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Financial Stability Review

December 2004

The **Financial Stability Review** aims:

- to encourage informed debate on financial stability issues, domestically and internationally
- to survey potential risks to financial stability
- to analyse ways of promoting and maintaining a stable financial system

Essential information

The *Financial Stability Review* is available as a complete document in pdf format, together with additional information about the Review, on the Bank of England's website: www.bankofengland.co.uk. The *Financial stability themes and issues* section is at: www.bankofengland.co.uk/fsr/themesandissues.htm and the *Financial stability conjuncture and outlook overview* is at: www.bankofengland.co.uk/fsr/overview0412.pdf.

The Bank also now occasionally publishes papers on financial stability themes on its website; they can be found at: www.bankofengland.co.uk/fsr/financialstabilitypapers.htm. The papers may subsequently be included in whole or in part in the next *Financial Stability Review*.

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Financial Stability Review

December 2004

- | | | |
|---|--|--|
| <p>3 Financial stability themes and issues</p> <p>7 The financial stability conjuncture and outlook</p> <p>74 Strengthening financial infrastructure</p> <p>86 Continuous Linked Settlement (CLS) and foreign exchange settlement risk
David Sawyer, Market Infrastructure Division, Bank of England</p> <p>93 Securities settlement systems: assessing their relative riskiness
Will Kerry, Market Infrastructure Division, Bank of England</p> | <p>99 Collateral posting decisions in CHAPS Sterling
Kevin James and Matthew Willison, Market Infrastructure Division, Bank of England</p> <p>105 Collective Action Clauses (CACs): an analysis of provisions included in recent sovereign bond issues (summary)
John Drage and Catherine Hovaguimian, International Finance Division, Bank of England</p> <p>107 Financial instrument accounting
Sir Andrew Large, Deputy Governor, Financial Stability, Bank of England</p> | <p>112 Bank stability and transparency
Erlend Nier, Financial Industry and Regulation Division, Bank of England</p> <p>119 Assessing risks from UK non-bank financial sectors
Matthew Corder, Financial Industry and Regulation Division, Bank of England</p> <p>127 Risk appetite: concept and measurement
Prasanna Gai and Nicholas Vause, Financial Stability Assessment Division, Bank of England</p> |
|---|--|--|





themes and issues

There has been little sign of major credit risks crystallising since the June *Review* and financial market conditions have also been relatively benign. As the main firms and sectors within the UK financial system, and the internationally active financial firms to which they are exposed, generally remain robust, the threats to financial stability in the short run remain subdued. But the continuing rapid build-up of debt by many borrowers and the aggressive ‘search for yield’ by some market participants may be building up vulnerabilities for the longer term. The factors contributing to systemic risk are discussed in the Bank of England’s regular assessment of the *Financial stability conjuncture and outlook*.

In the event that credit, market or liquidity risks materialise, the system-wide consequences depend partly on the scope for contagion via counterparty and other relationships, including exposures that may exist as a result of payment and settlement arrangements. The regular article *Strengthening financial infrastructure* reports progress on a range of initiatives to reduce the risks of spillovers, but focuses, in particular, on two topics. First, the future reform of prudential regulation: the completion of the text of the new ‘Basel II’ framework for capital standards is a major landmark, but further work is required, notably on how regulation should evolve to reflect the development of credit risk transfer markets and other innovations that enable credit risk to be traded. While banks increasingly hold such assets in their trading books, there is a question as to the underlying liquidity of markets for these products in stressed conditions. Second, ‘tiering’ – where some firms make use of financial infrastructures via member firms rather than via direct membership themselves – can give rise to credit, legal, operational and liquidity risks as well as some benefits to participating firms. The article explores the pros and cons in the context of the United Kingdom’s main financial infrastructures.

Just as some banks prefer not to be direct members of domestic payment and settlement systems, David Sawyer’s article *Continuous Linked Settlement (CLS) and foreign exchange settlement risk* shows that some financial intermediaries have chosen not to participate directly in CLS, a system launched two years ago to help reduce settlement risk in the foreign exchange market. Although volumes and values of transactions settled in CLS have continued to grow, over half of global foreign exchange settlement still appears to be taking place outside CLS, especially for transactions involving non-bank financial institutions such as

themes and issues



hedge funds. Central banks and supervisors have made clear their interest in how banks manage the counterparty risks to which they are potentially exposed in such transactions. The authorities continue to monitor whether enough has been done to reduce foreign exchange settlement risk, and to consider what further steps may be necessary.

Financial stability risks also arise in connection with the settlement of securities transactions. In *Securities settlement systems: assessing their relative riskiness*, Will Kerry reviews the types of risk entailed and proposes a method for assessing how important the systems in various countries are from the perspective of the UK financial system. Not surprisingly, the UK system, CREST, heads the list, but those of several other countries could have a material impact too. The UK authorities, therefore, have an interest in ensuring that adequate minimum requirements for mitigating risks continue to be met by major systems around the world. To this end, they will, for example, participate in the work to implement the standards recently developed by the Committee of European Securities Regulators and the European System of Central Banks.

The smooth functioning of payments systems – especially large-value payments systems – is a particularly important aspect of financial stability. In *Collateral posting decisions in CHAPS Sterling*¹, Kevin James and Matthew Willison investigate why banks that are members of CHAPS Sterling, the main domestic UK large-value payments system, tend to post more collateral with the Bank of England than usually needed to support their payment activities. They argue that it is likely to reflect the fact that the cost to members of being unable to make a payment is high relative to the cost of posting collateral. The benefit for financial stability is that, even if individual banks do face temporary operational difficulties making payments, others are likely to have sufficient liquidity available for the rest of the system to continue to function smoothly.

Financial stability authorities can help align the incentives facing financial market participants with the public policy objective of reducing threats to the stability of the financial system as a whole. For example, they can promote appropriate financial market conventions, encouraging market practice to converge on arrangements that promote systemic stability. In *Collective Action Clauses (CACs): an analysis of provisions included in recent sovereign bond issues*,² John Drage and Catherine Hovaguimian review progress on one such initiative, to promote a more orderly framework for restructuring sovereign debt when necessary. The paper, summarised in this *Review*, observes that the widespread

(1) Published first on the Bank website on 2 November 2004 at www.bankofengland.co.uk/fsr/fsr17art8.pdf

(2) Published first on the Bank website on 2 November 2004 at www.bankofengland.co.uk/fsr/fsr17art9.pdf

adoption of majority amendment provisions is welcome progress. The paper identifies a number of further innovations that could contribute to financial stability, in particular: the appointment of a bondholder representative; clauses permitting the aggregation of majority action provisions over a number of different bond issues; and more explicit collective action provisions in syndicated loans.



Sir Andrew Large, the Bank of England's Deputy Governor for Financial Stability, has recently emphasised the part that well-designed accounting standards play in maintaining financial stability. In a speech to the thirteenth City of London Central Banking Conference, reprinted here, he argues that, in looking in the longer term towards a revision of IAS 39 (a standard dealing with financial instruments), it might be helpful to seek a shared understanding about who and what accounts are for; whether, and if so how, fair value measures can be accommodated alongside historic cost measures; and the implications of a wider application of fair values for the volatility of accounting results. This theme is also touched on in *Strengthening financial infrastructure*, which makes the point that prudential regulation and accounting standards need to evolve in parallel if the benefits of financial innovation are to be fully realised.

The debate about accounting standards is, in part, a debate about the transparency of a firm's financial affairs. In the wake of the various financial crises around the world in the 1990s, several bodies – notably the IMF and the Basel Committee on Banking Supervision – have called for increased transparency of banking firms. The idea is to provide market incentives for banks to manage their risks more prudently. But is transparency necessarily beneficial when a bank is already under stress? In *Bank stability and transparency*, Erlend Nier looks at empirical evidence to consider how, on balance, bank transparency affects the probability of severe systemic problems. He argues that banks that disclose more information in their annual accounts are less at risk and, hence, a regime of enhanced transparency should help reduce the incidence of banking failure. The so-called 'Pillar 3' disclosures by banks under the Basel II framework could, therefore, contribute further to financial stability.

Erlend Nier's article focuses on banks, which, in general, are the intermediaries most likely to give rise to systemic risk. But non-bank financial sectors can also affect UK financial stability adversely. In *Assessing risks from UK non-bank financial sectors*, Matthew Corder outlines the various channels through which problems might be transmitted: via disruption to non-banks' provision of financial services to households, counterparty exposures, non-banks' activities in capital markets and effects on confidence. Focusing on UK-resident firms as an example, he identifies the sectors with the greatest potential to threaten the

themes and issues



Financial Stability Review
December 2004

stability of the UK financial system, and suggests that they are: securities dealers; building societies; life insurers and pension funds; so-called non-bank 'other finance providers'; and general insurers.

Whatever the sector, individual financial institutions are likely to be more vulnerable to shocks, with potential systemic spillover effects, if – all other things equal – their appetite for risk increases. 'Risk appetite' is frequently cited as a key factor driving broad trends in asset prices. And rapid changes in the willingness of investors to bear risk can generate strong correlations among the prices of seemingly unrelated assets, greatly exacerbating market risk. This has been the underlying concern behind the discussion of the search for yield in recent *Reviews*. *Risk appetite: concept and measurement*, by Prasanna Gai and Nicholas Vause, reviews the concept and measurement of risk appetite, suggesting a precise definition that might usefully be adopted more widely. The article explores the analytical basis of risk appetite, distinguishes it from 'risk premia' and 'risk aversion', and proposes a way of measuring it. It also reviews a number of other measures used by financial market commentators and practitioners. Further work is needed to improve the way in which risk appetite is measured, but the preliminary findings reported in the article seem to suggest that risk appetite has been high recently.

The financial stability conjuncture and outlook

An overview of UK financial stability: threats and resilience 9

1	Credit risk	14
	Credit risk: key points	14
	Introduction	15
1.1	UK household sector credit risks	17
1.2	UK corporate credit risks	24
1.3	The United States	29
1.4	Europe	34
1.5	Japan	40
1.6	Emerging market economies	42
2	Risks in the international financial system	49
	Risks in the international financial system: key points	49
2.1	International financial markets	50
2.2	Hedge funds and leverage	57
2.3	Major financial institutions	58
2.4	Implications for the UK financial system	60
3	UK financial sector resilience	65
	UK financial sector resilience: key points	65
3.1	The large UK-owned banking sector	66
3.2	UK non-bank financial sectors	71
3.3	Links between financial institutions	71



The financial stability conjuncture and outlook

An overview of UK financial stability: threats and resilience

The past six months have been a relatively benign period for UK financial stability. Credit losses suffered by the large UK-owned banks have been small and new provisions have declined (Chart 1). Nor have there been significant pressures on liquidity or solvency in the international financial system. In general, asset prices have been less volatile than usual and most major equity markets have risen somewhat.

The immediate prospects for both the UK and international financial systems also appear broadly favourable, with major economies unlikely to experience marked falls in growth and yield curves suggesting that sharp increases in borrowers' interest payments are not anticipated. Market indicators of credit risk and expected interest rate volatility (Chart 2) are consistent with this near-term outlook.

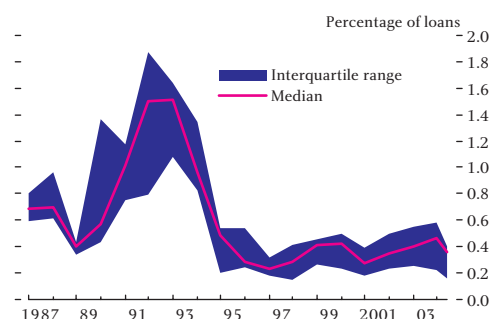
However, financial stability authorities focus on downside risks rather than the most likely outlook, because they attempt to identify potential threats to stability. In that light, there are three main reasons for vigilance.

First, globally, doubts about the sustainability of the current pattern of capital flows have increased, with downward pressure on the US dollar and rising uncertainty about future exchange rate movements – and about their consequences for interest rates, asset prices and activity. That may affect the market risks faced by financial institutions and, over a longer time horizon, the creditworthiness of borrowers in any countries where growth slows sharply.

Second, market indicators may partly reflect a greater appetite for risk. The intensification of the 'search for yield' noted in recent *Reviews* continues to pose risk management challenges, not least because it may have led some financial institutions to build up positions in what could prove to be relatively illiquid assets.

Third, the increase in unsecured debt for many UK households, the rapid rise in lending to the commercial property sector and

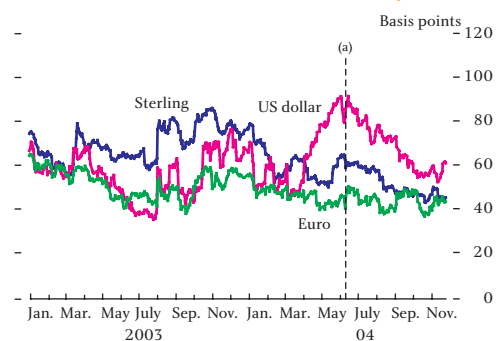
Chart 1
Large UK-owned banks' new provisions for bad and doubtful debts^(a)



Sources: Thomson Financial Datastream, published accounts and Bank calculations.

(a) New provisions charge for bad and doubtful debts in the P&L account as a percentage of loans to customers (including finance leases) and banks.

Chart 2
Short-term interest rate uncertainty^(a)

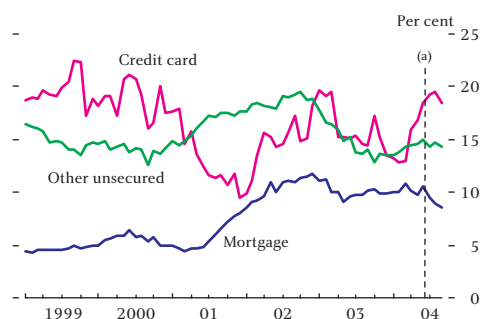


Sources: LIFFE, Chicago Mercantile Exchange and Bank calculations.

(a) Six-month volatilities implied from at-the-money options on three-month interest rate futures.

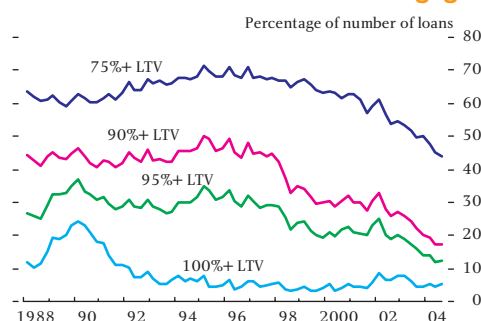
(b) June 2004 *Review*.

Chart 3
Annual growth of large UK-owned banks' lending to individuals



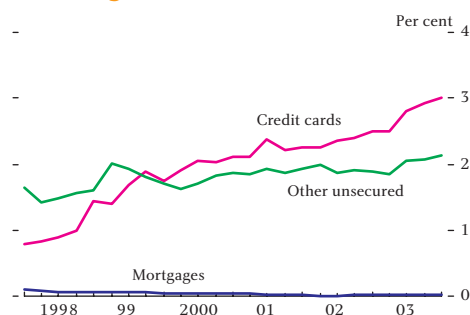
Source: Bank of England.
(a) June 2004 Review.

Chart 4
Loan-to-value ratios on new UK mortgages



Source: Council of Mortgage Lenders.

Chart 5
UK-owned banks' annualised write-off rates on lending to UK individuals^(a)



Source: Bank of England.
(a) Adjusted to reflect one bank's change in accounting method.

signs of higher leverage in some parts of the international financial system suggest a rise in longer-term vulnerabilities. Lenders and borrowers may underestimate these vulnerabilities because at the moment the near-term risks seem low.

Credit risk and the accumulation of debt

The contrast between low near-term risks and heightened longer-term vulnerabilities is evident when the credit risk facing the UK financial sector is considered.

Domestic mortgages are the single largest category of exposures of the major UK-owned banks, which have been expanding mortgage lending at a considerably faster rate than the growth in households' disposable income (Chart 3). In the near term, given the prospects for incomes and employment, default rates on this lending are likely to remain low. And banks continue to benefit from substantial collateral, thanks to falls in loan-to-value ratios on new lending (Chart 4) and past rises in house prices.

However, unsecured lending has recently been increasing even more rapidly than lending secured on property (although its level remains considerably lower). It is not clear that credit pricing has taken due account of the upward drift in banks' write-off rates on unsecured lending (Chart 5); on the contrary, the spread between the effective interest rate charged and banks' funding costs has fallen further since the June 2004 Review, perhaps because of increased competition. Although banks have continued to improve credit-scoring models and stress tests, these techniques have yet to be tested by a period of pronounced economic strain. If, in such a period, lenders attempted to lower risk by making it much more difficult or expensive for borrowers to roll over their unsecured lending, wider repayment problems might be precipitated.

Credit risk from UK companies appears subdued in the near term. Sterling corporate bond spreads have fallen a little since the June 2004 Review, and estimates of the probability of corporate default have generally declined, reflecting rises in corporate profitability and equity prices in most sectors.

Nonetheless, while corporate capital gearing has continued to fall, it remains high by the standards of the past twenty years (although its equilibrium level in a low inflation environment is uncertain). In contrast to 2002, when firms were repairing balance sheets by cutting back on dividends, lowering capital expenditure and refinancing debt, the recent easing in corporate gearing has largely reflected financial surpluses and the increase in the market value of corporate assets.

Over half the new corporate lending in the year to September 2004 was to the commercial property sector

(Chart 6), and the sector now accounts for over a third of the outstanding stock of lending to UK non-financial firms. That raises the issue of whether lenders are sufficiently diversifying their UK corporate credit risk. Property yields have continued to decline (including relative to other returns), and, in the light of recent weak rental growth and high vacancy rates, it is unclear whether investors' expectations of rental income will be met.

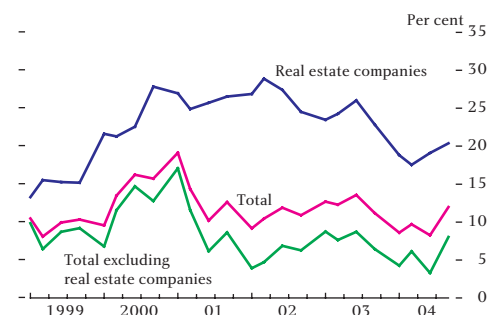
The major UK-owned banks have continued to increase their exposures to other economies. If the major economies perform in the near term as most forecasters expect, credit risks on these exposures are likely to remain moderate. World economic growth has been very strong this year and, as a result, there have been few pressures on domestic banking systems. The picture in the euro area is perhaps less encouraging than elsewhere, given the downward revisions to expectations for GDP growth and concerns about the possible impact of dollar depreciation. And some parts of the German banking system have been finding it difficult to sustain increases in profitability. But for most continental European banks, profitability and capital remain satisfactory (Chart 7). In the United States, the high and increasing indebtedness of the household sector is perhaps of less concern than might first appear, because a much higher proportion of household debt is at low long-term fixed rates than in the United Kingdom. On the corporate side, the general outlook seems to have improved, but some large, highly indebted companies with big pension and health care liabilities, notably in the airline and automobile industries, still appear to be under strain (Chart 8).

As far as the emerging-market economy (EME) exposures of the UK financial system are concerned, despite the rise in oil prices and uncertainty about China's growth prospects, market confidence in EME credit prospects appears to have strengthened. Sovereign spreads (Chart 9) have fallen considerably since their peak in autumn 2002, and by more than would be suggested by ratings agencies' upgrades. Low funding costs have encouraged strong foreign currency issuance of bonds and syndicated loans this year, especially by EME companies.

The international financial system and the 'search for yield'

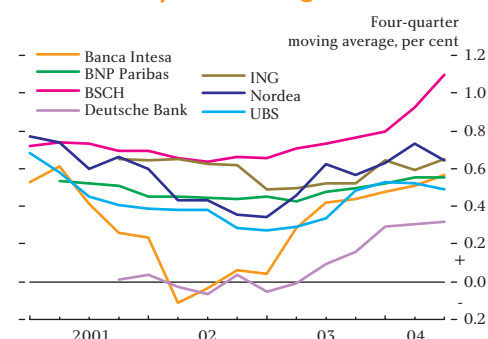
In the past six months, the downside risks in the international financial system highlighted in the June 2004 *Review* have not materialised. The increases in official US interest rates to date, from their lowest point in over forty years, were well signalled and have not triggered the sharp upward shift in market yield curves that some had feared. And asset price volatility has been low. But given this background, it has remained difficult to find investments with the prospective returns that many investors still expect, and so the 'search for yield' has been continuing.

Chart 6
Annual growth of large UK-owned banks' lending to non-financial companies



Source: Bank of England.

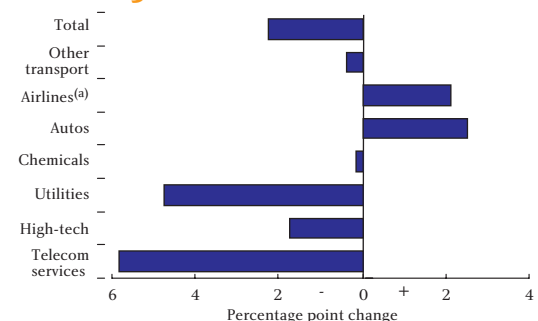
Chart 7
Return on assets for the largest banks in selected European banking sectors^{(a)(b)}



Sources: Bloomberg and Deutsche Bank company reports.

- (a) Rate of return on assets, defined as annualised net income divided by total assets.
- (b) Deutsche Bank and ING series start at 2001 Q4, because of reporting changes and exceptional non-operating items respectively. BNP Paribas reports assets on a half-yearly basis; assets are assumed to remain unchanged from previous half-yearly levels in the intervening quarters.

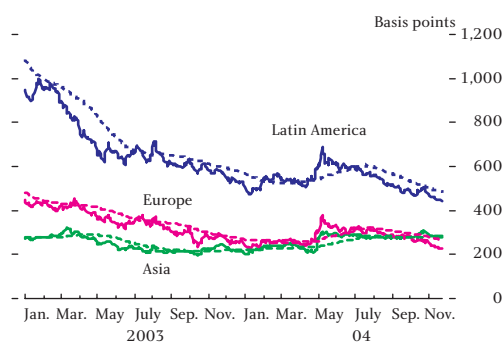
Chart 8
Change in capital gearing of US non-financial corporate sectors, end-2002 to end-2003



Sources: Standard and Poors' Compustat and Bank calculations.

- (a) Excludes UAL and US Airways.

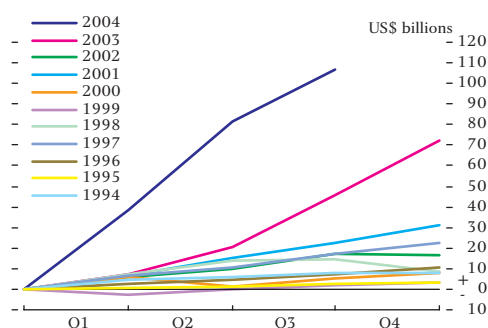
Chart 9
Emerging-market sovereign bond spreads^(a)



Source: JP Morgan Chase & Co.

(a) Dotted lines indicate 60-day moving average.

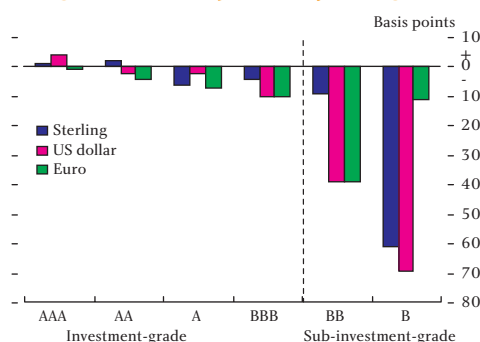
Chart 10
Cumulative flows of capital into hedge funds^(a)



Source: TASS Research.

(a) Figures are based on the TASS hedge fund database, which currently contains 3,023 reporting and 2,036 non-reporting funds.

Chart 11
Changes in credit spreads by rating^{(a)(b)}



Sources: Merrill Lynch and Bank calculations.

(a) Spread over swaps.

(b) Changes since June 2004 Review.

It has taken various forms, including continuing substantial flows of investors' funds into hedge funds (Chart 10), carry trades of different sorts, the rapid development of more complex structured credit products and the growth of the leveraged loan and high-yield debt markets. These activities have permitted greater portfolio diversification but have also entailed increases in gearing for some borrowers and more leveraged assets for some investors. Spreads on corporate debt, especially at the high-yield end, have narrowed further (Chart 11), as have those on emerging-market debt, and some debt covenants have been relaxed. Concerns have arisen that risk may be being underpriced in capital markets, potentially leading to an over-accumulation of risky exposures. Measures of uncertainty in financial markets suggest a mixture of lower perceived risks in the near term and a greater willingness to take on risk, but in what proportion is unclear. It is, perhaps, significant that some market contacts have expressed misgivings at the scale of investor demand for risky and potentially illiquid assets. Unexpected economic developments could trigger the attempted simultaneous unwinding of common positions, possibly leading to strains on market liquidity.

Many large complex financial institutions (LCFIs)¹ are developing new lines of business, in response to the low margins in many well-established financial markets and subdued demand for traditional investment banking services. For example, structured credit markets are expanding rapidly. The combination of relative novelty and dependence on complex pricing models poses risks in such markets. Some LCFIs have reportedly been expanding energy and commodity trading and prime brokerage activity for hedge funds. Against the backdrop of generally high rates of return on equity (Chart 12) and substantial capital, the risks in the short run to the LCFIs themselves appear to remain low, despite the litigatory challenges that highlight reputational risks that could, if they crystallised, threaten some lines of business. But, in the longer run, the vulnerability of LCFIs to unexpected market developments, including episodes of illiquidity or dislocation, may be increasing, enhancing the importance of appropriate stress testing and scenario planning.

The resilience of the UK financial system

Overall, then, the current environment facing the UK financial sector appears favourable, but downside risks remain, particularly in the light of the build-up of debt and the continuing 'search for yield'. If these risks were to crystallise in the near term, the robust profitability and capital of the major UK-owned banks should help to contain any potential systemic impact. These banks' return on equity generally increased in the first half of this year, with both cost-income ratios and new

(1) These firms are active globally in a wide range of capital markets and activities, often including banking, securities dealing, prime brokerage and insurance services.

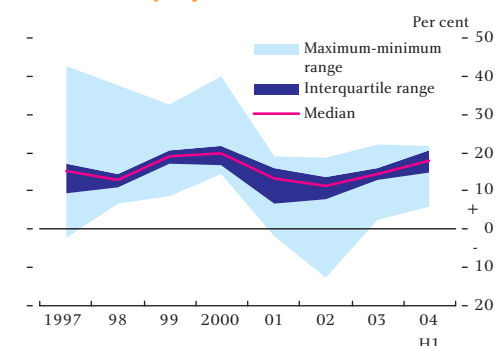
provisions falling. And reported total and Tier 1 capital ratios rose marginally, remaining well above regulatory minima (Chart 13). The continuing need to fill the gap between customer deposits and lending by raising funds in highly liquid wholesale markets has increased the importance of liquidity management, but the indications are that banks' liquidity buffers are adequate. In the financial system outside the banking sector, there are also few signs of stress; even in the life insurance industry, where pressures remain, profitability has been improving. However, in the longer term, the falling share of net interest income (Chart 14) suggests that the major banks may be increasing their dependence on potentially more volatile sources of income. And interest margins, particularly on unsecured lending to households, are narrowing.

In the light of the longer-term challenges set out above, the use of a wide range of scenarios in banks' stress tests is desirable, including combinations of possible adverse shocks to profits, credit quality and market liquidity, and the exit of key counterparties from markets. Quantitative risk modelling is becoming more widespread, which should prove helpful, but such models are largely untested by major periods of stress and may not take full account of feedbacks from the banking system to asset prices and the broader economy.

Both prudential regulation and accounting standards must keep pace with financial innovation and its implications for systemic risk. In the article *Strengthening financial infrastructure* below, credit risk transfer markets are identified as one area where that is becoming more pressing, and appropriate work is under way. The article also discusses some risks associated with a 'tiered' payment structure. The high-value CHAPS Sterling system has relatively few banks as direct members. Non-member banks use the CHAPS Sterling system indirectly through correspondent relationships with direct members, thereby potentially increasing inter-bank exposures. The Bank's recent proposed reforms to its operations in the sterling money markets should encourage a range of UK banks and building societies, in addition to the current direct members of CHAPS Sterling, to hold reserve accounts at the Bank. The Bank hopes that some of these institutions, particularly those with significant sterling payment flows, will also choose to become direct members of CHAPS Sterling. The article also explores whether similar risks arise from clearing and settlement arrangements between direct and indirect participants in other infrastructures important to UK wholesale financial markets – such as CREST, LCH.Clearnet Ltd and the Continuous Linked Settlement System (CLS). This is an area where the Bank intends to do further work.

Chart 12

Return on equity for LCFIs^(a)

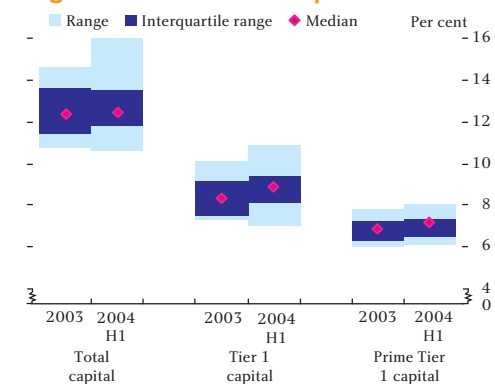


Sources: Earnings releases and Bank calculations.

(a) Net income divided by average shareholders' equity, annualised for 2004 H1.

Chart 13

Large UK-owned banks' capital ratios^{(a)(b)}



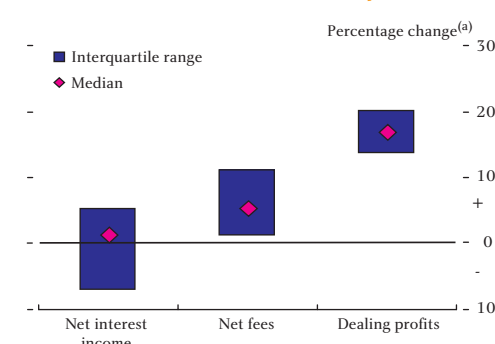
Sources: Published accounts, FSA regulatory returns and Bank calculations.

(a) Percentage of risk weighted assets.

(b) Prime Tier 1 includes ordinary shares, associated reserves and retained earnings.

Chart 14

Changes in selected components of large UK-owned banks' income, 2004 H1



Sources: Published accounts and Bank calculations.

(a) Annualised percentage change from year-end 2003 to 2004 H1.

1 Credit risk: key points

Near-term risks to the UK financial sector from direct and indirect exposures to household, corporate, and overseas borrowers have, on the whole, changed little since the previous *Review*. Although the immediate prospects for UK financial stability are broadly favourable, some areas of longer-term vulnerability remain as a result of which credit risks could rise significantly if the macroeconomic environment were to weaken:

- The continuing rapid growth in debt means that the UK household sector has become increasingly sensitive to any adverse shocks to employment income. Given the MPC's central forecast for output growth over the next two years, benign labour market conditions are likely to limit pressures on debt servicing. But if the macroeconomic outlook were to become significantly weaker, credit risks might increase, particularly on unsecured debt;
- The non-financial corporate sector remains, in aggregate, profitable and able to weather the consequences of sudden shocks (such as the sharp rise in the price of oil). Nevertheless, capital gearing remains high, suggesting that firms are more vulnerable to unfavourable events than on average over the past. Pension fund deficits have continued to contribute to financial pressures for some firms, and there are signs that financial strength may not extend across the whole of the corporate sector – a significant number of (mainly smaller) firms made operating losses during 2003. Banks' recent domestic corporate lending has been highly concentrated in the commercial real estate sector, where property yields have continued to decline, and it is possible that some investors may have underestimated the risks associated with this lending;
- Debt-servicing difficulties arising overseas may place pressures on the UK financial system through the significant international exposures of UK-owned banks. The economic outlook in the major overseas economies is largely favourable, although higher oil prices and downward revisions in forecasts for GDP growth in 2005 in the United States and Europe could contribute to weaknesses in some balance sheets – for instance, there is some evidence of fragility in the aviation and motor industries. Household debt-to-income ratios have also risen in the United States and parts of continental Europe, increasing households' vulnerability to adverse shocks in these countries. In the event of further rises in the price of oil, higher world interest rates or a sharper-than-expected slowdown in economic activity in China, there is a risk that the economic outlook for emerging market economies (EMEs) could also weaken, though market confidence in EME credit prospects appears to have strengthened and central forecasts for global growth are still favourable.

The UK banking system remains well placed in the face of these credit risks. Mortgage arrears continue to decline and loan-to-value ratios on new mortgages have been reduced further since the June 2004 *Review*. Unsecured lending to UK households and lending to the UK corporate sector, both of which appear somewhat riskier than mortgage lending, still only constitute a relatively small part of UK banks' lending activities. Risks from international credit exposures also appear moderate. But there remains the possibility that lenders and borrowers may be underestimating the longer-term vulnerabilities highlighted above, at a time when the immediate operating environment appears benign.

1 Credit risk

On-balance-sheet credit risk is a key part of any assessment of the risks to UK financial stability, given the size of the financial sector's exposures to household, corporate and sovereign borrowers (see Box 1). New provisions set aside by the large UK-owned banks against bad and doubtful debts have remained low (Chart 1.1). Most other major banking systems have also been benefiting from relatively low losses on their lending portfolios, as the later sections of this chapter illustrate.

The recent low level of banks' provisions reflects the favourable macroeconomic environment, which has lowered credit risk by boosting households' income and raising corporate profits.¹ Output growth is expected to be robust in the large UK-owned banks' major markets in 2004,² and to be slightly stronger than had generally been anticipated at the time of the June 2004 Review (Chart 1.2).

