bivariate parameters η , which describe the extreme dependence between individual bank stocks and the market risk factor and determine the tail- β s.

Charts B.3 and B.4 are derived in two steps. First, for each bank η s are estimated recursively over time. Second, for each point in time, the average η is derived for the 25 banks of each area/country.²⁴ The dashed and solid lines represent again GARCH-corrected and non-corrected data, respectively. Hence, each point

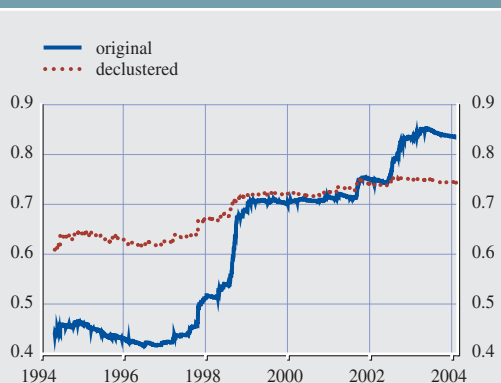
21 G. De Nicolo and M. Kwast (2002), "Systemic Risk and Financial Consolidation: Are They Related?", *Journal of Banking and Finance*, 26, pp. 861-880.

22 The test used is the recursive one presented by C. Quintos, Z. Fan and P. Philipps (2001), "Structural Change Tests in Tail Behaviour and the Asian Crisis", *Review of Economic Studies*, 68, pp. 633-663, and applied to η .

23 The indices are total return indices from Thomson Financial Datastream.

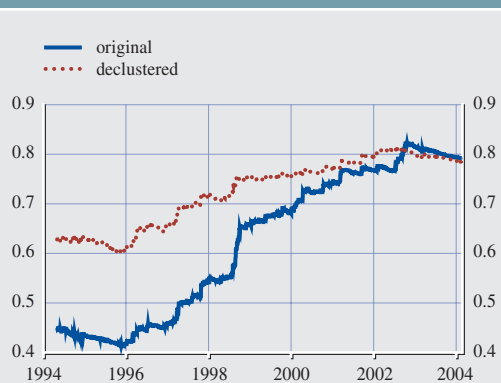
24 As each η estimator is asymptotically normally distributed, also the averages are normal.

Chart B.3 Evolution of extreme systematic risk in the euro area banking system



Source: Figure 3 of P. Hartmann, S. Straetmans and C. de Vries (2006), "Banking System Risk: A Cross-Atlantic Perspective", in M. Carey and R. Stulz (eds.), *Risks of Financial Institutions*, Chicago IL, Chicago University Press and National Bureau of Economic Research. Reprinted with kind permission by the Chicago University Press.

Chart B.4 Evolution of extreme systematic risk in the US banking system



Source: See Chart B.3.

on one of the lines represents an estimate of the average extreme systematic risk in the respective banking system since the start of the sample.

A first observation is that exposure to extreme systematic risk seems to be quite similar in the two banking systems. The average bivariate η s over the whole sample period are 0.83 for Europe and 0.79 for the US. A test cannot reject the null hypothesis that the two values are statistically indistinguishable. This contrasts with the multivariate spill-over results reported above. The systemically most important banks in the euro area and the US seem to be exposed to a similar extent to severe macroeconomic risk. It should, however, be kept in mind that behind the average tail dependence reported in the two charts, there are also some differences for different banks. In particular, smaller and more regional banks tend to be less exposed to fully area-wide shocks than larger and more diversified banks. Moreover, when looking at the relatively high values of η one needs to remember that for this bivariate measure the case of asymptotic independence is already reached at $\eta=0.5$.

Also the evolution over time is quite similar on the two continents. Both banking systems exhibit

a relatively clear increase of exposure to aggregate risk. This picture is confirmed with break tests on individual banks' η s. Almost all banks in the sample exhibit a significant upward break.

DISCUSSION AND CAVEATS

The approach presented in the present Special Feature has a number of desirable properties for the analysis of financial stability. For example, contrary to most other approaches it can capture the rare events that are of greatest interest for the analysis of financial instabilities. It is fully multivariate and therefore appropriate for the system dimension. The semi-parametric estimation approach does not rely on strong assumptions. For example, the assumption of particular parametric distributions for financial variables can be generally problematic for crisis situations, in particular in a cross-country context. More specifically the approach does not rely on the assumption of normally distributed returns or linear concepts such as correlation, which typically lead to considerable biases in the assessment of single and joint tail events.

Nevertheless, with the present approach it is still relatively easy to derive confidence bands

and test for statistical significance of the results. Although sometimes not explicitly reported, all the results in the Feature are highly statistically significant. Finally, while it was not done so for the present article, the approach can be extended to the estimation of crisis probabilities and they can be refined to detailed spill-over probabilities for whatever individual or groups of banks are of interest.

The methodology has also some caveats. First, an issue of concern in the EVT literature is the number of observations that enter the parameter estimates that determine the tail shape. While there are methods to determine this number optimally, results can be sensitive to the choice of method. Second, from time to time the optimal number of observations used does not constitute a large sample. So, small sample properties are of interest and have been dealt with in the underlying working paper. Third, the estimators presented here are first-order approximations. In some circumstances, the second order terms could have some importance.

Also with respect to the specific application conducted here, a number of issues need to be kept in mind. First, the analysis is based on market data. So, the estimations of systemic risk are only precise to the extent that bank stocks are accurately priced. Second, market data limit the scope of the analysis to listed banks. In particular in Europe, however, there are still a number of important public banks, co-operative banks or large networks of co-operative banks for which stock returns are unavailable. Third, a significant part of the sample period relates to one long cycle. Particularly due to the unavailability of European stock data, it is not possible to conduct the analysis for a longer period covering a larger number of cycles. And last, the two measures of system risk presented (extreme spill-over risk and extreme systematic risk) are to some extent related. While they clearly measure system risk from different angles, they should not be interpreted as drawing a perfect line between aggregate risk and contagion.

In sum, while applications of extreme value theory prove to be important for a variety of analyses relating to the stability of financial systems, there are also other approaches that can be fruitfully considered.

CONCLUDING REMARKS

This Special Feature illustrated how the theory of extreme values can be used to assess the stability of banking systems. It presented a tail dependence parameter that can be used to determine two forms of systemic risk, interbank spill-overs and exposure to extreme systematic risk. The parameter is relatively easy to estimate, lends itself to confidence intervals and statistical testing and gives rise to intuitive graphical illustrations of the evolution of systemic risk.

The approach was then applied to the 25 systemically most important banks in both the euro area and the United States during the period 1992 to 2004. Keeping the caveats listed above in mind, the analysis leads to a number of tentative conclusions. First, multivariate spill-over risk in the US banking system seems to be more pronounced than in the euro area system. This feature is partly related to the still relatively weak spill-over risk linkages between banks across European borders. Second, extreme systematic risk in both banking systems are rather similar. This seems interesting to note in relation to empirical literature that seems to have found more robust evidence showing the relevance of macro shocks for banking crises than the relevance of interbank contagion. Third, from a policy perspective it seems particularly important that the indicators in this Feature suggest an increase in banking system risk over the period considered. This increase was, however, relatively limited for spill-over risk in Europe.

All in all, the results underline the importance of macro-prudential analysis that pays attention to the area-wide dimension in Europe. An interesting and important question for future research is whether the ongoing process of financial integration in Europe will further

increase spill-over risks among European banks, e.g. to the levels already observed in the United States today.

C WHAT DRIVES EU BANKS' STOCK RETURNS? AN ANALYSIS BASED ON THE RETURN DECOMPOSITION TECHNIQUE

Information about the factors that drive bank-level stock return variability can provide useful input to financial stability analysis. In this Special Feature, the dynamic dividend-discount model is combined with an accounting-based VAR framework that decomposes EU banks' stock returns into cash flow and expected return components. The main findings are that while the bulk of the variability of EU banks' stock returns is due to cash flow shocks, the expected return shocks are relatively more important for large than for small banks. This suggests that large banks could be more prone to market-wide events that, in the literature, are associated with the expected return news component as opposed to the bank-specific news component, typically assumed to be incorporated in the cash flow component.

INTRODUCTION

The market prices of bank securities, such as equities, are of interest from a financial stability perspective for at least five reasons. First, a bank's equity price effectively summarises all the public information available from the bank, including potential risks, in one number. Second, when working under the efficient market hypothesis, securities prices at any point in time have a forward-looking component in that they incorporate expectations of both positive and negative future earnings prospects. Third, share price information is available at higher frequency compared with accounting information. Fourth, given that financial disturbances in one bank have the capacity to spread through the stock markets, it is important to know to what extent the variability in individual banks' stock prices is driven by common versus bank-specific components. Finally, as part of the implementation of Basel II, one of the pillars of the accord introduces market discipline to the supervisory and oversight process, thus accentuating the role of

market information in the prudential monitoring process.

For all these reasons, as part of its suite of financial stability monitoring indicators, the ECB uses information contained in banks' equity prices to calculate various macro-prudential indicators for the banking sector as a whole. A previous Special Feature in the December 2005 FSR analysed measures of banking sector profitability using both accounting-based and macroeconomic data.¹ The aim of this Special Feature is to complete that analysis and to provide a better understanding of the factors that may drive the unexpected variability of individual banks' equity prices by incorporating financial accounting data in a more thorough econometric model of bank stock returns. To this end, the empirical method that is applied in the analysis below explicitly distinguishes between changes in rational expectations of future dividends and changes in rational expectations of future returns. The literature frequently calls the former "news about future dividends", or "cash flow news", and the latter "news about future returns", or "expected return news." This Special Feature will interpret the EU banks' unexpected stock returns by breaking them down into components which are linked to these two types of news.

The analysis also investigates whether large banks' stock prices could be affected by different factors than small banks' stock prices. This could have important implications from the point of view of financial stability analysis, insofar as the relative importance of the stock markets as an indicator either of bank-specific distress or an indicator of contagion between banks may differ according to the type of the institution. The analysis also contributes to assessing market efficiency in that it investigates how the markets price in information about banks and how this process may differ across different types of banks.

¹ See ECB (2005), "What determines euro area bank profitability?", *Financial Stability Review*, December.

The main findings of the analysis are that, using bank-level data, news on cash flow fundamentals tends to dominate news on expected returns as a driver of stock return variability in the EU banking sector. Previous literature based on an approach that allows for time-varying expected returns has interpreted the two return news components so that the cash flow, or dividend, component is more likely to reflect firm-specific, or idiosyncratic, news. The expected return news component, in turn, is more likely to reflect systematic, macroeconomic news. Indeed, in an accounting-based model, cash flow news equals the expected changes in the bank's return on equity (ROE), while expected return news equals expected changes in the bank's excess log stock return and in the common discount rate.² Moreover, since unexpected changes in a bank's stock return are, by definition, associated with simultaneous offsetting movement in future expected returns, expected return news have a *transitory* impact on value. Cash flow shocks, conversely, have *permanent* effects on value as they do not result in a change in future expected returns.

It is also found that the size of the cash flow component relative to the expected return component is substantially stronger for small banks than for large banks. A possible reason behind this finding is that larger EU banks are more diversified across business lines and geographical regions, which could make them more sensitive to market-wide developments than smaller banks, which may be more exposed to local projects. This result suggests that, among other things, smaller banks could be less prone to systemic shocks transmitted via the stock market channel. Finally, in line with earlier work based on US firm-level stock market data, the results confirm that EU banks' stock returns exhibit a short-term momentum effect, while return gains tend to be reversed in the long term.

This Special Feature first discusses the relevant literature, then provides an overview of the data and the empirical methodology, and finally

presents the results and draws some conclusions from a financial stability perspective.

POTENTIAL DETERMINANTS OF BANKS' STOCK RETURNS

There is a growing literature that directly investigates the value of equity and bond market indicators for predicting distress in financial institutions.³ These studies find some indications that equity price developments help in predicting banking distress or supervisory downgrades. More recent work using both equity prices and subordinated debt spreads for EU banks has found that models that incorporate both debt and equity spreads are the most accurate at predicting distress episodes over various horizons.

Work assessing the effect of business cycle variables on bank stocks has concluded that returns can differ across countries and types of banks, and that better-capitalised banks produce higher stock returns during downturns.⁴ However, these results say little about how the bank-specific financial information is incorporated into the stock return.