Credit risk has also been affected by the unexpected rise in the oil price (Chart 1.3). As discussed in the August and November *Inflation Reports*, the aggregate impact of oil price increases on firms' costs and profitability, and world output growth, is unlikely to be as great as that of the 1970s oil price shocks; in real terms, prices are lower and the oil intensity of production in OECD countries has fallen. However, higher oil and commodity prices may affect the distribution of credit risk across both companies and countries. For example, higher oil prices may benefit a small number of oil-producing countries, while reducing the incomes of a larger number of net oil importers (see Chapter 1.6).

UK and US short-term interest rates rose in 2004; this might have increased the pressures on some borrowers, despite the pickup in growth. But past experience suggests that a given change in the level of interest rates tends to have a smaller impact on UK banks' provisions than a similar change in output growth,³ and the debt-servicing burden for many borrowers has been lightened by the low level of short-term interest rates in large UK-owned banks' major markets. Short-term interest rate expectations for 2005 in the United Kingdom, United States and euro area have all fallen since the June 2004 Review. And, in the case of the United Kingdom, market participants now expect short-term rates to remain broadly unchanged. Ten-year US-dollar, euro and sterling government bond yields have all fallen since the June 2004 Review.

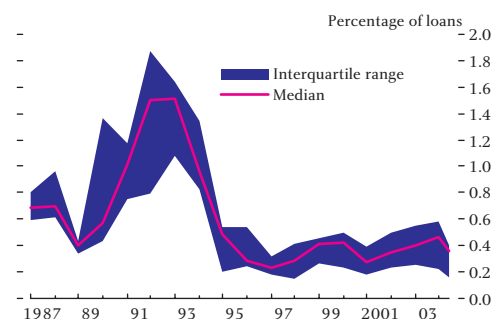
(1) Banks' provisions are typically backward-looking and thus follow the cycle of credit losses. See Jackson, P and Lodge, D (2000), 'Fair Value Accounting, Capital Standards, Expected Loss Provisioning and Financial Stability', Bank of England *Financial Stability Review*, June.

(2) In June 2004, claims on UK residents accounted for 61% of large UK-owned banks' assets, euro-area residents 9%, US residents 14% and other countries 16%.

(3) See Hoggarth, G and Pain, D (2002), 'Bank provisioning: the UK experience', Bank of England *Financial Stability Review*, June.

Chart 1.1

Large UK-owned banks' new provisions for bad and doubtful debts^(a)

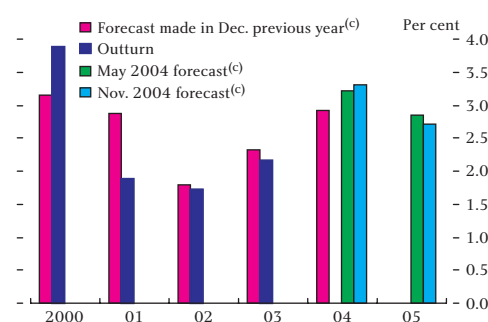


Sources: Thomson Financial Datastream, published accounts and Bank calculations.

(a) New provisions charge for bad and doubtful debts in the P&L account as a percentage of loans to customers (including finance leases) and banks.

Chart 1.2

Real GDP growth^(a): United Kingdom, United States and selected euro area^(b)



Sources: Consensus Economics Inc, OECD and Bank calculations.

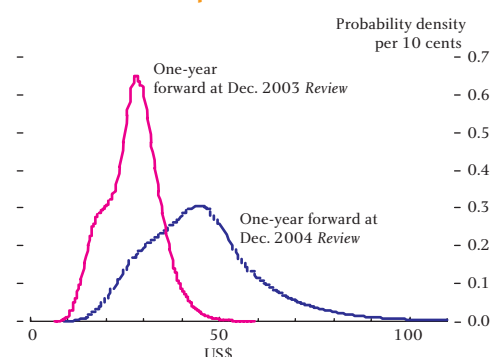
(a) Weighted by large UK-owned banks' claims on those countries in June 2004.

(b) Ireland, Netherlands, Spain, France, Italy and Germany.

(c) Consensus forecasts.

Chart 1.3

Implied probability density functions for crude oil futures prices^{(a)(b)}

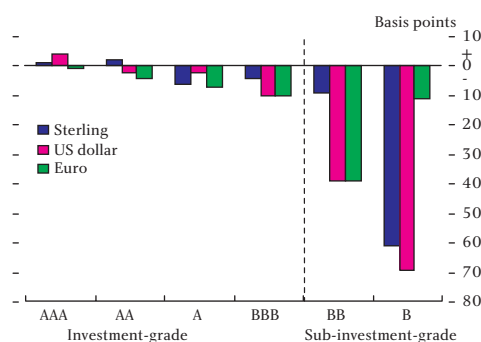


Sources: New York Mercantile Exchange, Bloomberg and Bank calculations.

(a) Risk-neutral distributions derived from options prices for West Texas Intermediate.

(b) Oil price at the Dec. 2003 Review was US\$30. Oil price at Dec. 2004 Review was US\$49.

Chart 1.4
Changes in credit spreads by rating^{(a)(b)}



Sources: Merrill Lynch and Bank calculations.

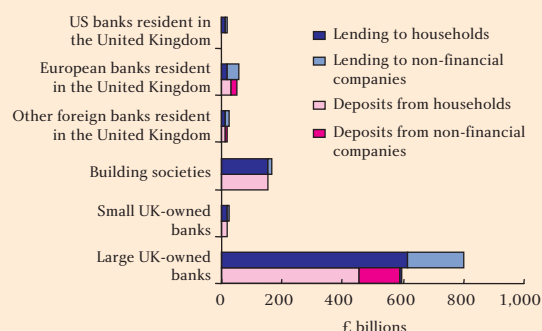
(a) Spread over swaps.

(b) Changes since June 2004 *Review*.

Market indicators point to lower corporate credit risk. With the exception of Japan, equity indices in the major industrial economies have increased over the past six months. Credit default swap premia have mainly fallen since the June 2004 *Review* and corporate bond spreads have declined (Chart 1.4), with the improvements greatest for sub-investment-grade companies and borrowers in emerging markets. Although that may partly reflect investors' higher risk appetite (see Chapter 2), corporate bond default rates have declined, suggesting that there has been some improvement in fundamentals. Rating agency assessments have pointed in the same direction, with upgrades outnumbering downgrades over the period. The remainder of this chapter considers the major factors affecting near-term credit risk.

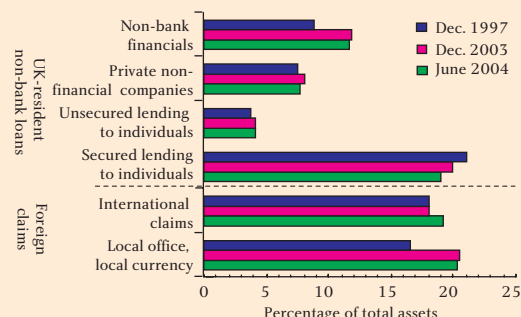
Box 1: The large UK-owned banking sector

Chart A
UK-resident financial institutions' UK-based lending and deposit-taking activities, as at September 2004



Source: Bank of England.

Chart B
Composition of large UK-owned banking sector's total assets^(a)



Sources: Bank of England and FSA regulatory returns.

(a) Domestic exposures are net of securitisations.

While more than 400 banks and building societies operate in the United Kingdom, ten large banking groups undertake the majority of UK households' and companies' banking activities (Chart A). The ten largest banking groups by total assets are: Abbey, Alliance & Leicester, Barclays, Bradford & Bingley, HBOS, HSBC Holdings, Lloyds TSB, Northern Rock, RBS Group and Standard Chartered. Throughout this *Review*, these banks are described as the large UK-owned banking sector. Unless otherwise stated, charts include data for these banking groups' subsidiaries prior to merger or acquisition, while figures for demutualised building societies are included from the date that data became available.

By type of borrower, households and non-financial companies in the United Kingdom and abroad together constitute the major part of the large UK-owned banking sector's collective on-balance-sheet exposures (Chart B). Overseas exposures account for around 40% of the total assets of the sector, although there is considerable variation across institutions. Foreign claims have increased in recent years through acquisitions by UK-owned banks of foreign financial institutions, especially in the United States. Since the June 2004 *Review*, cross-border links have been further strengthened by the Spanish-owned bank, Banco Santander, acquiring the sixth largest UK-owned bank by total assets, Abbey, in November.¹

(1) Abbey has been retained in the peer group of large UK-owned banks used in this *Review*, given that the acquisition occurred after the period of the latest financial results (2004 H1). The June 2005 *Review* will revisit the criteria used to select a peer group of banks for UK banking sector surveillance.

1.1 UK household sector credit risks

For most large UK-owned banks, lending to households is the largest single component of their domestic loan portfolio. On average, it makes up around 76% of their loans to UK-resident households and private non-financial companies, and 23% of their total assets. Any assessment of the risks to banks from the household sector needs to consider both the nature of banks' exposures to the sector and the extent of financial pressures on households.

The exposures of large UK-owned banks

Secured lending

The annual growth of large UK-owned banks' mortgage lending remained rapid in 2004 H1 (Chart 1.5). At around 10%, it considerably exceeded the growth rate of nominal GDP. Since mid-year, there has been a slowdown in mortgage lending for house purchase. Buy-to-let lending has continued to grow particularly quickly, but nevertheless still makes up only 7% of aggregate mortgage exposures.¹

Unsecured lending

The large UK-owned banking sector's unsecured lending has continued to grow even faster than their secured lending during the second half of 2004 (Chart 1.5). Despite its faster rate of growth, unsecured lending still makes up only 18% of large UK-owned banks' lending to UK-resident individuals (Chart 1.6). Nevertheless, with growth rates exceeding those for secured lending for the past five years, unsecured lending to UK households is becoming a more substantial proportion of the large UK-owned banking sector's exposures. Given that many characteristics (such as loss given default, 'draw-down' behaviour and pricing) of unsecured lending are different to those of secured lending, the risk management challenges facing banks are also gradually changing.

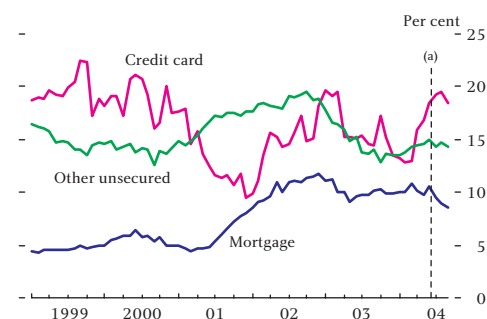
Financial pressures on households

Growth of debt

Households' total borrowing from all banks and other lenders has increased even more rapidly than their borrowing from the large UK-owned banks. Total borrowing growth has remained close to an annual rate of 15% this year (Chart 1.7), raising households' debt to 140% of aggregate income (Chart 1.8). This is above the levels in the United States and most large European countries. But whether this leaves UK households more vulnerable than elsewhere to future adverse shocks depends on how debt is distributed in different countries across households

Chart 1.5

Annual growth of large UK-owned banks' lending to individuals

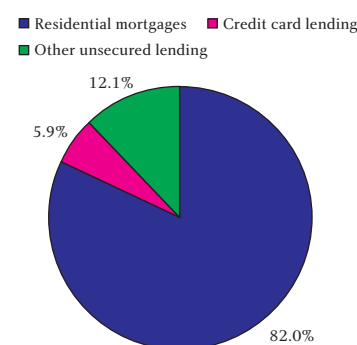


Source: Bank of England.

(a) June 2004 Review.

Chart 1.6

Large UK-owned banks' stock of lending to UK individuals^(a)

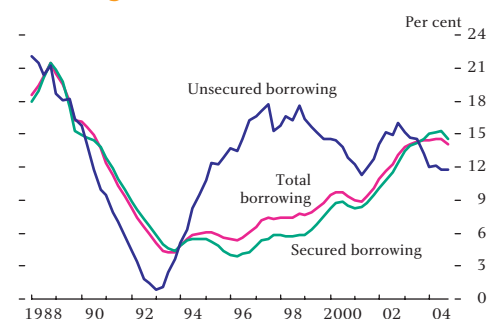


Sources: Bank of England and published accounts.

(a) Sep. 2004.

Chart 1.7

Households' secured and unsecured borrowing^{(a)(b)}



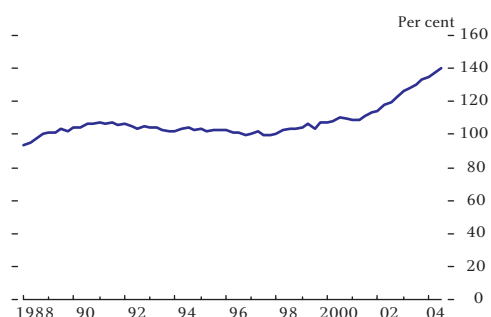
Source: Bank of England.

(a) Data are seasonally adjusted and quarterly.

(b) Twelve-month growth rate.

(1) See 'Box 1: The buy-to-let mortgage market' in the June 2004 Review, page 20.

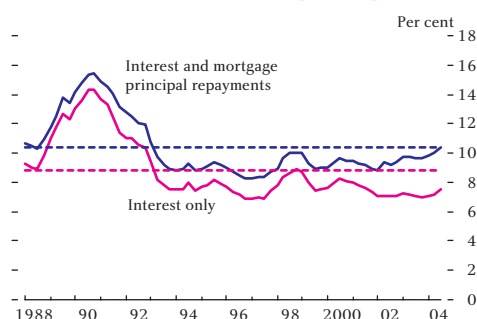
Chart 1.8
Ratio of household sector debt to income^{(a)(b)(c)}



Sources: ONS and Bank calculations.

- (a) Percentage of annualised post-tax income.
- (b) Debt equals total liabilities.
- (c) Debt data are not seasonally adjusted.

Chart 1.9
Household sector income gearing^(a)



Sources: ONS and Bank of England.

- (a) Dashed lines indicate averages from 1988 Q1 to 2004 Q2.

subject to different financial pressures, and on the responses of the relevant financial systems to such shocks.¹

UK households' borrowing growth is likely to remain strong over the next few years, partly because the aggregate level of debt is likely to continue to adjust to the recent rise in house prices relative to income.² The boost to borrowing would, however, be less strong – or could even be reversed – if housing market turnover or prices were to fall substantially. Aggregate debt would also be increased if the upward trend in the number of mortgage borrowers continues. In the past few years, this increase has mainly reflected the rising number, and smaller average size, of households.³

In aggregate, the growth of debt has been accompanied by an increase in financial assets, reflecting both gross saving and equity price gains. However, these assets are unlikely to be available to the most vulnerable households, as they tend only to have a small amount of financial wealth.⁴

Debt affordability

Income gearing, which provides an indication of the burden faced by the household sector as a whole in servicing its debt, picked up modestly during the first half of 2004 (Chart 1.9). Households' average effective borrowing rate increased further in Q3, reflecting the latest interest rate changes. This is likely to have caused a further rise in gearing.

The increase in mortgage interest repayments is likely to have been more abrupt for those households for whom short-term fixed-rate mortgage contracts have recently expired.⁵ The current average standard variable rate is about two percentage points higher than the average two-year fixed-rate product that was available two years ago. Given market expectations for interest rates, a household whose fixed-rate mortgage contract expires over the next year is also likely to experience a mortgage rate increase. Similarly, the interest rate on some households' 'annual review mortgages' may increase on the next review date.

(1) Higher aggregate debt can also signal an improvement in welfare. Households may have been able to maintain consumption during temporary periods of lower income, or to match expectations of higher future income. Or they may have been able to use debt to purchase expensive durable goods and housing. See Hancock, M and Wood, R (2004), 'Household secured debt', *Bank of England Quarterly Bulletin*, Autumn.

(2) Slow adjustment occurs because only a relatively small proportion (averaging 10% over the past thirty years) of the housing stock changes hands each year. See Hamilton, R (2003), 'Trends in households' secured debt', *Bank of England Quarterly Bulletin*, Autumn.

(3) The increase in the number of households is likely to have raised the aggregate level of debt because there has been no offsetting reduction in the average dwelling (and thus, potentially, mortgage) size.

(4) See Cox, P, Whitley, J and Brierley, P (2002), 'Financial pressures in the UK household sector: evidence from the British Household Panel Survey', *Bank of England Quarterly Bulletin*, Winter.

(5) In 2002, 23% of new mortgages were taken out at a fixed interest rate, with this proportion rising to 36% in 2003.

Changes in aggregate default risk also depend on changes in the repayment difficulties associated with a given level of income gearing. As discussed in Box 2, the proportion of households reporting mortgage payment problems has fallen by about two thirds since the early 1990s, largely because households are less likely to report a problem for a given level of mortgage payments relative to income.

Income and unemployment

Previous research has found that income shocks were the largest single determinant of household debt difficulties in the early 1990s.¹ So it is reassuring that labour market conditions remain benign. Whole-economy earnings grew by 3.7% in the year to 2004 Q3. Unemployment is low, at only about half its early 1990s level (Chart 1.10). And inflows into unemployment have also fallen, reducing the number of households experiencing a sudden loss of employment income. As discussed in the November *Inflation Report* (page 41), the MPC expects the employment rate to increase marginally over the next two years, with wage growth probably rising.

House prices

The increase in house prices in recent years has strengthened the financial position of many homeowners by increasing their capacity to refinance debts.² Reflecting this, a recent survey³ found that 40% of mortgage holders agreed with the statement, “My house value has risen so much that I do not worry about other debts I may have”. Over half those sampled had remortgaged, with a number of these having taken the opportunity to consolidate other debts. Overall, 56% of households reported looking to save money on monthly payments when remortgaging.

As discussed in the November *Inflation Report* (pages 6–7), the outlook for house prices remains uncertain. Any sustained fall in prices would reduce homeowners’ cushion of housing equity. This might reduce their opportunity to remortgage to consolidate other debts or to lower their monthly payments. Financing difficulties would be exacerbated if any fall in house prices were accompanied by a wider economic slowdown, although the MPC’s November central projection is for output growth to be close to trend. Any fall in house prices might also increase the financial pressures associated with buy-to-let borrowing if it were accompanied by a reduction in rental values.

Chart 1.10

Unemployment: level and inflows^(a)

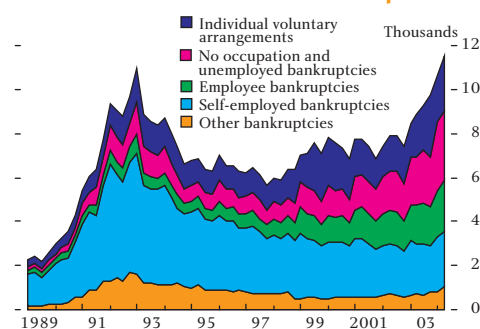


Source: ONS.

- (a) Unemployment rate data are annual between 1989-92. Data are monthly from Apr. 1992.
- (b) Claimant count inflows.
- (c) LFS measure.

Chart 1.11

Personal insolvencies and bankruptcies^{(a)(b)(c)}



Source: DTI.

- (a) Data are for England and Wales. Data are quarterly and not seasonally adjusted.
- (b) Individual voluntary arrangements include Deeds of Arrangement.
- (c) Other bankruptcies includes directors and promoters of companies and those whose occupation is unknown.

(1) See Coles, A (1992), ‘Causes and characteristics of arrears and possessions’, *Council of Mortgage Lenders Housing Finance*, No. 13, pages 10-12.

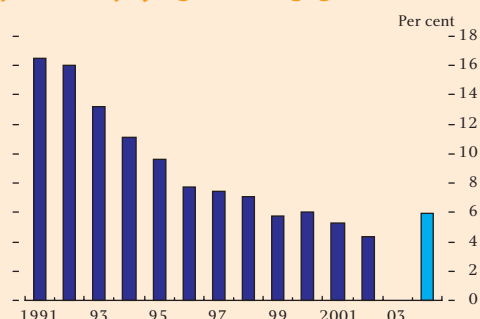
(2) But increasing house prices raise the cost of housing services, and any gain for those trading down will be offset by the corresponding extra outlay for households that are trading up or buying for the first time. See November 2004 *Inflation Report*, pages 12–13.

(3) Market research conducted by Bradford and Bingley in March 2004.

Box 2: Households' perception of their mortgage burden

Chart A

Proportion of households reporting problems paying for mortgage



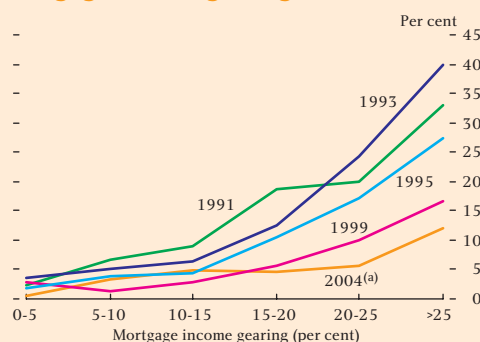
Sources: BHPS (1991-2002), Bank/NMG (2004) and Bank calculations.

Median monthly mortgage payments have eased from 15% of households' income in 1991 to 13% in 2004.¹ Yet the proportion of households reporting problems meeting these payments has fallen by about two thirds over this time (Chart A).²

Examination of the distribution of mortgage payment problems by mortgage income gearing³ reveals two key stylised facts (Chart B). First, households with higher gearing are more likely to report payment problems; in 2004, households with gearing over 25% of income were about twice as likely to report problems as those with lower gearing. Second, over the past decade, households have become less likely to report payment problems for any given level of gearing. This reduction has been particularly pronounced at high gearing levels.

Chart B

Proportion of households reporting problems paying for mortgage by level of mortgage income gearing



Sources: BHPS (1991-2002), Bank/NMG (2004) and Bank calculations.

(a) Because of a smaller sample size for the 2004 survey, the results have been averaged with those for 2002 to reduce sampling volatility.

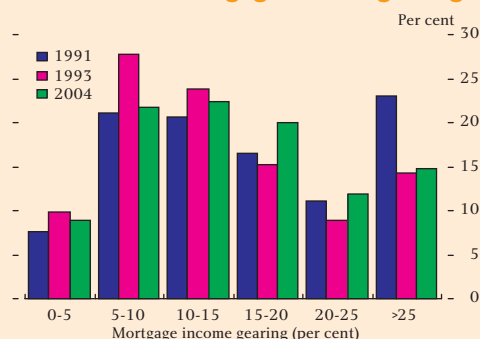
Shift-share analysis⁴ reveals that the reduction in the proportion of households reporting problems between 1991 and 1993 was largely due to the decline in the fraction of households with high gearing (Chart C), reflecting the reduction in interest rates.

In contrast, the (larger) reduction in mortgage payment problems since 1993 is more than accounted for by households being much less likely to report problems for any given level of income gearing. Over this time, the distribution of gearing across households has changed relatively little, while there is now less difference in the proportion of reported payment problems among households with different gearing levels.

Households' greater tolerance of a given level of mortgage income gearing may be associated with a number of factors, including: steady economic and wage growth; the fall in unemployment (and inflows into unemployment); lower and less volatile nominal interest rates and inflation; and the increase in house prices which (for most homeowners) has raised housing equity. Of course, should some of these factors change, the burden of debt might increase.

Chart C

Distribution of mortgage income gearing



Sources: BHPS (1991-2002), Bank/NMG (2004) and Bank calculations.

- (1) Data from the British Household Panel Survey (BHPS) for 1991 to 2002, and a special survey commissioned by the Bank and conducted by NMG Research in September 2004.
- (2) In contrast, the fraction of households reporting that their unsecured debt is a heavy burden has changed little since 1995.
- (3) Defined as a household's total mortgage cost as a percentage of their income.
- (4) Aggregate changes in reported payment problems over time are decomposed into changes in the probability of each group (i) reporting problems (P_i) and changes in each group's weight in the total (W_i). Groups are defined on the basis of mortgage income gearing.

$$\Delta \sum_i P_{i,t} W_{i,t} = \sum_i \Delta P_{i,t} \frac{(W_{i,t} + W_{i,t-1})}{2} + \sum_i \Delta W_{i,t} \frac{(P_{i,t} + P_{i,t-1})}{2}$$

Personal insolvencies

Personal insolvencies have continued to rise this year, and are now above their early 1990s level (Chart 1.11), despite a fall in bankruptcies amongst the self-employed (which probably reflects the benign business environment discussed in Chapter 1.2). Although unemployment has fallen substantially since the early 1990s (and there has been no increase in inactivity), the unemployed and inactive now account for twice as many bankruptcies as they did in the early 1990s. Any future pickup in unemployment might therefore be accompanied by a larger increase in the overall personal insolvency rate than it would have done in the past.

The rise in insolvencies has largely reflected an increase in debtor, rather than creditor, petitions for bankruptcy (Chart 1.12). This may have been partly due to the implementation of the Enterprise Act (2002) on 1 April 2004,¹ which changed the penalties associated with most bankruptcies in England and Wales. But that seems unlikely to be the whole story; these penalties remain high and there has been a similar increase in insolvencies in Scotland over the past few years, where the legal regime has remained unchanged (Chart 1.13).

Risks to large UK-owned banks

Secured lending

Backward-looking indicators continue to show little sign of stress on the UK-owned banking sector's secured lending. New provisions for bad and doubtful debts, for example, at around 0.35% of total loans, remain low, which is broadly consistent with what might have been expected given the macroeconomic environment.² Mortgage arrears and write-offs remain at or near historical lows (Chart 1.14). And while mortgage possessions have increased in recent months, this has been from a low base.³

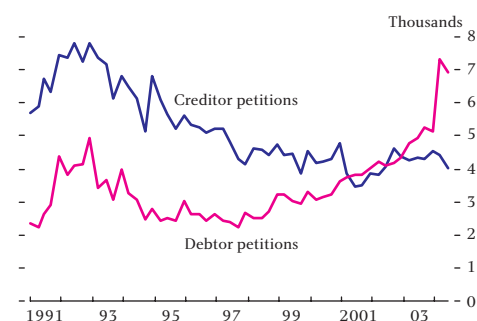
Forward-looking indicators of risk, such as spreads on mortgage-backed securities (MBS) and demand for MBS issues, show little sign of investor concern. However, these indicators should be interpreted with caution, given that spreads on MBS can be influenced by factors other than the underlying quality of the assets, such as the way in which the issue has been structured. Lack of secondary market liquidity means that it is difficult to monitor developments in MBS spreads.

(1) The Enterprise Act reduced the period for automatic discharge of most bankrupts, while increasing it for those whose conduct is deemed to have been irresponsible or reckless.

(2) Based on the simple model in Hoggarth, G and Pain, D (2002), 'Bank provisioning: the UK experience', Bank of England *Financial Stability Review*, June.

(3) The increase in possession orders may be associated with recent changes to bankruptcy legislation that have limited the period in which a bankrupt's home may be possessed to three years. Previously there was no time limit.

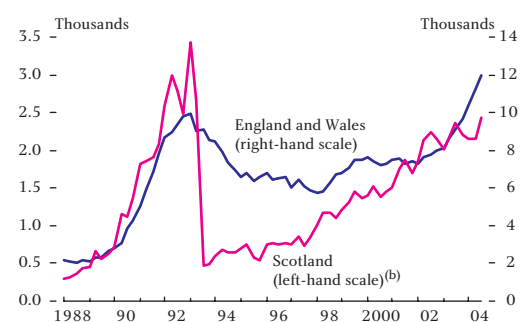
Chart 1.12
Bankruptcy petitions in England and Wales^{(a)(b)}



Source: Department for Constitutional Affairs Judicial Statistics.

- (a) Number of bankruptcy petitions registered does not necessarily sum to number of bankruptcy orders made.
(b) Data are quarterly and not seasonally adjusted.

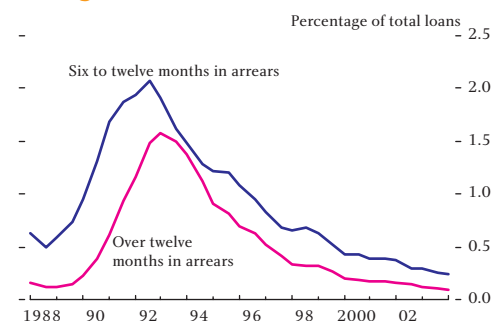
Chart 1.13
Personal insolvencies^(a)



Sources: DTI, Accountant in Bankruptcy and Bank calculations.

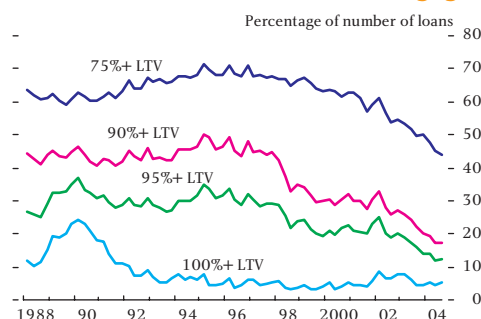
- (a) Includes bankruptcies and individual voluntary arrangements for England and Wales, and sequestrations and protected trust deeds for Scotland. Data are quarterly.
(b) The timing of insolvencies in the early 1990s may have been distorted by the introduction of the Bankruptcy (Scotland) Act in Apr. 1993.

Chart 1.14
UK lenders' arrears on domestic mortgage lending



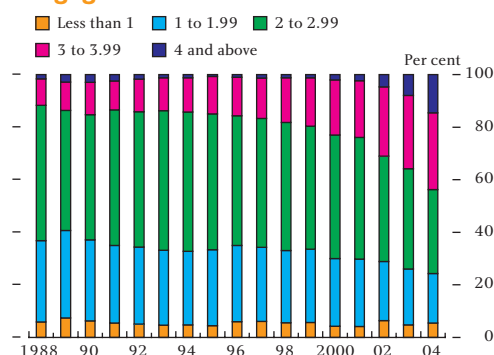
Source: Council of Mortgage Lenders.

Chart 1.15
Loan-to-value ratios on new UK mortgages



Source: Council of Mortgage Lenders.

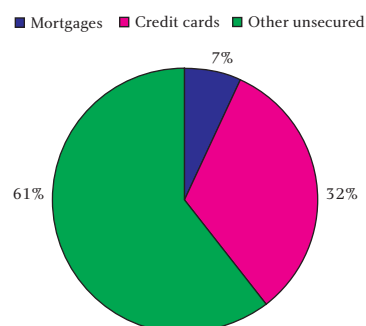
Chart 1.16
Loan-to-income multiples on new UK mortgage advances^(a)



Source: Council of Mortgage Lenders.

(a) Excludes lending for which loan-to-income ratios are not known.

Chart 1.17
Breakdown of UK-owned banks' write-offs on lending to UK individuals^{(a)(b)}



Source: Bank of England.

(a) From Oct. 1997 to Sep. 2004.

(b) Adjusted to reflect one bank's change in accounting method.

Even were defaults to rise, large UK-owned banks would not necessarily face material losses, because mortgage lending is backed by collateral. Average loan-to-value (LTV) ratios on new lending continued to fall during 2004 H1, and are now considerably lower than in the late 1980s (Chart 1.15). The mean and distribution of LTV ratios on the total outstanding mortgage stock are less easy to measure, though they are a more appropriate indicator of the risk to banks. Many large UK-owned banks report mean LTV ratios in their published accounts, and these tend to be in the region of 40 to 50%. This accords with a special survey of households commissioned by the Bank and conducted by NMG Research in September 2004, in which 45% of mortgage debt was held by households where the current LTV was 50% or above, and 16% of mortgage debt where the LTV was 70% or above. LTV ratios on mortgage portfolios should, however, be interpreted with some caution. In a scenario where there was a market-wide fall in the value of housing collateral, any widespread attempt by banks to realise its value could put further downward pressure on house prices.

The risk of loss to banks will be greater if mortgage lending with high LTV ratios has been concentrated amongst borrowers under financial pressure. In processing information from a sample of lenders, the FSA tracks and categorises new mortgage lending with both high LTV ratios and high loan-to-income (LTI) ratios – the latter being one indicator of financial pressure on households (Chart 1.16). In 2004 Q2, the proportion of new lending falling into the combined medium and higher risk categories had moved a little ahead of the fairly narrow range within which it had fluctuated over the past couple of years. However, over a longer horizon, evidence from the Survey of Mortgage Lenders and The British Household Panel Survey suggests that in recent years fewer households than in the late 1980s have high debt repayment commitments but little collateral to offer.¹

Unsecured lending

Unsecured lending is always likely to incur proportionally higher loss given default than is secured lending, given the absence of collateral or guarantees. Indeed, although unsecured lending makes up only 18% of large UK-owned banks' lending to UK-resident individuals, it has been responsible for 93% of write-offs on such lending in the past seven years (Chart 1.17). However, the overall profitability of banks' unsecured lending depends on whether the risks they face have been reflected in the interest rates and fees charged to borrowers.

(1) Hancock, M and Wood, R (2004), 'Household secured debt', *Bank of England Quarterly Bulletin*, Autumn.

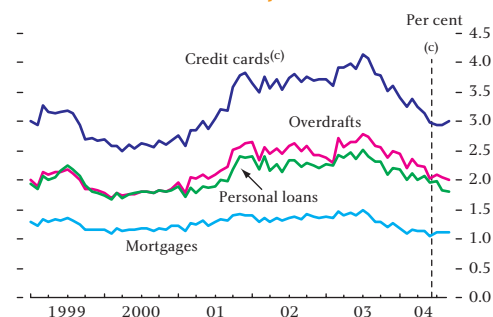
The spread between effective interest rates on unsecured lending and banks' cost of funds has continued to fall since the June 2004 *Review* (Chart 1.18). Market contacts attribute this to strong competition between unsecured lenders, illustrated by the increase in zero-interest credit card offers (Chart 1.19).¹ The downward trend in unsecured lending spreads should, however, be interpreted with caution. The average level of effective interest rates on credit cards, for example, still remains high relative to that on secured lending. Furthermore, some unsecured lending, such as personal loans, is undertaken in conjunction with fee income.

Credit losses from unsecured lending have increased marginally since the previous *Review*. Annual write-off rates on credit cards rose to 3% in 2004 Q3, while rates on other unsecured lending rose to 2.1% (Chart 1.20). Some of the rise in write-offs on credit cards could be associated with the recent increase in personal insolvencies discussed above. However, bank contacts suggest that only around 5 to 20% of write-offs are related to bankruptcy, so that may only provide a part of the explanation. Despite their recent rise, write-off rates on large UK-owned banks' unsecured lending still remain below rates in some other countries, such as the United States and Hong Kong.