The so-called dividend-discount model of equity pricing concludes that a bank's stock returns can be high either if its future earnings growth (the "fundamental", often measured by dividends) is high, if its expected returns are low, or in case of any combination of the two. This workhorse model for analysing equity

2 See J. Campbell (1991), "The variance decomposition of stock returns", *Economic Journal*, Vol. 101, No 405, and T. Vuolteenhao (2002), "What drives firm-level stock returns?", *Journal of Finance*, LVII, No 1, for an extensive discussion of these links. However, it could also be argued that it is not possible to make a one-to-one mapping from idiosyncratic events to cash flow news on the one hand and from macro events to expected return news on the other, as both news components could incorporate some elements of the other types of event.

3 For the US, see T. Curry, P. Elmer and G. Fissel (2001), "Regulator use of market data to improve the identification of bank financial distress", *FDIC Working Paper*, 2001/01. For EU banks, see R. Gropp, J. Vesala and G. Vulpes (2006), "Equity and bond market signals as leading indicators of bank fragility", *Journal of Money, Credit and Banking*, forthcoming.

4 See R. Van der Vennet, O. De Jonghe, and L. Baele (2004), "Bank risks and the business cycle", *University of Gent Working Paper*, No 264.

markets has lent itself to a substantial body of research on the determinants of firms' stock prices.

The literature based on applications of the dividend-discount model can be divided roughly into two main strands, although alternative classifications might also exist. The first line of research tries to relate bank stock returns to contemporaneous bank risk or some other bank-specific characteristics. This work on the empirical predictability of stock returns has produced several important and widely quoted results, of which the most prominent findings are that small firms' average stock returns tend to outperform large firms' returns (size effect), that past longer-term losers tend to outperform past longer-term winners (long-term reversal), and that past short-term winners tend to outperform past short-term losers (momentum).⁵ Other findings include the fact that firms with past high profitability generally have higher than average stock returns, and that firms with higher leverage tend to outperform firms with lower leverage.⁶

However, such analysis cannot tell whether a bank's stock return reacts to news because market participants' expectations of future dividends change, or because their expectations of future returns have changed. The second strand of the research tries to address this issue by explaining the empirical predictability of stock returns and then to decompose the returns into their components. To this end, the present value formulation of the dividend-discount model, where expected returns are assumed to remain constant, has had to be augmented by a log-linear approximation that is tractable even when expected returns vary through time.⁷

This method enables an analysis of the relative importance of the cash flow and expected return components as the drivers of aggregate stock returns. Previous work using aggregate market-level stock returns has found that the variability in expected returns accounts for about 50 to 60% of the variability in unexpected returns. By contrast, cash flow news only explains about

one-third of the variance in unexpected returns.⁸ Until recently, however, there has been little evidence of what determines stock returns at the firm level. The ability to categorise the news into firm-specific and market-wide components can, however, tell us whether individual banks are more sensitive to common, or systemic, shocks relative to shocks that are specific to their own cash flow fundamentals.

Studies applying firm-level data using the return decomposition technique have produced two important results. The first is that while market-wide shocks ("expected return news") tend to drive aggregate stock indices, variability in firm-level stock returns is mostly associated with shocks to cash flow expectations ("cash flow news"). The second finding is that the dependence of firm-level returns tends to vary according to the size of the firm, with large firms being relatively more sensitive to firm-specific cash flow news.⁹

There are some reasons why banks' stock returns could be expected to behave differently than non-financial firms' stock returns. Indeed, the stock return literature sometimes excludes financial industry firms on the grounds that banks are in some way different. Banks indeed differ from most non-financial firms in two main respects.

- 5 See R. Banz (1981), "The relationship between return and market value of common stocks", *Journal of Financial Economics*, 9; W. De Bondt and R. Thaler (1985), "Does the stock market overreact?", *Journal of Finance*, 40; and N. Jegadeesh and S. Titman (1999), "Profitability of momentum strategies: An evaluation of alternative explanations", *Journal of Finance*, 56 (2).
- 6 See L. Bhandari (1988), "Debt/equity ratio and expected common stock returns: Empirical evidence", *Journal of Finance*, 43; and R. Haugen and N. Baker (1996), "Commonality in the determinants of expected stock returns", *Journal of Financial Economics*, 41. Similar results for European markets have been presented by K. Rowenhorst (1998), "International momentum strategies", *Journal of Finance*, 53 (1).
- 7 See J. Campbell and R. Shiller (1988), "The dividend-price ratio and expectations of future dividends and discount factors", *Review of Financial Studies*, 1.
- 8 See J. Campbell, (1991), *op. cit.*
- 9 See J. Campbell and R. Shiller (1988), *op. cit.*, J. Campbell (1991), *op. cit.*, T. Vuolteenaho (2002), *op. cit.* and R. Cohen, P. Gompers and T. Vuolteenaho (2003), "Who underreacts to cash-flow news? Evidence from trading between individuals and institutions", *Journal of Financial Economics*, 66.

First, the majority of banks' assets are long-term financial claims – such as loans – on households and firms. Banks finance these assets by selling their own debt and equity as well as by receiving the majority of their funds in the form of short-term deposits. The main difference between banks and non-financial firms in this case is that banks tend to be more leveraged. Second, because banks tend to hold their liquid deposits against relatively illiquid loans, and since they are highly leveraged, they are potentially vulnerable to bank runs. Since bank failures result in a high social cost, the banking industry is highly regulated – for example, by means of deposit insurance or minimum capital requirements – to reduce the risk of failure. These regulatory barriers to entry may increase the ability of firms in the industry to earn rents, and thus their stock returns could behave differently to those of non-financial firms.

Work using individual bank data needs to consider these factors. Given that the European regulatory framework for financial institutions, including deposit insurance, is harmonised at the EU level, and the Basel accord for capital requirements is widely applied, it is unlikely that regulatory factors can account for systematic differences in returns.¹⁰ This leaves leverage, size and diversification as the relevant variables to be considered in our analysis.

Research based on different methodologies and a cross-section of US banks has found that information about earnings, leverage and non-interest income can predict a cross-section of future bank stock returns.¹¹ Moreover, there is some evidence that bank stock returns may vary with the business cycle. Studies based on European data find evidence of cyclical variation in bank stock returns, and reveal that banks that are better capitalised (with higher equity-to-loan ratios) and more diversified have higher returns than poorly capitalised, less diversified banks.¹²

METHODOLOGY AND DATA

As discussed above, the stock return decomposition framework is based on the augmented dividend-discount model. Taken to the empirical level, the stock return regression is augmented by other regression equations that describe the evolution through time of the forecasting variables. The resulting VAR system, in combination with the log-linear asset pricing framework, can be used to calculate the impact that an innovation in the expected return will have on the stock price, holding expected future cash flow variables constant. This impact is the “expected return news” component of the unexpected stock return. The “cash flow news” is obtained as a residual.

An accounting-based present-value model is needed to apply this at firm level. The model consists of a system of four equations. The left-hand-side variable is log excess stock returns; the right-hand-side variables are log excess ROE, log leverage and the log book-to-market ratio.¹³ Modelling corporate dividend policy is avoided by excluding any dividend-based variables from the VAR due to the lack of time series stability of a firm's dividend policy variable. From the VAR output, a set of impulse response functions and a variance decomposition can be generated. One lag is included in the four-equation VAR.¹⁴

10 For more on the introduction of deposit insurance in the EU, see R. Gropp and J. Vesala (2004), “Deposit insurance, moral hazard, and market monitoring”, *Review of Finance*, 8 (4).

11 M. J. Cooper, W. Jackson and G. Patterson (2003), “Evidence of predictability in the cross-section of bank stock returns”, *Journal of Banking and Finance*, 27.

12 L. Baele, R. Van der Vennet and A. Van Landschoot (2005), “Bank risk strategies and cyclical variation in bank stock returns”, mimeo.

13 Three assumptions are necessary to replace dividends by ROE in the return decomposition framework. First, ROE, book equity and market equity need to be strictly positive. Second, the difference between log ROE and log book equity, and the difference between log book equity and log market equity, have to be stationary. Third, the clean-surplus identity is assumed to be satisfied, i.e. book equity in the current year equals book equity in the last year, plus earnings less dividends.

14 Standard lag selection tests indicated one lag was optimal.

The banks selected for this study are listed EU banks that show a consistent time series of annual data from 1991 to 2004 for all variables used in the estimation. The dataset consists of accounting and market information for a pooled time series of 53 EU banks. The accounting data such as ROE, book value of equity, and book debt variables, as well as the equity price series and the earnings per share series, are taken from Datastream.¹⁵ The risk-free rate is the short-term rate taken from the BIS.

Various transformations are made to the data. The equity prices and the risk free rate are continuously compounded.¹⁶ The excess stock return is constructed as the difference between the two series. Owing to the panel estimation approach followed, the excess return series is then cross-sectionally demeaned and normalised by dividing by its standard deviation. In a last step, the series is annualised. The excess ROE variable is created by subtracting the compounded risk-free rate from the logged ROE. Leverage is defined as book equity divided by book equity plus book debt. The annual book-to-market ratio is defined as the ratio of book value of equity to market value of equity. The market value of equity is calculated by multiplying the monthly equity price with the monthly amount of shares outstanding; the series is annualised afterwards to ensure consistency with the annual balance sheet data.

RESULTS FROM THE VECTOR AUTOREGRESSION MODEL

Based on the chosen sample of EU banks, the results from the VAR analysis appear to be in line with several seminal studies of the determinants of firm-level stock returns as reported above.

The coefficient estimates are reported in Table C.1.¹⁷ The statistically significant estimates reveal that expected stock returns are high when past returns and past leverage are high. Banks' expected profitability is high when past profitability is high and the past book-to-market

Table C.1 VAR coefficient estimates

(1991 - 2004)				
	return	ROE	leverage	book to mkt
return (-1)	0.06 <i>0.09</i>	0.01 <i>0.83</i>	-0.01 <i>0.91</i>	-0.14 <i>0.00</i>
ROE (-1)	-0.03 <i>0.39</i>	0.57 <i>0.00</i>	0.02 <i>0.72</i>	-0.10 <i>0.00</i>
leverage (-1)	0.02 <i>0.08</i>	0.02 <i>0.12</i>	0.91 <i>0.00</i>	0.00 <i>0.85</i>
book-to-mkt (-1)	0.00 <i>0.77</i>	-0.04 <i>0.02</i>	0.03 <i>0.18</i>	0.89 <i>0.00</i>

Source: ECB calculation.
Note: T-probabilities in italics.

ratio is low. Expected leverage tends to be mainly driven by its past value, while the expected book-to-market ratio is high when past excess returns and past profitability are low and the past book-to-market ratio is high.

These results suggest that investors in EU bank stocks tend to be trend-followers in the short run, as bank stock returns show persistence. Moreover, the result that higher past leverage tends to be associated with higher returns is interesting in the case of banks, as banks are "special" in the way that they are, in fact, highly leveraged firms.

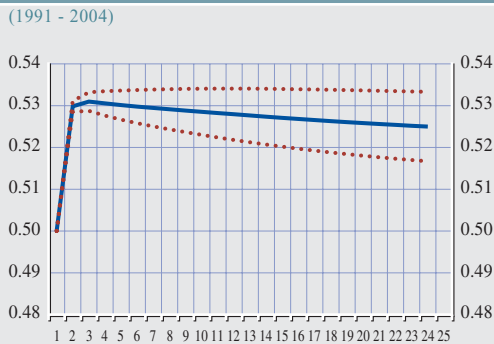
The finding that EU banks' expected returns are high when past stock returns are high is also confirmed by the impulse response function, which shows the response of cumulative returns to a 50 basis point return shock (see Chart C.1). Indeed, the returns continue to rise for roughly

15 A total of seven observations were missing: two for ROE, two for book equity, and three for book debt. These missing observations were linearly interpolated.

16 The data for the UK, Sweden and Denmark were converted into euro using the relevant market exchange rate. Data for the UK were also converted to euro units as they are quoted on Datastream in GBP pence. The compounding for the UK data was done on an April to April rather than a calendar year basis in order to coincide with the UK fiscal year.

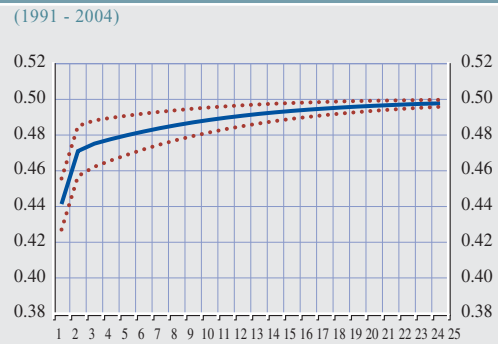
17 The fact that some of the T-probabilities (which are comparable to P-values) are relatively high indicates that the model could be over-specified. This is often characteristic of panel data estimations, and should therefore not necessarily be taken as a sign of low predictive power. On the other hand, the limited data in our sample could also affect the results.