Looking forward, banks face a number of risk management challenges. One is managing the transition to the new personal insolvency law regime, which could have a long-lasting effect if it changes debtor behaviour and thus the sensitivity of write-offs to adverse macroeconomic shocks. Another is managing the implications of the strong growth in unsecured lending over the past five years (Chart 1.5), especially where this has occurred through lending to new customers for whom the bank has no past current account information with which to supplement a credit assessment. Lending to customers with multiple borrowing relationships may also pose a challenge when the bank does not have complete information about the evolution of a customer's total indebtedness over time.

Banks have been undertaking measures to strengthen their risk management in the face of such problems, for example, by studying the impact of changes in insolvency regimes in other jurisdictions, such as Australia and Hong Kong. Most UK banks already share some indicators of adverse credit history with other lenders, which helps address the challenge posed by multiple borrower relationships. Contacts suggest that indicators that confirm borrowers have a history of timely repayment could be shared more freely in future. In part encouraged by the introduction of Basel II, banks have also been developing their quantitative risk modelling techniques over recent years,

Chart 1.18
The large UK-owned banking sector's effective interest rate spread over Libor^{(a)(b)}



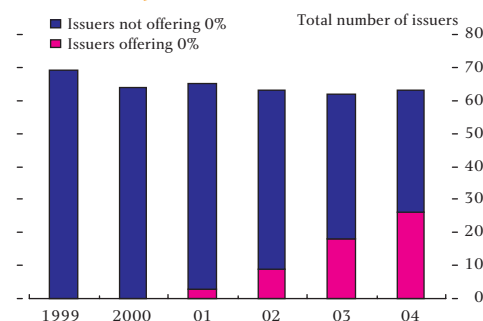
Source: Bank of England.

(a) Medians of average effective interest rates. Includes only interest-bearing balances.

(b) Using three-month Libor.

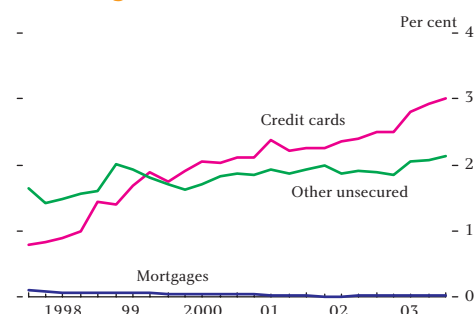
(c) June 2004 *Review*.

Chart 1.19
Prevalence of credit card issuers offering 0% interest periods



Source: Bank of England.

Chart 1.20
UK-owned banks' annualised write-off rates on lending to UK individuals^(a)

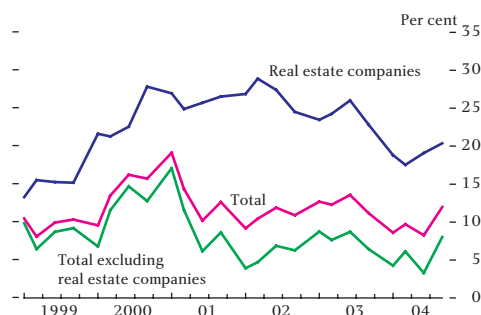


Source: Bank of England.

(a) Adjusted to reflect one bank's change in accounting method.

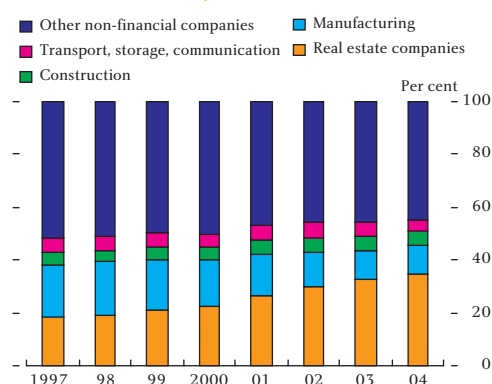
(1) The 2004 Bank/NMG survey found that about 7% of all unsecured debt is interest free. See May, O, Tudela, M and Young, G (2004), 'British household indebtedness and financial stress: a micro picture', *Bank of England Quarterly Bulletin*, forthcoming.

Chart 1.21
Annual growth of large UK-owned banks' lending to non-financial companies



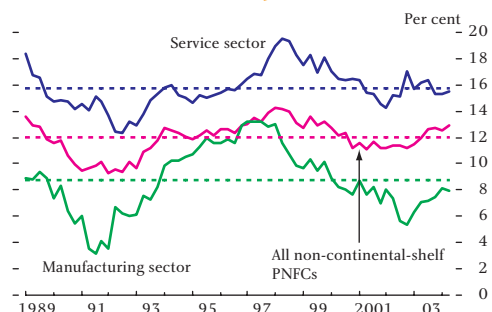
Source: Bank of England.

Chart 1.22
Large UK-owned banks' stock of lending to non-financial companies



Source: Bank of England.

Chart 1.23
Net rate of return on capital^{(a)(b)}



Source: ONS.

(a) Net operating surplus/net capital employed.

(b) Dashed lines indicate averages taken from 1989 Q1 to 2004 Q2.

including credit scoring models, which use micro-level information on individual borrowers, and stress tests, which model the implications of macroeconomic shocks. Many of these models, however, are yet to be tested by a period of actual economic stress.

If credit quality were to deteriorate, one response by banks could be to reduce their exposure to unsecured lending, by either cutting back on new lending or by raising interest margins. Although reducing lending could be an effective strategy for some individual banks, simultaneous action could exacerbate pressures on both borrowers and lenders.

1.2 UK corporate credit risks

Large UK-owned banks' lending to private non-financial companies (PNFC) represents around 8% of their total assets. Although lending to this sector accounts for only 24% of lending to UK-resident households and PNFCs, it has accounted for 35% of total domestic write-offs since 1997. Furthermore, over the past five years the volatility of write-off rates on lending to this sector has been higher than that for lending to individuals. Any evaluation of risks to banks from non-financial companies, as with risks from the household sector, will depend on both the nature of banks' exposures and the extent of financial pressures on the sector.

Exposures of large UK-owned banks

The growth of large UK-owned banks' new lending to UK non-financial companies increased to around 12% in the year to 2003 Q3. There has been considerable dispersion in growth across sectors: for example, the annual growth rate of lending to real estate companies is still rapid, at 20%, while that of lending to other non-financial companies is 8% (Chart 1.21).

Lending to real estate companies accounted for 55% of large UK-owned banks' new lending to non-financial companies in the year to September 2004, following a 65% contribution in 2003. As a result, this sub-sector now makes up around 35% of the stock of large UK-owned banks' lending to non-financial companies. This compares with around 10% for the manufacturing sector, for example (Chart 1.22).

Financial pressures on companies

Aggregate profitability

Corporate profitability continued to pick up over the first half of 2004. This partly reflected strong profits from UK Continental Shelf companies (oil producers), due to high oil prices. But average profitability amongst other companies also rose, with the net rate of return on capital remaining above its long-run average (Chart 1.23). Although positive, the mean expectation of profit

growth for 2005, as reported by Consensus Economics, is below its 2004 value, and has been revised down over the past year.

The strength of profits helped the corporate sector remain in financial surplus for the eighth successive quarter in 2004 Q2. Reflecting this, PNFCs' demand for external finance has been relatively weak for most of this time (Chart 1.24). Bank borrowing picked up in 2004 Q3, although bond issuance remained weak and there was a net repurchase of equity.

Disaggregated measures of profitability

Credit risk also depends on the distribution of profitability across firms, and whether there are any pockets of unusually high vulnerability. Data from UK companies' accounts reveal that the dispersion of quoted companies' profit margins has increased over much of the past twenty years (Chart 1.25). In 2003, 38% of quoted companies made a loss – similar to the rates in 2002 and 2001, but substantially above those prior to 1999 (Chart 1.26). But these are primarily small companies, accounting for about 14% of quoted non-financial companies' debt. And if non-quoted companies are also considered, the proportion of companies making a loss is close to its average since 1991. Also reassuring is that the proportion of firms that have reported so far in 2004 that made losses is fractionally lower than in 2003,¹ while profit warnings this year have been running a little below their levels over the previous three years.

Since the start of the year, movements in the FTSE All-Share index have only been weakly correlated with oil price changes. However, rising oil and commodities prices are likely to have had a more marked effect on some companies than others. For example, increased fuel costs have affected airlines, the share prices of which have fallen over the year to date.

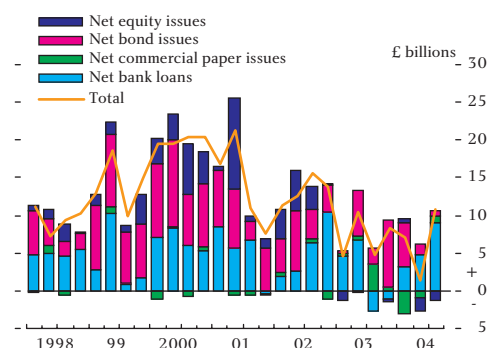
Capital gearing and balance sheet adjustment

The ratio of companies' debt to the market value of their assets – a measure of capital gearing – provides an aggregate indicator of the sustainability of their balance sheet position. Gearing has continued to ease in 2004 (Chart 1.27), reflecting the small fall in net debt and the increase in market values. However, by historical standards, gearing remains high and is also above the estimated 'equilibrium level' calculated in a recent Bank working paper.²

(1) Based on the results from 401 quoted companies that have so far published accounts for 2004, about a third of the final sample.

(2) The equilibrium level is calculated by offsetting the tax advantages of debt finance against the costs to the firm of financial stress, which becomes more likely at higher levels of debt. For more information, see Bunn, P and Young, G (2004), 'Corporate capital structure in the United Kingdom: determinants and adjustment', Bank of England Working Paper No 226.

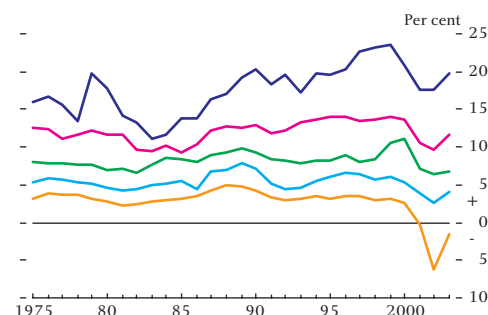
Chart 1.24
PNFCs' external finance^(a)



Source: Bank of England.

(a) Excluding securitisations and borrowing by PNFCs from non-resident monetary financial institutions. The components do not sum to the total in each quarter because the total has been seasonally adjusted independently.

Chart 1.25
Distribution of weighted profit margins of quoted PNFCs^{(a)(b)}

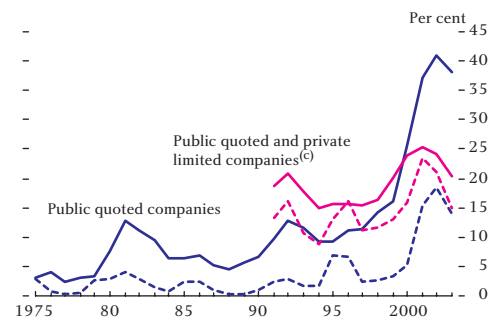


Sources: Thomson Financial Datastream and Bank calculations.

(a) Earnings before interest and taxes divided by turnover, sales weighted.

(b) 90th, 75th, 50th, 25th and 10th percentiles shown.

Chart 1.26
Percentage of companies making a loss^{(a)(b)}



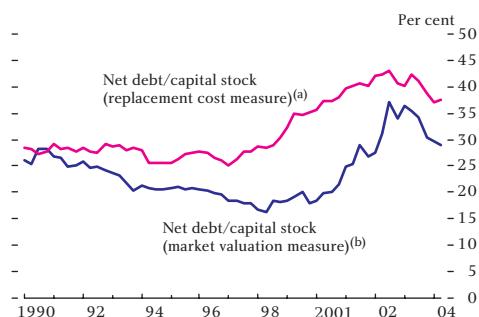
Sources: Bureau van Dijk, Thomson Financial Datastream and Bank calculations.

(a) Profit (loss) = earnings before interest and taxes.

(b) Solid lines are % of companies making a loss, dashed lines are % of debt owed by these firms.

(c) Sample includes all public quoted companies and private limited companies with over 100 employees.

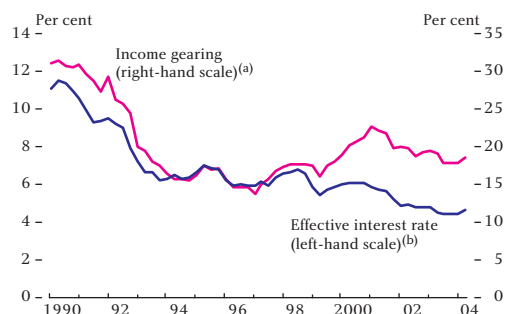
Chart 1.27
PNFCs' capital gearing



Sources: ONS and Bank calculations.

- (a) PNFCs' net debt divided by the total value of capital at replacement cost.
- (b) PNFCs' net debt divided by the market value of assets of UK-resident firms.

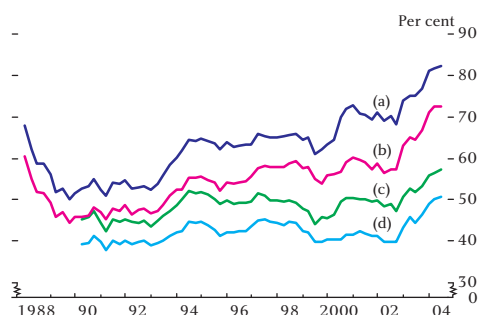
Chart 1.28
PNFCs' income gearing and effective interest rate



Sources: ONS and Bank calculations.

- (a) As measured by interest payments as a percentage of gross operating surplus.
- (b) As measured by annualised interest payments as a percentage of gross debt.

Chart 1.29
Indicators of corporate liquidity



Sources: ONS and Bank of England.

- (a) PNFCs' liquidity = (all currency deposits + money market instruments (MMIs) + bond assets)/(all borrowing – bonds issued – direct investment).
- (b) As (a) excluding holdings of MMIs and bonds.
- (c) As (a) but also dividing by bonds issued.
- (d) As (b) but also dividing by bonds issued.

There is little evidence that many firms are actively seeking to reduce gearing further by making cutbacks in dividends, lowering capital expenditure or refinancing debt. Although average dividend payments relative to GDP in the first half of 2004 were fairly low by historical standards (particularly given the strength of corporate profitability), the fraction of highly geared quoted companies cutting their dividend fell in both 2002 and 2003. Capital expenditure has recently been robust, growing by an average of 1.9% over the past three quarters. And, rather than repaying debt, there was a net buy-back of equities in 2004 Q3.

Consistent with this overall picture, the 2004 Q3 Institute of Directors survey revealed that a net balance of only 6% of companies believed that their gearing was too high. There also appears to be little pressure to reduce gearing from investors; on the contrary, corporate contacts suggest that there has been a rising appetite for debt relative to equity.

Pension fund deficits have continued to add to financial pressures for some companies. Adding these deficits to traditional balance sheet exposures increases the aggregate debt of FTSE 100 companies with defined-benefit pension schemes by 6%.¹ The size of these deficits has remained little changed over both the past year and since the June 2004 *Review*, as favourable equity price movements have been offset by upward revaluations to liabilities (reflecting a slight fall in the long-term interest rate used to discount future payments and an upward reassessment of life expectancy).

Debt servicing

High profitability, together with low average borrowing rates, has ensured that aggregate corporate income gearing remains relatively low (Chart 1.28). Liquidity ratios are at a record high (Chart 1.29), indicating that in aggregate companies have a significant buffer against any future adverse shocks. However, discussions with companies over the past year have suggested that liquidity may in some cases be higher than desired in the long run, reflecting the expense of repaying long-term borrowing, the lack of suitable investment opportunities or precautionary motives.

Market contacts have highlighted the increasing number of highly leveraged buyouts involving private equity firms. Given the current benign conditions, it is possible that some firms have underestimated the risks of high leverage. If so, that could cause some such deals to come under strain and thus possibly lead to a rise in debt restructuring.

(1) Bank of England calculations as at 1 November 2004.

Corporate insolvencies

The number of corporate insolvencies has continued to fall (Chart 1.30). Market contacts report that, in addition to reflecting the robust profitability of the corporate sector, this may also reflect an increased willingness of financial institutions to maintain credit to distressed firms.

The number of receiverships has declined in 2004, which could suggest that insolvencies will fall further.¹ However, this has been accompanied by an increase in administrations (Chart 1.31). The divergence between the two may partly reflect measures introduced by the 2002 Enterprise Act, which made it easier for firms in financial difficulties to enter administration. Although one aim of the Act was to provide incentives to maintain companies as going concerns, and to avoid unnecessary insolvencies, the increase in administrations over the past year is too small to explain much of the overall fall in insolvencies. For companies that remain solvent, administrations may nevertheless ultimately lead to write-downs of debt by banks.

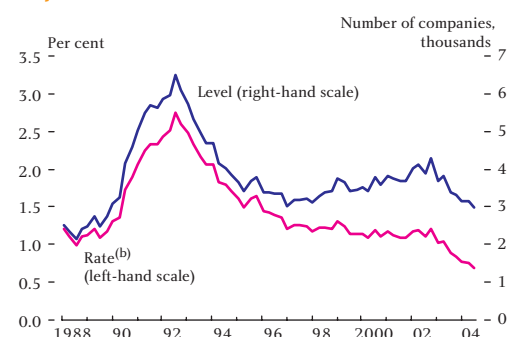
Market indicators of corporate prospects remain benign. Corporate bond spreads are low by historical standards. Equity prices have, in general, risen, both since the June 2004 *Review* and over the past year, and the dispersion in the distribution of equity returns for FTSE 350 companies is lower than on average, with significantly fewer companies suffering heavy equity price falls. Reflecting these positive developments, the likelihood of corporate default over a twelve-month horizon (as measured by models based upon leverage, equity prices and volatilities²) has declined further during 2004.

The commercial property sector

Commercial property companies' demand for finance remains strong. Their total borrowing from all UK banks grew by 17% in the year to 2004 Q3, unchanged from the previous quarter.³ This finance has partly been used to fund the purchase of property assets from companies, who subsequently lease them back ('sale and lease back'). The risks associated with this debt may be low if it is secured against the rental stream from good quality tenants. Nevertheless, quoted commercial property companies' capital gearing has increased over the past ten years, although it remains below the early 1990s high.

Strong investor demand continues to put upward pressure on commercial property prices. Market contacts argue that this has partly reflected better returns than from equities over the past

Chart 1.30
Corporate insolvencies^(a)

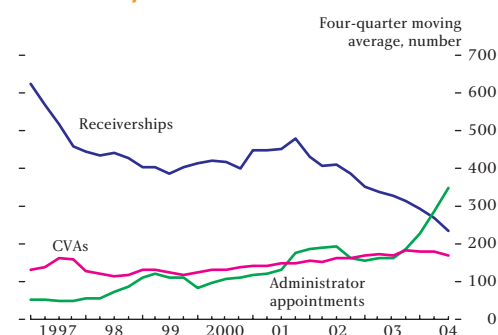


Source: DTI.

(a) Seasonally adjusted. Latest observation is for 2004 Q3 and is provisional.

(b) Ratio of insolvencies to average number of companies over the preceding year.

Chart 1.31
Administrator appointments, company voluntary arrangements (CVAs) and receiverships



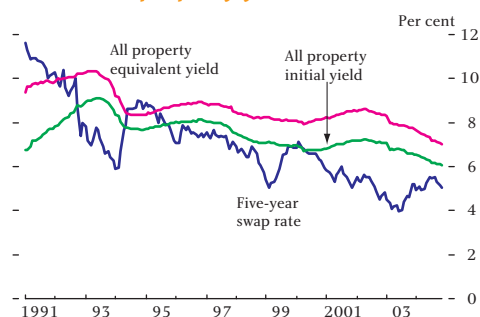
Source: DTI.

(1) Receiverships and Company Voluntary Arrangements turn into insolvencies if companies undergoing those proceedings fall into liquidation. The main aim of an administration is to rescue the firm as a going concern.

(2) See Tudela, M and Young, G (2003), 'Predicting default among UK companies: a Merton model approach', Bank of England *Financial Stability Review*, June.

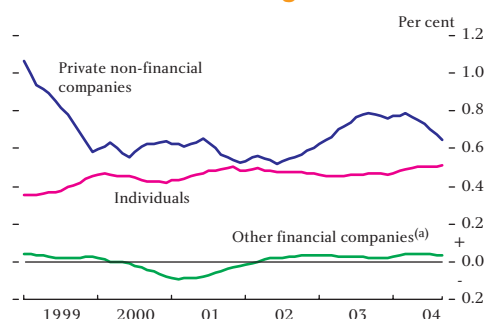
(3) Statistics are for real estate companies, including residential property developers.

Chart 1.32
Commercial property yields



Sources: Investment Property Databank and Bloomberg.

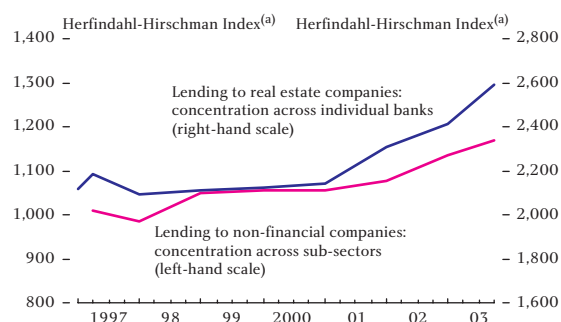
Chart 1.33
UK-resident banks' annualised write-off rates on domestic lending



Source: Bank of England.

(a) All financial companies which are not licensed as banks.

Chart 1.34
Concentration of large UK-owned banks' lending to non-financial companies



Source: Bank of England.

(a) The Herfindahl-Hirschman Index (HHI) is the sum of the squared market shares. A rise in the HHI indicates a rise in concentration.

decade and potential diversification benefits. Reassuringly, and in contrast to the early 90s, this demand has not translated into a high level of speculative, unlet, development.

Given recent weak rental growth and high vacancy rates, the increase in commercial property capital values has been accompanied by a reduction in yields (Chart 1.32), reducing the spread over money-market rates. Some lenders may have underestimated the risks associated with these loans: surveys point to a weakening in PNFCs' profits growth in 2005 and it is possible that investors' expectations of rental income and vacancy levels will not be met.

Risks to banks

Consistent with the fall in corporate insolvencies, the write-off rate on UK-resident banks' lending to PNFCs has fallen slightly since the June 2004 Review (Chart 1.33). According to the Finance Leasing Association, the fraction of balances in arrears has fallen during 2003 and 2004, suggesting that future write-offs may remain moderate.

Although backward-looking indicators show little sign of recent deterioration, increased concentration of lending to non-financial companies raises challenges for the future (Chart 1.34). In particular, lending to real estate companies accounts for a third of the large UK-owned banks' stock of lending to non-financial companies, compared with a fifth in 2000. This lending has also become increasingly concentrated amongst a small number of banks (Chart 1.34).

Commercial property lending provides little immediate cause for concern. Write-offs and arrears on existing lending in 2003 remained very low. And loan-to-value ratios on bank lending for new developments remained little changed between 2000 and 2003, at around 80%. The strength of 'sale and lease back' activity means that some of the growth in lending to real estate companies could merely have replaced lending to other types of non-financial companies. However, in some cases, banks may have credit exposures to both real estate companies and the corporate borrowers that are tenants. Also, the risks associated with unsecured lending to companies that have used property assets as collateral for other borrowing may have increased. Although the demand for commercial property investments is strong at present, any future fall in capital values could lead to breaches of loan-to-value covenants. That would reduce the degree of protection for banks' loans, although, in the absence of corporate defaults, losses may not crystallise.

1.3 The United States

Over the past few years, the United States has become an increasingly important source of business for UK-owned banks. By end-June 2004, claims¹ on the United States accounted for over an eighth of the assets of the large UK-owned banks, mostly via US branches and subsidiaries. US business is particularly important for Barclays, HBSC and the Royal Bank of Scotland (RBS), accounting for around a fifth of their total assets. Developments in the US household sector, in particular, are potentially important for the UK financial system. HSBC has a major presence in the US residential mortgage and credit card markets; while the completion in August of the acquisition of Charter One, a large US regional bank, further increased the importance to RBS of the US residential mortgage and unsecured consumer loan markets. By contrast, Barclays undertakes little lending to US households or companies, focusing its US operations on investment banking. More generally, developments in the US economy and financial sector are also important for UK financial stability because large US banks are major counterparties for the large UK-owned banks in both interbank and derivative markets.

US growth was slightly weaker than expected in 2004 Q2 and Q3, and Consensus forecasts for real GDP growth in both 2004 and 2005 have been revised down since the previous *Review*. Nevertheless, the recovery is expected to remain robust, which is likely to help US borrowers to continue to service their loans. Since the June 2004 *Review*, the Federal Open Market Committee (FOMC) has raised the Fed Funds rate by 100 basis points, but long-term interest rates have fallen by 60 basis points and there have been downward revisions to the expected path of official interest rates.

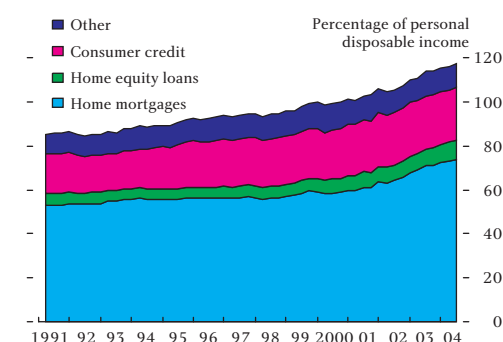
The private non-financial sector

The household sector

Household debt has continued to grow faster than disposable income, resulting in a further rise in the aggregate debt-to-income ratio (Chart 1.35). The growth in mortgage debt has remained rapid despite slowing somewhat in 2004 Q2. Home equity lending, particularly home equity lines of credit, continued to grow extremely rapidly, perhaps partly in response to the substantial rise in house prices over the past few years (Box 3). The growth of consumer credit has been fairly subdued since 2002, at least partly because of the high level of mortgage refinancing activity in the first half of 2003 (Chart 1.36). Although the household debt-to-income ratio is relatively high, the ratio of net worth to income is still higher than its average level in the 1990s.

Chart 1.35

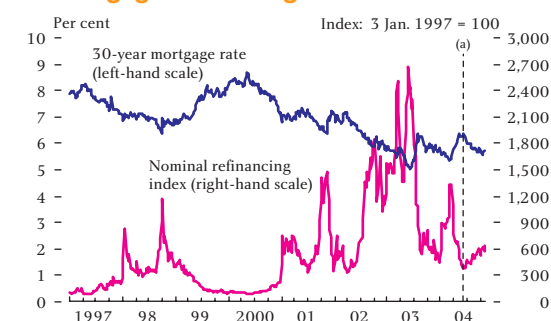
US household debt-to-income ratio



Sources: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2004 Q2, and Thomson Financial Datastream.

Chart 1.36

US mortgage refinancing

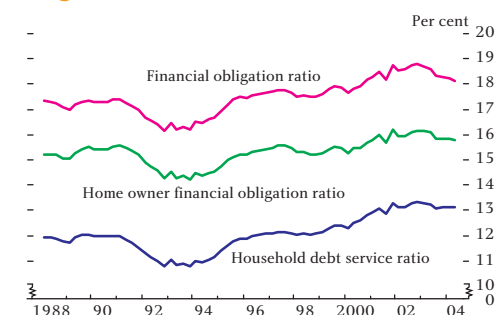


Sources: Mortgage Bankers Association of America and Bloomberg.

(a) June 2004 *Review*.

Chart 1.37

Household debt service and financial obligation ratios^(a)



Sources: Board of Governors of the Federal Reserve System and Thomson Financial Datastream.

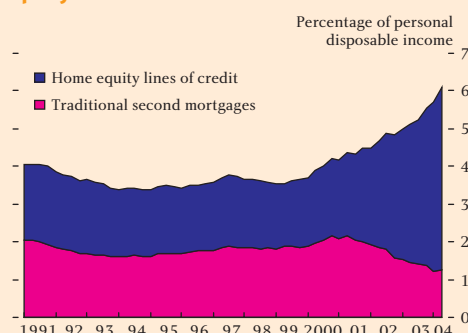
(a) Minimum debt payments, and payments for autoleases, rent, property tax and homeowner insurance as a proportion of personal disposable income.

(1) Consolidated foreign claims adjusted for risk transfers.

Box 3: Home equity lending in the United States

Chart A

US banks and savings institutions: home equity credit



Sources: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2004 Q2, Federal Deposit Insurance Corporation, Bank calculations and Thomson Financial Datastream.

Table 1

US bank holding companies: outstanding holdings of HELOCs^(a)

	2004 (US\$ billions)	Growth since 2001 (Per cent)	2004 Percentage of total loans
Wells Fargo	50.5	288	19
Bank of America	42.2	50	8
JP Morgan Chase	37.4	119	10
Wachovia	15.3	311	9
National City Corp	13.8	150	16
Countrywide	13.7	425	40
Citigroup	11.1	162	2
US Bancorp	10.5	68	9
Keycorp	9.5	1,608	15
Citizens Financial	8.6	156	11
HSBC North America ^(b)	5.0	225	3
All commercial banks	341.2	121	7

Sources: Financial accounts and Federal Deposit Insurance Corporation.

(a) Data are for the top ten BHCs by HELOC lending, plus HSBC America Holdings, as at end 2004 Q2. Data for JP Morgan Chase and Citizens Financial include data for Bank One and Charter One respectively.

(b) The growth of HSBC North America's holdings of HELOCs may be overstated because Household International is only included in the 2004 figures.

US home equity lending has grown rapidly over the past few years and now accounts for 7.6% of household debt, compared with 5.1% in 1995 (Chart A). The growth may partly reflect the fact that house prices have risen by over one third over the past four years. The particularly rapid growth since 2003 Q3 may also be associated with a sharp decline in mortgage refinancing in the second half of 2003.

Home equity loans can be divided into two types. The first is the traditional second mortgage (TSM), with a fixed sum repayable over a fixed period. The second is a home equity line of credit (HELOC), which is a revolving credit line secured by housing. A HELOC plan specifies a credit limit, a repayment schedule and interest charges. The interest charges are typically at variable rates.

HELOCs have grown significantly since 1999. The amount of HELOCs drawn on commercial banks and savings institutions¹ has grown from 1.8% of personal disposable income to 4.9%. In that period, the TSMs of these institutions fell relative to personal disposable income. Given that HELOCs typically have variable rates, this may have increased somewhat the vulnerability of households to interest rate rises.

However, the 1997 Federal Reserve 'Survey of Consumers' found that homeowners with HELOCs have a relatively high median household income and median home equity – higher than homeowners with TSMs or homeowners with first mortgages. Moreover, despite the sharp growth in HELOC lending since the survey, charge-off rates on HELOCs have remained relatively stable.² These remain significantly below charge-off rates on credit cards, on other consumer debt and on TSMs. Finally, despite the rapid growth, outstanding home equity lending is still only 12% of that of first mortgages.

(Table 1) gives the outstanding HELOCs of the largest ten HELOC lenders (these account for over half of the total HELOC lending by commercial banks), as well as the outstanding HELOCs of HSBC North America. There is considerable variability in holdings relative to total loans. HSBC North America has low holdings of HELOCs relative to total loans, while the holdings of Citizens Financial, owned by RBS, are above the industry average.

(1) Commercial banks and savings institutions hold 68% of total home equity loans.

(2) However, the rapid growth in HELOCs may have reduced the average age of the stock of HELOCs, reducing average charge-off rates for a while.

Both the household debt service ratio and the Federal Reserve's broader 'financial obligations ratio' have remained broadly flat over the past three years, despite the rise in the debt-to-income ratio (Chart 1.37). In large part, this reflects the reductions in average effective interest rates achieved through mortgage refinancing.¹ Another factor has been the use of mortgage refinancing and home equity loans and lines of credit to pay down higher-cost unsecured debt.

The preponderance of long-term fixed-rate mortgages means that households' debt service costs are much less sensitive to rises in short or long-term interest rates than in the United Kingdom. Although there has been a marked shift recently to adjustable-rate mortgages (ARMs)² (Chart 1.38), around 85 to 90% of outstanding mortgages are still long-term fixed-rate loans. Unsecured consumer debt accounts for about 20% of household debt. Its largest component is instalment loans (for example, student loans and car loans), which typically have fixed rates; credit card debt, with variable rates, is significantly smaller.

Charge-off rates on mortgages and home equity lending remain low (Chart 1.39). This is not surprising given that mortgage debt is largely insulated from the direct effect of rising interest rates; that the financial obligations ratio of home owners has been broadly stable; and that the unemployment rate has fallen. Although the financial position of renters has improved over the past two years, the financial obligations ratio of this group remains much higher than for home owners. Charge-off rates on credit cards and other consumer lending are substantially higher than for mortgages but have levelled off recently, mirroring the trend in personal bankruptcies.

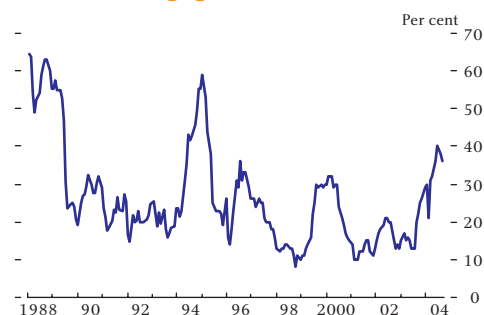
Only a quarter of first-lien mortgages are originated with loan-to-value ratios (LTV) of more than 80%, and the average LTV for outstanding mortgages is about 45%. This significant equity cushion would provide protection for lenders against all but the most extreme declines in house prices. House price increases have been above average for the past four years, with the annual rate of house price inflation reaching 9.4% in 2004 Q2, the highest for almost 25 years.