Chart C.1 Shock to expected return (50 basis points)



Source: ECB calculations.
Note: The band around the mean shows the Jackknife standard errors.

Chart C.2 Shock to cash flows (50 basis points)



Source: ECB calculations.
Note: The band around the mean shows the Jackknife standard errors.

three years after the shock, showing a considerable momentum effect. However, after that the returns first level off and then slowly decline, confirming that EU banks' stock prices demonstrate some long-run mean reversion.

The second impulse response function plots the reaction of banks' stock returns to a 50 basis point cash flow shock (see Chart C.2). If expected returns were constant, the shock would result in exactly a 50% increase in realised returns. Instead, the analysis based on the dynamic dividend-discount model reveals that the initial response is only 44%, increasing only gradually towards 50%. This suggests that investors initially under-react to news, and that it could typically take the market several years to incorporate fully the positive fundamental shock into banks' stock prices.¹⁸

RESULTS FROM THE RETURN DECOMPOSITION ANALYSIS

The main focus of the analysis is, however, on the relative importance of cash flow, or firm-specific, versus expected return, or macroeconomic, news. The variance decomposition resulting from the VAR model reveals that the cash flow component is the main driving force of EU banks' stock returns. Indeed, the coefficient of the bank-specific cash flow component is more than ten times

larger than the coefficient of the expected return component (see Table C.2). Moreover, there is a relatively strong positive covariance between the two return components. The previous literature has shown that this positive interrelation between the two return components is in fact driving the observed under-reaction by markets to the positive fundamental news. This is because part of the impact of cash flow shocks to returns is offset by the instantaneous opposite movement in the expected return component as prescribed by the underlying theoretical model.

Finally, as discussed above, it is possible that the results of the variance decomposition could differ depending on bank size. Tables C.3 and C.4 below confirm that this indeed is the case for EU banks, although the outcome is somewhat

¹⁸ This is in line with the findings from US stock markets by T. Vuolteenaho (2002), op. cit.

Table C.2 VAR return decomposition: all banks

(1991 - 2004)			
stock variance	ER variance	cash-flow variance	ER cash-flow covariance
1.23	0.12	1.45	0.34
<i>0.08</i>	<i>0.02</i>	<i>0.10</i>	<i>0.05</i>

Source: ECB calculations.
Note: Jackknife standard errors in italics.

**Table C.3 VAR return decomposition:
large banks**

(1991 - 2004)

stock variance	ER variance	cash-flow variance	ER cash-flow covariance
1.18	0.30	1.60	0.72
<i>0.10</i>	<i>0.05</i>	<i>0.14</i>	<i>0.12</i>

Source: ECB calculations.

Note: Jackknife standard errors in italics.

**Table C.4 VAR return decomposition:
small banks**

(1991 - 2004)

stock variance	ER variance	cash-flow variance	ER cash-flow covariance
1.26	0.15	1.63	0.52
<i>0.14</i>	<i>0.03</i>	<i>0.17</i>	<i>0.07</i>

Source: ECB calculations.

Note: Jackknife standard errors in italics.

different than what has been reported for non-financial firms. While both large and small banks are more substantially affected by the cash flow news component, the ratio of cash flow to expected return news is twice as high for small banks as for large banks. This suggests that the common, or macroeconomic, component could actually be relatively more important for large banks.

Why is the bank-specific component relatively more dominant for small rather than large listed EU banks? One possible explanation is that, owing to the more widespread activities of large banks both across borders and across business lines. Market-wide information has become more relevant for large banks, whereas bank-specific information could still be relatively more valuable for smaller banks that are more specialised, both geographically and regarding their business model.

Small banks are also more often characterised by an ownership structure whereby investor portfolios are less diversified. In such cases, news that is more typically associated with bank-specific fundamentals could have a more profound impact on banks' stock returns via investor reactions. Moreover, the typically less frequent disclosure of financial results by small banks could increase the relative role of such bank-specific information for determining their stock prices. Finally, from time to time banks' stock returns also tend to be affected by perceptions of future takeover activity, which is typically a bank-specific factor. Insofar as M&A activity among EU banks has tended to be more (although by no means exclusively)

concentrated among the smaller banks, it could also explain the relative sensitivity of these types of banks' stock returns to firm-specific news.

The financial stability implications of this finding are interesting. It suggests that under standard distributional assumptions, smaller banks could in fact be less prone to systemic shocks spreading through the stock market channel than large banks. This finding also interestingly complements the results reported in Box 16 in this Review, namely that the tail dependence between banks, and therefore their sensitivity to extreme shocks, tends to be relatively higher for larger rather than smaller EU banks.

CONCLUDING REMARKS

This Special Feature combined the dynamic dividend-discount model with an accounting-based bank-level VAR framework to analyse the driving forces of EU banks' stock returns. It finds that while in the short term, expected returns are mainly driven by the momentum of past returns and past leverage, over the longer term, returns show some mean reversion to shocks.

At the same time, the positive covariance between the return news components means that the markets initially tend to under-react to positive news on bank-specific fundamentals, and only gradually incorporate such information into prices. Such cash flow news is, however, found to be the main driving force of bank-level stock returns. Finally, it is found that the

expected return news component is relatively more important for large banks than for small banks. Several explanations potentially account for this result, with the key implication that large banks could in fact be more prone to market-wide shocks that spread through the stock market channel.

STATISTICAL ANNEX

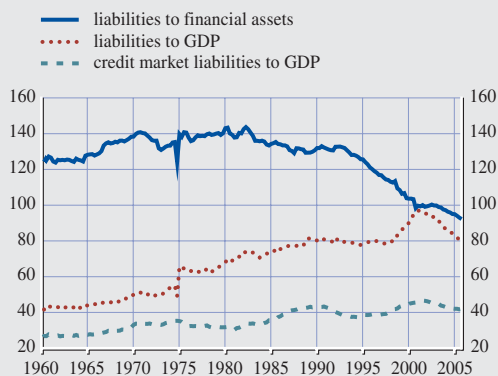
Chart S1:	US non-farm, non-financial corporate business liabilities	S3
Chart S2:	US non-farm, non-financial corporate business net equity issuance	S3
Chart S3:	US household debt-to-disposable income ratio	S3
Chart S4:	US household debt burden	S3
Chart S5:	Share of adjustable rate mortgages in the US	S4
Chart S6:	US general government and federal debt-to-GDP ratio	S4
Chart S7:	Japanese banks' non-performing loans	S4
Chart S8:	International positions of all BIS reporting banks vis-à-vis emerging markets	S4
Chart S9:	Nominal broad USD effective exchange rate index	S6
Chart S10:	One-month implied volatility for USD/EUR, JPY/EUR and JPY/USD	S6
Chart S11:	Ten-year government bond yields in the US and Japan	S6
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I EXTERNAL ENVIRONMENT

Chart S1 US non-farm, non-financial corporate business liabilities

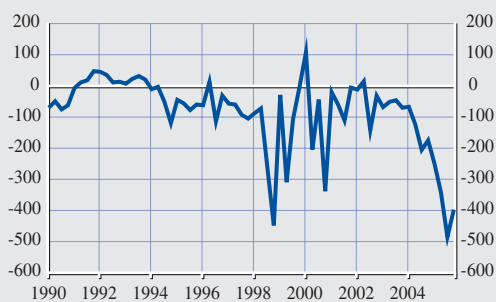
(Q1 1960 - Q4 2005, %)



Sources: US Federal Reserve Board and Bureau of Economic Analysis.

Chart S2 US non-farm, non-financial corporate business net equity issuance

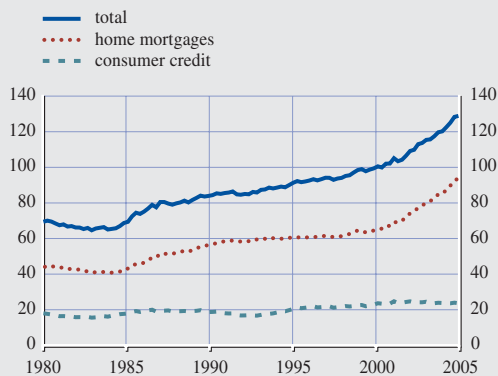
(Q1 1990 - Q4 2005, USD billions, seasonally adjusted quarterly annualised data)



Source: US Federal Reserve Board.

Chart S3 US household debt-to-disposable income ratio

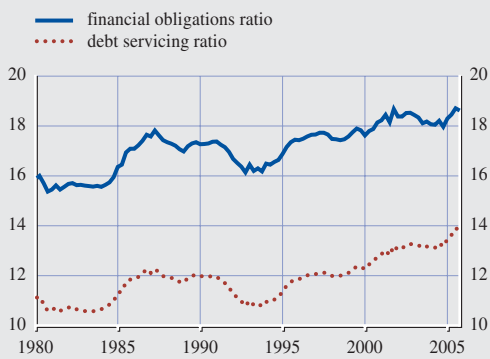
(Q1 1980 - Q4 2005, % of disposable income)



Source: US Federal Reserve Board.

Chart S4 US household debt burden

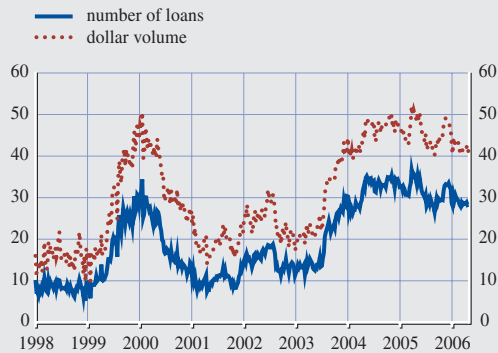
(Q1 1980 - Q4 2005, % of disposable income)



Source: US Federal Reserve Board.

Chart S5 Share of adjustable rate mortgages in the US

(Jan. 1998 - Apr. 2006, % of total new mortgages)



Source: Mortgage Bankers Association.

Chart S6 US general government and federal debt-to-GDP ratio

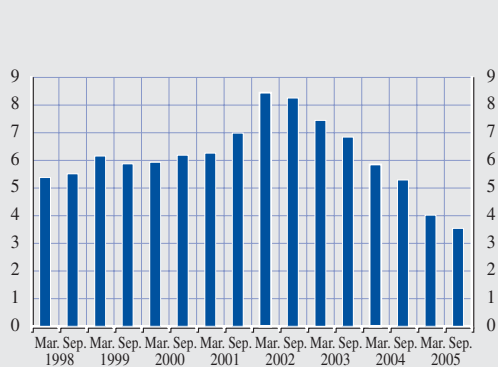
(Q1 1980 - Q4 2005, %)



Sources: US Federal Reserve Board and Bureau of Economic Analysis.
Note: General government comprises federal, state and local government gross debt.

Chart S7 Japanese banks' non-performing loans

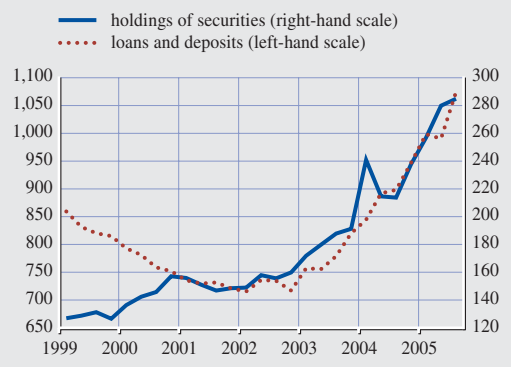
(Mar. 1998 - Sep. 2005, % of total loans)



Source: Japan Financial Services Agency.

Chart S8 International positions of all BIS reporting banks vis-à-vis emerging markets

(Q1 1999 - Q3 2005, USD billions)



Source: Bank for International Settlements (BIS).

Table SI Selected financial vulnerability indicators for some of the main emerging market economies

	Current account balance (% of GDP)			External debt (% of GDP)			Short-term external debt (% of reserves)			Foreign reserves (in months of imports)		
	2004	2005	2006(f)	2004	2005	2006(f)	2004	2005	2006(f)	2004	2005	2006(f)
Latin America												
Argentina	2.1	2.6	2.3	114	75	64	76	52	57	5.8	7.3	6.5
Brazil	1.9	1.8	1.0	36	24	19	36	36	30	6.1	5.1	5.2
Chile	1.5	-0.4	-1.1	47	39	35	41	41	42	4.9	4.1	4.0
Colombia	-1.0	-0.6	-1.2	40	32	32	18	17	17	6.5	6.3	6.3
Mexico	-1.1	-0.7	-1.0	23	21	19	54	46	46	3.3	3.4	3.2
Venezuela	12.6	16.5	11.7	36	30	25	30	22	22	7.6	7.7	6.5
Asia												
China	3.6	6.7	7.2	13	12	12	17	16	14	11.7	13.3	14.1
India	-0.9	-1.9	-1.5	20	18	18	12	12	12	10.0	7.6	6.8
Indonesia	1.5	1.0	0.8	54	46	38	53	64	65	5.0	3.9	3.9
Malaysia	12.6	12.2	8.5	56	39	33	27	12	10	6.2	6.0	6.0
South Korea	4.1	2.3	1.6	26	24	24	30	31	32	8.6	7.7	7.0
Thailand	4.1	-2.1	-2.6	32	30	30	26	27	27	5.2	4.4	4.1
Emerging Europe												
Russia	7.9	10.0	7.7	36	28	25	34	30	25	11.5	13.1	14.4
Turkey	-5.2	-6.2	-6.4	53	47	47	121	112	115	3.9	4.6	4.8

Source: Institute of International Finance.

Note: Data for 2006 are forecasts.

2 INTERNATIONAL FINANCIAL MARKETS

Chart S9 Nominal broad USD effective exchange rate index

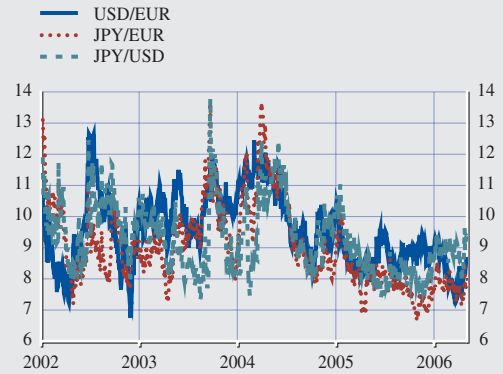
(Jan. 2002 - Apr. 2006, index: Jan. 2002 = 100)



Source: US Federal Reserve Board.

Chart S10 One-month implied volatility for USD/EUR, JPY/EUR and JPY/USD

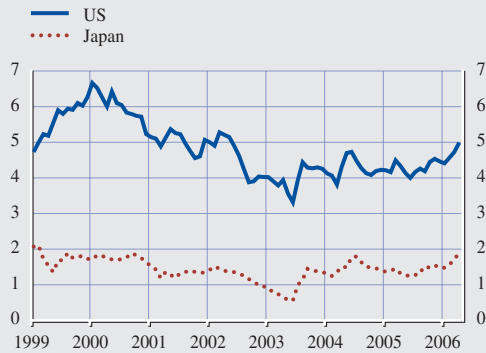
(Jan. 2002 - May 2006, %)



Source: Reuters.

Chart S11 Ten-year government bond yields in the US and Japan

(Jan. 1999 - Apr. 2006, %)



Source: ECB.

Chart S12 US risk aversion index

(Jan. 1990 - Mar. 2006)



Source: Goldman Sachs.

Note: The risk aversion index ranges between 0 and 10, and measures investors' willingness to invest in risky assets as opposed to risk-free securities.

Chart S13 Stock prices in the US

(Jan. 2002 - May 2006, S&P 500, index: Jan. 2003 = 100)



Source: Reuters.

Chart S14 Price-earnings (P/E) ratio for the US stock market

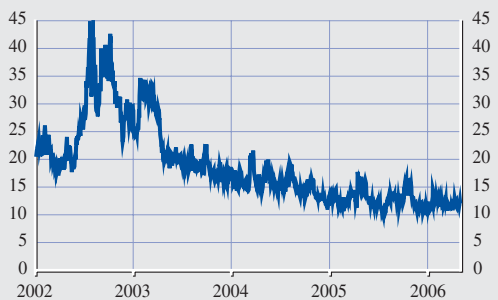
(Jan. 1983 - Apr. 2006, %, ten-year trailing earnings)



Sources: Thomson Financial 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.

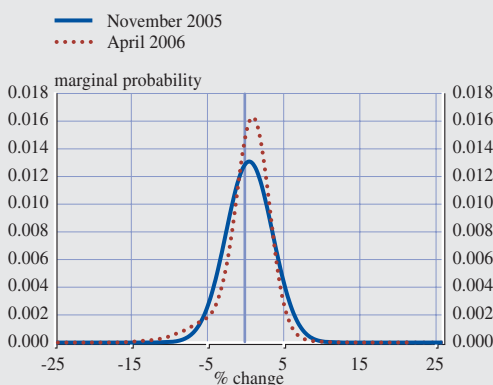
Chart S15 VIX implied volatility for the S&P 500 index

(Jan. 2002 - May 2006, %)



Source: Thomson Financial Datastream.
Note: Data calculated by the Chicago Board Options Exchange (CBOE).

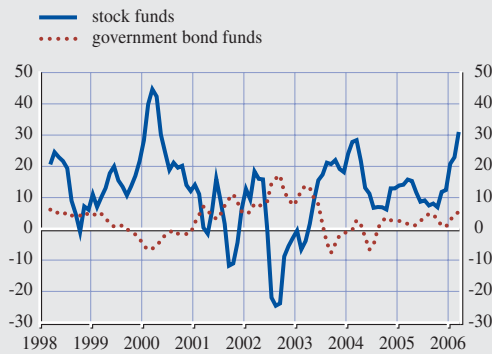
Chart S16 Option-implied probability distribution function for the S&P 500 index



Sources: Bloomberg and ECB calculations.
Note: Based on options with one month maturities.

Chart S17 US mutual fund flows

(Mar. 1998 - Mar. 2006, USD billions, three-month moving average)



Source: Investment Company Institute.

Chart S18 Debit balances in New York Stock Exchange margin accounts

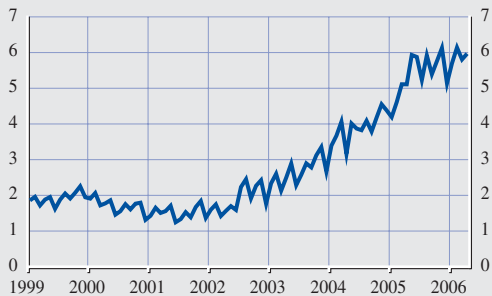
(Jan. 1992 - Feb. 2006, USD billions)



Source: Chicago Board Options Exchange (CBOE).
 Note: Borrowing to buy stocks "on margin" allows investors to use loans to pay for up to 50% of a stock's price.

Chart S19 Open interest in options contracts on the S&P 500 index

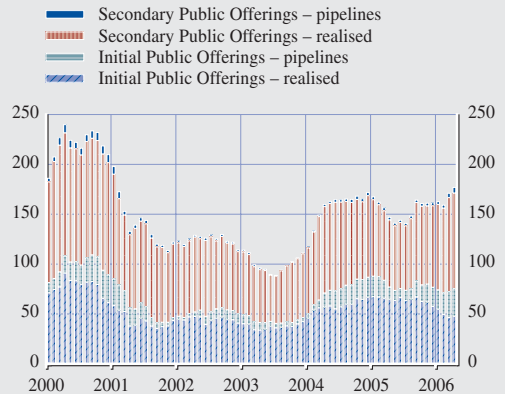
(Jan. 1999 - Apr. 2006, millions of contracts)



Source: Chicago Board Options Exchange (CBOE).

Chart S20 Gross equity issuance in the US

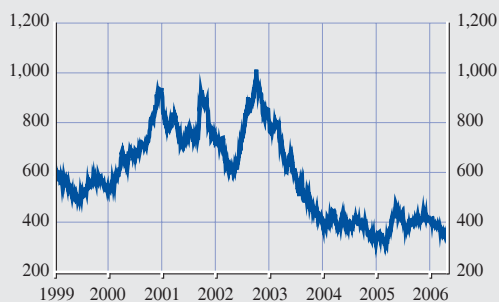
(Jan. 2000 - Apr. 2006, USD billions, 12-month moving sums)



Source: Thomson Financial Datastream.

Chart S21 Spreads on US high-yield corporate bonds

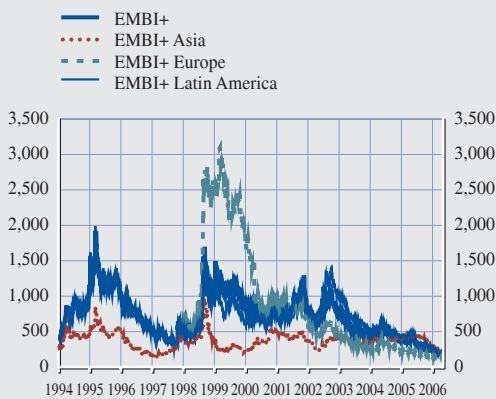
(Jan. 1999 - May 2006, basis points)



Source: JP Morgan Chase & Co.
 Note: Spread between the yield to maturity of the US domestic high-yield index (BB+ rating or below, average maturity of 7.7 years) and the US ten-year government bond yield.

Chart S22 Sovereign bond spreads in major emerging regions

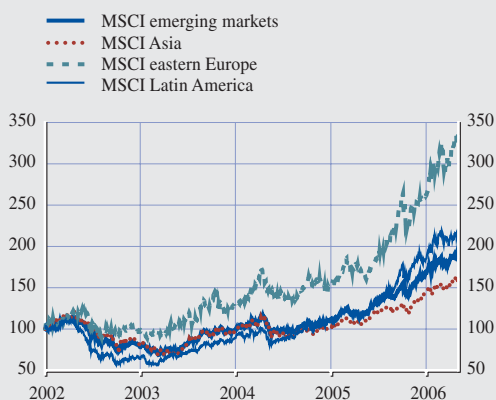
(Jan. 1994 - May 2006, basis points)



Source: JP Morgan Chase & Co.
 Note: The series shown is the Emerging Market Bond Index Plus (EMBI+) "performing" index.

Chart S23 Equity market indices in major emerging regions

(Jan. 2002 - May 2006, index: Jan. 2002 = 100)



Source: Bloomberg.

Table S2 Total international bond issuance (private and public) in selected emerging markets

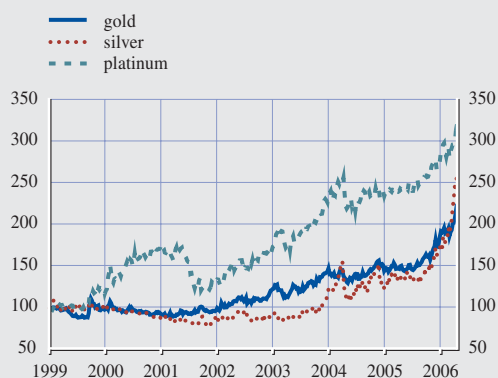
(USD millions)										
	2001	2002	2003	2004	2005	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1
Total major EMEs	66,167	65,273	99,488	114,978	163,327	28,895	61,784	35,020	37,629	30,496
Latin America	29,154	18,963	32,635	36,782	73,990	9,087	42,331	12,573	9,999	10,944
<i>of which:</i>										
Argentina	3,328	-	-	915	35,941	150	35,641	-	150	100
Brazil	7,417	5,736	11,803	9,426	3,402	17,773	2,735	9,262	2,373	4,714
Chile	2,150	1,399	1,000	1,307	-	-	-	-	-	428
Colombia	4,004	1,000	1,265	1,544	2,097	447	-	1,000	650	238
Mexico	7,552	6,098	11,226	15,501	6,853	3,363	1,475	800	1,216	3,000
Venezuela	1,729	1,049	4,478	4,380	6,079	1,325	1,604	150	3,000	-
Non-Japan Asia	31,616	35,782	50,148	57,964	58,790	12,188	11,558	16,416	18,629	13,568
<i>of which:</i>										
China	2,552	860	2,979	6,188	3,741	500	195	1,500	1,546	291
Hong Kong	9,267	1,989	12,631	6,268	7,353	1,678	2,280	650	2,745	996
India	99	153	450	4,417	4,349	1,018	500	1,347	1,484	3,260
South Korea	6,385	11,843	11,028	16,018	16,749	3,744	2,913	3,556	6,536	2,517
Malaysia	1,766	5,965	1,364	3,440	3,248	1,053	1,095	900	200	1,450
Singapore	7,400	812	3,885	6,985	5,543	425	1,025	3,337	756	-
Thailand	-	48	300	1,400	1,800	150	650	650	350	270
Emerging Europe	5,397	10,529	16,706	20,232	30,548	7,620	7,895	6,032	9,001	5,984
<i>of which:</i>										
Russia	1,503	3,713	8,585	10,490	17,359	3,466	4,172	4,438	5,283	2,824
Turkey	2,159	3,460	5,454	6,477	9,947	3,794	2,875	1,468	1,809	2,713
Ukraine	-	399	1,250	2,158	1,783	100	234	125	1,323	447
Bulgaria	223	1,248	62	10	260	260	-	-	-	-
Romania	794	1,062	814	-	1,199	-	614	-	585	-
Croatia	718	647	541	1,098	-	-	-	-	-	-

Source: Dealogic (Bondware).