The non-financial corporate sector

Corporate capital gearing at replacement cost³ continued to fall in 2004 Q2, as did income gearing (Chart 1.40) – both to their lowest levels for five years. This partly reflects strong profit growth in 2003 and continued robustness of profits in 2004.

Chart 1.38

Adjustable-rate mortgages' share of new US home mortgages^(a)

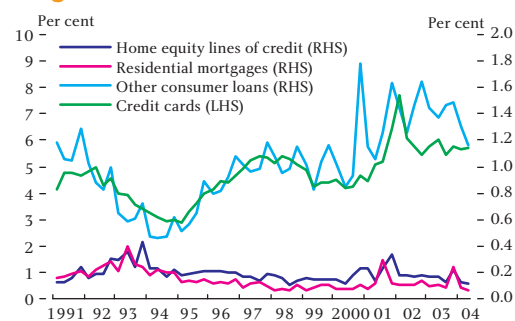


Source: Federal Housing Finance Board.

(a) As a percentage of total mortgage originations.

Chart 1.39

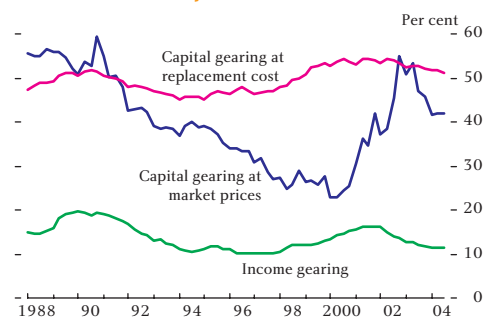
US banks and savings institutions: charge-off rates



Source: Federal Deposit Insurance Corporation.

Chart 1.40

Capital and income gearing of the US non-financial corporate sector



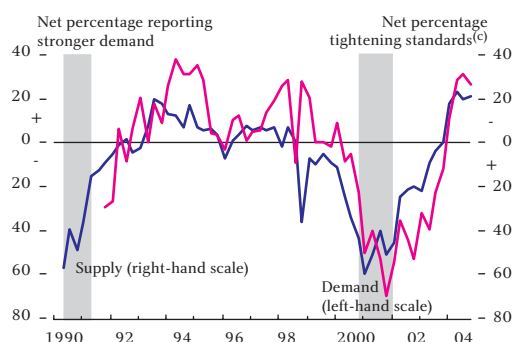
Sources: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2004 Q2, Bureau of Economic Analysis; Department of Commerce, Bank calculations and Thomson Financial Datastream.

(1) Home owners who refinanced in 2001 and the first half of 2002 achieved an average reduction in mortgage rate of 1.83 percentage points.

(2) ARMs are similar to UK fixed-rate mortgages, with the interest rate fixed for an initial period – usually five or seven years – before switching to a variable rate.

(3) For consistency with the UK definition, inventories have been excluded, raising the ratio by, on average, 8 percentage points.

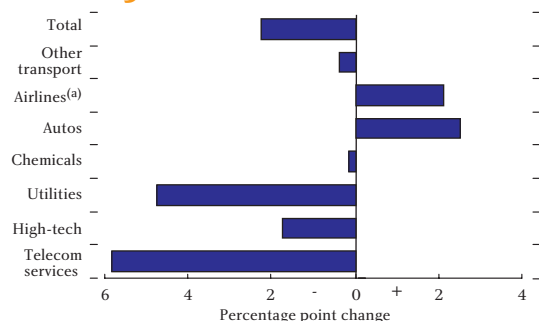
Chart 1.41
US bank lending conditions for commercial and industrial loans^{(a)(b)}



Sources: Board of Governors of the Federal Reserve System: Senior Loan Officer Survey, National Bureau of Economic Research and Thomson Financial Datastream.

- (a) To large and medium-sized firms.
- (b) Shaded area equals the period of recession.
- (c) Inverted scale.

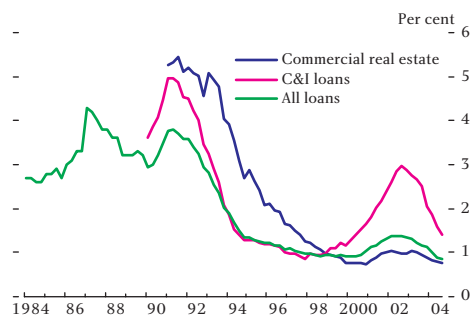
Chart 1.42
Change in capital gearing of US non-financial corporate sectors, end-2002 to end-2003



Sources: Standard and Poor's Compustat and Bank calculations.

- (a) Excludes UAL and US Airways.

Chart 1.43
US banks and savings institutions: non-current loan rates^(a)



Source: Federal Deposit Insurance Corporation.

- (a) Non-current loan rates are defined as loans 90 days past due plus loans in non-accrual status.

Debt growth was sluggish in 2004 Q2, with net issuance of bonds falling sharply. However the stock of commercial and industrial (C&I) loans grew for the first quarter since 2000 and continued to do so in the third quarter. Recent Senior Loan Officer surveys suggest that this reflected both supply and demand factors. Banks have been easing C&I lending standards and corporate loan demand has been increasing since the beginning of this year (Chart 1.41).

Data from firms' accounts suggest that capital gearing, as measured by the ratio of non-financial corporate debt to the book value of tangible assets, fell in 2003 in those sectors prominent in the late 1990s boom – the high-tech and telecommunication services sectors and the utilities (Chart 1.42). However, capital gearing increased in some of the sectors most sensitive to oil prices in 2003: gearing rose in the auto and airlines sectors and was broadly flat in the chemicals and 'other transportation' sectors.

Credit default swap (CDS) premia have risen for some of the major US auto and auto-parts companies since the previous Review, although they remain much lower than in late 2002. In mid-October, Standard and Poor's (S&P) downgraded General Motors (GM) and its GMAC financing subsidiary from BBB to BBB- (one notch above sub-investment-grade) but changed the outlook to stable. And in November, Moody's also downgraded GM's and GMAC's long-term debt ratings by one notch. As well as a tough operating environment the auto industry also faces large unfunded pension and healthcare obligations.

Rising oil prices have affected US passenger airlines. Most major airlines remain unprofitable, with US Airways Group filing for bankruptcy on 12 September 2004. CDS premia for most other major airlines have fallen since the June 2004 Review, but remain high. The direct exposures of US banks are small and mostly secured on aircraft assets, providing some protection in the case of default.

In the first three quarters of 2004, the annualised rate of total bankruptcies was about half of that in 2003. The annualised rates for the transport and chemicals sectors were also lower than in recent years. High-yield spreads in the chemical sector have fallen since the previous Review, consistent with reports that, despite higher energy costs, sales have grown.

Credit quality improved further in 2004 Q2 and Q3, with the proportion of non-current C&I loans falling to its lowest level since the beginning of 2000 (Chart 1.43). The Shared National Credit (SNC) Review¹ indicated that the stock of large syndicated loan commitments fell by 6% in the year to 2004 Q2. The value

(1) The SNC generally covers syndicated loans or commitments of at least US\$20 million that are shared by three or more financial institutions.

of 'classified' (substandard, doubtful and loss) commitments halved, reducing the proportion of 'classified' loans to just 4.8% of the outstanding stock. Loan quality improved across all industrial sectors, particularly in the telecoms and cable sector and the manufacturing sector. Nevertheless, over 10% of outstanding commitments to the telecoms and cable sector and the oil, gas, pipeline and utilities sector remain 'classified'.

Commercial property

Lending to commercial real estate (CRE) has continued to grow rapidly. It now accounts for almost one eighth of commercial banks' outstanding loans and over a quarter of total loans at small US banks; some of the latter might be vulnerable in the event of a downturn in the commercial property market. But delinquency and charge-off rates on commercial real estate have remained surprisingly low given the high level of vacancy rates (Chart 1.43). Demand for office space declined sharply in 2001 and, although it has picked up this year, office vacancy rates remain at a relatively high level (Chart 1.44). Vacancy rates for industrial property also rose sharply in 2001 and remain at a historically high level.

Banking

Overall, the US banking sector remains strong. Published capital ratios and profitability are high, and credit quality has improved. Since the June 2004 *Review*, bank share prices have outperformed the S&P 500 and CDS premia for large domestic banks have narrowed.

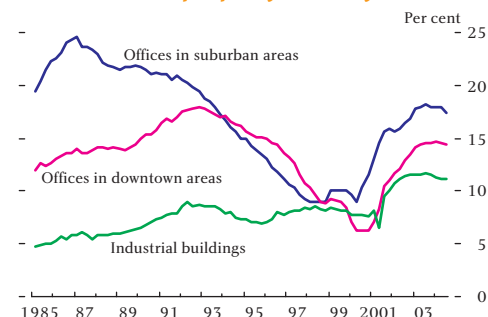
Having fallen in 2004 Q2, the profits of US commercial banks and savings institutions recovered in the third quarter and the return on equity remained relatively high (Chart 1.45). The Second-quarter profits were depressed by litigation charges at JP Morgan Chase and Citigroup and by lower gains on sales of securities following the rise in long-term interest rates.

Trading revenues fell sharply in the third quarter to their lowest level since the autumn of 1998. In aggregate, US banks and savings institutions recorded a loss of \$1.4 billion on interest rate exposures, largely accounted for by the largest US commercial banks. Market contacts report that some large US banks were wrongly positioned on long-term interest rates. Losses on interest rates exposures were partly offset by record trading revenues from 'commodity and other exposures'¹ (Chart 1.46).

Net interest income continued to increase rapidly as strong loan growth offset a further narrowing of net interest margins. The fall in net interest margins was accounted for by large banks which rely more on wholesale funding which tends to be repriced more quickly than retail deposits.

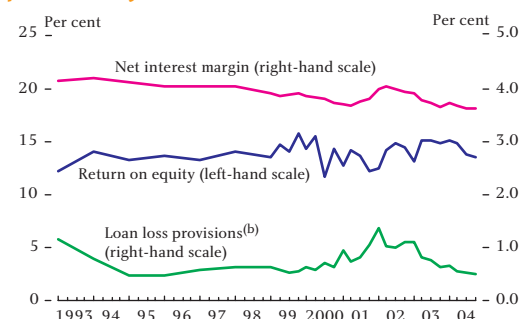
(1) Other exposures include exposures arising from credit default swaps.

Chart 1.44
US commercial property vacancy rates



Sources: CB Richard Ellis and Bloomberg.

Chart 1.45
US banks and savings institutions: profitability indicators^(a)

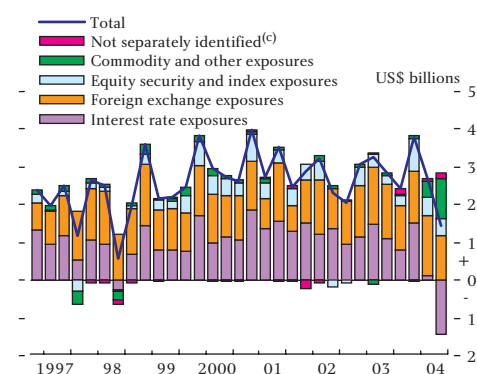


Source: Federal Deposit Insurance Corporation.

(a) Data are annual from 1992 to 1998, and quarterly from 1999 Q1 onwards.

(b) Loan loss provisions as a percentage of total loans.

Chart 1.46
US banks and savings institutions: trading revenue^{(a)(b)}



Source: Federal Deposit Insurance Corporation.

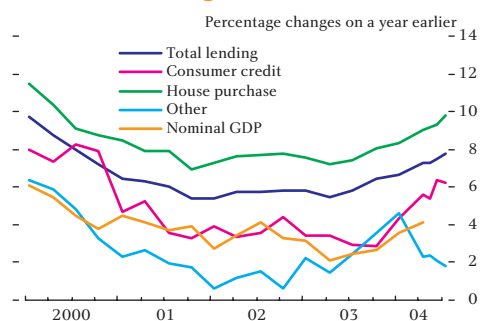
(a) Trading revenues comprises gains/losses on positions and fees.

(b) For banks and savings institutions with assets greater than US\$100 million. From March 2000, those with trading assets less than US\$2 million are exempt from the reporting requirement.

(c) Trading revenues of banks and savings institutions that are not required to provide a breakdown of their trading revenues.

Chart 1.47

Household lending in the euro area^(a)

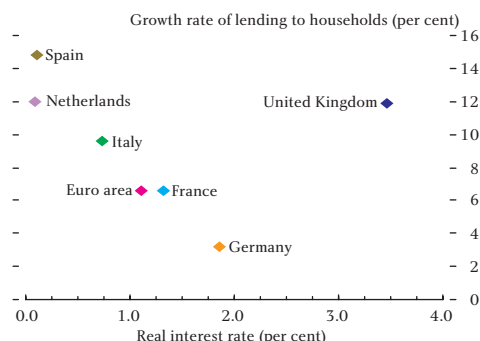


Sources: European Central Bank and Eurostat.

(a) Quarterly data to June 2004, monthly data from July 2004.

Chart 1.48

Average annual growth rate of lending to households vs average real interest rate since 2000^{(a)(b)}



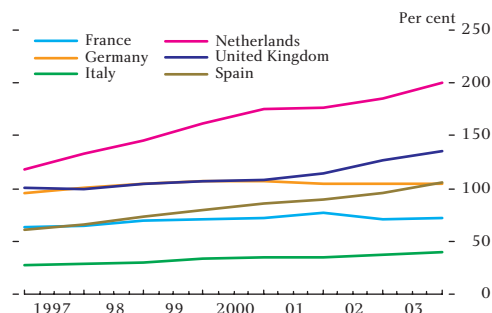
Sources: Eurostat, European Central Bank, Deutsche Bundesbank, De Nederlandsche Bank, Banca d'Italia, Banque de France, Banco de España and Bank calculations.

(a) Averages of quarterly lending data and monthly real interest rate data up to 2004 Q2. Real interest rates are proxied by the official interest rate minus the annual HICP inflation rate.

(b) Lending to individuals used for UK, Italian and German data.

Chart 1.49

Household debt-to-income ratios



Sources: Eurostat, Deutsche Bundesbank, Banque de France, Banca d'Italia, Banco de España, Netherlands Central Bureau of Statistics, ONS, OECD and Bank calculations.

1.4 Europe

UK-owned banks' exposures to borrowers in the rest of Europe¹ increased by some 15% in the first half of 2004, to account for some 35% of UK-owned banks' international exposures and 14% of UK-owned banks' total assets.² The increase was broadly similar to that for exposures to the United States. The biggest absolute increase was in exposures to Germany, which have risen above those to Hong Kong, largely reflecting a rise in holdings of public-sector debt. The rise in exposures was due more to growth of existing businesses than to mergers and acquisitions. But the purchase of First Active mortgage bank by RBS contributed to a sharp increase in exposures to Ireland; these rose by a third, though remain smaller than those to Germany or France.

Despite the recent increase, the share of UK-owned banks' international exposures accounted for by Europe has risen only slightly in the past five years, and by less than the share accounted for by the United States (the share of other international exposures has fallen). This pattern broadly mirrors the relative growth performance of the euro area and the United States. Euro-area growth eased further in 2004 Q3, and Consensus forecasts for euro-area growth in 2005 have edged down since the June 2004 *Review*, suggesting lower expectations of incomes growth. However, longer-term market interest rates have fallen since the previous *Review*, so the net effect on prospective debt servicing burdens is unclear. The depreciation of the dollar and uncertainty surrounding oil prices pose some risks to activity and income, although – as in other industrial economies – oil price effects may be limited by a reduction in the oil intensity of production over the years.

The private non-financial sector

The household sector

Euro-area banks' loans to euro-area households account for some 18% of their total assets, a smaller share than the analogue for UK-owned banks. But these exposures have risen rapidly in the past year (Chart 1.47), largely because of rising lending for house purchase, associated with rapid increases in house prices in a number of countries. Low real interest rates have also encouraged the increase in lending to households in some countries (Chart 1.48), and consumer credit growth overall has risen in the past year. As a result, household debt-to-income ratios have picked up in several European countries, increasing households' vulnerability to adverse shocks to interest rates or incomes³

(1) Defined here as the euro-area countries plus Denmark, Iceland, Liechtenstein, Norway, Sweden and Switzerland.

(2) Abbey National is included in UK-owned banks as these data cover a period before the takeover by Banco Santander on 12 November 2004.

(3) In Ireland, the ratio of personal sector debt to income has doubled over the past decade, to almost 95% in early 2004. Household debt-to-income ratios in the Nordic countries have also been rising.

(Chart 1.49). In some of those countries – particularly Spain and Ireland – some UK-owned banks have sizeable direct exposures to households via their operations overseas. But the picture across Europe is varied, and in Germany, in particular, house prices have been weak and the household debt-to-income ratio stable. Box 4 provides a further assessment of debt-to-income ratios across the major industrial countries.

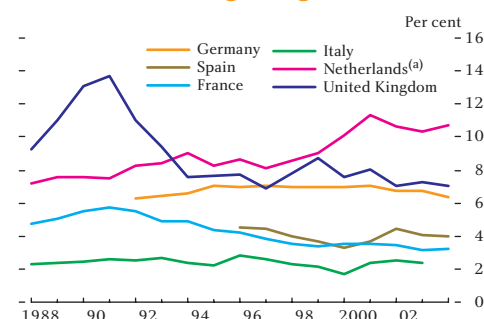
Nevertheless, income gearing seems likely to have remained moderate in most countries (Chart 1.50), reflecting continued low interest rates, stable, if high, unemployment and rising nominal earnings. Lending growth has been most rapid where most loans are advanced at variable interest rates, perhaps because of lower initial debt servicing costs (given the slope of the yield curve in recent years). That is likely to have increased the sensitivity of debt servicing in those countries to changes in interest rates.

The likelihood of households defaulting is also affected by personal insolvency law. Many continental European countries do not have formal personal insolvency regimes, so data are scarce. But in Germany personal insolvencies have risen markedly (Chart 1.51), albeit from a low base, following legislation making it easier for individual debtors to petition for bankruptcy.¹ That increase parallels the further rise in UK insolvencies following legislative change (see Chapter 1.1). But household lending forms a substantially smaller share of bank lending in Germany than in the United Kingdom, and comparisons are hard to draw given that personal insolvency laws differ in the two countries.

The private non-financial corporate sector

Lending by euro-area banks to euro-area PNFCs accounts for some 15% of total euro-area banks' assets, a higher share than lending to domestic companies accounts for in the United Kingdom, reflecting the generally greater reliance of continental companies on bank finance. Lending growth has edged up since the June 2004 *Review*, though the ECB's euro-area bank lending survey suggests continued subdued corporate loan demand, largely reflecting weak investment demand, greater use by companies of market-based finance and increasing availability of internal funds. The same survey also points to a slight net easing of credit standards in 2004 Q2 and Q3, in response to increased competition among both lenders and other investors. Gross issuance in the corporate loan markets has been robust, in large part reflecting the refinancing of debt on cheaper or easier terms. But capital gearing has edged down in the past 18 months, as equity prices have risen (Chart 1.52).

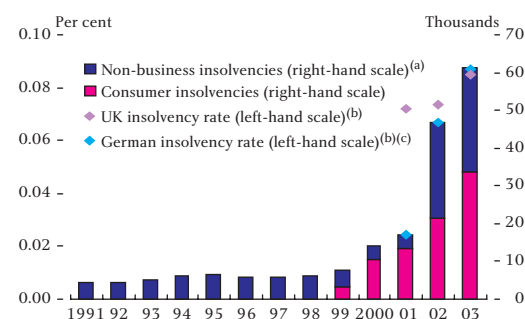
Chart 1.50
Household income gearing



Sources: Eurostat and ONS.

(a) Data for the Netherlands for 2003 are provisional.

Chart 1.51
German non-business insolvencies



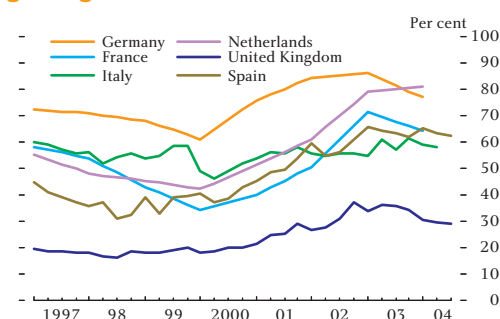
Sources: Federal Statistical Office Germany, DTI and Bank calculations.

(a) Separate consumer insolvency data only available from 1999 onwards. Prior to 1999, consumer insolvencies included within non-business insolvency data.

(b) Insolvency rate defined as the number of insolvencies as a share of resident population aged 16 years or older.

(c) UK personal insolvencies are for England and Wales only.

Chart 1.52
Private non-financial corporations' capital gearing at market value^(a)



Sources: Deutsche Bundesbank, Banque de France, Banca d'Italia, Banco de España, Netherlands Central Bureau of Statistics, ONS and Bank calculations.

(a) The UK measure excludes cross-border intra-company debt.

(1) Reform of consumer insolvency proceedings came into force in December 2001.

Box 4: International debt-to-income ratios

Table 1

Change in 'debt-like' liabilities as a share of annual GDP across countries, from end-1995 to end-2002^{(a)(b)(c)}

Percentage points	Simple average	Weighted average ^(d)	Minimum	Maximum
Non-financial corporations	17.3	9.5	-16.7	40.6
Financial Corporations	61.4	53.3	16.9	151.1
General Government	-2.6	5.4	-29.2	82.9
Households and NPISH	17.6	15.1	2.9	50.8

Sources: OECD, Board of Governors of the Federal Reserve System and Bank calculations.

(a) G12 minus Switzerland.

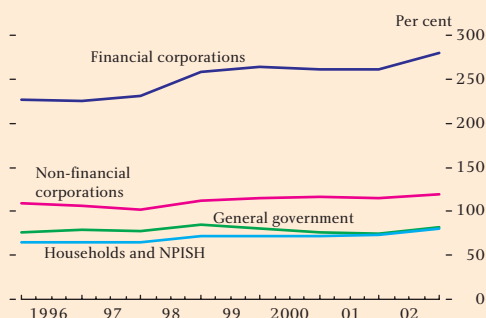
(b) 'Debt-like' liabilities include currency and deposits, loans, other accounts receivable/payable and securities other than shares.

(c) Under current exchange rates.

(d) Weighted by GDP.

Chart A

'Debt-like' liabilities as a share of annual GDP^{(a)(b)(c)}



Sources: OECD, Board of Governors of the Federal Reserve System and Bank calculations.

(a) G12 minus Switzerland, weighted average.

(b) 'Debt-like' liabilities include currency and deposits, loans, other accounts receivable/payable and securities other than shares.

(c) Under current exchange rates.

If borrowers are highly indebted, this may lower their ability to service and repay their debts when faced with an adverse shock to their income. A high level of aggregate debt in a country or sector may, when combined with other information, help to provide an early warning of increasing aggregate default risk.¹

Estimates of the aggregate G12² sectoral debt-to-income measures were compiled using recently published OECD data³ based on the System of National Accounts 1993, which was designed to provide consistent but not exhaustive guidance on the compilation of national accounts. Table 1 highlights the range of movements across countries for 'debt-like' liabilities. Countries do not provide data on a completely uniform basis. For example, countries differ as to whether they provide consolidated (at the sector or sub-sector level) or unconsolidated data. Differences in method are more pronounced for total liabilities than for 'debt-like' liabilities,⁴ as the former include shares and other equity and the insurance technical reserves classes, for which there is greater scope for variations in measurement and institutional treatment.

The liabilities measured are predominantly on-balance-sheet, thus excluding some potentially large liabilities, such as unfunded pension schemes and financial derivatives. The data are only available annually from end-1995 to end-2002 so far. While of limited use for current surveillance, they do provide an insight into the broad trends.

'Debt-like' liabilities are more likely to be relevant for financial stability than are total liabilities. Chart A shows the ratio of 'debt-like' liabilities to GDP at market value for each of four sectors aggregated across the G12 countries. The financial corporations sector has the most liabilities, as, in carrying out financial intermediation, it acts as counterparty to each of the other sectors.

(1) Aggregate debt-to-income ratios do not, though, provide an insight into the distribution of debt across agents in the economy, and a given aggregate ratio can be consistent with quite different levels of aggregate default risk if that distribution differs. Some Bank work has adopted a micro-level approach, using agents' financial accounts to analyse the indebtedness of both households and companies. For example, the number and type of households accumulating debt have been investigated (see Tudela, M and Young, G (2003), 'The distribution of unsecured debt in the United Kingdom: survey evidence', *Bank of England Quarterly Bulletin*, Winter) while company accounts have been compared across countries (See 'Box 3: Comparing the leverage of US, UK, French and German firms', in the December 2003 *Review*).

(2) The G12 comprises thirteen countries: Australia, Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Spain, Sweden, Switzerland, the United Kingdom and the United States. Where not stated otherwise, G12 references exclude Switzerland because of data collection difficulties.

(3) Organisation for Economic Co-operation and Development (OECD) (2004) *Financial Balance Sheets: Stocks Volume IIb (1991-2002)*, National Accounts of OECD Countries.

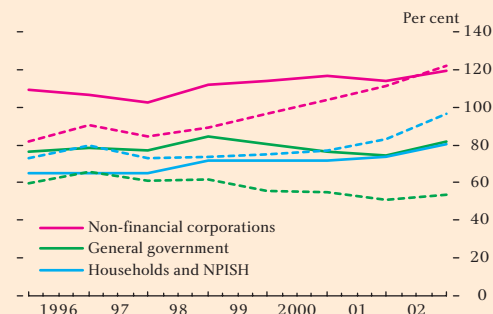
(4) Debt-like liabilities include currency and deposits, loans, other accounts receivable/payable and securities other than shares.

Chart B plots the G12 'debt-like' liabilities non-financial sectoral averages, together with those for the United Kingdom, and shows the recent rise in households' liabilities in the United Kingdom and the G12 as a whole. Chart B suggests that there has been a more rapid growth in the level of indebtedness of the UK household and non-financial sectors as a share of GDP than in the G12 as a whole. UK non-financial corporations' debt increased significantly faster than GDP after 1998, whereas the rapid growth in household debt started in 2001. The UK general government 'debt-like' liabilities appear to mirror movements in the corresponding G12 aggregate measure, though at a lower level.

Chart C shows *short-term* 'debt-like' liabilities; data are only available for a smaller sample of countries. While Chart A shows that aggregate 'debt-like' liabilities grew as a share of GDP in 2002, this is only apparent in the financial corporations sector in Chart C, possibly suggesting a switch from short-term towards long-term liabilities in other sectors.

The increase in 'debt-like' liabilities as a share of GDP over the sample period, together with the rise in financial corporations' total and 'debt-like' liabilities, also suggests that financial activity has been playing an increasingly important role in the economy.

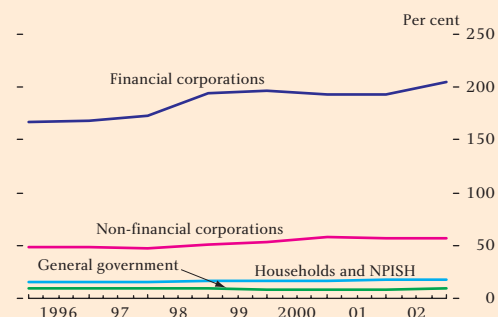
Chart B
UK and G12 'debt-like' liabilities as a share of annual GDP^{(a)(b)(c)}



Sources: OECD, Board of Governors of the Federal Reserve System and Bank calculations.

- (a) Continuous lines G12 minus Switzerland, weighted average. Dotted lines United Kingdom.
- (b) 'Debt-like' liabilities include currency and deposits, loans, other accounts receivable/payable and securities other than shares.
- (c) Under current exchange rates.

Chart C
Short-term 'debt-like' liabilities as a share of annual GDP^{(a)(b)(c)}

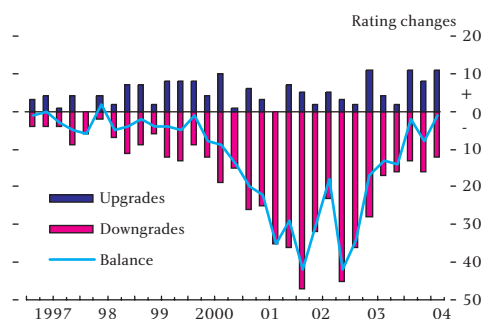


Sources: OECD, Board of Governors of the Federal Reserve System and Bank calculations.

- (a) Short-term defined as under one year.
- (b) Under current exchange rates.
- (c) G12 minus Australia, Canada, Italy, Japan and Switzerland, weighted average. Netherlands 2002 figures estimated using long-run proportions.

The number of corporate ratings downgrades has fallen back, broadly to match the number of upgrades (Chart 1.53), and corporate credit spreads have in general fallen further. Equity prices have risen since June and equity price volatility has fallen, implying, other things equal, a fall in default risk. And the equity prices of some sectors that had weakened since the start of the year – in particular airlines and technology – have recently recovered somewhat. Corporate income gearing is likely to have remained broadly stable in the euro area, as interest rates have remained low. Corporate earnings are estimated to have increased in 2004, probably reflecting the beneficial effects of

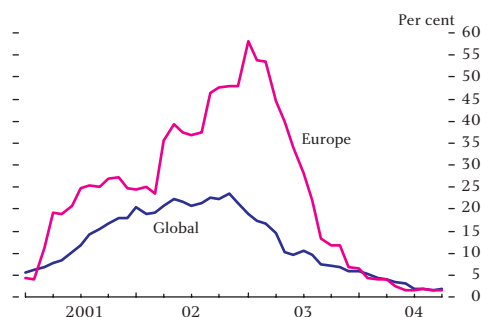
Chart 1.53
Number of European corporate ratings changes^(a)



Source: Moody's Investors Service.

(a) In the euro-area countries plus Denmark, Sweden and the United Kingdom.

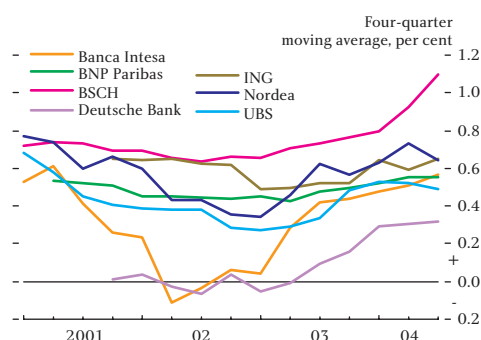
Chart 1.54
Sub-investment-grade corporate bond default rates^(a)



Source: Moody's Investors Service.

(a) Trailing twelve-month dollar-weighted default rates.

Chart 1.55
Return on assets for the largest banks in selected European banking sectors^{(a)(b)}



Sources: Bloomberg and Deutsche Bank company reports.

(a) Rate of return on assets, defined as annualised net income divided by total assets.

(b) Deutsche Bank and ING series start at 2001 Q4, because of reporting changes and exceptional non-operating items respectively. BNP Paribas reports assets on a half-yearly basis; assets are assumed to remain unchanged from previous half-yearly levels in the intervening quarters.

corporate restructuring. However, profits growth is generally expected to be slower in 2005 than for 2004.

Consistent with market indicators, the incidence of large-scale corporate failures has been low in the past year; sub-investment-grade corporate bond default rates have fallen further (Chart 1.54). And the number of corporate insolvencies generally seems to have stabilised or fallen during 2004. German corporate insolvency numbers have risen further, however, perhaps reflecting the effect of weak domestic demand on smaller companies, which are typically more dependent on domestic markets than are larger companies.

The financial sector

Non-bank financial institutions (NBFIs)

On-balance-sheet claims on NBFIs account for only 3% of euro-area banks' total assets, although this may understate the potential for contagion from NBFIs to banks, and particularly bancassurers, given that they often operate in the same markets. Ratings agencies report an improved performance among European insurers during 2004 and a continued stabilisation in the ratings outlook, suggesting that the risks facing these institutions have moderated.

Banking sectors¹

Over half of UK banks' consolidated international exposures to borrowers in the rest of Europe are to banks, a much higher share than for exposures to the United States. The profitability of large European banks has continued to recover (Chart 1.55), because of further reductions in costs relative to incomes and a fall in provisions (due primarily to a fall in large-scale corporate failures). However, the recovery for German banks has remained patchy, with two of the largest four banks reporting negligible profits or a loss in Q3. Interest income as a share of total assets has tended to edge down further. The ECB's euro-area bank lending survey suggests that interest margins on new household lending have been falling, partly because of strong competition and partly perceived improvements in the creditworthiness of households. In Germany, some large banks have sold non-performing loans to third parties, which may boost those banks' net interest income in future.

As discussed in previous *Reviews*, indicators of profitability suggest that German banks have significantly lower buffers than the European average (Chart 1.56). That may partially reflect structural factors, such as the extent of state involvement in the banking sector. Over five times as many banks operate in Germany as in the United Kingdom, and, measured by the return on equity, the average profitability of German banks over the past

(1) 'Banking sectors' are used here and in the charts as shorthand for the national banking sectors of Germany, France, Italy, Switzerland and Spain, and the increasingly integrated regional banking sectors of both the Benelux and Nordic regions.

five years has been around a third that of UK-owned banks. The removal of explicit state guarantees for German public banks scheduled for July 2005 is likely to add to pressures for consolidation within the German banking sector. In particular, 'shadow ratings' suggest that ratings for Landesbanks will be on average four notches below those under guarantee.¹ Some banks have already responded by consolidating and pursuing greater specialisation, and in aggregate Landesbanks have reduced their overseas operations, including those in the United Kingdom. Contacts suggest that Landesbanks have been building up liquidity while state guarantees are still available, providing a cushion for adjustment, but they are likely to need to diversify their sources of financing over the longer term.

Market indicators suggest some improvement in the performance of European banks and a reduction in the risk of default; CDS premia have narrowed further overall since the June 2004 *Review* (Chart 1.57). Solvency ratios have remained satisfactory overall, and picked up in the first half of 2004 for those large banks with the weakest solvency ratios. That, together with increased profitability, indicates an improvement in the financial health of European banks overall.