Note: Regions are defined as follows: Latin America: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, Uruguay and Venezuela. Non-Japan Asia: Brunei, Burma, China, Special Administrative Region of Hong Kong, Indonesia, Laos, Macau, Malaysia, Nauru, North Korea, the Philippines, Samoa, Singapore, South Korea, Taiwan, Thailand and Vietnam. Emerging Europe: Bulgaria, Croatia, Romania, Russia, Turkey and Ukraine.

Chart S24 Precious metal prices

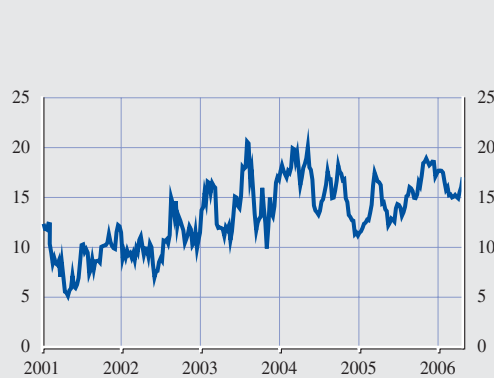
(Jan. 1999 - Apr. 2006, index: Jan. 1999 = 100, prices in USD)



Source: Bloomberg.

Chart S25 Share of non-commercial futures positions in overall crude oil futures positions

(Jan. 2001 - Apr. 2006, %)

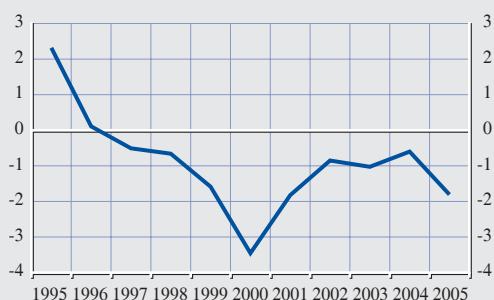


Source: Bloomberg.

3 EURO AREA ENVIRONMENT

Chart S26 Net lending/borrowing of non-financial corporations in the euro area

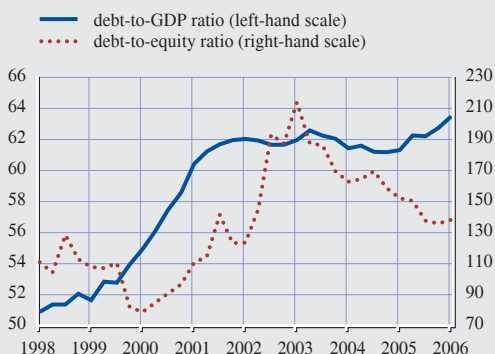
(1995 - 2005, financing gap, % of GDP)



Source: ECB.
Note: Data for 2005 are estimates using flow-of-funds projections.

Chart S27 Total debt of non-financial corporations in the euro area

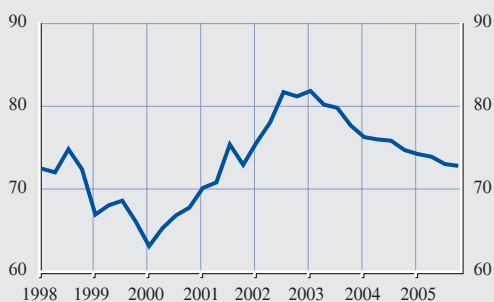
(Q1 1998 - Q1 2006, %)



Source: ECB.
Note: Data for Q4 2005 and Q1 2006 are partly based on estimates.

Chart S28 Total debt-to-financial assets ratio of non-financial corporations in the euro area

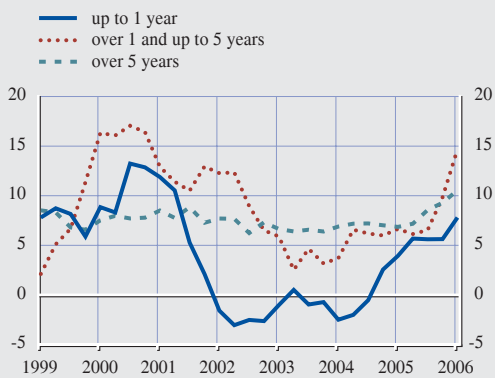
(Q1 1998 - Q4 2005, %)



Source: ECB.
Note: Data for 2005 are partly based on estimates.

Chart S29 Annual growth in loans to non-financial corporations in the euro area for selected maturities

(Q1 1999 - Q1 2006, % per annum)

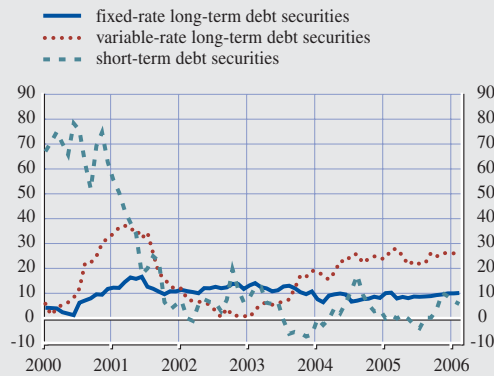


Source: ECB.
Note: Data are based on financial transactions of MFIs' loans.



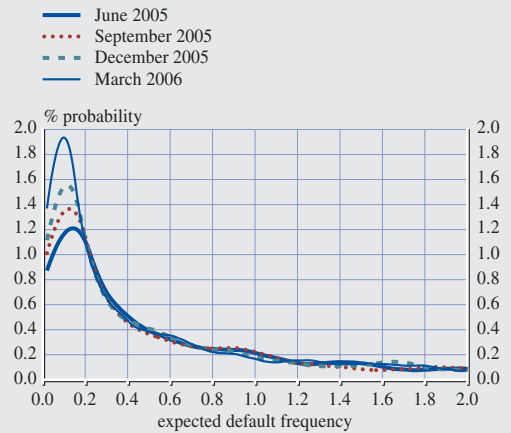
Chart S30 Annual growth in debt securities issued by non-financial corporations in the euro area

(Jan. 2000 - Feb. 2006, % per annum)



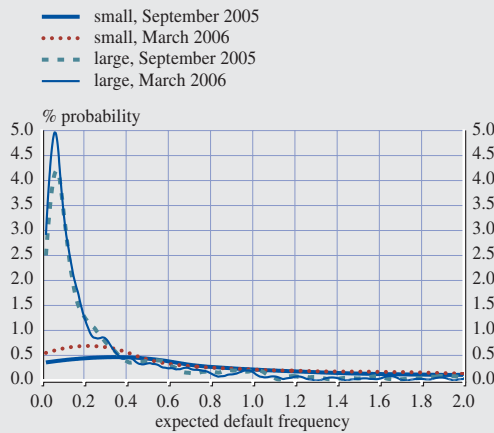
Source: ECB.

Chart S31 Euro area non-financial corporations' expected default frequency (EDF) distributions



Sources: Moody's KMV and ECB calculations.
Note: The EDF provides an estimate of the probability of default over the following year.

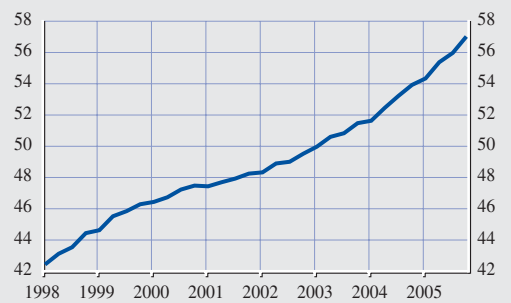
Chart S32 Expected default frequency (EDF) distributions for large and small euro area non-financial corporations



Sources: Moody's KMV and ECB calculations.
Note: The EDF provides an estimate of the probability of default over the following year. Size is determined by the quartiles of the value of liabilities: small if in the lower and large if in the upper quartile of the distribution.

Chart S33 Household debt-to-GDP ratio in the euro area

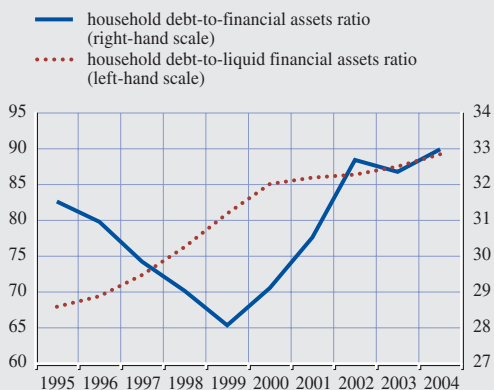
(Q1 1998 - Q4 2005, %)



Sources: ECB and Eurostat.
Note: Data for Q3 and Q4 2005 are estimated on the basis of monetary data.

Chart S34 Ratio of household debt to financial assets and liquid financial assets in the euro area

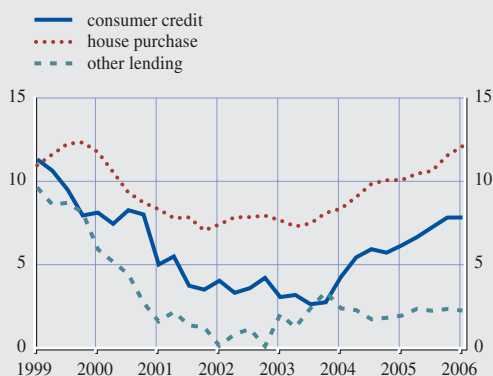
(1995 - 2004, %)



Source: ECB.

Chart S35 Annual growth in loans to households in the euro area

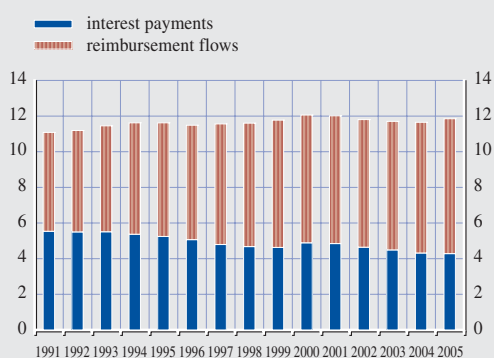
(Q1 1999 - Q1 2006, % per annum)



Source: ECB.
Note: Data are based on financial transactions of MFIs' loans.

Chart S36 Total debt servicing burden of the euro area household sector

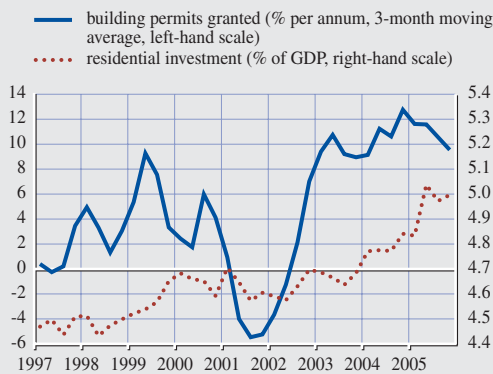
(1991 - 2005, % of disposable income)



Source: ECB calculations.

Chart S37 Building permits and residential investment in the euro area

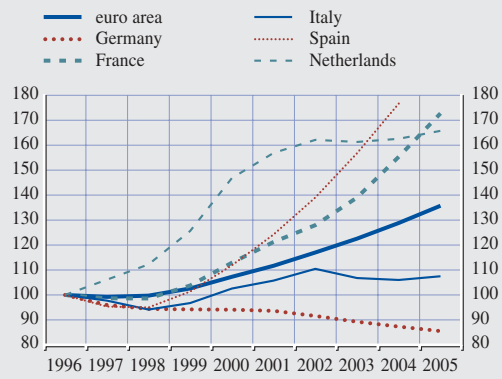
(Q1 1997 - Q4 2005)



Sources: ECB, Eurostat and ECB calculations.
Note: Germany is excluded owing to the effect of reunification on aggregate residential investment.

Chart S38 House price-to-rent ratio for the euro area

(1996 - 2005, index: 1996 = 100)

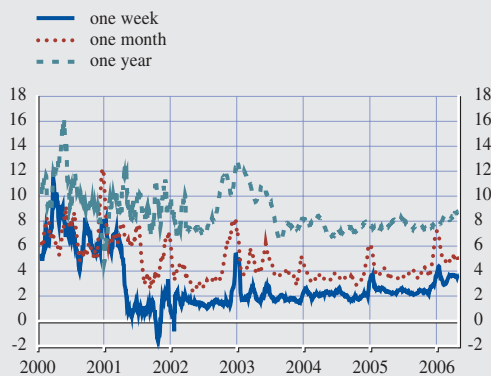


Source: ECB.

4 EURO AREA FINANCIAL MARKETS

Chart S39 Euro area spreads between interbank deposit and repo interest rates

(Jan. 2000 - May 2006, basis points, 20-day moving average)



Source: ECB.

Chart S40 Bid-ask spreads for EONIA swap rates

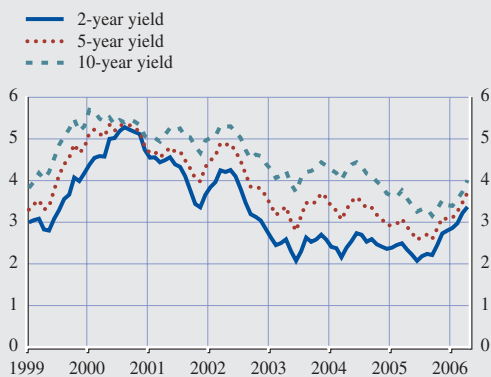
(Jan. 2003 - Apr. 2006, basis points, 20-day moving average, transaction weighted)



Source: ECB.

Chart S41 Euro area government bond yields

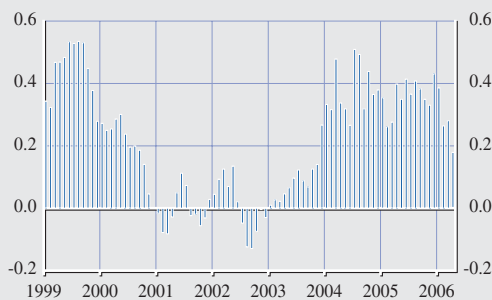
(Jan. 1999 - Apr. 2006, %)



Source: ECB.

Chart S42 Option-implied skewness coefficient for ten-year bond yields in Germany

(Jan. 1999 - Apr. 2006, average monthly skewness)



Sources: Eurex and ECB calculations.

Chart S43 Stock prices in the euro area

(Jan. 2002 - May 2006, Dow Jones EURO STOXX, index: Jan. 2003 = 100)



Source: Reuters.

Chart S44 Price-earnings (P/E) ratio for the euro area stock market

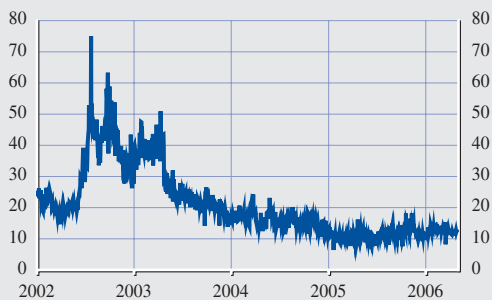
(Jan. 1983 - Apr. 2006, %, ten-year trailing earnings)



Source: Thomson Financial Datastream.
Note: The P/E ratio is based on prevailing stock prices relative to an average of the previous ten years of earnings.

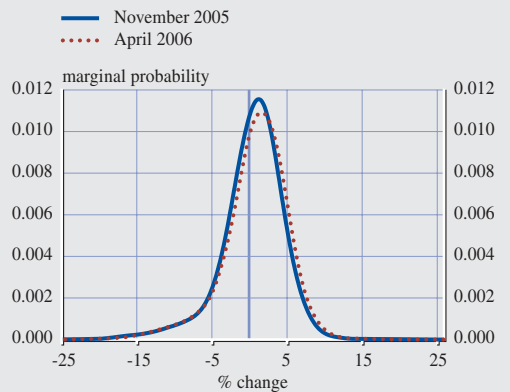
Chart S45: Implied volatility for the Dow Jones EURO STOXX 50 index

(Jan. 2002 - May 2006, %)



Source: Bloomberg.

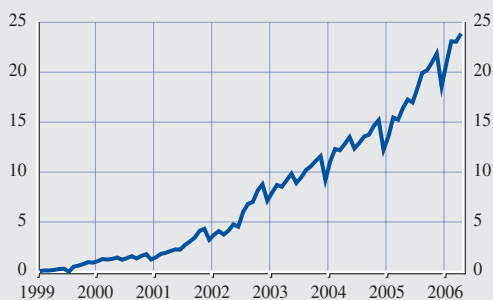
Chart S46 Option-implied probability distribution function for the Dow Jones EURO STOXX 50 index



Sources: Bloomberg and ECB calculations.
Note: Based on options with one month maturities.

Chart S47 Open interest in options contracts on the Dow Jones EURO STOXX 50 index

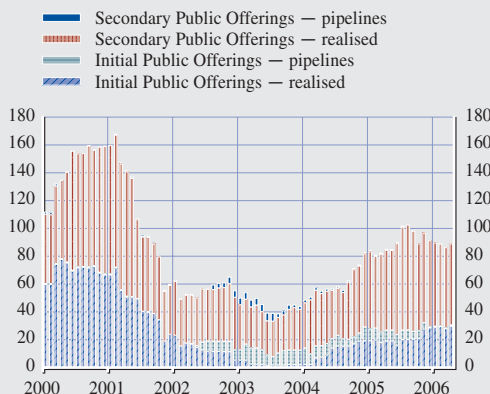
(Jan. 1999 - Apr. 2006, millions of contracts)



Source: Eurex.

Chart S48 Gross equity issuance and pipeline deals in the euro area

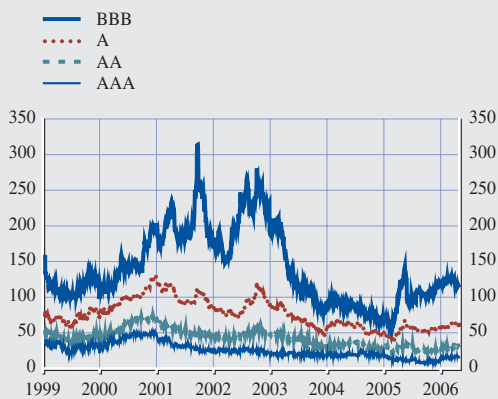
(Jan. 2000 - Apr. 2006, EUR billions, 12-month moving sums)



Source: Thomson Financial Datastream.

Chart S49 Corporate bond spreads in the euro area

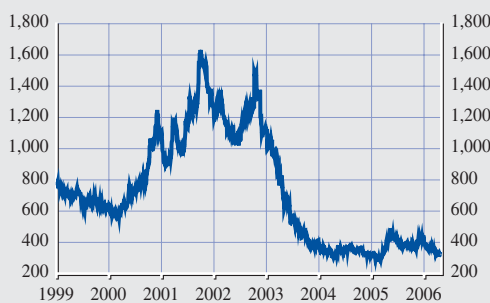
(Jan. 1999 - May 2006, basis points)



Source: Thomson Financial Datastream.
Note: Spread between the seven to ten-year yield to maturity and the euro area seven to ten-year government bond yield.

Chart S50 Spreads on euro area high-yield corporate bonds

(Jan. 1999 - May 2006, basis points)

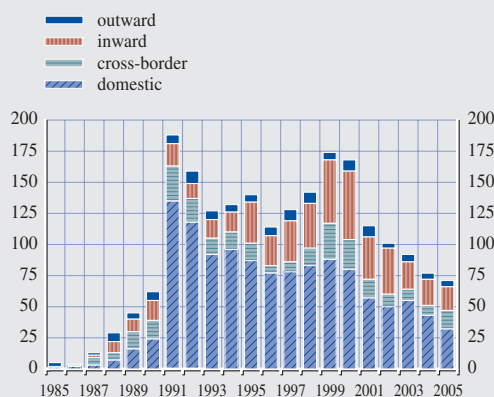


Source: JP Morgan Chase & Co.
Note: Spread between the yield to maturity of the euro area high-yield index (BB + rating or below, average maturity of 5.5 years) and the euro area five-year government bond yield.

5 EURO AREA FINANCIAL INSTITUTIONS

Chart S51 Number of euro area banking sector mergers and acquisitions (M&As)

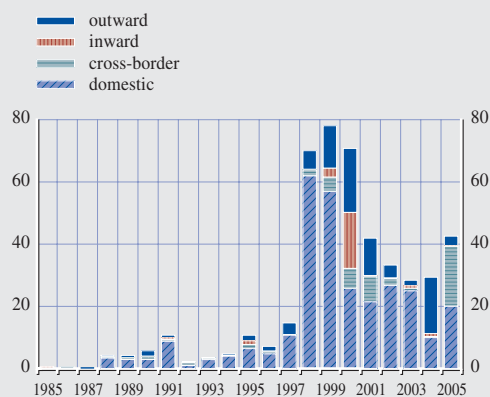
(1985 - 2005, number of deals)



Sources: Thomson Financial SDC and ECB calculations.
Note: M&As include both controlling and minority stakes and deals with and without reported value. "Cross-border" refers to inter-euro area M&As; "inward" denotes M&As by non-euro area banks in the euro area; and "outward" stands for M&A activity of euro area banks outside the euro area.

Chart S52 Value of euro area banking sector mergers and acquisitions (M&As)

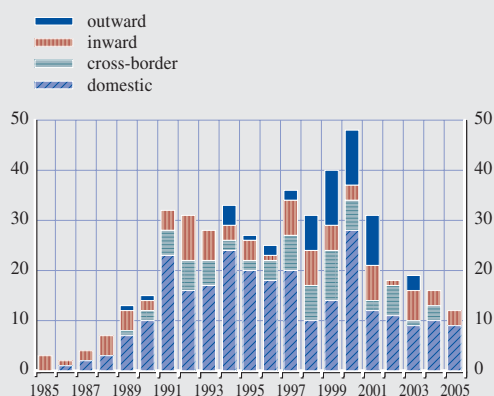
(1985 - 2005, value of deals, EUR billions)



Sources: Thomson Financial SDC and ECB calculations.
Note: M&As include both controlling and minority stakes. "Cross-border" refers to inter-euro area M&As; "inward" denotes M&As by non-euro area banks in the euro area; and "outward" stands for M&A activity of euro area banks outside the euro area.

Chart S53 Number of mergers and acquisitions (M&As) between banks and insurance companies in the euro area

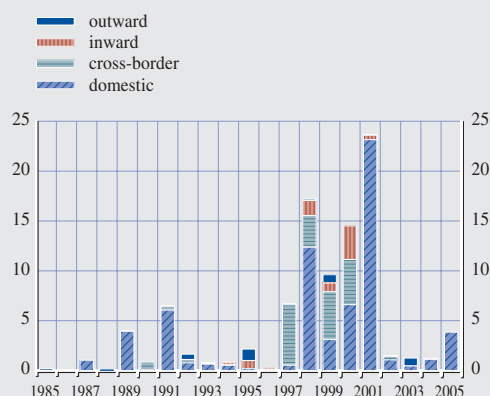
(1985 - 2005, number of deals)



Sources: Thomson Financial SDC and ECB calculations.
Note: The number of deals includes both deals with and without reported value, and records both minority and controlling stakes.

Chart S54 Value of mergers and acquisitions (M&As) between banks and insurance companies in the euro area

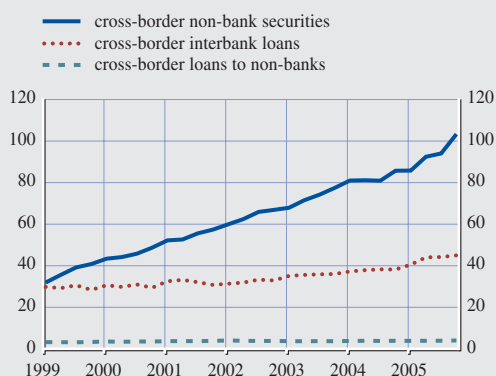
(1985 - 2005, value of deals, EUR billions)



Sources: Thomson Financial SDC and ECB calculations.
Note: Deals include both controlling and minority stakes.