However, some have pointed to continued risks to banks in a number of European countries from high concentrations of balance-sheet exposures to individual companies.² The failure of Parmalat revealed that, in that case at least, risks had been widely dispersed, although subsequent proceedings have shown that European banks are not immune to litigation risk. Household lending has accounted for a smaller share of euro-area banks' write-offs and write-downs in recent years than has corporate lending, and in general euro-area banks charge a higher rate of interest on household lending. Nonetheless, the rapid pace of household lending growth may have been associated with increased credit risks in some countries; for example, the Banco de España has recently warned lenders in Spain against lending at high loan-to-value ratios.³

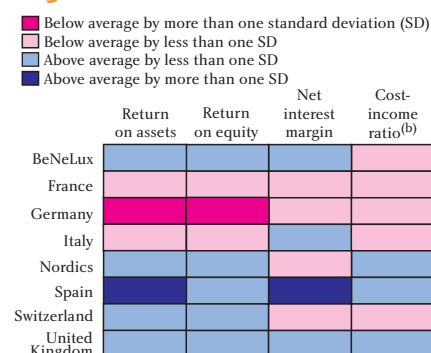
In aggregate, European banks continue to have a customer funding gap (Chart 1.58), as do their UK counterparts (Chapter 3). That gap has been filled by market-based sources of finance, which are generally more expensive than customer deposits and may be more prone to changes in market sentiment.

(1) Based on the assumption of ongoing financial support by the Landesbanks' owners, the savings banks and regional governments.

(2) 'Concentration risks remain high at European banks', Standard and Poor's, October 2004. Germany, Italy, Sweden and Portugal are highlighted as having a high concentration of single-name corporate credit risk.

(3) For example, see Deputy Governor Gil's speech at the Cultural Centre of Caixanova, Vigo, 11 November 2004.

Chart 1.56
European banking sector key ratios for 2003^(a)

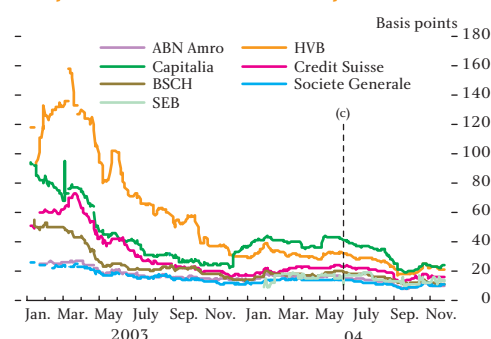


Sources: Bureau van Dijk Bankscope and Bank calculations.

(a) Sample consists of 92 of 100 largest continental European banks and ten largest UK banks.

(b) Inverted scale, so that pink colour implies above average rather than below.

Chart 1.57
CDS premia for selected European banks^{(a)(b)}



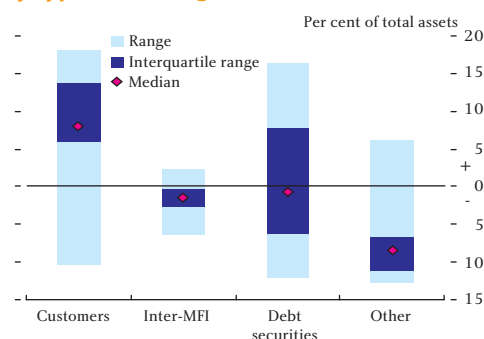
Source: Markit.

(a) Daily closing prices of five-year senior CDS contracts; gaps represent days for which there are no data.

(b) The banks with the highest current CDS price from each banking sector.

(c) June 2004 *Review*.

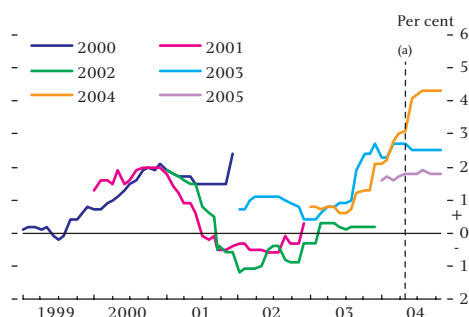
Chart 1.58
Euro-area MFIs' funding gaps at 2004 Q2, by type of funding^(a)



Source: European Central Bank.

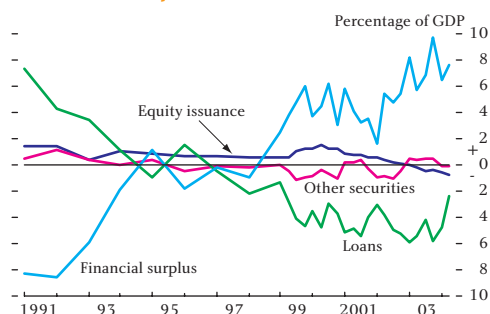
(a) Measured as assets less liabilities in the balance sheet categories shown, as a percentage of total assets, for monetary financial institutions. Median and ranges are of national banking system funding gaps.

Chart 1.59
Consensus GDP forecasts



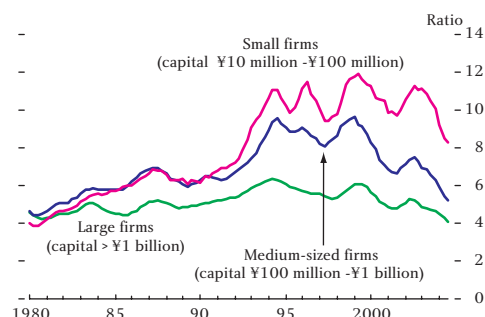
Source: Consensus Economics Inc.
(a) June 2004 Review.

Chart 1.60
Sources of corporate finance^(a)



Sources: Bank of Japan and Bank calculations.
(a) Fiscal year data 1990-98, four-quarter moving averages from 1999 Q2.

Chart 1.61
Ratio of corporate debt to operating cashflow^(a)



Sources: Ministry of Finance corporate survey and Bank calculations.
(a) Four-quarter moving average of gross debt divided by four-quarter sum of operating profits plus depreciation.

1.5 Japan

The pace of Japan's recovery appears to have slowed markedly since the previous Review, but Consensus forecasts show that growth is expected to continue through 2005 (Chart 1.59).¹ Although the direct impact of the Japanese economy on UK-owned banks is limited – Japan accounts for just 3% of their foreign claims – they and other internationally active banks may have both on- and off-balance sheet exposures to Japanese counterparties via capital markets. For example, the yen is involved in 20% of global foreign exchange (FX) transactions and 29% of over-the-counter FX derivatives turnover. These counterparties – especially Japan's major banks – are in turn exposed to risks from domestic borrowers, which are mainly corporations and the government.

Japan's non-financial sector

The household sector

Despite the recovery of output and consumption, growth in employees' real compensation has been modest. However, consumer confidence is close to its highest levels in a decade, supported by improved employment prospects. Consistent with this, the number of personal bankruptcies has fallen further since the previous Review. The household sector's financial surplus has fallen, but in stock terms households remain large net creditors, and much household borrowing is at long-term fixed rates.

The private non-financial corporate sector

As higher demand has not been accompanied by rising labour costs, profits have continued to improve; in the six months to September, listed firms recorded a 21% year-on-year rise in net profits, and raised their profit forecasts for the year to March 2005 by 17%. Higher profits have allowed PNFCs in aggregate to fund investment while continuing to repay loans and increase financial surpluses (Chart 1.60). Thus, income gearing and the ratio of debt to operating cashflow (Chart 1.61) have fallen. Small firms remain more heavily indebted than large ones, but the gap has narrowed somewhat.

This improved financial position has been reflected in a steep fall in both the number and liabilities of failed businesses in the six months to September (Chart 1.62). A flurry of recent rating agency upgrades² suggests a continued upward trend in perceived credit quality, at least of larger companies.

Japan's banking system

Non-performing loans (NPLs) have continued to fall at the major banks (Chart 1.63). With the Japanese Financial Services Agency (JFSA) target of halving NPL ratios from their peaks by

(1) However, these forecasts do not yet take account of weaker-than-expected growth in 2004 Q3 or the new chain-linked estimates of GDP.

(2) Moody's has upgraded 39 issuers so far in 2004, 15% of rated firms.

March 2005 looming, several banks reported higher-than-expected write-offs and provisioning for loans to troubled borrowers in the six months to September. Other borrowers were upgraded, benefiting from restructuring or the recovery in corporate profits.

The downward trend in banks' outstanding corporate loans has continued since the June 2004 *Review*. Banks have responded by increasing their holdings of Japanese government bonds (JGBs) – now 15% of total bank assets.¹ The duration of these holdings appears to be short, somewhat mitigating the increase in exposure to the JGB market. The major banks have further reduced equity holdings since the previous *Review*.

Operating profitability at the major banks remains weak, although they have made some progress in raising fee income over the past year. Interest margins remain low on corporate lending, and are lower still on the banks' short-duration bond holdings. Lending to individuals, which has higher margins, is growing but still accounts for only 15% of bank assets. Nevertheless, lower loan-loss charges and smaller valuation losses on securities than in recent years have allowed major banks to raise Tier 1 capital levels and increase capital quality by crystallising deferred tax assets² (Chart 1.64).

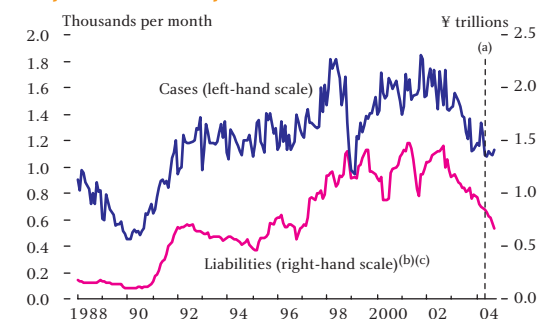
Deposit insurance on demand deposits will be capped from April 2005. Improved bank balance sheets, the official crisis management system for banks and exemptions for settlement accounts should contain the risk of large-scale withdrawals.

In July, UFJ and MTFG announced plans for a merger, which now looks likely to be completed by October 2005. Merging two very large³ and very different banks successfully will be challenging. UFJ's capital base, depleted by provisioning for NPLs that it had tried to conceal from JFSA inspectors, was strengthened by a capital injection from MTFG in September.

Reflecting the sustained improvement in the quality of the major Japanese banks' assets and capital over the past two years, CDS premia have continued to decline since the June 2004 *Review* and Moody's recently raised the bank financial strength ratings⁴ of SMFG and UFJ from E, the lowest possible level, to E+, and Mizuho's rating from E to D-. However, the banks remain poorly capitalised by comparison with their international peers, and low operating profits mean that any negative shocks would erode these capital buffers.

- (1) For comparison, European government debt makes up 6.5% of euro-area banks' assets.
- (2) These mainly reflect the fact that loan-loss provisions count as a tax-deductible expense only when the loss is finalised rather than when the provision is made. See Section 1.4 of the June 2003 *Review*, page 41, for a discussion of the associated risks.
- (3) The combined entity will be the world's largest bank by total assets, accounting for around a quarter of domestic bank assets.
- (4) Which represent Moody's opinion of a bank's soundness and safety excluding external support, eg from the government.

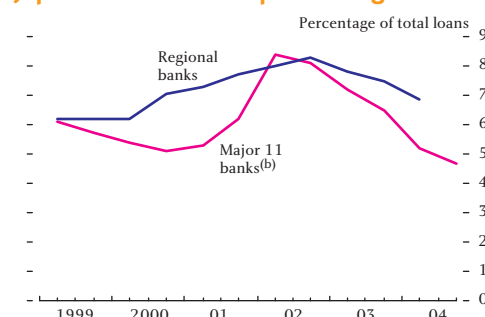
Chart 1.62
Corporate bankruptcies



Sources: Bloomberg and Thomson Financial Datastream.

- (a) June 2004 *Review*.
- (b) Excluding debt of life insurers.
- (c) Twelve-month moving average.

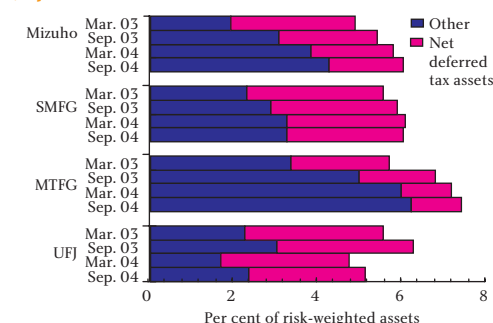
Chart 1.63
Japanese banks' non-performing loans^(a)



Sources: Japanese Financial Services Agency and Bank calculations.

- (a) Financial Reconstruction Law basis.
- (b) Constituent banks of the four major banking groups plus Resona Bank, Sumitomo Trust and Chuo Mitsui Trust.

Chart 1.64
Composition of Tier 1 capital of major Japanese banks^(a)

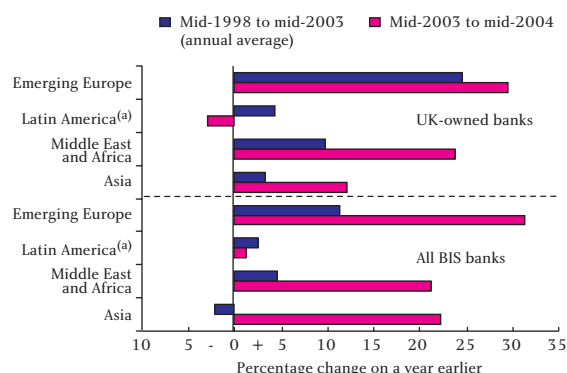


Sources: Published accounts and Bank calculations.

- (a) Consolidated.

Chart 1.65

BIS-reporting banks' consolidated foreign claims on selected EMEs



Source: Bank for International Settlements.

(a) Latin America includes the Caribbean.

Table 1.A

Net private sector financial flows to EMEs by region^(a)

(US\$ billions)		2001	02	03e	04f
Latin America	Equity investment	57.0	33.4	21.0	27.7
	Private creditors	-6.8	-17.1	9.5	9.4
	<i>Banks</i>	-11.4	-12.5	-3.3	-5.1
	<i>Non-banks</i>	4.6	-4.6	12.7	14.5
Asia	Equity investment	64.0	59.9	90.1	84.9
	Private creditors	-9.9	0.8	28.0	25.2
	<i>Banks</i>	-8.9	-1.1	13.8	15.6
	<i>Non-banks</i>	-0.9	1.8	14.2	9.6
Europe	Equity investment	17.4	22.3	8.7	17.0
	Private creditors	0.7	24.3	51.9	51.3
	<i>Banks</i>	-3.4	5.5	23.3	21.5
	<i>Non-banks</i>	4.1	18.8	28.7	29.8
Total^(b)	Equity investment	148.8	117.6	123.7	137.6
	Private creditors	-16.8	7.4	89.1	88.3
	<i>Banks</i>	-23.7	-8.3	31.6	32.8
	<i>Non-banks</i>	6.9	15.6	57.5	55.5
Total external financing		132.0	125.0	212.8	225.9

Source: Institute of International Finance, 'Capital Flows to Emerging Market Economies', 2 Oct. 2004.

(a) Equity investment is the sum of direct and portfolio investment.

(b) Total also includes Africa and the Middle East.

e = estimate. f = forecast.

1.6 Emerging market economies

Claims on emerging market economies (EMEs) by UK-owned banks, which account for around one-fifth of their lending overseas, grew briskly in the year to June 2004 (12%).¹ The growth in lending over the period was particularly strong in emerging Europe (29%), in Africa and the Middle East (24%), and, to a lesser extent, in Asia (12%). In contrast, lending to Latin America fell (Chart 1.65).²

Borrowing from abroad by EMEs is also intermediated through financial markets. There has been further large bond issuance by EMEs and bond spreads have fallen in recent months (Chapter 2.1). And, according to the Institute of International Finance (IIF), total net private sector (bank and bond) debt flows to EMEs this year are expected to be around US\$90 billion – the second successive year of strong borrowing (Table 1.A).

The external environment facing EMEs has remained benign, in large part, since the previous *Review*. World output growth is likely to reach a thirty-year high this year and world interest rates, and thus EME external funding costs, remain low despite the tightening of US monetary policy since the summer. And a number of EMEs have also benefited from the continued strength of (non-agricultural) commodity prices.

Consequently, private sector and IMF forecasts of output growth for this year in all the main EME regions have been revised upwards, to over 5% according to Consensus Economics (Chart 1.66). There have also been a number of sovereign credit rating upgrades in recent months, including of some large international borrowers such as Brazil and Turkey.

Only a modest slowdown is generally expected in world growth next year and so the external outlook facing EMEs remains favourable. There are, though, a number of downside risks. On the one hand, a combination of sustained higher oil prices, a sharp rise in world interest rates and significantly lower world growth (and non-oil commodity prices) would hurt many EMEs. If, on the other hand, the external environment remains benign, there is a risk that some EME governments or private sectors may borrow more than their future capacity to repay over the longer term.

This section explores these issues in more detail.

(1) EMEs are defined here as countries in central and eastern Europe, Latin America, the Middle East, Africa and Asia (other than Japan).

(2) Non-Japan Asia accounts for the lion's share of UK banks' exposures to EMEs. In June 2004, foreign claims on non-Japan Asia were US\$263 billion, compared with US\$38 billion in Latin America and the Caribbean, US\$37 billion in the Middle East and Africa and US\$16 billion in emerging Europe.

Sustained high oil prices

The price of Brent crude oil has risen to around \$40 per barrel from \$35 at the time of the June 2004 *Review* and less than \$30, on average, last year. If prices remain high, this could have a large impact on EMEs, by switching income from oil-importing countries towards a smaller number of oil-producing economies. This would be more likely to be harmful in aggregate if driven by a reduction in world oil supply rather than continued buoyant world demand.

The main gainers would be concentrated in OPEC countries and a few non-OPEC producers, in particular Russia. In the short run, the rise in oil prices has significantly improved the external and government financial balance sheets of these countries. However, in the longer term, it may, in some cases, delay structural reform and output diversification and build up underlying vulnerabilities that would become apparent if oil price increases were reversed.

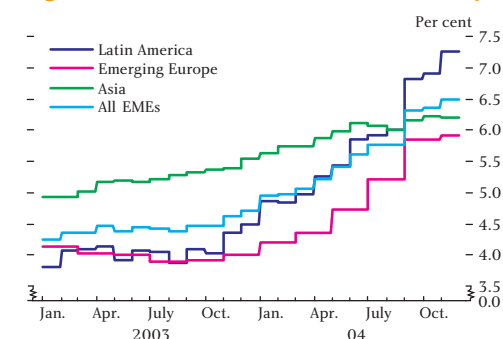
Net oil importers are more numerous; economies in Asia and, to a lesser extent, in emerging Europe (other than Russia) would be affected most. So far at least, the impact has been cushioned, to some extent, because the rise in oil prices partly reflects the fast growth of the Chinese and US economies. This has boosted non-oil exports, particularly from the rest of Asia, and, through raising prices, the export earnings of EME metal producers. The latter has benefited economies in Latin America and the former Soviet Union in particular (Chart 1.67).¹ In addition, most Asian economies have built up strong external positions in recent years by running current account surpluses and building up foreign currency reserves. Some emerging European economies would appear to be more vulnerable, since they are starting from a position of current account deficit (Chart 1.68).

The increase in oil prices is also likely to have a bigger domestic impact on EMEs than on developed countries, since the former tend to be much less efficient in using oil. To the extent that oil price rises are being passed on to consumers, inflationary pressures are building up. Across most EMEs, price inflation has been edging up during this year and some countries, such as Brazil, Poland and Thailand, have responded by increasing interest rates.

A number of EMEs, though, subsidise oil, shifting the cost of higher oil prices on to the government's budget instead. This has increased the burden on some already highly indebted governments such as India and Indonesia.

Chart 1.66

Regional Consensus GDP forecasts, 2004^(a)

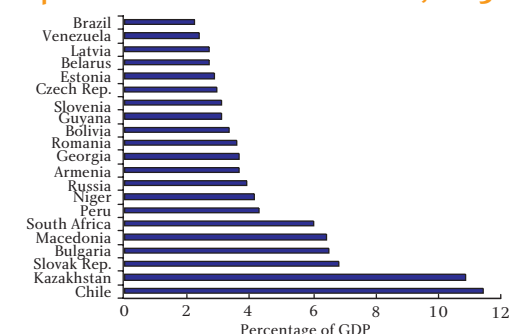


Source: Consensus Economics Inc.

(a) An average of countries' monthly 2004 GDP forecasts. Bi-monthly forecasts for emerging Europe.

Chart 1.67

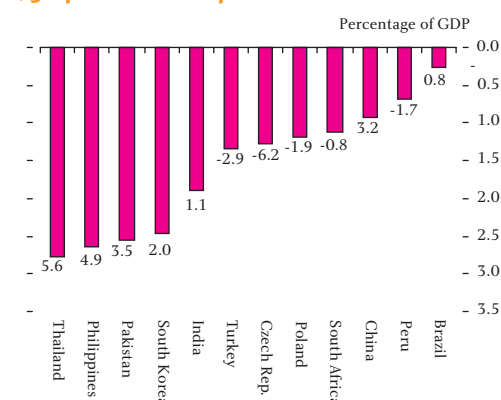
Exports of metals for selected EMEs, 2003



Sources: IMF and United Nations.

Chart 1.68

Impact on annual oil trade balance of a \$50 per barrel oil price for selected EMEs^{(a)(b)}



Sources: United Nations and IMF.

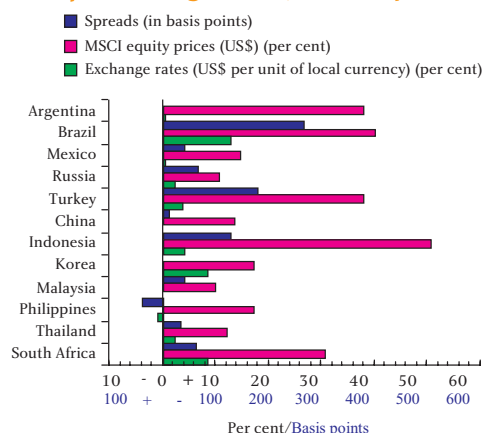
(a) Oil balance comprises the sum of crude and refined products, 2003 data.

(b) Calculated by multiplying the 2003 oil balance by the percentage increase in oil prices (2003: \$29 per barrel). The change in the oil balance is shown as a percentage of forecast 2004 GDP (2003 current account balance percentage of GDP shown below bars).

(1) According to IMF estimates, the increase in non-energy commodity prices this year has boosted the net exports of EME oil importers by almost 0.5% of GDP, on average (IMF World Economic Outlook, September 2004, Table 1.17, page 67).

Chart 1.69

Asset price change since June 2004 Review^(a)

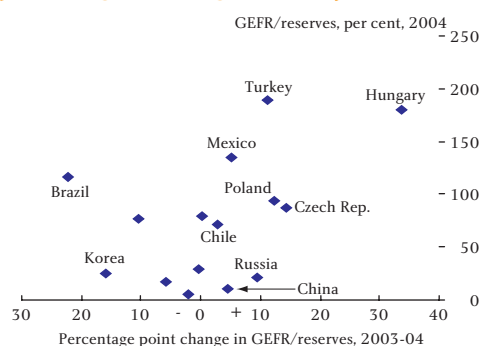


Sources: Bloomberg, JP Morgan Chase & Co. and Morgan Stanley Capital International Inc.

(a) Bars to the left of the axis denote rises in spreads, falls in equity prices and depreciation of the exchange rate.

Chart 1.70

Gross external financing requirement^(a) as a percentage of foreign currency reserves^(b)



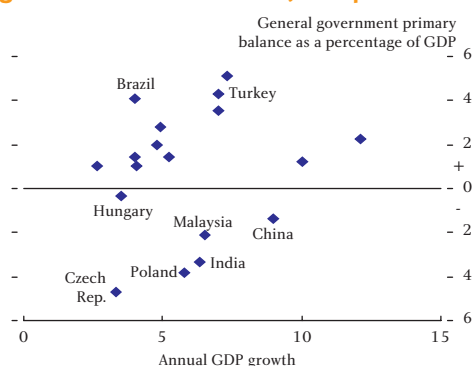
Sources: IMF and Institute of International Finance.

(a) Defined as short-term debt, plus amortisation, plus current account deficit. 2003 figures are estimates and 2004 are forecasts.

(b) Foreign currency reserves are defined as total reserves excluding gold at end-June.

Chart 1.71

Government primary balance and GDP growth for selected EMEs, 2004 forecast



Source: IMF, World Economic Outlook, September 2004.

The interest rate environment

Sustained higher oil prices and/or a marked slowdown in the world economy would weaken EMEs more if combined with an unexpectedly sharp rise in US interest rates associated with, for example, a rise in inflation expectations or marked downward pressure on the US dollar. That would increase EMEs' external funding costs and, *in extremis*, could prevent some borrowers obtaining external finance altogether.

Earlier Bank work suggests that, everything else equal, a 100 basis point rise in US policy rates would result in about an 80 basis point rise in the average EME spread from the current level.¹ However, in practice, the sensitivity of EME spreads to changes in US interest rates would also be affected by the cause of the increase and on general market sentiment at the time.² For example, the 100 basis point rise in official US interest rates since June has been associated with a fall rather than a rise in spreads in most EMEs (Chart 1.69).

But as discussed in previous *Reviews*, many EMEs have reduced their immediate vulnerability to a reversal in market sentiment. A number of EME sovereigns have taken the opportunity of low external funding costs not only to finance their needs for this year but to begin prefinancing for next year. Some have also continued to lengthen the maturity of their debt structures and reduce the proportion of debt linked to foreign currency.³ Nonetheless, some large EMEs, especially in emerging Europe (other than Russia), have large and growing external financing requirements (Chart 1.70).

Conversely, if world interest rates remain low, there is a risk that some EME governments or private sectors will borrow more than their future capacity to repay. Some EMEs with very large government debt-GDP ratios, such as Brazil and Turkey, are currently running large primary surpluses and thus have somewhat reduced their debt burdens since the end of last year. But, despite current robust GDP growth, some EME governments have maintained high debt burdens or increased them further, by running only small primary surpluses or deficits (Chart 1.71). These fiscal positions would look less favourable still if current strong GDP growth were not maintained.

(1) See Ferrucci, G (2003), 'Empirical determinants of emerging market economies' sovereign spreads', Bank of England *Working Paper* 205, October.

(2) For example, the Bank spread model can explain around only 40% of the variation in bond spreads of EMEs over the December 1991-March 2003 period.

(3) Brazil, for example, reduced its share of gross federal government domestic securities linked to the exchange rate from 33.5% at the end of 2002 to 11.2% in September this year.

Data on EMEs' private sector debt are less readily available. But EME foreign currency corporate bond issuance this year has been strong (Chart 1.72). This has been most pronounced in Asia and Russia. To the extent that this represents borrowing brought forward from next year to take advantage of cheap financing costs, this has reduced EMEs' funding costs. But it could also reflect lenders moving down the credit quality spectrum in search of higher returns. Moreover, unlike sovereigns, many corporate borrowers are unrated with limited public information on their creditworthiness. In Russia, whereas the government's outstanding external debt is falling, the private sector's is rising quickly, albeit from a low starting point. And to the extent that recent corporate issuance in Russia is rated, most of it is sub-investment-grade (Box 5).

However, from a UK perspective, although UK-owned banks' exposures to EMEs have increased strongly in the past two years, the average quality of these exposures, proxied by the sovereign rating of the borrower, has increased (Chart 1.73).

As discussed in the June 2004 *Review*, bank lending to households is growing strongly in emerging Europe (Chart 1.74). And in some countries sizeable loans are being made in foreign currency. This seems to have been partly financed over the past year by strong interbank borrowing from BIS-area banks in foreign currency (Chart 1.75). There is a risk that household borrowers in some EMEs do not fully realise the foreign exchange risk they are taking on. This could materialise as a credit loss to the lending banks.

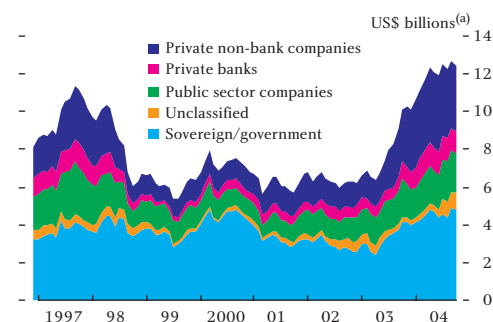
Slowdown in China

In China, the rapid growth in output over the past decade and continuing economic liberalisation mean that its economic conjuncture and policies are now having a significant impact upon the wider world economy and financial system.

There was a steady slowdown in the Chinese economy in the first half of the year, confined to the domestic corporate sector. But more recent data give conflicting evidence of whether the slowdown has continued since.

The annual growth in bank lending has been on a steady downward path during this year, from 20% in March to 13% in October – well below the authorities' 16%–17% target range. There are also reports of a severe shortage of credit in some sectors. But the annual rate of growth in investment and industrial production stopped falling in June (having declined rapidly earlier in the year). Companies are probably financing spending, to some extent, from outside the official banking system. The growth rates in retail sales and exports remain buoyant (Chart 1.76). Moreover, although annual consumer price inflation has fallen since the June 2004 *Review*, to 4.3% in

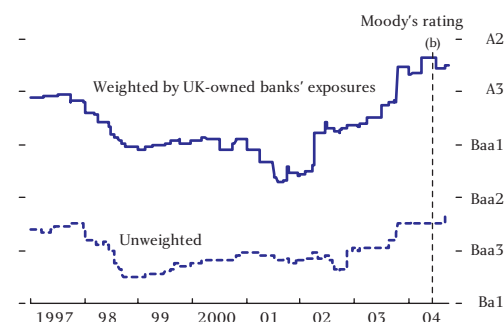
Chart 1.72
EME external bond issuance January 1997–October 2004



Source: Dealogic.

(a) Twelve-month moving average.

Chart 1.73
Average sovereign credit ratings for selected EMEs^(a)

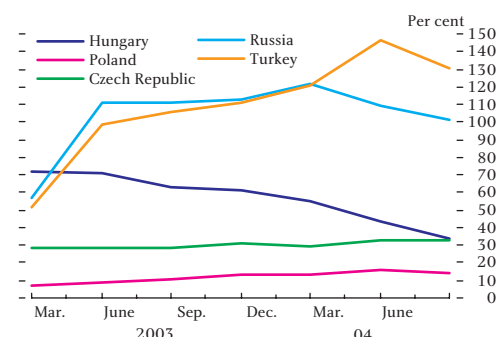


Sources: Moody's Investors Service, Bank for International Settlements and Bank calculations.

(a) Dotted line is a simple arithmetic average of the credit ratings of 20 EMEs' exposures. Solid line weights the credit ratings by UK-owned banks' international claims at the time.

(b) June 2004 *Review*.

Chart 1.74
Annual growth in credit to households for selected emerging European countries^(a)



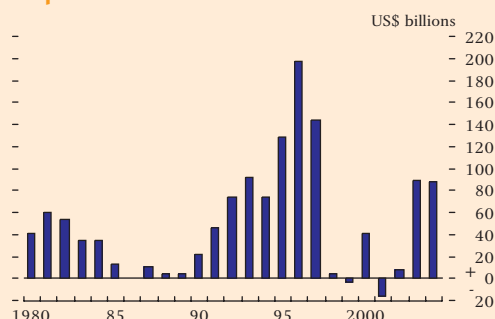
Sources: National central banks.

(a) Lending consists of both domestic and foreign currency.

Box 5: Are there risks of emerging market debtors over-borrowing?

Chart A

Net private debt flows to EMEs^(a)

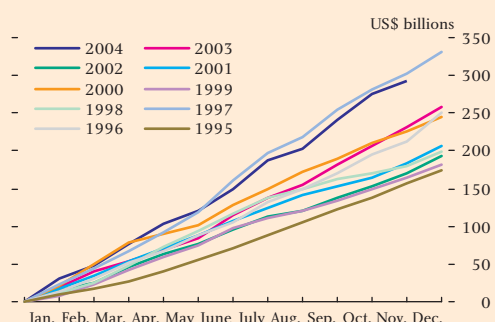


Source: Institute of International Finance.

(a) Estimate for 2003, forecast for 2004.

Chart B

Cumulative gross issuance of debt by EMEs^(a)



Source: Dealogic.

(a) Debt includes international bonds and syndicated loans. November data estimated by using data from 1-15 Nov. and linearly interpolating to form end-month data.

The rapid growth in foreign currency capital inflows, much of it short term, contributed to the financial crisis in a number of East Asian economies in the second half of the 1990s. In the aftermath of the crisis, net debt flows to emerging market economies (EMEs) dried up, but have again grown strongly over the past two years (Chart A). Moreover, gross issuance of foreign currency debt – bonds and syndicated loans – during this year has returned to levels last seen in 1997 (Chart B). External equity issuance has also been strong, although less so than debt.

This renewed borrowing by EMEs in the past two years partly reflects an improvement in fundamentals. Many EMEs have accumulated sizeable foreign exchange reserves, improved debt structures, adopted more flexible exchange rate regimes¹ and – in Asia and Latin America at least – are running current account surpluses. Therefore, the level of debt that EME borrowers can sustain has probably increased. The demand for EME debt has also been buoyed by low global interest rates. Moreover, longer-term structural inflows by pension funds from developed economies seeking to diversify their portfolios have increased the amount of funds available to EMEs.

Nonetheless, there is a risk that some emerging market governments or companies may borrow more than is sustainable in the medium term should the current benign conditions not continue. This would especially be the case if the strong output growth witnessed currently in many EMEs and high (non-agricultural) commodity prices are not maintained.

For governments, high indebtedness could lead to a future sovereign debt crisis. For companies, excessive leverage, especially if combined with a currency mismatch between assets and liabilities, could lead to widespread defaults on bonds and loans. The Asian crisis, in the second half of the 1990s, showed how a fast build-up of corporate debt can contribute to vulnerabilities in the financial system as a whole.