Chart S55 Cross-border activity of euro area MFIs

(Q1 1999 - Q4 2005, % of total domestic outstanding amounts)



Source: ECB.

Note: Cross-border activity refers to cross-euro area activity (i.e. it excludes international activities outside the euro area and in third countries) and is based on unconsolidated data (i.e. a euro area MFI's loan to its foreign branch or subsidiary is classified as cross-border).

Table S3 Euro area banking sector structure

(2004)

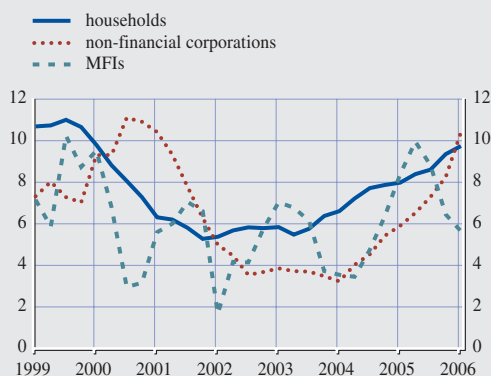
		Change from 2003
Number of credit institutions		
Stand-alone credit institutions	4,102	-219
Banking groups	458	-35
Credit institutions	4,551	-259
Domestic credit institutions	3,681	-234
Foreign-controlled subsidiaries and branches	870	-25
Total assets (EUR billions)		
Domestic credit institutions	18,963	5.9
of which (%):		
Large	69.4	2.5
Medium-sized	26.5	-2.0
Small	4.2	-0.6
Foreign-controlled subsidiaries and branches	2,936	8.7

Source: Banking Supervision Committee.

Note: Changes from 2003: for the number of institutions, they are in absolute numbers; for total assets, in percentages; for the size distribution breakdown of total assets, in percentage points.

Chart S56 Annual growth in euro area MFI loans extended by sector

(Q1 1999 - Q1 2006, % per annum)

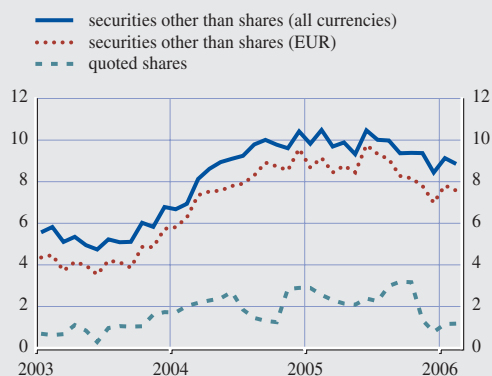


Source: ECB.

Note: Data are based on financial transactions of MFI loans.

Chart S57 Annual growth in euro area MFIs' securities and shares issuance

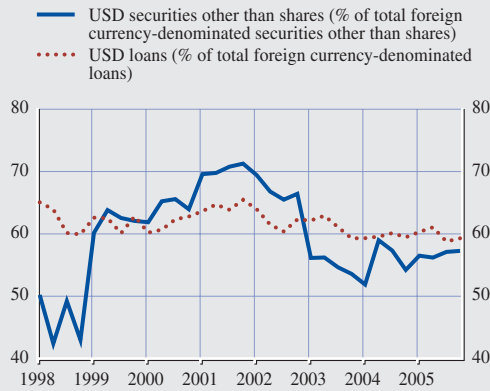
(Jan. 2003 - Feb. 2006, % per annum)



Source: ECB.

Chart S58 Euro area MFIs' foreign currency-denominated assets, selected balance sheet items

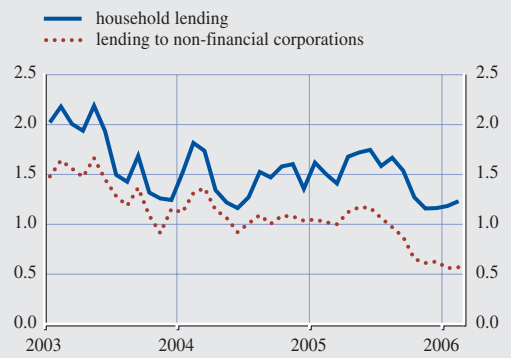
(Q1 1998 - Q4 2005)



Source: ECB.

Chart S59 Lending margins of euro area MFIs

(Jan. 2003 - Feb. 2006, % points)



Source: ECB.

Note: The weighted lending margins are the difference between the interest rate on new lending and the interest rate swap rate, where both have corresponding initial rate fixations/maturities.

Chart S60 Deposit margin of euro area MFIs

(Jan. 2003 - Feb. 2006, % points)

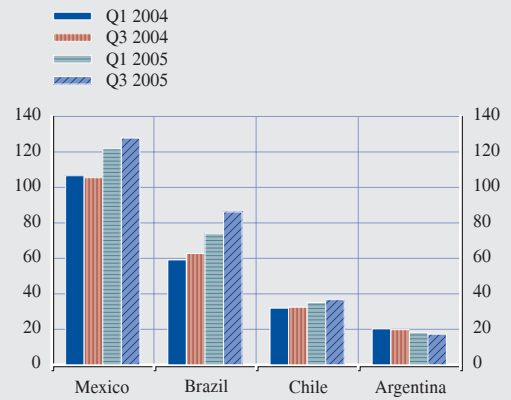


Source: ECB.

Note: The weighted deposit margins are the difference between the interest rate swap rate and the deposit rate, where both have corresponding initial rate fixations/maturities.

Chart S61 International exposure of euro area banks to Latin American countries

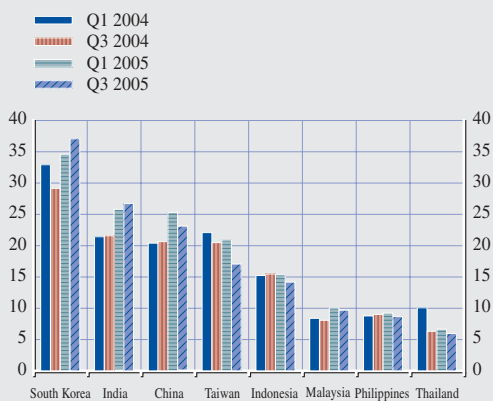
(USD billions)



Source: BIS.

Chart S62 International exposure of euro area banks to Asian countries

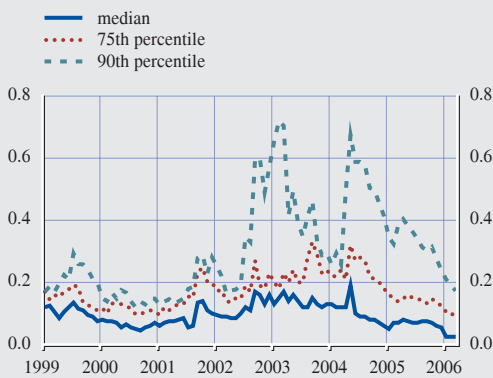
(USD billions)



Source: BIS.

Chart S63 Expected default frequencies (EDF) for a sample of large euro area banks

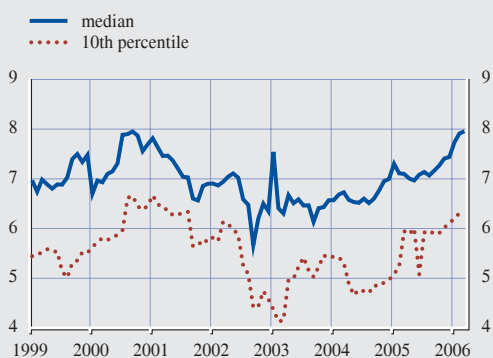
(Jan. 1999 - Mar. 2006, % probability)



Sources: Moody's KMV and ECB calculations.

Chart S64 Distance-to-default for a sample of large euro area banks

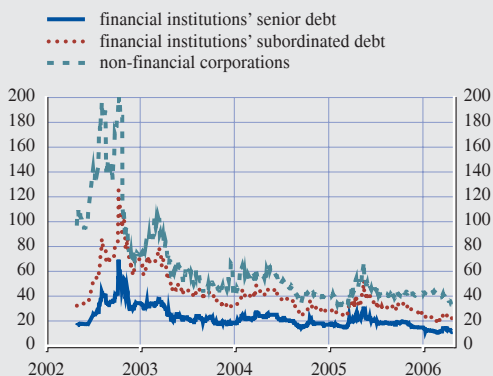
(Jan. 1999 - Mar. 2006)



Sources: Moody's KMV and ECB calculations.
Note: An increase in the distance-to-default reflects an improving assessment.

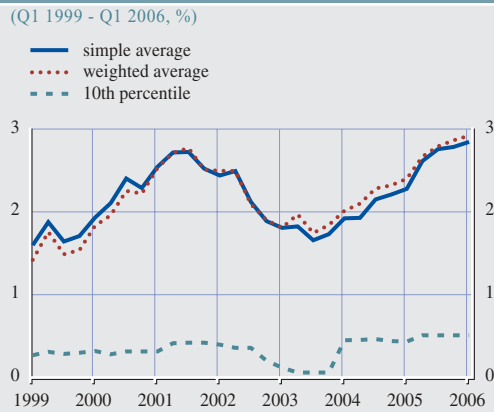
Chart S65 European financial and non-financial institutions' credit default swaps

(May 2002 - May 2006, basis points, five-year maturity)



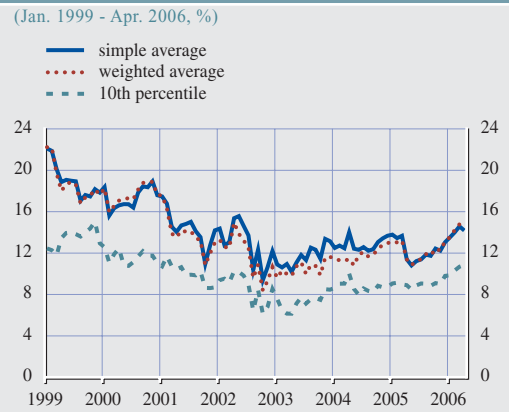
Source: JP Morgan Chase & Co.
Note: European financial institutions and non-financial institutions correspond to the definitions of JP Morgan Chase & Co.

Chart S66 Earnings per share (EPS) for a sample of large euro area banks



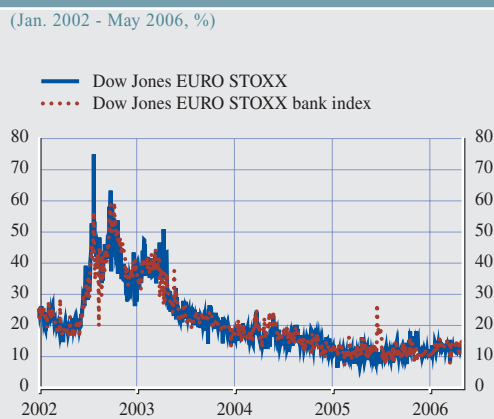
Sources: Thomson Financial Datastream and ECB calculations.

Chart S67 Price-earnings (P/E) ratios for a sample of large euro area banks



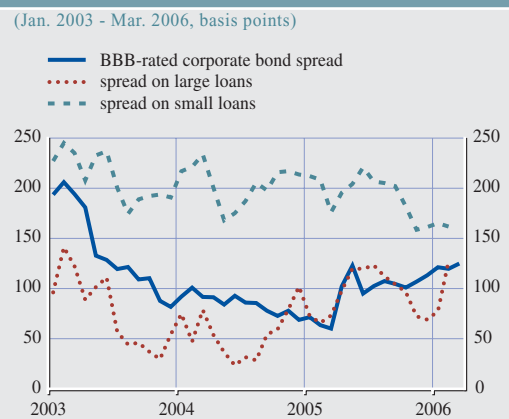
Sources: Thomson Financial Datastream and ECB calculations.

Chart S68 Implied volatility for Dow Jones EURO STOXX total market and bank indices



Source: Bloomberg.

Chart S69 Euro area corporate bond and bank loan spreads



Sources: ECB and Thomson Financial Datastream.
 Note: Spread between the rate on loans to non-financial corporations with one up to five years' of initial rate fixation below (small) and above (large) €1 million, and the three-year government bond yield.