On the sovereign side, recent fiscal performance has improved in some highly indebted EMEs. For example, Brazil and Turkey are targeted to run primary fiscal surpluses of 4.5% of GDP and 6.5% of GNP respectively this year, while some other countries, such as Romania and Chile, have decided to cancel planned external debt issuance altogether. And a number of EMEs have accumulated sizeable foreign currency assets. However, the ratio of government debt to GDP, on average, in EMEs is estimated to

(1) According to the IMF (IMF World Economic Outlook (September 2004)), the proportion of emerging markets with fully floating exchange rates has risen from under 20% in 1998 to 40% today.

have risen by 6.5% of GDP since 2001.¹ Moreover, despite strong output growth, a number of EMEs (for example, the large new member states of the EU) continue to run primary fiscal deficits.

Although gross foreign currency debt issuance by both EME sovereigns and companies has been close to record levels this year, corporate sector issuance has increased particularly rapidly. Unlike sovereign debt, the majority of corporate issuance has been unrated, especially in Asia (Chart C), so lenders are increasing their exposures particularly to borrowers in EMEs about whom there is likely to be limited information on creditworthiness. One of the lessons of the Asian crisis is that lending to relatively untransparent borrowers carries the risk of not being able to identify potential vulnerabilities.²

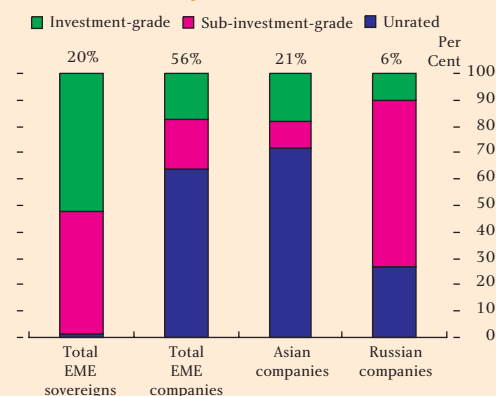
Corporate bond and syndicated loan issuance has risen particularly rapidly in Russia this year – by 52% in the year to mid-November over the same period last year. Most of this issuance has been sub-investment-grade (Chart C) but half has been made by oil and gas (related) companies which should be able to generate strong foreign currency earnings (if energy prices remain high). However, metal producers, banks and telecommunications companies have also been undertaking large amounts of issuance. Anecdotal evidence suggests that investors, particularly from Europe, are buying Russian debt to benefit from the generally improved macroeconomic outlook there. Given that the government has reduced its external debt (and built up a large cushion of foreign exchange reserves), investors instead have switched their exposures to companies. Although external private sector debt in Russia is low by EME standards, it has increased rapidly of late – from 1% to 9% of GDP in the two years to end 2003 (Chart D). Banks from the BIS area as a whole increased their international claims on Russia by 36% (US\$46 billion) in the year to 2004 Q2. UK-owned banks alone increased exposures by 80%, mainly to the non-bank private sector, but this level of exposure remains small, at around 1% of UK-owned bank exposures to all EMEs (Chart E).

Overall, as yet, there is no widespread evidence of EMEs increasing indebtedness sharply. But there is evidence in some countries of strong borrowing by unrated or low-rated firms. Given the lack of transparency of many companies, and the role that corporate defaults have played in previous financial crises, this trend deserves continuing monitoring.

(1) This estimate is based on the mean increase in gross general government debt to GDP of 15 EMEs: Brazil, Chile, Columbia, Mexico, Uruguay, India, Malaysia, Philippines, South Korea, Thailand, Czech Republic, Hungary, Poland, South Africa and Turkey.

(2) Baumann, H and Nier, E (2003), 'Market discipline and financial stability: some empirical evidence', Bank of England *Financial Stability Review*, June, find that banks which are more transparent tend to be financially stronger. Further discussion of the link between transparency and stability can be found in Nier, E, 'Bank stability and transparency' in this Review.

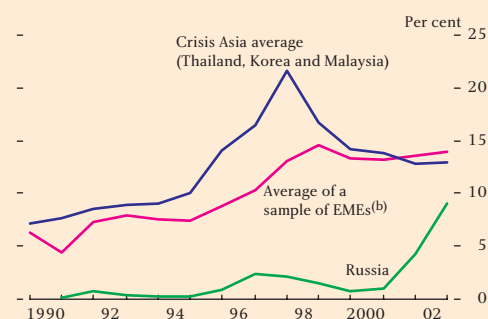
Chart C
Credit rating of foreign currency EME debt issuance in 2004^(a)



Source: Dealogic.

(a) Data from Jan. to 15 Nov. 2004. Percentage of total EME foreign currency debt issuance shown above bars.

Chart D
Private sector external debt relative to GDP^(a)

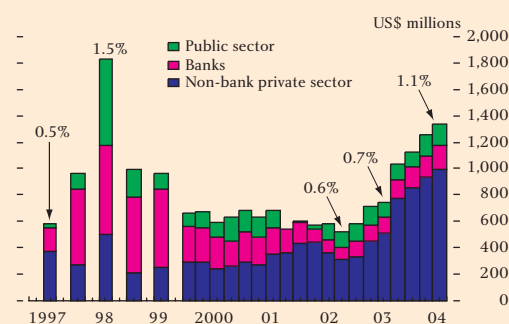


Sources: Institute of International Finance and Bank calculations.

(a) Private sector (non-bank) corporate debt of greater than one year original maturity.

(b) EME average is a GDP-weighted average of Brazil, Turkey, Colombia, Venezuela, South Korea, Malaysia, Mexico, Thailand, Russia, Czech Republic, Hungary and Poland.

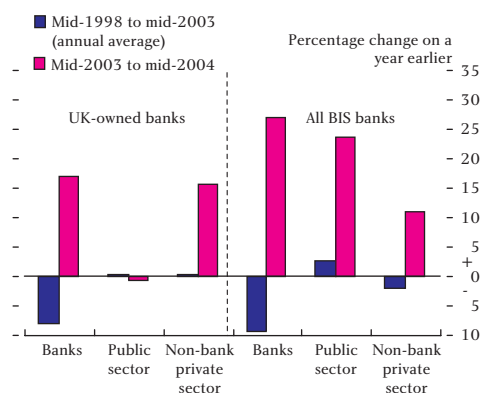
Chart E
UK-owned banks' cross-border claims on Russia^(a)



Source: Bank for International Settlements.

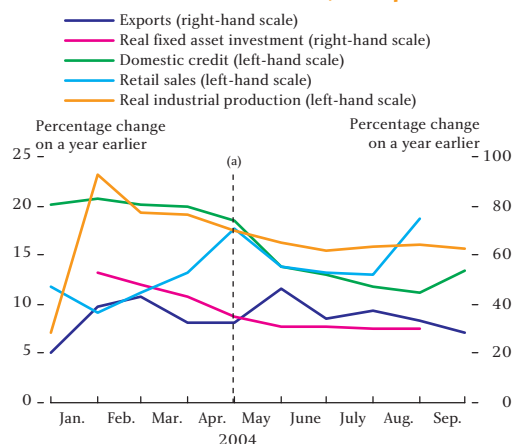
(a) UK cross-border claims on Russia as a percentage of total claims on emerging markets shown above bars.

Chart 1.75
BIS-reporting banks' consolidated
international claims on selected EMEs



Source: Bank for International Settlements.

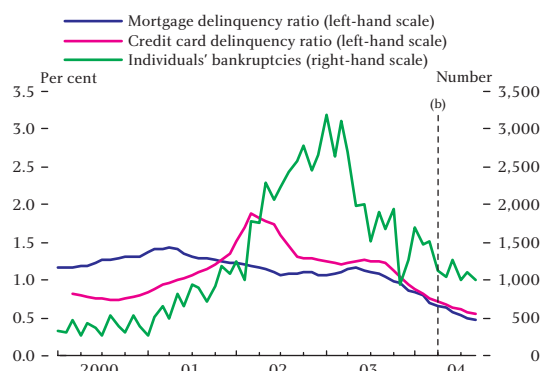
Chart 1.76
Chinese economic indicators, 2004



Sources: Thompson Financial Datatstream, China National Administration of Customs, National Bureau of Statistics of China, OECD and People's Bank of China.

(a) June 2004 Review.

Chart 1.77
Hong Kong: indicators of banks' credit quality^(a)



Sources: Hong Kong Monetary Authority and Hong Kong Official Receivers Office.

(a) The delinquency ratio represents the total value of loans more than three months in arrears as a proportion of the total outstanding loans.

(b) June 2004 Review.

October, annual goods inflation is strong and still rising (9.6% in September) and real interest rates remain negative on some measures. In response to these renewed risks of overheating, the authorities increased interest rates by 0.27% points at the end of October – the first rise in interest rates in nine years.

A 'hard landing' would increase further the fragility of the Chinese banking system, where non-performing loans, estimated at US\$200 billion (14% of GDP), represent a large contingent claim on the government. But there is recent evidence of improvement, at least amongst some of the bigger banks. The non-performing loan ratio of the major banks¹ fell, on official figures, by 3.3% points during 2004 Q2, while the NPL ratio at the Bank of China – one of the largest state-owned banks – fell to 4.6% in October and its capital adequacy ratio is now above the Basel minimum. And the recent liberalisation of capital controls is likely to result in an inflow of foreign investment, thus strengthening some Chinese banks further.²

A marked slowdown of the Chinese economy would not only increase domestic vulnerabilities but also would reduce export and GDP growth in the rest of Asia, especially in the Newly Industrialised Economies and Japan.³ World commodity prices too might fall, hurting commodity-producing EMEs further afield; between 2001 and 2003, China's imports of raw materials and fuels increased by 55% and 67% respectively.

The most tangible impact of any slowdown in China on the UK financial system would probably be via Hong Kong, where UK-owned banks have large exposures. However, currently at least, the Hong Kong economy continues to witness a strong and broad-based recovery. Although output growth moderated in the third quarter, it remained robust – real GDP rose by 7.2% year-on-year (and by 1.9% during quarter). Despite the hard currency peg, substantial liquidity in the money market has meant that bank lending rates in Hong Kong have risen by less than the increase in US rates. Consumer prices have stopped falling. The banking sector has also strengthened further. Asset quality has improved, with credit card delinquency rates falling to 0.55% in the third quarter – the lowest since the survey started in 1996 – and the mortgage delinquency rate falling to 0.4% in October (Chart 1.77).⁴

(1) The four large state-owned banks plus eleven major commercial banks.

(2) In August, HSBC bought a 20% stake in the Bank of Communications – the fifth largest bank in China. This is the first major foreign acquisition in the Chinese banking system.

(3) See Eichengreen, B, Rhee, Y and Tong, H (2004), 'The Impact of China on the exports of other Asian countries', *NBER Working Paper*, 10768, September.

(4) The delinquency rate is defined as the share of lending in arrears for more than 90 days.

2 Risks in the international financial system: key points

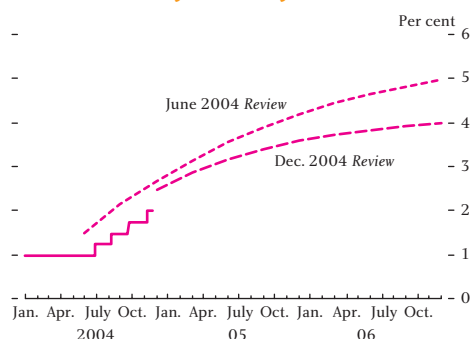
Financial market developments since the June *Review* have been consistent with favourable macroeconomic conditions. Global economic growth has remained robust and inflation expectations contained. Large complex financial institutions (LCFIs) have benefited from high rates of return on their equity and hold substantial cushions of capital. The downside risk that market yield curves might rise sharply in response to the recent increases in US official interest rates, prompting wider asset price volatility, did not materialise; and measures of realised and expected asset price volatility are generally lower.

But despite the benign operating environment, there remains the possibility that financial market participants may be underestimating key vulnerabilities and mis-pricing market risks. In particular:

- Financial intermediaries and investors appear to have continued their ‘search for yield’ in a wide range of markets, holding positions that could leave them vulnerable to instability in the pattern of global capital flows and exchange rates, credit events or sharper-than-expected interest rate rises. A number of market participants have also discussed the possibility that risk is being underpriced. In the event of an adverse shock, any over-accumulation of exposures from the mis-pricing of assets may result in an abrupt, and costly, adjustment of balance sheets;
- Hedge funds continue to experience strong inflows from investors. Given the relatively modest returns on many hedge fund strategies, some are increasing their involvement in less liquid markets. LCFIs face a number of challenges. These include low margins and subdued demand for traditional investment banking services, which has prompted expansion into other activities, including commodity markets and provision of prime brokerage services to hedge funds. LCFIs may also need to tackle the consequences of regulatory investigation and litigation, as well as manage their participation in the rapidly growing structured credit markets;
- Large UK-owned banks have also been active in international financial markets, and their gross inter-bank exposure to foreign-owned financial institutions, including LCFIs, is sizeable. This leaves them exposed to potentially significant counterparty credit risks. And they face market risk, through both their trading books and banking books.

Chart 2.1

US dollar money market yield curves^{(a)(b)}

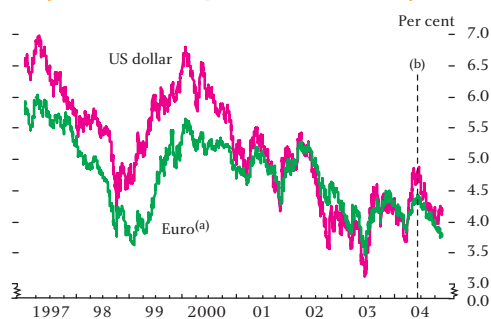


Source: Chicago Mercantile Exchange and Bloomberg.

- (a) The solid line is the US policy interest rate, ie the Fed Funds target rate.
- (b) The dotted and dashed lines are money market yield curves implied from three-month US dollar interest rate futures.

Chart 2.2

Ten-year nominal government bond yields

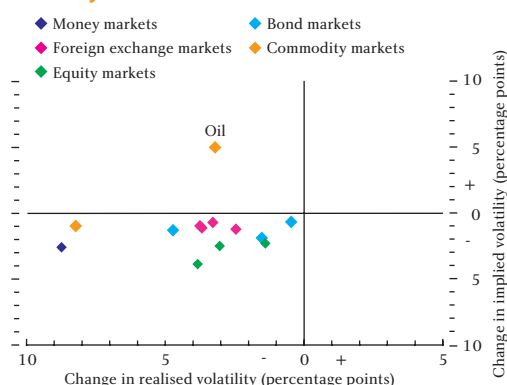


Source: Bloomberg.

- (a) German bonds represent the euro.
- (b) June 2004 Review.

Chart 2.3

Volatility of financial markets^{(a)(b)(c)(d)}



Sources: Bloomberg, Chicago Mercantile Exchange, LIFFE, New York Mercantile Exchange, Reuters and Bank calculations.

- (a) Implied volatility calculated from three-month option prices (or as near to three months as possible).
- (b) Realised volatility calculated as a 60-day rolling annualised standard deviation of returns.
- (c) Changes between June 2004 and Dec. 2004 Reviews.
- (d) Multiple data points for each market category indicate different financial instruments.

2 Risks in the international financial system

2.1 International financial markets

The market environment

At the time of the June 2004 Review, economic data suggestive of a stronger global cyclical upswing, particularly in the United States, had prompted upward revisions to financial markets' expectations of the path of official interest rates. Perhaps the major near-term challenge preoccupying financial intermediaries and traders was their exit strategies from a variety of positions characterising the 'search for yield' described in previous Reviews.¹

In the event, while increasing official interest rates by 25 basis points four times during this period, the US Federal Open Market Committee (FOMC) has repeated "that policy accommodation can be removed at a pace that is likely to be measured".² The effect of this on financial markets, together with generally less strong economic data in the summer and early autumn, particularly in the United States, and rising oil prices, seems to have been to support the view that US official interest rates will not rise as far, or as soon, as anticipated in the spring (Chart 2.1).

Partly against that background, government bond yields have fallen back at longer maturities (Chart 2.2); credit spreads have continued to narrow; and equity markets are for the most part higher. Actual volatility, and expected volatility implied by options, has declined in many markets (Chart 2.3). More generally, financial intermediaries and investors have maintained many of the strategies characterising the 'search for yield'.

The current pattern of financial asset prices is, for some market participants, consistent with a benign economic outlook – a view which emphasises actual and expected global growth, well-anchored inflation expectations, and generally stronger corporate and emerging-market sovereign balance sheets.

The sustainability and the possible longer-run implications of the 'search for yield' continue, however, to be widely discussed. Concerns centre on two possible adjustment mechanisms, which could have an impact on the stability of the financial system. In the shorter term, there could be an asset price correction at some point in particular markets, perhaps with spillovers to other parts of the system. A second risk is of credit problems over a

(1) See the June 2004 Review, pages 47–48, and the December 2003 Review, pages 17–18.

(2) See, for example, the Federal Reserve Board's Monetary Policy Report submitted to the US Congress in July 2004.

longer period, possible if a sustained mispricing of credit risk resulted in an overaccumulation of debt.

In this context, many commentators and market participants have contrasted the apparently benign outlook implied by financial asset prices with the range of uncertainties and sources of downside risk that they continue to perceive. Those enumerated by practitioners include: concerns about the sustainability of the current pattern of global capital flows; the possibility of more aggressive tightening of official interest rates than is currently implied by yield curves; risks to global growth from higher oil and other industrial commodity prices; and, perhaps, an event that precipitates a more general repricing of credit risk. On this view, low implied volatility in some markets is a puzzle, and may reflect implied volatility largely tracking realised volatility – which has declined in many markets – rather than being forward-looking.

Some possible downside risks

Foreign exchange markets

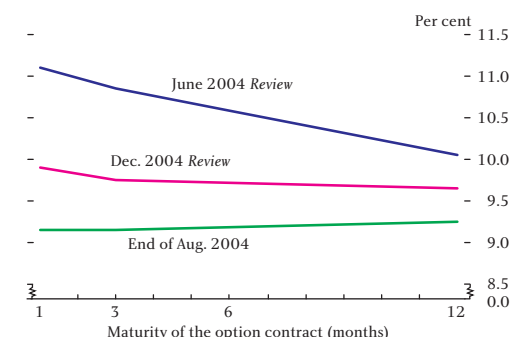
For much of the period, the major exchange rates were relatively stable, and implied, as well as actual, volatility fell. This encouraged a re-emergence of carry trades, with short positions against the US dollar funding long positions in, for example, the Canadian dollar, the euro and, early in the period, sterling.

Later in the period, the US dollar depreciated (by 5.9% on an effective basis over the period as a whole): the euro and some Asian currencies appreciated. Currency implied volatilities, which had fallen earlier in the period, rose (Chart 2.4). In part, this appeared to reflect renewed market concerns about the stability of the current pattern of international capital flows, given the large external financing needs of the United States. Foreign portfolio flows – including official flows – have tended in recent years to be more concentrated in US debt markets: as well as US Treasuries, these have included the Government Sponsored Enterprises (GSEs) and US corporate bonds (Chart 2.5). A potential risk, therefore, is that any reduction in the share of foreigners' saving going into these assets could affect their required return, with actual returns adjusting via some combination of a fall in dollar exchange rates and falls in the dollar price of these assets.

The June 2004 *Review* noted that the exchange rate policies and investment strategies of a number of Asian authorities would be relevant to developments in currency and interest rate markets. Recent price movements in the renminbi non-deliverable forward market suggest that market participants have increased their expectation of a change in China's exchange rate policies (Chart 2.6). Some commentators have described the current arrangements as akin to a *de facto* second 'Bretton Woods' system.¹ Market contacts have suggested that the stability

Chart 2.4

Term structure of implied volatility for the US dollar/yen bilateral exchange rate^(a)

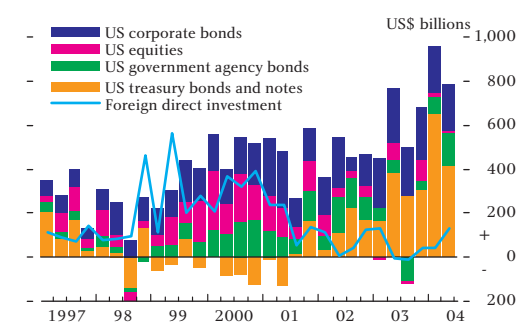


Sources: RBS Markets and Bank calculations.

(a) Implied volatility calculated from option prices.

Chart 2.5

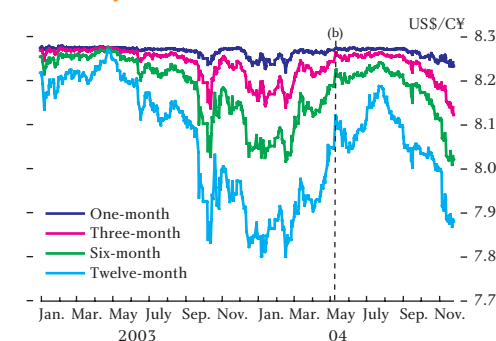
Foreign net purchases of long-term US securities



Sources: Federal Reserve Bank and Bank calculations.

Chart 2.6

Chinese yuan non-deliverable forwards^(a)



Source: JP Morgan Chase & Co.

(a) Non-deliverable forwards are used to speculate in non-convertible or restricted currencies (such as quasi-fixed exchange rate regimes). Contracts involve no exchange of principal and are usually settled in US\$.

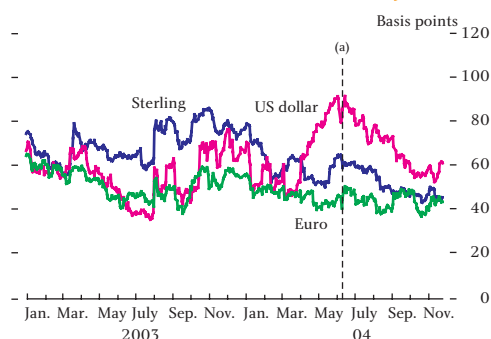
(b) June 2004 *Review*.

implied by this is an important consideration underpinning carry trades of various types as part of the 'search for yield' in currency and interest rate markets. To the extent that the official policies on which this anticipation of stability is based proved to be less durable than markets generally appear to expect, there is a risk of potentially abrupt movements in currency and interest rate markets. For some currency pairs, for example dollar/yen, any large adjustment might be complicated by hedging in options markets, notably in relation to so-called power reverse dual currency notes, as discussed in previous *Reviews*.²

Interest rate markets

Near-term uncertainty in the market about the course of monetary policy has apparently fallen since the spring (Chart 2.7). However, a risk that policy rates in the major economies could rise further and sooner than markets currently anticipate has been identified by a number of market participants. Indeed, the published results of a number of large US banks reveal that they had been positioned accordingly in the first half of the review period, particularly on the US yield curve, sustaining losses on those positions (Chart 2.8) (see also Chapter 1.3). Proprietary survey data were also consistent with many asset managers having expressed the same view (in the sense of being short relative to their interest rate duration benchmarks). The closing of outright short, or short-of-duration-benchmark, positions in US fixed-income markets has been suggested as one factor amplifying the decline in US yields. At the same time, market contacts have suggested that others – particularly perhaps in the official sector – may have been lengthening the duration of their portfolios.

Chart 2.7
Short-term interest rate uncertainty^(a)

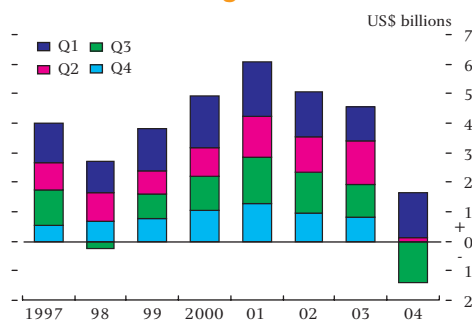


Sources: LIFFE, Chicago Mercantile Exchange and Bank calculations.

(a) Six-month volatilities implied from at-the-money options on three-month interest rate futures.

(b) June 2004 *Review*.

Chart 2.8
Interest rate trading book revenues for US banks and savings institutions^{(a)(b)}



Source: Federal Deposit Insurance Corporation.

(a) Trading revenues comprises gains/losses on positions and fees.

(b) For banks and savings institutions with assets greater than US\$100 million. From March 2000, those with trading assets less than US\$2 million are exempt from the reporting requirement.

It is hard to know the extent to which financial intermediaries have hedged their exposures to interest rate risk. Some have suggested that hedging was one element in large interest rate options trades seen on US and UK exchanges in the autumn. However, were the risk of sharply higher yields to materialise – as anticipated by some in the spring – it is possible that financial intermediaries would face quite a challenge in managing the various strategies that constitute the 'search for yield', with potential knock-on effects to, for example, swap and credit spreads.

Equity markets

Equity markets in the major industrial economies have for the most part risen since the previous *Review* (Chart 2.9). Despite

(1) Dooley, M, Folkerts-Landau, D and Garber, P (2003), 'An essay on the revived Bretton Woods system', NBER Working Paper no.9971 (September); and Obstfeld, M and Rogoff, K (2004), 'The unsustainable US current account position revisited', NBER Working Paper no.10869 (October).

(2) See 'Box 3: Structured notes and the US dollar/yen exchange rate' in the June 2003 *Review*, page 43.

moderating corporate earnings growth and higher oil prices, equity markets appear to have been supported by lower risk-free rates. One category of downside risk that some market participants have identified is a shock to global oil supply, resulting in oil prices rising significantly higher than recent levels, and so potentially sufficient both materially to reduce global growth and to raise inflation expectations. While this would represent a material downside risk to global equity markets, options-derived skews on major equity indices have become slightly less negative over the review period (Chart 2.10).

High corporate profitability in some of the major economies has resulted in companies returning cash to shareholders in the form of higher dividends and share buy-backs. As well as releveraging balance sheets, this may, at least in the short run, have added further liquidity to the 'search for yield' by investors as the cash is redeployed.

Risks from the corporate sector

Another downside risk is a credit event that resulted in a, perhaps abrupt, repricing of risk. Potential sources of such risk might include a crystallisation of difficulties in a particular sector – possible examples are automobile manufacturing or the aviation industry – that resulted in a significant credit ratings downgrade, or even administration, for a particular firm. Alternatively, regulatory or judicial investigations and actions might have a sufficient impact in particular industries to result in significant movements in the prices of their debt and equity. The insurance sector has been a recent focus for the markets in this respect, with the price of default protection rising markedly for a brief period (Chart 2.11).

The global insurance industry has also been confronted with an unusually high frequency of natural catastrophes since the previous Review, notably the US hurricane season. Losses will be mostly borne by US primary insurers. Global reinsurers were little affected, partly because the losses were spread over a number of discrete events, rather than one large event.

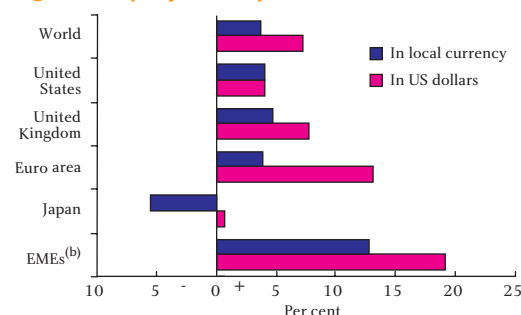
Less liquid markets

The risks outlined above have been the subject of stress tests by a number of financial intermediaries. Should any of them crystallise, a degree of comfort can be taken from the depth and liquidity of the major traded markets, and indeed from the generally strong balance sheets of the large complex financial institutions in particular. Market participants have, however, suggested that some other markets, which have experienced recent rapid growth associated with the 'search for yield', but which remain less liquid, could be vulnerable to less orderly adjustment.

An example of this was apparent in late summer when there were reports of large-scale sales of Japanese and other Asian

Chart 2.9

Regional equity index performance^(a)



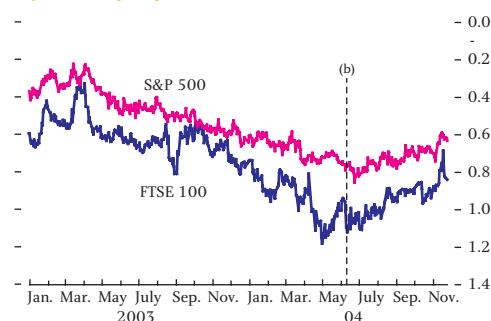
Sources: Morgan Stanley Capital International, Bloomberg and Bank calculations.

(a) Percentage change in market capitalisation weighted indices between the June 2004 Review and Dec. 2004 Review.

(b) Emerging market economies.

Chart 2.10

Implied equity index skews^(a)



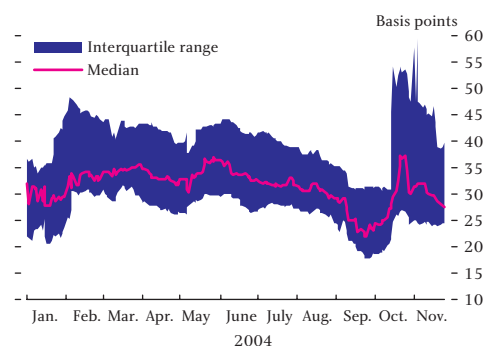
Sources: Chicago Mercantile Exchange, LIFFE and Bank calculations.

(a) A negative skew indicates there are more extreme outcomes below the mean of the distribution than there are above.

(b) June 2004 Review.

Chart 2.11

CDS premia for large insurers^{(a)(b)}

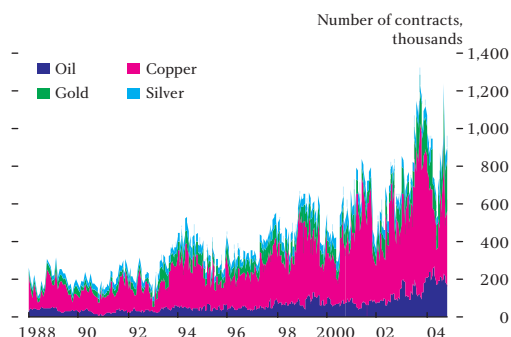


Source: Markit.

(a) Includes multi-line and monoline insurers, reinsurers and insurance brokers.

(b) Annual premia for credit protection on issuers using ISDA documentation, measured as mid-point between last bid and ask quotes of five-year senior debt CDS contracts.

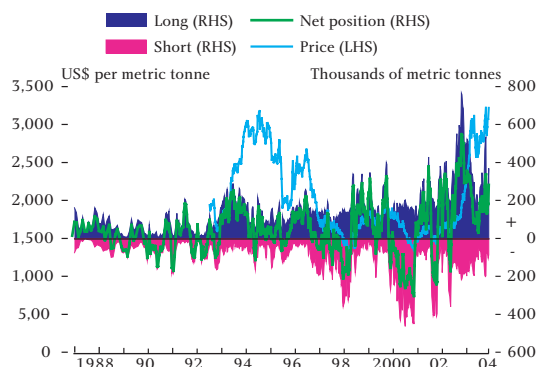
Chart 2.12
Speculative positions in commodity futures^(a)



Sources: Commodity Futures Trading Commission and Bank calculations.

(a) Sum of long and short non-commercial positions, ie positions unrelated to commercial hedging activities.

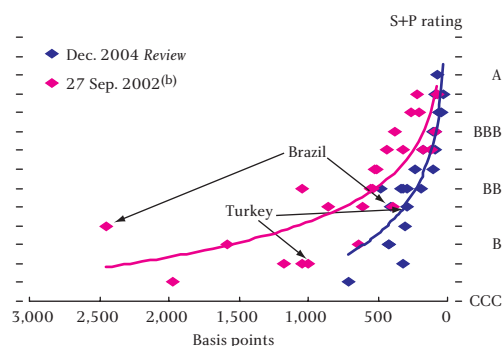
Chart 2.13
Speculative positions in copper futures^(a)



Sources: Commodity Futures Trading Commission and Bank calculations.

(a) Non-commercial positions, ie positions unrelated to commercial hedging activities.

Chart 2.14
Sovereign credit rating and bond spreads for selected EMEs^(a)



Sources: JP Morgan Chase & Co. and Standard & Poor's.

(a) Lines represent logarithmic best-fit lines. Ratings are plotted linearly.
 (b) Peak in bond spreads.

convertible bonds by hedge funds and bank trading desks. This appears to have been prompted by falls in the mark-to-market value of convertible bonds as implied equity volatility declined, perhaps exacerbated by retail investors effectively selling volatility by purchasing structured notes with embedded optionality.¹

Commodity markets

The sharp rise in commodity prices has drawn new capital into these markets. Data on speculative positioning bear this out to an extent (Chart 2.12). Many have associated the sharp single-day fall in some industrial metals prices in the autumn with speculative activity (Chart 2.13). At the same time, investors are turning their attention to commodity markets, as part of a wider trend towards increasing their portfolio allocations to so-called 'alternative asset classes'.² In many cases, their exposures to the commodities sector appear to take the form of investments in products linked to commodity indices; or of investments in, for example, those hedge funds that trade commodity markets.

Emerging market economies (EMEs)

Just as the widening of credit spreads in the spring was particularly pronounced for emerging market sovereign and corporate debt, so too has been the subsequent spread narrowing. EME equity prices have also risen strongly, especially in emerging Europe and Latin America.

Low funding costs have resulted in strong foreign currency issuance of bonds and syndicated loans this year, especially by EME companies (see Chapter 1). Some contacts have drawn attention to record high sales of heavily over-subscribed issues of Russian corporate bonds, despite concerns about property rights highlighted by the Yukos case and difficulties in the banking sector. More generally, the narrowing of sovereign spreads since their peak in autumn 2002 suggests a significantly larger perceived reduction in credit risk than do ratings agencies' credit upgrades, especially among lower credit quality sovereigns (Chart 2.14). However, models of spreads based on fundamentals suggest that EME spreads remain higher than predicted.

Market contacts report that the 'search for yield' in EMEs, in particular via carry trades, has re-emerged. However, there have also been suggestions that recent flows into EMEs, which have

(1) See 'Box 5: Convertible bond arbitrage' in the June 2001 Review, page 73; and Rule, D, Garratt, A and Rummel, O (2004), 'Structured note markets: products, participants and links to wholesale derivatives markets', Bank of England Financial Stability Review, June.