Table S4 Euro area consolidated foreign claims of reporting banks on individual countries

(USD billions)

	2003				2004				2005		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Total all countries	3,847.2	4,164.5	4,146.4	4,345.1	4,824.4	4,815.5	4,900.4	5,586.7	5,787.9	5,997.2	6,060.7
Total non-developed countries (incl. offshore centres)	962.3	993.6	1,045.2	1,129.5	1,185.4	1,208.7	1,238.5	1,408.8	1,436.1	1,551.9	1,588.4
Hong Kong	26.3	30.3	30.0	31.9	35.3	36.3	36.7	41.1	35.9	48.1	54.1
Singapore	31.4	31.0	31.6	29.1	34.8	34.1	34.2	36.2	35.8	38.7	39.7
Total offshore centres	269.4	272.8	290.6	302.4	331.6	343.6	364.7	417.0	425.9	445.6	445.9
China	18.5	19.0	20.2	19.0	20.4	22.5	20.6	23.8	25.3	23.4	23.1
India	14.7	15.9	17.6	18.4	21.4	21.1	21.6	24.2	25.8	27.9	26.7
Indonesia	14.7	15.8	15.0	15.2	15.2	14.4	15.5	15.8	15.4	15.0	14.2
Malaysia	7.4	8.2	8.7	8.7	8.4	7.9	8.1	9.9	10.1	10.9	9.7
Philippines	6.6	6.9	7.5	7.5	8.8	8.7	9.0	8.4	9.2	8.6	8.7
South Korea	23.6	27.0	30.0	29.9	32.9	31.4	29.2	33.3	34.6	37.2	37.1
Taiwan China	11.7	13.6	17.2	17.9	22.1	23.7	20.5	23.6	20.9	18.7	17.1
Thailand	9.6	9.5	10.4	9.9	10.1	9.3	6.3	6.3	6.7	6.6	6.0
Total Asia and Pacific EMEs	121.6	130.8	142.8	145.0	160.2	162.0	151.5	168.6	172.1	173.1	168.3
Cyprus	21.4	24.2	25.9	31.5	30.4	33.7	33.7	37.8	37.4	40.1	41.6
Czech Republic	24.3	25.7	26.3	39.0	40.4	41.1	39.1	46.0	45.5	63.0	65.8
Hungary	27.1	29.3	31.9	36.0	37.2	39.5	41.4	49.8	50.4	61.9	62.9
Poland	56.4	57.3	59.0	64.1	62.9	65.2	69.4	87.2	88.5	93.6	97.5
Russia	24.3	25.8	28.0	33.3	37.1	34.2	34.2	40.7	40.0	49.2	53.2
Turkey	20.6	20.5	20.8	22.5	22.7	23.3	23.7	26.2	26.8	28.3	29.7
Total European EMEs and new EU Member States	244.2	256.0	270.6	322.8	330.1	342.0	354.4	419.6	428.0	513.1	543.1
Argentina	23.5	23.1	22.9	21.6	20.3	19.8	19.8	19.8	18.1	17.5	17.3
Brazil	51.2	54.4	57.1	59.4	59.1	58.4	62.7	67.4	73.9	80.7	86.2
Chile	29.3	29.2	29.9	32.6	31.9	31.0	32.5	35.0	35.1	36.4	36.7
Colombia	6.8	6.7	6.7	6.4	6.8	6.7	6.9	8.1	7.4	8.1	8.0
Ecuador	0.6	0.6	0.7	0.7	0.8	0.8	0.9	0.9	0.9	0.8	0.9
Mexico	98.2	100.7	100.7	103.9	106.6	107.2	105.5	120.0	121.9	127.6	127.8
Peru	8.7	9.8	9.2	9.5	9.3	9.5	9.6	10.0	9.9	10.3	10.3
Uruguay	2.2	2.0	2.1	2.0	1.9	2.0	2.0	2.0	2.3	2.1	2.2
Venezuela	10.5	10.8	11.7	13.1	12.1	12.5	12.8	14.7	14.3	15.6	16.8
Total Latin America	239.8	245.9	249.8	258.4	257.9	256.5	261.3	288.2	294.4	309.4	316.6
Iran	6.4	7.4	7.8	8.7	9.5	9.5	10.1	11.7	12.0	12.5	12.8
Morocco	10.4	9.2	9.7	11.3	10.5	11.0	11.4	12.6	12.6	11.0	12.5
South Africa	9.2	10.6	10.7	11.3	11.3	11.2	11.6	13.5	12.5	11.8	12.2
Total Middle East and Africa	87.4	88.1	91.4	101.0	105.6	104.5	106.6	115.4	115.6	110.7	114.5

Source: BIS.

Table S5 Financial conditions of a sample of large euro area banks

(2004 - 2005)		min.	1st quartile	average	3rd quartile	max.
Return on equity (ROE) (%)	2004	4.30	10.10	16.48	19.75	33.20
	2005	9.00	16.30	19.66	21.85	37.00
Net interest income (% of total assets)	2004	0.30	0.57	0.82	0.93	1.21
	2005	0.31	0.60	0.88	1.03	1.43
Net interest income (% of total income)	2004	24.07	38.89	47.94	56.51	69.54
	2005	23.53	35.22	45.36	59.88	68.70
Trading income (% of total income)	2004	2.69	7.02	12.92	15.68	28.73
	2005	2.58	6.83	14.52	15.35	37.14
Fees and commissions (% of total income)	2004	15.90	20.67	28.91	36.48	44.15
	2005	17.12	21.69	27.57	34.80	40.02
Other income (% of total income)	2004	-3.07	1.77	4.38	6.65	26.70
	2005	-0.27	2.03	6.72	2.03	16.73
Loan impairment costs (% of total assets)	2004	0.03	0.06	0.10	0.15	0.40
	2005	-0.02	0.02	0.07	0.11	0.26
Tier 1 ratio (%)	2004	6.32	7.04	7.87	8.45	10.90
	2005	7.10	7.55	8.31	9.10	11.60
Total capital ratio (%)	2004	8.46	10.69	11.05	12.77	13.30
	2005	8.50	10.74	11.45	12.48	16.30
Cost-to-income ratio (%)	2004	48.60	61.55	68.62	70.90	85.30
	2005	46.70	57.20	64.27	67.00	89.40

Sources: Banks' annual accounts and ECB calculations.

Table S6 Rating developments for a sample of 75 euro area banks

	Moody's	Fitch	Standard & Poor's	average of 3 agencies	average of upgrades	average of downgrades	average of no. of rating changes
Jan. 2004 to Oct. 2004	4.3	4.7	5.0	4.7	7.2	4.5	4.6
Nov. 2004 to Aug. 2005	4.2	4.9	5.2	4.8	5.2	4.7	4.8
Sep. 2005 to Feb. 2006	4.1	4.8	5.2	4.7	5.3	4.8	4.7

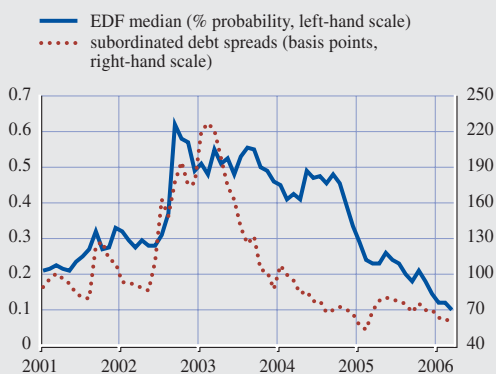
	Moody's	Fitch	Standard & Poor's	numerical equivalent
Aaa	AAA	AAA	AAA	1
Aa1	AA+	AA+	AA+	2
Aa2	AA	AA	AA	3
Aa3	AA-	AA-	AA-	4
A1	A+	A+	A+	5
A2	A	A	A	6
A3	A-	A-	A-	7
Baa1	BBB+	BBB+	BBB+	8
Baa2	BBB	BBB	BBB	9
Baa3	BBB-	BBB-	BBB-	10
Ba1	BB+	BB+	BB+	11
Ba2	BB	BB	BB	12
Ba3	BB-	BB-	BB-	13

Sources: Moody's, Fitch Ratings and Standard and Poor's.

Note: The numerical values assigned to the letter ratings are based on practice at the ECB

Chart S70 Subordinated bond spreads and expected default frequencies (EDF) for the euro area insurance industry

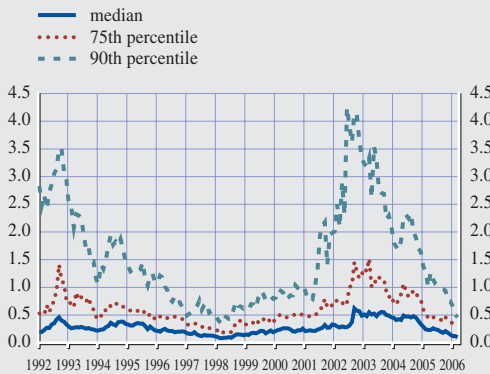
(Jan. 2001 - Mar. 2006)



Sources: Moody's KMV and JP Morgan Chase & Co.

Chart S71 Expected default frequencies (EDF) for the euro area insurance industry

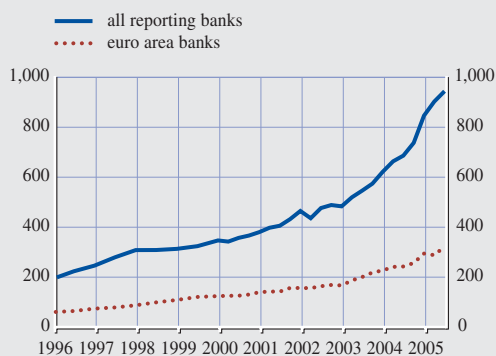
(Jan. 1992 - Mar. 2006, % probability)



Source: Moody's KMV.

Chart S72 Global consolidated claims on non-banks in offshore financial centres

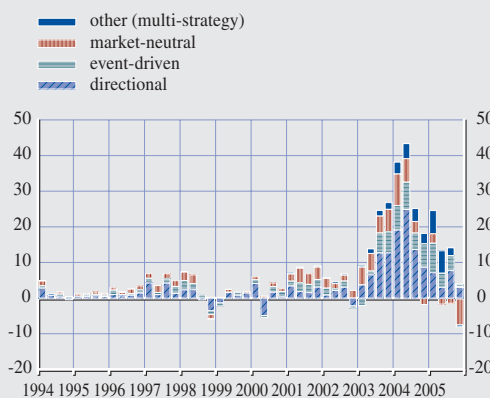
(Q1 1996 - Q3 2005, USD billions)



Source: BIS.

Chart S73 Global hedge fund net flows

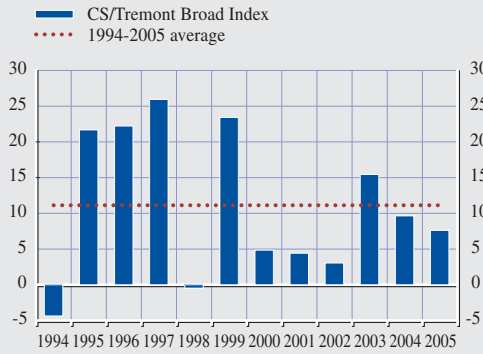
(Q1 1994 - Q4 2005, USD billions)



Source: Tremont Capital Management.
Notes: Excluding funds of hedge funds. Directional group includes long/short equity hedge, global macro, emerging markets, dedicated short bias and managed futures strategies. Market neutral group consists of convertible arbitrage, fixed income arbitrage and equity market neutral strategies.

Chart S74 Annual global hedge fund returns

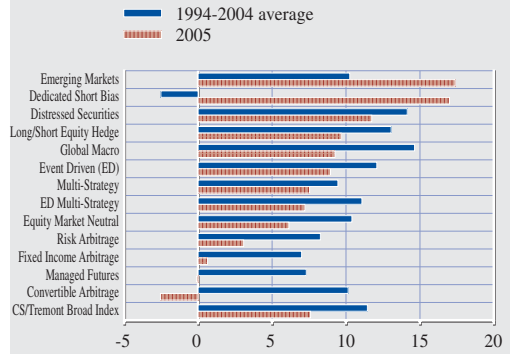
(1994 - 2005, %, in USD terms, net of all fees)



Sources: Credit Suisse Tremont Index and ECB calculations.

Chart S75 Annual global hedge fund returns by strategy

(%, in USD terms, net of all fees)



Sources: Credit Suisse Tremont Index and ECB calculations.

ISSN 1830201-7



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