(2) See the box 'Search for alpha' in the Bank of England Quarterly Bulletin Autumn 2004, pages 272–273.

increased further in 2004 (Chart 2.15), will be less prone to reversal. Hedge funds and institutional investors are reported to be showing interest in EMEs on a longer-term basis than in the mid-to late-1990s. It is difficult to evaluate such judgments, since they are not dissimilar from those made in the mid-1990s. A protracted period of stability, with more modest returns than during the recent rally, may be necessary to embed these holdings in long-term portfolios.

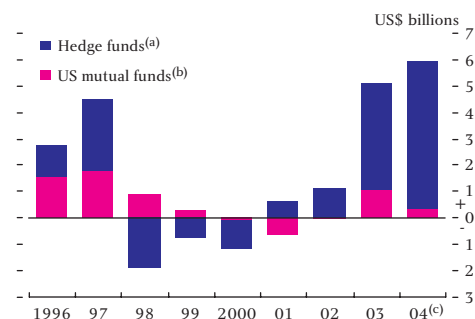
Credit markets

Since the relatively brief repricing of risk and tightening of credit conditions in the spring, many of the trends in credit markets described in the June 2004 *Review* have re-emerged, and in some cases may have intensified (Chart 2.16). A general narrowing of credit spreads is consistent with an improved outlook for corporate credit risk; only a few troubled sectors, such as airlines and the automobile industry, are exceptions. With generally modest demand for net external finance, spreads have fallen to equilibrate the demand for credit risk exposure with supply. The questions are whether risk is being priced properly, and to what extent the search for yield is leading to excessive leverage – for example in the leveraged buy-out and structured credit markets. Issuance by sub-investment-grade companies has remained relatively high, which in the past has been a precursor of an increase in defaults (Chart 2.17).

In the syndicated loan market, contacts report lengthening maturities and further weakening in terms and conditions. This is particularly the case for leveraged loans, for which demand has continued to be strong in the United States and Europe (Chart 2.18). Leverage multiples are reported to be near late-1990s highs (including examples of over six times equity), and covenants have been relaxed. However, the market may now be less concentrated by industry sector than in the late-1990s (when the focus was the technology, media, and telecommunications sector), although refinancing of cable companies has been one pocket of concentration in Europe. It also seems that risk transfer may be aided by a greater share of loan issuance being taken up by non-banks, including, for the moment, hedge funds; and by greater syndication of loans bridging to high-yield debt issuance – although it remains to be seen to what extent these developments will persist if credit conditions tighten.

Risk transfer also increasingly occurs via the structured credit markets, which have continued to expand very rapidly. One driver is said to have been European and Asian regional banks seeking to increase their international credit exposures synthetically, apparently on the view that they could build a higher quality and more diversified book more easily that way than in the cash loan markets.

Chart 2.15
Investment in EME securities



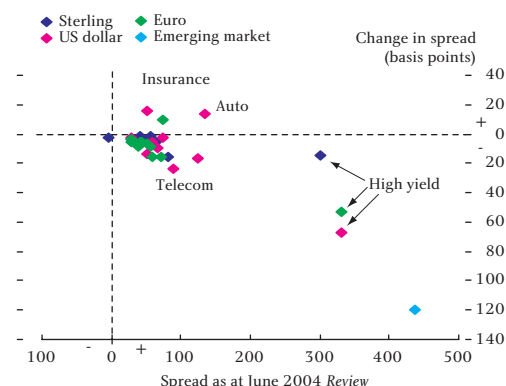
Sources: TASS Research, Investment Companies Institute and Bank calculations.

(a) Net capital inflows into EME hedge funds reporting to TASS.

(b) Institutional investment in EME equity US mutual funds.

(c) Data for 2004 are annualised.

Chart 2.16
Changes in regional and sectoral bond yield spreads^{(a)(b)(c)}



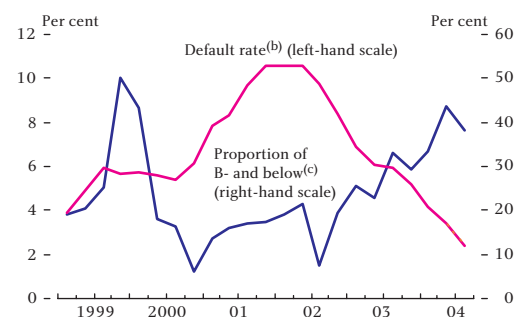
Sources: Merrill Lynch and Bank calculations.

(a) Spread over swaps.

(b) Each point represents a bond index from the Merrill Lynch Global Index System.

(c) Changes in spread between the June 2004 *Review* and Dec. 2004 *Review*.

Chart 2.17
US bond issuance versus default rate^(a)



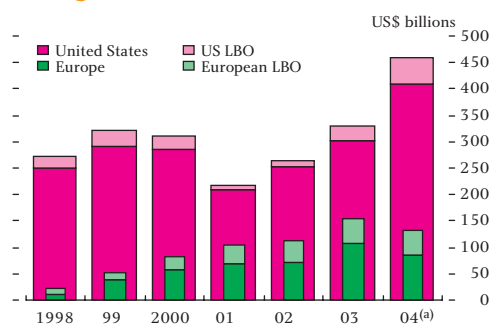
Sources: Moody's Investors Service, Thomson SDC Platinum and Bank calculations.

(a) S&P ratings at launch.

(b) Twelve-month issuer-weighted speculative-grade default rate.

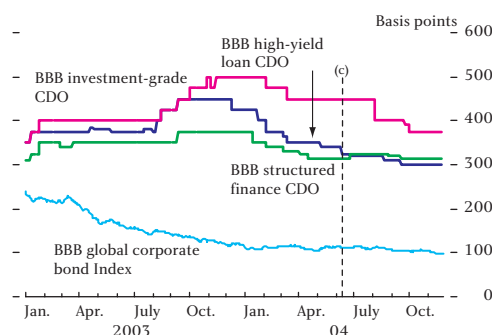
(c) Proportion of B- and below rated US domestic bond issues out of total sub-investment-grade issues.

Chart 2.18
Leveraged loan issuance



Sources: Loan Pricing Corporation and Bank calculations.
(a) 2004 data are annualised based on 2004 Q1-Q3 data.

Chart 2.19
Structured credit spreads^(a) versus bond yield spreads^(b)



Sources: JP Morgan Chase & Co. and Merrill Lynch.
(a) Spreads over Libor on BBB-rated tranches of collateralised debt obligations (CDOs) with a variety of underlying assets.
(b) Spreads over swaps for BBB-rated corporate bonds (CDS premia generally trade higher than bond or loan spreads).
(c) June 2004 Review.

The structured credit markets have, indeed, made it possible for more investors to diversify and leverage credit portfolios – in other words, some previously missing markets now exist. Recently, the renewed compression in corporate bond spreads has spurred greater and more complex use of leverage – for example, so-called CDO-squared (and, more recently, CDO-cubed) – as dealers seek to assemble tranches of portfolios that meet investors' return, risk and credit rating criteria while also yielding expected profits for the arrangers (Chart 2.19). But the 'search for yield' may well have driven spread compression too far. For example, some of the largest declines in credit spreads this year have been in companies with wide credit spreads given their credit rating. In addition to the influence of economic fundamentals, declines in the spreads of these companies are said, by many practitioners, also to reflect their inclusion in structured credit portfolios. This is because their relatively wide spreads allow the arranger to increase yields without affecting the ratings of the tranches.

When dealers arrange tranches of credit portfolios for investors, the investor effectively sells credit protection, leaving the intermediary with an unhedged position where they have effectively bought protection. Dealers typically aim to (delta) hedge by selling sufficient protection – in the single-name credit default swap (CDS) market, or using the DJ iTraxx credit indices – to offset their exposure to movements in credit spreads. If the tranches are leveraged, the size of the hedge will be a multiple of the tranche size. Market contacts say that the scale of these hedging flows has put downward pressure on CDS premia, which at times have fallen below the spread over Libor on an issuer's bonds. In this way, investor demand for portfolio tranches feeds through into narrower spreads on corporate bonds. Until the markets become fully liquid and efficient, it is possible that this could occasionally drive a wedge between fundamentals and market prices.

The distinguishing features of the commodity, EME and structured credit markets described above have been strong increases in participation by financial intermediaries and end-investors; relatively strong recent returns; and relative illiquidity. While developments in these markets may be warranted by fundamentals in each case, it is possible that they may also be characterised by a degree of exuberance. If so, they may be a component of a gradual overaccumulation of exposures brought about by any material mispricing of risk; or they may be vulnerable to a nearer-term adjustment which, in the presence of leverage, could potentially be quite abrupt.

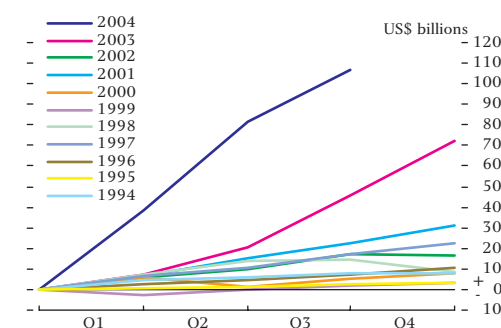
2.2 Hedge funds and leverage

Inflows into hedge funds have continued at record levels, despite the relatively modest returns of many strategies recently (Chart 2.20 and Chart 2.21). Low volatility and an absence of directional trends in many major markets for much of the year have contributed to an environment which many funds have found difficult. To generate returns, as described above, some have been increasing their involvement in less efficient markets, where mispricing – and so positive risk-adjusted returns – may conceivably be more likely. This has been especially marked in credit markets, where hedge funds have become more active in lending (for example second-lien tranches of syndicated loans) and distressed debt as well as CDO tranches. Consistent with this, some hedge funds have moved into private-equity-like strategies; and some private equity firms have set up hedge funds. In a separate development, it seems that a few hedge funds have now established vehicles to write catastrophe reinsurance. To some extent, such strategies obtain a return for illiquidity.

As previous *Reviews* have noted, a combination of leverage, relatively illiquid assets and, in many cases, model-based approaches to trading and valuation may, in the event of material asset price shifts, exacerbate stressed conditions. In such circumstances, much would depend on the maturity structure of funds' liabilities. Evidence here is mixed. A number of the largest and most high-profile funds appear to have succeeded in lengthening – or maintaining – the lock-ins they are able to impose on their investors. Others (perhaps particularly those reliant on investments by funds of hedge funds) appear still to offer their investors monthly, or quarterly, liquidity – and are thus potentially more at risk of sharp withdrawals of funds in the event of a change in sentiment. Some intermediaries may offer more frequent liquidity to clients who invest in hedge-fund-linked products.

Previous *Reviews* have highlighted the difficulty in measuring leverage in the hedge fund sector. In part this is because of the absence of directly observable measures. But it is also because leverage can take many different forms: individual investors and funds of funds may be leveraged, as well as the funds themselves; and hedge funds may have 'economic leverage', via derivatives or via assets that themselves embody leverage.¹ Crude proxies for funded leverage, for example lending to the Cayman Islands, where many funds are domiciled, have continued to show strong increases (Chart 2.22). Notwithstanding public reports of significant trading losses at individual large funds, market contacts have suggested that, taken as a whole, the fund sector is

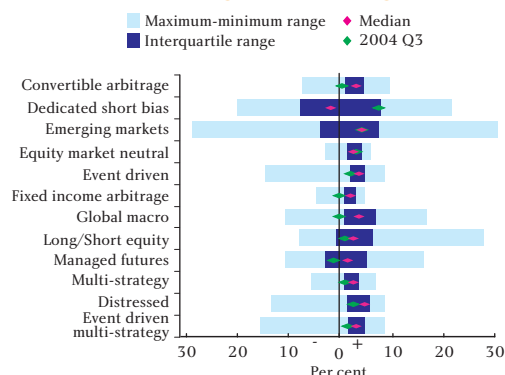
Chart 2.20
Cumulative flows of capital into hedge funds^(a)



Source: TASS Research.

(a) Figures are based on the TASS hedge fund database, which currently contains 3,023 reporting and 2,036 non-reporting funds.

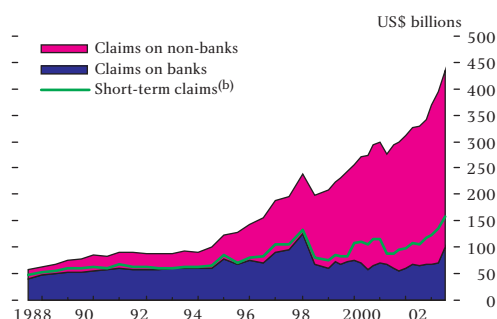
Chart 2.21
Performance of hedge fund strategies^(a)



Sources: TASS Research, Bloomberg and Bank calculations.

(a) Using data for 1994 Q1 to 2004 Q3.

Chart 2.22
Bank lending to entities domiciled in the Cayman Islands^(a)



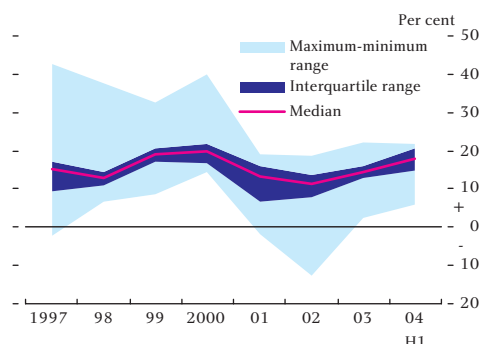
Source: Bank for International Settlements.

(a) Consolidated claims of BIS-reporting banks on the Cayman Islands.

(b) Claims with maturity of up to one year.

(1) As discussed most recently in 'Box 5: Hedge fund industry leverage' in the June 2004 *Review*, page 53.

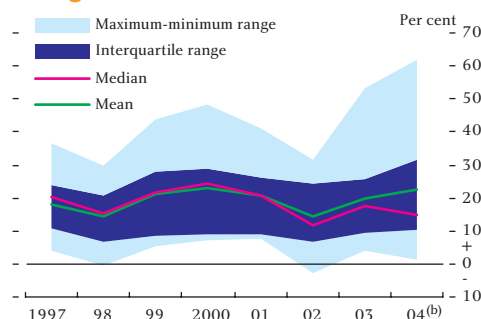
Chart 2.23
Return on equity for LCFIs^(a)



Sources: Earnings releases and Bank calculations.

(a) Net income divided by average shareholders' equity, annualised for 2004 H1.

Chart 2.24
Proportion of net revenues attributable to trading for LCFIs^(a)

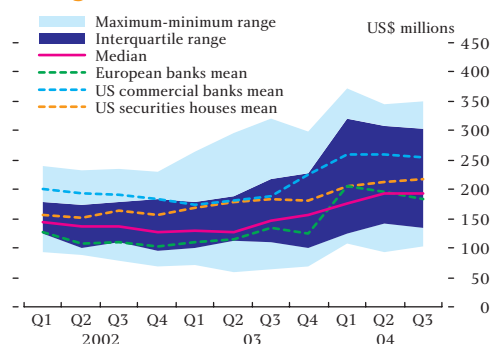


Sources: Earnings releases and Bank calculations.

(a) Net trading revenues as a proportion of total net revenues.

(b) 2004 data annualised from 2004 H1 or 2004 Q1 and Q2 data, contingent are LCFI reporting convention.

Chart 2.25
Trading book market risk for LCFIs^{(a)(b)}



Sources: Regulatory filings, earnings releases and Bank calculations.

(a) Average value-at-risk adjusted to a ten-day holding period, 99% confidence interval and US\$, as necessary.

(b) For LCFIs reporting quarterly value-at-risk, thus excluding one European bank and both UK banks.

not as leveraged as in 1998. Nevertheless, given strong growth and the apparent increase in 'economic leverage', it seems plausible to believe that potential leverage in the hedge fund sector may have been increasing in recent years. An important question is therefore whether investor expectations of hedge fund returns are moderating in line with the greater efficiency in markets potentially resulting from increased hedge fund activity and investment bank product innovation.

2.3 Major financial institutions

Large complex financial institutions

The large complex financial institutions (LCFIs)¹ as a whole continue to be financially strong, although a number of challenges have become more apparent since the June 2004 *Review*. In aggregate, the group continues to be highly profitable (Chart 2.23). Judging from market-based indicators, there has been a moderate reduction in concern over both creditworthiness and profitability. The price of protection against an LCFI default has fallen since the previous *Review*.

Profitability has varied significantly across business lines. Traditional activities such as investment banking, particularly for the US LCFIs, have been subdued until recently. In part this reflects conditions in primary financial markets, most notably mergers and acquisitions, and initial public offerings of equity. To maintain high profitability in aggregate, the LCFIs have relied on revenues from trading activities (Chart 2.24). More recently, markets that have traded in tight ranges, and low and falling volatility, have been reflected in lower trading revenues. In response, LCFIs in aggregate have increased their exposure to market risk (Chart 2.25), as measured by value-at-risk (VaR).² Some, however, reduced their VaR. But a fall in VaR does not necessarily indicate a reduction in the size of trading positions; it could simply be a mechanical effect of lower historical volatility being reflected in updates of the data sets that are used in many market risk systems.

The LCFIs face a number of challenges. First, as recent experience has emphasised, there is a risk of regulatory investigations and litigation. As well as direct costs such as legal expenses (Chart 2.26) and the absorption of senior management's time, there can be reputational consequences. Questions have been posed about the challenges inherent in

(1) The December 2001 *Review* page 81 described the criteria used to determine an LCFI peer group. It comprises: ABN Amro, Bank of America, Barclays, BNP Paribas, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan Chase & Co, Lehman Brothers, Merrill Lynch, Morgan Stanley, Société Générale and UBS.

(2) VaR is an aggregate measure of downside risk, defined as the maximum loss over a target horizon such that there is a low, pre-specified probability that the actual loss will be larger. See Jorion, P (2002), 'Fallacies about the effects of market risk management systems', Bank of England *Financial Stability Review*, December.

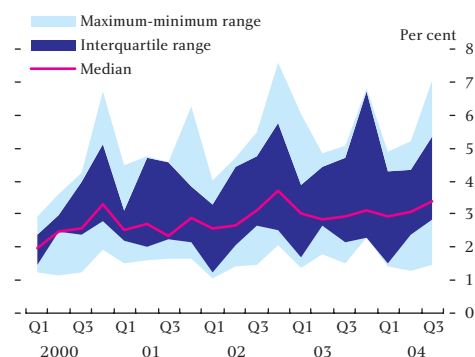
managing such large and complex institutions, and about how to balance the influence of the various different dimensions of matrix-management structures.

These risks are not confined to the banking sector but can extend to some of the LCFIs' most important counterparties, including two of the US Government Sponsored Enterprises (GSEs), Freddie Mac and Fannie Mae, and some global insurers. As noted above, the recent marked widening for a brief period of some insurance companies' CDS premia illustrated the effect that regulatory and judicial investigations can have on their perceived credit standing. For some, who are active as risk-taking intermediaries in global capital markets, maintaining a very high credit rating is intrinsic to their business model.

Second, the rapid growth in structured credit markets has brought challenges. Dealers' back offices seem to have struggled to keep pace with front offices, with backlogs of unconfirmed trades. There are questions about the models used, which have known limitations and are untested in stressed market conditions. More generally, it is unclear to what extent these new markets would remain liquid in a less benign credit or trading environment. On the one hand, active two-way markets with a wide range of participants now exist in most investment-grade single name CDSs and in the standardised CDS indices and index tranches. Dealers are planning regular price fixings in these instruments to provide greater transparency, including reference prices for more complex derivatives. And arbitrage between the portfolio and single-name credit markets, and between CDS, bond and loan markets, should help to underpin liquidity throughout the credit markets – for example, dealers could quickly move to exploit any misalignment between CDS premia and required returns on CDO tranches by structuring synthetic CDOs. On the other hand, the markets remain untested in the face of a sharp widening of credit spreads or a sharp increase in default correlation. The rapid growth of the structured credit markets, the narrowing of credit spreads and the wider 'search for yield' have drawn in many new participants during a period when modelling and operational infrastructure are still developing. It is unclear how they would respond in stressed market conditions.

Finally, LCFIs continue to adapt business models as competition reduces risk-adjusted returns in some markets. In some products, firms compete primarily to gain market share and league table ranking. For some while now, this has been most obvious in equity market block trades, often undertaken at narrow discounts, as highlighted in previous *Reviews*.¹ As time passes, this seems to be part of a broader pattern of equity market intermediation involving more risk taking, making it slightly

Chart 2.26
Professional fees paid by US LCFIs as a percentage of net revenues^{(a)(b)}



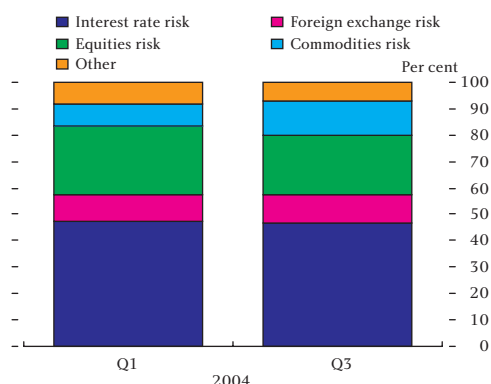
Sources: Company reports and Bank calculations.

(a) Professional fees used as a proxy for legal expenses.

(b) Data for five of the seven US LCFIs due to disclosure.

(1) See the December 2003 *Review*, page 29.

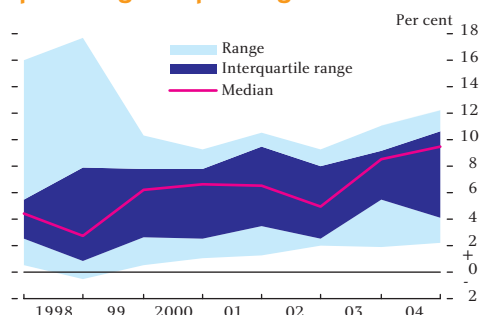
Chart 2.27
Trading book market risk for LCFIs^{(a)(b)},
proportions by market risk category



Sources: Regulatory filings, earnings releases and Bank calculations.

- (a) Average value at risk adjusted to ten-day holding period and 99% confidence interval.
(b) For LCFIs reporting quarterly value-at-risk, thus excluding one European bank and both UK banks.

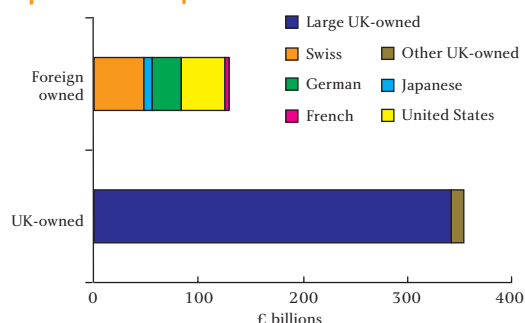
Chart 2.28
Large UK-owned banks' dealing income as
a percentage of operating income^(a)



Sources: Published accounts and Bank calculations.

- (a) Includes seven of the ten largest UK-owned banks.

Chart 2.29
UK-resident banks' participation in the
unsecured interbank market,
September 2004^{(a)(b)}



Source: Bank of England.

- (a) Lending in all currencies. Includes unsecured loans and holdings of CD and CP issued by other UK-resident banks.
(b) Unconsolidated data that include intra-group transactions.

more like fixed-income market intermediation. The range of markets covered by LCFIs generally has also been broadening. Notably, a number of LCFIs are increasing their involvement in commodity markets, either through adjustment of the composition of their trading risk (Chart 2.27) or through the purchase of commodity trading operations.

Perhaps the most significant developments, under way for a while now, centre around the servicing of hedge funds. In particular, competition to provide prime brokerage services has intensified (Box 6). Some LCFIs have taken further steps into the hedge fund sector, for example through the outright purchase of funds. Such acquisitions, together with a more explicit focus on in-house hedge funds at some LCFIs, may simply be an extension of their asset management business and so bring further revenue diversification. But experience suggests that to avoid costly mis-steps, acquisitions and expansion needs to be in line with long-term business strategy, and that appropriate risk management and controls need to be put in place and maintained.

2.4 Implications for the UK financial system

Large UK-owned banks too are active in the international financial markets discussed above, through their trading, funding, underwriting, and investment activities. Indeed, in the past three years some UK banks have increased their market activities as reflected in global league tables (especially bonds, syndicated loans, and foreign exchange). Although volatile, dealing profits of large UK-owned banks have also grown noticeably as a proportion of total income (Chart 2.28). This could be interpreted as another indication of greater financial market involvement.¹

Counterparty credit risk

UK banks have significant counterparty exposures to foreign-owned financial institutions, including the LCFIs discussed above. Around a fifth of large UK-owned banks' foreign on-balance-sheet claims are international claims against foreign banking sectors.² Foreign-owned banks are also significant participants in the London unsecured interbank market (Chart 2.29), although the size of this participation has not changed materially since the June 2004 Review.

(1) Dealing profits should, however, be interpreted with some caution. Some banks, for example, include the net interest income earned on the dealing book as dealing income. Net interest income on the dealing book can be influenced by factors other than short-term financial market activity. For example, if the yield curve is upward sloping and dealing positions are being funded at the short end of the yield curve, this will provide positive net interest income to dealing income.

(2) See 'Box 2: UK-owned banks' international exposures' in the June 2004 Review, page 28.

Box 6: Prime brokerage

As noted on pages 58–60, one of the challenges facing LCFIs is to continue to adapt their business models as risk-adjusted returns are apparently declining in some markets. For many, this has included placing increased emphasis on servicing hedge funds. Competition among major banks and securities houses for prime brokerage mandates remains strong. Prime brokerage in this context is a portmanteau term for a range of hedge fund services that may comprise many or all of: extension of (mainly secured) credit; securities lending; trade executions; cash management; clearing and settlement; custody; reporting, accounting and other fund administration services; technology platforms; and capital introduction (introducing potential investors to hedge fund managers).¹ The core of the prime brokerage relationship is financing of hedge funds' positions and clearing and settlement of their trades.

Three broad categories of prime brokerage can be identified, although there is some overlap between them and delineations may not in practice be clear-cut:

- *Equity prime brokerage*, sometimes referred to as 'traditional' prime brokerage, comprises, for the most part, secured financing of long equity positions, securities lending to cover short positions and associated custody services.
- *Synthetic prime brokerage* is a more recent development and typically involves enabling hedge funds to take positions using contracts for differences or total return swaps. The funds might otherwise have taken these positions by buying or selling short the underlying securities. The broker may hedge its resulting positions by trading in the underlying securities, or finding offsetting positions in the rest of its book. For new entrants to the industry, this may be part of a strategy to become an additional prime broker to the fund's main broker: this way, they can get funds' business without offering administrative and ancillary services.
- *Fixed-income prime brokerage* is targeted at macro and relative value fixed-income funds. It combines

elements of the two categories above, and involves providing a service covering some or all of bonds, repo, over-the-counter derivatives (such as swaps), foreign exchange and futures clearing. The exchange-traded derivatives and over-the-counter derivatives aspects of both fixed-income and traditional prime brokerage are sometimes referred to as *derivatives prime brokerage*. As part of this service, the prime broker may clear over-the-counter derivatives with other dealers by interposing itself between the fund and the dealer; that way, the prime broker has the potential counterparty exposure to the dealer.

Challenges for prime brokers

Risk management by prime brokers is generally thought to have improved in the past few years and many hedge funds – particularly among the largest – have themselves been increasing their own risk management capabilities. Market contacts, both in major banks and securities houses and in hedge funds, have suggested that there is a general determination in the industry 'not to repeat the 1998 experience'. Nevertheless, and particularly in the context of competition among prime brokers, a number of challenges remain.

Concerns have been expressed that competition is resulting in initial margin requirements (applied by prime brokers to hedge funds' positions) being relaxed. This is perhaps especially the case in synthetic and fixed-income prime brokerage, where much of the value comes from selling derivatives to hedge funds. The challenge for prime brokers is therefore to maintain an appropriate balance between the interests of the firms' trading desks and those of prudent credit control.

Prime brokers need to assure themselves that they have sufficient scope to ensure that their margin requirements are adequate in changing circumstances. Some prime brokers have reported pressure from hedge funds to give a commitment that margin terms will remain constant for a defined period, or to relinquish so-called 'termination events' that allow the prime broker to demand repayment of borrowing if the net asset value of the fund falls below

(1) See 'Box 5: Prime brokerage' in the June 2004 *Review*, page 56.

a certain trigger level – provided the hedge fund continues to meet its obligations to the prime broker in that period. From the point of view of the funds, the motivation is to help them manage their liquidity risks, especially in stressed circumstances. But prime brokers need to weigh that against their own need for flexibility to provide themselves with an adequate margin cushion in circumstances when market volatility increases.

As prime brokers expand the range of instruments in which they can provide a service, so the number of positions across which they can offer margin offsets, based on past covariances in the positions (so-called VaR-based margining) increases. While the motivation for this is based on prudent risk management principles, prime brokers will need to be sure that the terms they apply reflect their potential exposures in stressed conditions; and that their ability to net their exposures to funds in the event of default, potentially across different legal jurisdictions, is enforceable.

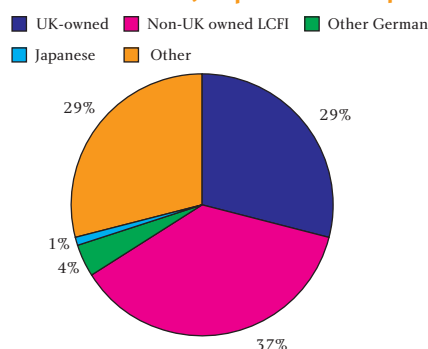
A related point, noted in the June 2004 *Review*, is that many funds – particularly the larger – have a number of prime brokers. From the funds' perspective, this is a prudent attempt to diversify their sources of liquidity. But individual prime brokers need to consider the implications for them of hedge funds having multiple

prime brokers, and their risk management approach where they lack a comprehensive picture of a fund's overall leverage and any concentration of its positions.

As discussed in the main text, hedge funds are said to be increasingly involved in less liquid and more 'exotic' markets, where positions may be taken in bespoke structured derivative instruments or in illiquid securities or loans, such as distressed debt. Prime brokers need to judge on what terms to provide financing for these positions. Considerations include whether the fund's leverage and the quality of its capital (for example the lock-in arrangements that apply to investors) are appropriate given the illiquidity of its assets.

These less liquid markets tend to be relatively specialised, and there may only be a small number of banks and securities houses actively participating and so providing liquidity. In this context, a few banks and dealers are conducting 'major player exit' stress tests to try to calibrate the effects on their positions – including exposures within their prime broker operation – of another bank or dealer (or large hedge fund) leaving particular markets. Other banks and securities houses may wish to consider, and similarly attempt to model, their own exposures in this context.

Chart 2.30
Large UK-owned banks' 'large exposures' to financial firms, September 2004



Sources: Bank of England and FSA regulatory returns.

Regulatory 'large exposures' returns submitted to the FSA¹ capture both on-balance-sheet and off-balance-sheet instruments. They show that large UK-owned banks have material counterparty exposures to LCFIs, investment banks, and other internationally active financial institutions. Furthermore, collectively these exposures are of the same order of magnitude as their exposures to other large UK-owned banks (Chart 2.30). Exposures to Japanese and German financial firms (excluding LCFIs) are more modest.

UK banks' wholesale market activities also result in counterparty exposures to non-financial companies. One channel is through UK banks' increasing share of syndicated lending (Chart 2.31), which is predominantly to non-financial firms. Another channel is via their role as sponsors in the asset-backed commercial paper (ABCP) market, where their participation has grown

(1) For regulatory purposes, 'large exposures' are defined as the largest twenty exposures equal to or under one-year maturity that are both larger than £250 million in size and over 5% of the Large Exposures Capital Base (LECB), plus any other longer-term exposures that equal or exceed 10% of LECB. LECB is defined as Tier 1 capital plus Tier 2 capital less any regulatory deductions.

significantly in recent years. In both cases, however, the ultimate risk to UK banks will depend on the extent to which exposures have been hedged or sold on, which is difficult to assess.

Market and liquidity risk

Some UK banks allocate a material proportion of their economic capital to cover market risk (although less than that allocated to credit risk). Market risks are typically classified as being in the 'trading' or 'banking' book, an accounting distinction also used by banking regulators.

The trading book

The largest UK-owned banks all disclose market risk in the trading book using a value-at-risk (VaR) method. Interest rate (or yield curve) risk continues to make up the majority of their VaR, with the rest consisting mostly of foreign exchange and equity risk. Average VaR as a percentage of quarterly earnings was little changed for UK banks in the six months to 2004 H1, following falls during 2003. VaR remains low for most UK banks when compared with US and European LCFIs (Chart 2.32).

However, it is well recognised that standard measures of VaR should be interpreted with some caution. They provide no information on the nature of potential losses beyond the reported confidence threshold, and for trading positions in particularly illiquid markets (such as distressed debt, high-yield credit and Mergers and Acquisitions (M&A) arbitrage strategies) the assumed holding period may not provide a sufficient time to liquidate positions. To address these types of issues, in their internal risk management banks tend to use a range of different VaR assumptions, and supplement VaR analysis with both stress tests and scenario analysis of market prices and market liquidity.

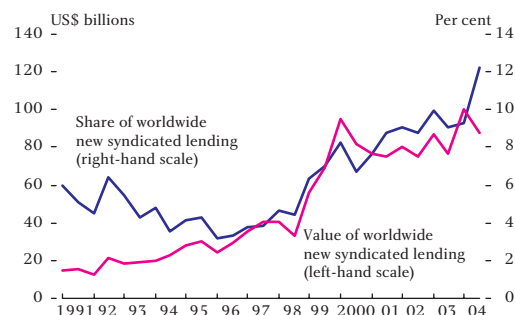
The banking book

Although increasing marginally, large UK-owned banks' trading books still make up the minority of total assets (Chart 2.33). But UK banks also take market risk in their banking books, to the extent that they run mismatches between the maturities and interest rate terms of their deposits and lending.

Disclosure of market risk in the banking books of UK banks is made according to Financial Reporting Standard 13 (FRS13), which requires that net liabilities open to repricing at different maturities are reported. However, as discussed in the June 2004 *Review*, this measure has a number of pitfalls, including a focus on contractual rather than behavioural maturities (which may differ because of factors such as mortgage prepayment and current accounts not being repriced regularly). Reflecting such weaknesses, for internal purposes UK banks use a number of alternative methods of measuring market risk in the banking book, including VaR, stress testing and scenario analysis. Implementation of Basel II may result in further improvement in

Chart 2.31

Large UK-owned banks' share of new worldwide syndicated lending^{(a)(b)}

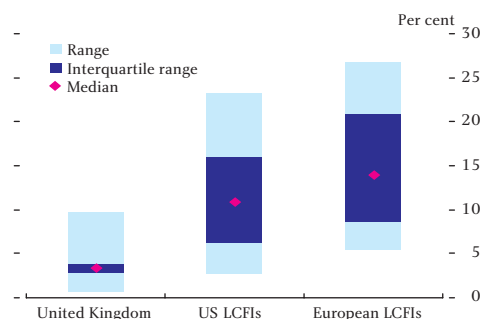


Source: Dealogic.

- (a) Includes cancelled loans, but excludes amendment and unsigned loans.
- (b) Where the actual proportions provided by each syndicate member are unknown, loan amounts have been split equally amongst participating banks.

Chart 2.32

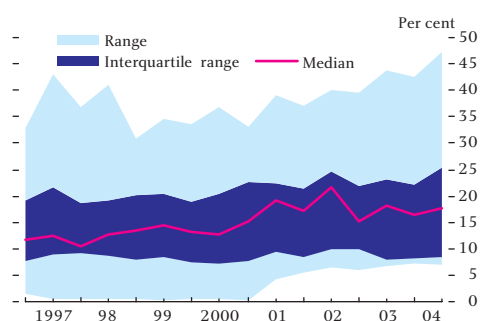
Average trading VaR as a percentage of average quarterly operating income, as at end 2003^{(a)(b)(c)}



Sources: Published accounts and Bank calculations.

- (a) Published VaRs have been adjusted to a ten-day holding period and a 99% confidence interval. This assumes independent and normally distributed returns.
- (b) Average quarterly income is calculated from annual income.
- (c) Data for six UK-owned banks, seven US LCFIs and six European LCFIs.

Chart 2.33
Large UK-owned banks' trading book assets
relative to total assets^{(a)(b)}



Sources: Bank of England and FSA regulatory returns.

(a) Includes data for banking groups' subsidiaries prior to merger or acquisition.

(b) Includes seven of the ten largest UK-owned banks.

market risk measurement and better disclosure. What publicly available data there are suggest that VaR in the banking book is larger than in the trading book for many large UK-owned banks. Nevertheless, despite the yield curve flattening since the June 2004 *Review*, UK banks have not reported material losses to the banking book.

3 UK financial sector resilience: key points

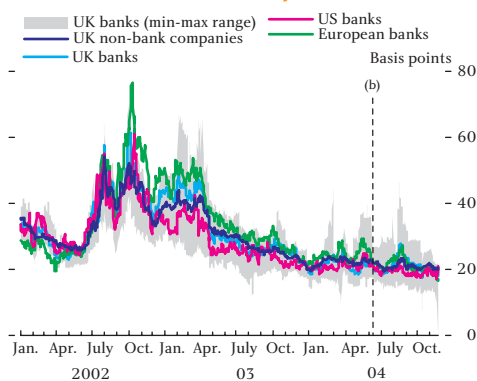
The UK financial system remains robust. The profitability and capitalisation of UK-owned banks has improved further since June, and their buffers of capital and high-quality liquid assets remain above the regulatory minima, strengthening the capacity of banks to manage the risks outlined in this *Review*. The operating environment for non-bank financial intermediaries, particularly for those in the life insurance sector, has also improved.

Some aspects of the operations of UK financial institutions, nevertheless, have implications for systemic stability should key market and credit risks crystallise. In particular:

- The growth of UK-owned banks' lending to households and firms continues to outpace the growth of funding from these sources. Although the ensuing 'customer funding gap' has stabilised following a steady increase between 1998 and 2003, it continues to be financed, in part, by short-term borrowing from foreign-owned banks in the interbank market. While UK-owned banks are developing alternative, longer-term, sources of funding, liquidity management could become more challenging should any individual bank come under financial pressure;
- A growing proportion of UK-owned banks' income is being derived from non-interest income. Although there are benefits from diversifying income sources, non-interest income could be more volatile than interest income and may be more susceptible to market risk;
- The trading and funding relationships between financial institutions, as well as the direct counterparty exposures of banks to each other, mean that shocks in one sector can rapidly spread across the financial system as a whole. These shocks can be amplified if there is a shared dependence on the liquidity of certain markets.
- Attempts to manage exposures linking financial institutions (for example, through off-balance-sheet exchange-traded derivative transactions) need to be pursued carefully to avoid excessive concentration of risks building up within particular parts of the financial system. Exposures between banks through the payment and settlement system also need similar management. Continued efforts to mitigate risks in the financial infrastructure important to UK wholesale financial markets – such as CREST, LCH.Clearnet Ltd and the Continuous Linked Settlement (CLS) system – are important in this regard.

3 UK financial sector resilience

Chart 3.1
Implied volatilities for large UK-owned banks and non-bank companies^(a)



Sources: Bloomberg, Thomson Financial Datastream and published accounts.

- (a) Data are available for nine large UK-owned banks, 39 other FTSE-100 companies, 22 continental European and 13 US banks.
(b) June 2004 Review.

As discussed in Chapters 1 and 2, the past six months has been a relatively benign period for UK financial stability. Credit losses suffered by large UK-owned banks remain subdued: new provisions have fallen; mortgage arrears and write-off rates remain at or near historical lows; and the number of UK corporate insolvencies has fallen further. World economic growth has been very strong in 2004. And financial asset price volatility has been subdued.

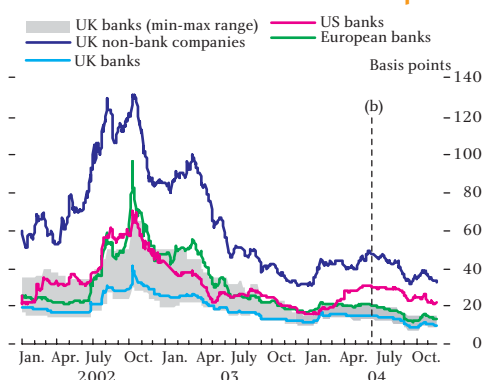
However vulnerabilities still remain: UK banks' credit card and commercial property lending growth have been particularly rapid; UK household indebtedness continues to increase relative to income; and there are still risks in the external environment. In international financial markets, some intermediaries and investors have continued their 'search for yield', leaving them vulnerable to credit events, sharper-than-expected interest rate rises and instability in the pattern of global capital flows.

3.1 The large UK-owned banking sector¹

Market assessment

Market indicators suggest that there are few concerns amongst market participants about the resilience of large UK-owned banks. The FTSE 350 Bank Index has risen by around 5% since the June 2004 Review, broadly in line with the FTSE 350 Index. The expected volatility of UK banks' share prices, as derived from option prices, has remained relatively low (Chart 3.1). And the implied probability of default of UK banks – inferred from a model based on the behaviour of bank equity prices – has fallen further since the June 2004 Review, touching its lowest level since April 1998.² That is consistent with more direct measures of the credit risk associated with UK banks. Credit default swap (CDS) premia for large UK-owned banks, for example, have fallen since the June 2004 Review, and remain low compared with those for US and European banks and UK non-bank companies (Chart 3.2). However, market indicators should be interpreted with caution. As discussed in Chapter 2, some of the recent

Chart 3.2
Credit default swap premia for large UK-owned banks and non-bank companies^(a)



Sources: Bloomberg, Credit Trade, JP Morgan Chase & Co, Mark-it Partners, Thomson Financial Datastream and published accounts.

- (a) Data are available for seven large UK-owned banks, 37 other FTSE-100 companies, 22 continental Europe and twelve US banks.
(b) June 2004 Review.

(1) This analysis of the UK banking sector concentrates on the ten largest UK-owned banks, which together take 85% of deposits from UK-resident households and private non-financial companies. In November, Abbey National, the sixth largest UK-owned bank, was acquired by Banco Santander, the largest Spanish-owned bank. Abbey has been retained in the peer group of large UK-owned banks used in this Review, given that the acquisition occurred after the period of the latest financial results (2004 H1). The June 2005 Review will revisit the criteria used to select a peer group of banks for UK banking sector surveillance.

(2) This refers to a Merton-style model in which the underlying value of a bank's assets is assumed to follow a stochastic process estimated from the market value of the bank's equity price and other outstanding liabilities. For the purpose of the model, non-equity liabilities are assumed to comprise only customer deposits.

general reduction in spreads and implied volatilities may be due to lower risk premia, perhaps associated with investors' 'search for yield'; as well as improvements in economic fundamentals.

Credit rating agencies' evaluations provide another indicator of the perceived strength of banking sectors; in principle, these should not be affected in the same way by changing risk premia. Financial Strength Ratings reflect an assessment of a bank's strength on a stand-alone basis.¹ These ratings remain high for large UK-owned banks, in line with those in the mid-1990s and with current ratings for most foreign-owned large complex financial institutions (LCFIs) (Chart 3.3).²

Profitability and capitalisation

The large UK-owned banking sector's profitability and capitalisation remains high by the standards of the past 15 to 20 years, as shown in Box 7. Reported profits and capital for the sector have also increased since the June 2004 *Review*.

Profitability

The median return on equity of large UK-owned banks rose to 27.3% in 2004 H1, from 24.1% in 2003 (Chart B, in Box 7). The dispersion of profitability across the large UK-owned banking sector narrowed – the single large UK-owned bank that made losses in 2002 and 2003 returned to profit in 2004 H1.

Pre-tax profit margins for the sector rose in the first half of the year, because of reductions in both the aggregate cost-income ratio and new provisions (Chart 3.4): the former fell from 54.0% for the full year in 2003 to 51.4% in 2004 H1, and the latter fell to around 0.35% of total loans (Chart A, in Box 7). Indeed, profitability in 2004 H1 was either above or near the upper end of Consensus forecasts for the majority of the large UK-owned banks.

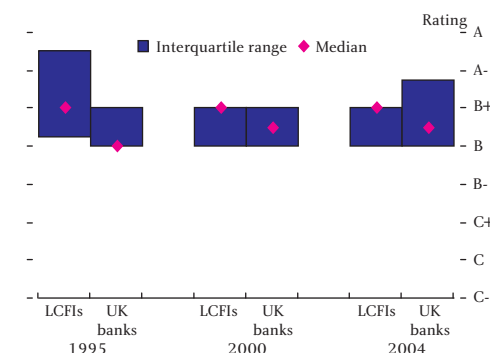
The increase in overall profit margins, however, masked a continued change in the composition of income (Chart 3.5). Net interest income grew by just 1.7% in the first half of 2004, compared with total income growth of 7%. Net interest margins have experienced a steady decline over the past 20 years (Chart 3.6), and fell further in the year to 2004 H1. The impact on net interest income was offset in 2004 H1 by rapid lending growth (see Chapter 1). A reduction in this lending growth would put downward pressure on UK banks' income.

(1) Moody's Financial Strength Ratings were first introduced in 1995. They exclude consideration of government support to the rated bank, and hence reflect an assessment of strength on a stand-alone basis.

(2) The December 2001 *Review* (page 81) describes the criteria used to determine an LCFI peer group. The group is as follows: ABN Amro, Barclays, Bank of America, BNP Paribas, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan Chase, Lehman Brothers, Merrill Lynch, Morgan Stanley, Société Générale, and UBS.

Chart 3.3

Moody's Financial Strength Ratings of large UK-owned banks and LCFIs^(a)

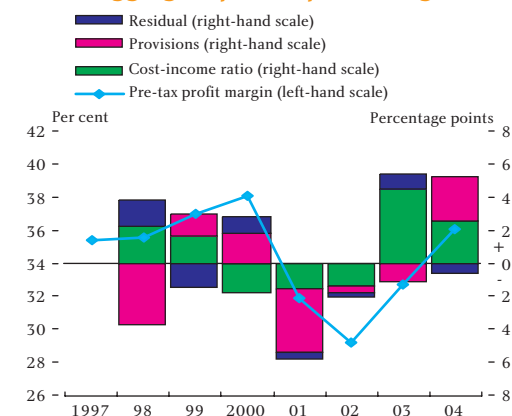


Sources: Bloomberg and Moody's Investors Service.

(a) Major banking subsidiaries of the LCFIs.

Chart 3.4

Contributions to changes in large UK-owned banks' aggregate pre-tax profit margin^{(a)(b)}



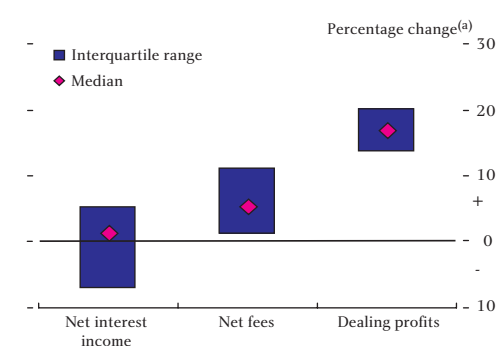
Sources: Published accounts and Bank calculations.

(a) See page 37 June 2004 *Review* for a breakdown of the pre-tax profit margin.

(b) Data for 2004 H1 results are annualised.

Chart 3.5

Changes in selected components of large UK-owned banks' income, 2004 H1



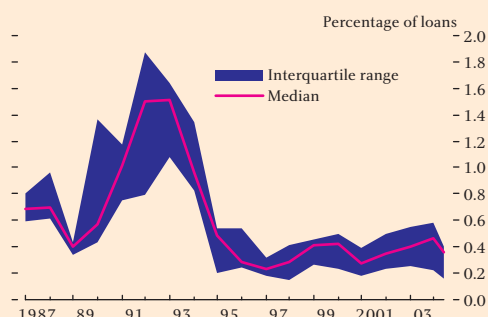
Sources: Published accounts and Bank calculations.

(a) Annualised percentage change from year-end 2003 to 2004 H1.

Box 7: A new peer group to analyse large UK-owned banks' resilience over time

Chart A

Large UK-owned banks' new provisions for bad and doubtful debts^(a)

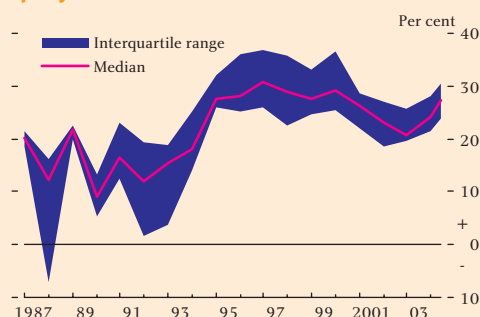


Sources: Thomson Financial Datastream, published accounts and Bank calculations.

(a) New provisions charge for bad and doubtful debts in the P&L account as a percentage of loans to customers (including finance leases) and banks.

Chart B

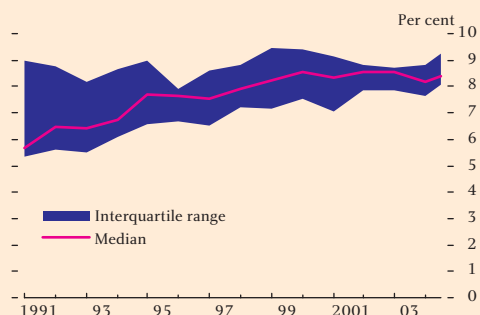
Large UK-owned banks' return on common equity



Sources: Thomson Financial Datastream, published accounts and Bank calculations.

Chart C

Large UK-owned banks' Tier 1 capital ratios



Sources: FSA regulatory returns and Bank calculations.

In recent *Reviews*, the analysis of the UK banking system has focused on the largest ten UK-owned banks by balance sheet size (measured at the most recent half-year end). The ten banks have on average since the beginning of 2001 held 98% of UK-owned banks' assets and 87% of all households' and companies' deposits. However, the choice of a static peer group based on the current structure of the banking system is not well suited to undertaking long-run comparisons (given changes in the composition of the group over time). Some of the ten largest banks at the end of 2004 H1 were converted building societies and had been involved in mergers and acquisitions.

This box introduces a new dynamic peer group designed to permit longer-term comparison of UK banks. It comprises the ten largest UK-owned banks at each year end. Annual re-selection has the advantage that the peer group reflects changes in the structure of the banking system and banks' organic growth. The peer group has been constructed between 1986 and 2004 H1 (with the start date reflecting Thomson Financial's coverage of banks' annual accounts information). The 19-year period includes a range of different economic developments, including the banks' recognition of losses made in the 1980s Less Developed Country (LDC) debt crisis,¹ the early 1990s recession and the more recent benign economic environment.

The peer group can be used to investigate the current resilience of large UK-owned banks in a longer-term context. The first major development evident in the dataset was several large UK-owned banks' recognition of losses made in the 1980s LDC debt crisis. This is reflected in the increase in the upper quartile of the new provisions ratio in 1987 and 1989 (Chart A). The recession of the early 1990s was felt more broadly, with the median and interquartile range of the new provisions ratio increasing to a peak in 1991–92. The subsequent recovery in economic activity saw a fall in new provisioning and increase in profitability. The large banks' return on equity has remained relatively high ever since, reflecting the favourable macroeconomic backdrop and the absence of other major shocks (Chart B). Since the UK banking regulator's implementation of the Basel Accord from end-1989, the large banks' Tier 1 ratios have increased steadily and in 2004 H1 stood well above the 4% minimum (Chart C).

(1) See Box 2 in Hoggarth, G and Pain, D (2002), 'Bank provisioning: the UK experience', in Bank of England *Financial Stability Review* for more details of large UK-owned banks' provisioning for the 1980s LDC debt crisis.

Growth in non-interest income, however, has remained strong, at around 15% in the first half of 2004. This could reflect a change in strategy in the light of falling interest margins, or a change in pricing structure – setting lower interest margins but imposing higher non-interest charges on customers. Net fees and commissions rose by 5% in the year to 2004 H1, while dealing income rose by 17%.

Capitalisation

The large UK-owned banks' published total and Tier 1 capital ratios rose marginally in 2004 H1, and remain well above regulatory minima. So-called 'prime Tier 1' capital – which excludes components of Tier 1 capital that carry debt-servicing obligations – is also reported to be high (Chart 3.7).¹

UK banks with life insurance subsidiaries (bancassurers) face a potential change in accounting rules that is likely to reduce the level of capital reported as Tier 1. Bancassurers are currently permitted to recognise an estimate of future profits from their life insurance businesses as an asset for accounting purposes. In July, the UK Accounting Standards Board published Financial Reporting Exposure Draft (FRED) 34, which proposes to restrict this practice.²

Funding and liquidity

The characteristics of a bank's funding and other liabilities influence its potential vulnerability to liquidity risk. To remain robust, banks require a sufficient stock of liquid assets to meet calls on liquidity as they arise.

Funding

As noted in recent *Reviews*, the growth of most large UK-owned banks' lending to households and non-financial companies (or 'customers') outpaced the growth of funding from these sources between 2001 and 2003.³ The resulting 'customer funding gap' has been filled by issuing debt securities and borrowing in the interbank market (Chart 3.8). A sizeable proportion of the large UK-owned banking sector's net borrowing in the interbank market is obtained from foreign-owned banks. In times of market-wide stress, such short-term wholesale liabilities could prove more vulnerable to sudden withdrawal, and therefore pose greater liquidity risks.

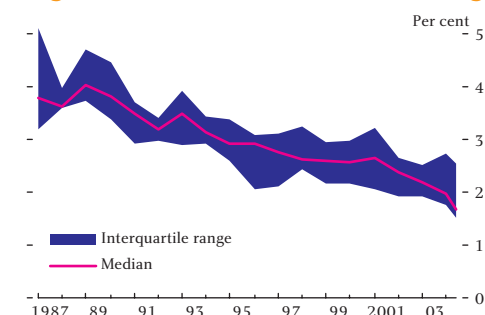
(1) Previous *Reviews* have argued that some forms of capital are likely to be more effective than others in helping banks absorb losses should they arise. Some forms of capital, such as subordinated debt, protect depositors but, from the perspective of system robustness, carry debt-servicing obligations that could prove difficult to defer in times of stress. Other types of capital, such as shareholders' equity, provide the flexibility for banks to hold back payments to capital holders and instead use the funds as a buffer.

(2) If enacted, it is unclear whether FRED 34 would be applied first for the accounting period ending December 2004 or later.

(3) Parkinson, S and Speight, G (2003), 'Large UK-owned banks' funding patterns: recent changes and implications', Bank of England *Financial Stability Review*, December.

Chart 3.6

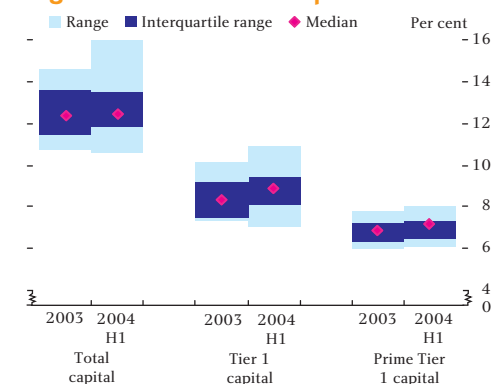
Large UK-owned banks' net interest margin



Sources: Thomson Financial Datastream, published accounts and Bank calculations.

Chart 3.7

Large UK-owned banks' capital ratios^{(a)(b)}



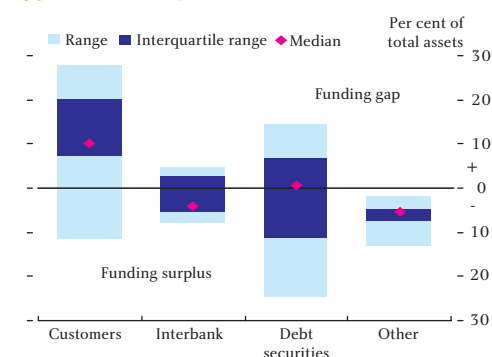
Sources: Published accounts, FSA regulatory returns and Bank calculations.

(a) Percentage of risk weighted assets.

(b) Prime Tier 1 includes ordinary shares, associated reserves and retained earnings.

Chart 3.8

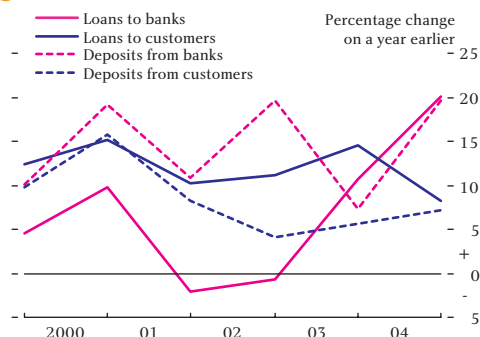
Large UK-owned banks' funding gaps, by type of funding, 2004 H1^(a)



Sources: Published accounts and Bank calculations.

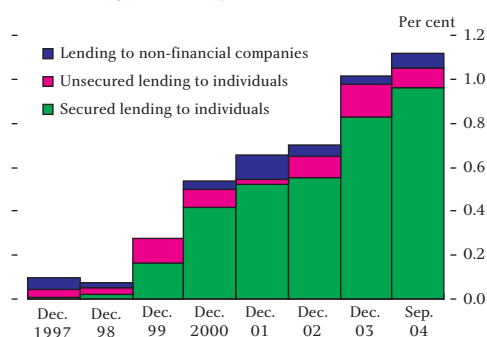
(a) Measured as assets less liabilities in the balance sheet categories shown, as a percentage of total assets.

Chart 3.9
Large UK-owned banks' asset and funding growth



Sources: Published accounts and Bank calculations.

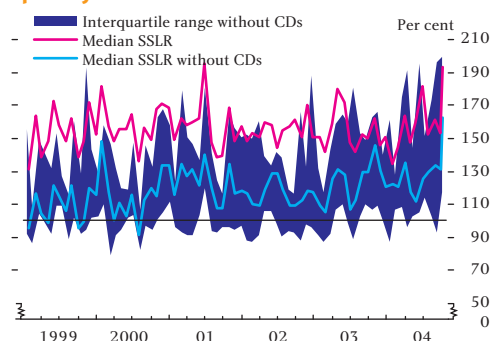
Chart 3.10
Annual net flows of loan transfers and securitisations by nature of underlying loan, as a percentage of total assets^(a)



Source: Bank of England.

(a) 2004 data annualised on the basis of previous four quarters.

Chart 3.11
Large UK-owned banks' sterling stock liquidity ratios



Source: FSA regulatory returns.

Over the past year, however, the growth rates of deposits from customers and of customer lending have converged (Chart 3.9). The customer funding gap was therefore broadly unchanged in 2004 H1. Nevertheless, the existing gap still requires funding. Some UK-owned banks have continued to develop alternative, long-term, funding sources. Since the June 2004 *Review*, there has been further UK covered bond issuance, bringing the total issuance to €14.25 billion (£9.8 billion) since the first UK covered bond issue in July 2003.¹ Net flows of securitisations remain a small proportion of the sector's overall funding, only representing around 1.1% of total assets in the year to September (Chart 3.10).²

Liquidity

Banks hold a buffer of high-quality liquid assets to remain robust against the liquidity risk inherent in their funding sources and other liabilities. In the UK, the regulatory minimum for liquid assets is determined by the sterling stock liquidity ratio (SSLR). Since the June 2004 *Review*, SSLRs have remained above the regulatory minimum of 100%. Excluding holdings of other banks' certificates of deposit (CDs) – which, as 'inside' rather than 'outside' assets, may not help the banking system as a whole in the event of a system-wide liquidity shock – the median SSLR has also remained above 100% (Chart 3.11).

The SSLR is based on sterling outflows. An alternative indicator is the ratio of liquid assets to those liabilities (in whatever currency) that might be classified as vulnerable to sudden withdrawal, as derived from data in published accounts. According to this indicator, most large UK-owned banks hold roughly the same level of 'liquid assets' as their stock of 'vulnerable liabilities', although the ratio has fallen in recent years (Chart 3.12). This measure encompasses assets and liabilities in all currencies, but it has other limitations. It is dependent on the exact definition of 'liquid assets' and 'vulnerable liabilities' used, and is not based on empirical estimates of potential outflows.

(1) As discussed in the June 2004 *Review*, the recent development of covered bond issuance represents an extension of the UK mortgage-backed securities market. UK covered bonds are structured in a broadly similar way to the well-established German *pfiandbriefe* market: long-term securities (with 5-to 15-year maturities), backed by pools of mortgages, issued in euro (with foreign exchange risk to the bank hedged as a matter of course), and offered to European investors.

(2) In September 2004, the FSA sent a letter to the British Bankers' Association outlining depositor protection issues that arise from covered bond issuance, highlighting that the regulatory treatment of covered bonds was under review. These securities could weaken the position of depositors in an insolvency, as covered bond holders have a preferential claim to the assets pledged to the covered bond pool.

3.2 UK non-bank financial sectors

An accompanying article in this *Review* introduces a framework to assess the channels through which different non-bank financial sectors might be important for systemic financial stability – both through their direct role, as providers of financial services, and via links with other financial institutions. Considering only UK-resident activities, the article concludes that a number of non-bank financial sectors are potentially important for financial stability, including securities dealers, non-life insurers, life insurers, pension funds, and ‘other finance providers’.¹

Although UK-resident, some of the non-bank financial intermediaries described above – such as securities dealers and non-life insurers – are largely foreign-owned. Global market price indices are one indicator of the perceived robustness of these intermediaries. Since the June 2004 *Review*, equity prices of global non-bank financial sectors have risen (Chart 3.13). CDS premia also remain low for most global non-bank financial firms, suggesting their perceived resilience to shocks remains strong. The risks to these global intermediaries are discussed in Chapter 2.

In autumn 2002 and spring 2003, UK life insurers were adversely affected by sharp declines in UK equity prices, in some cases prompting capital injections by their owners. But this year, the operating environment of UK life insurers has improved. Aggregate profits of the five largest UK-owned life insurers increased by 26% in the year to 2004 H1. The Association of British Insurers (ABI) also reports a 5.5% annual increase in new sales of products in 2004 Q3, although sales still remain 10% below 2002 peaks (Chart 3.14).

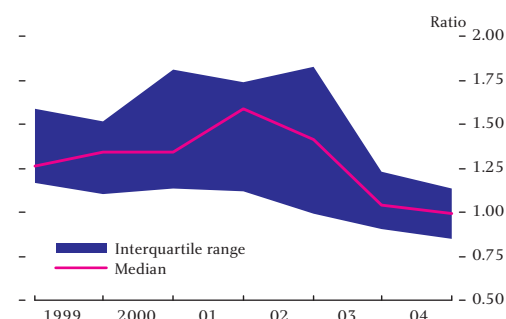
‘Other finance providers’ – such as mortgage credit companies, factoring companies, credit grantors and leasing corporations – play a material role in lending to UK households. The majority of secured lending by these finance providers is undertaken by companies that are subsidiaries of UK banking groups. As such, the strength of this sector is captured, in part, in large UK-owned banks’ consolidated group accounts, discussed above.

3.3 Links between financial institutions

Aggregate indicators of the strength of the financial sector are insufficient by themselves to provide a full assessment of the ability of the sector to withstand adverse shocks. Links between financial institutions create the potential for shocks that hit individual intermediaries, or particular parts of the financial

Chart 3.12

Large UK-owned banks’ ‘liquid assets’ as a ratio of ‘vulnerable liabilities’^{(a)(b)}

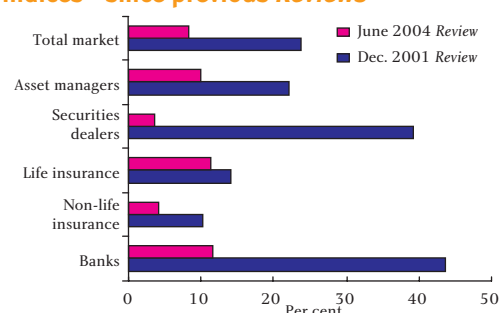


Sources: Published accounts and Bank calculations.

- (a) ‘Liquid assets’ are defined as debt securities, treasury bills, items in the course of collection from other banks and cash.
- (b) ‘Vulnerable liabilities’ are defined as items in the course of collection, an estimation of debt securities issued with a maturity of under three months, and interbank deposits.

Chart 3.13

Percentage change in global equity price indices^(a) since previous *Reviews*

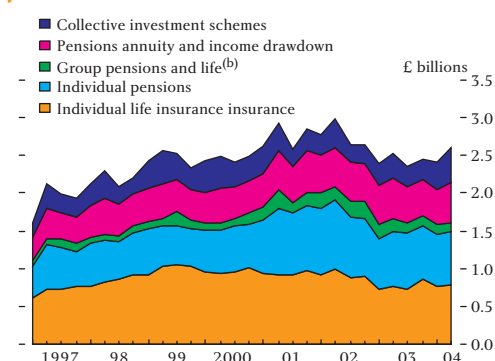


Sources: Thomson Financial Datastream and Bank calculations.

- (a) Denominated in US dollars.

Chart 3.14

Life insurers’ UK sales of long-term savings products^(a)



Source: Association of British Insurers.

- (a) Annual premium equivalent basis (ie regular premiums plus a tenth of single premiums).
- (b) Refers to the sale of policies to groups of people, such as the employees of a company.

(1) Corder, M (2004), ‘Assessing risks from UK non-bank financial sectors’, Bank of England *Financial Stability Review*, December.

sector, to be transmitted quickly to the financial sector as a whole.¹ The nature of these links matters.

Funding and trading exposures

Financial institutions are linked through a number of channels, including funding activities in interbank markets and trading relationships in financial markets.

Financial market liquidity and concentration

Large UK-owned banks and other financial institutions – such as LCFIs, securities dealers and hedge funds – are active in a number of financial markets, and so are exposed to market risk, as discussed in Chapter 2. Although measures of large UK-owned banks' value at risk (VaR) relative to income are low compared with US and European LCFIs, VaR calculations usually assume that markets do not become illiquid or disorderly. Hence they do not reflect links via banks' shared dependence on the liquidity of markets. Some of these markets are highly concentrated, with a relatively small number of intermediaries, each with a large market share.

On-balance-sheet counterparty exposures

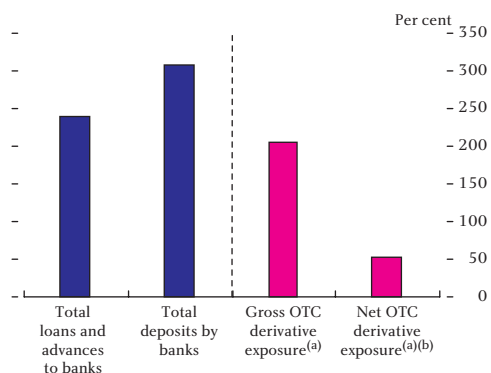
Counterparty links within the banking sector are particularly important given the high degree of interconnection in wholesale banking markets. As a result, even though the large UK-owned banking sector is a net borrower in the interbank market (as discussed earlier), gross unsecured interbank loans and advances are a large category of interbank exposure, amounting to more than two and a half times Tier 1 capital (Chart 3.15). By contrast, on-balance-sheet exposures to non-bank financial sectors are less material. The largest on-balance-sheet exposure is via secured lending to securities dealers, which are predominantly US-owned (Chart 3.16).

Off-balance-sheet counterparty exposures

Counterparty links also occur through off-balance-sheet activities, including both over-the-counter (OTC) and exchange-traded derivatives. According to the recently published Bank for International Settlements (BIS) Triennial Survey, the volume of global OTC currency and interest rate derivatives turnover has more than doubled in the past three years. The resultant risks are primarily managed through netting and collateral agreements. As a result, large UK-owned banks' net exposures via OTC derivatives remain small compared with exposures through gross unsecured interbank loans (which by contrast are not netted against interbank deposits) (Chart 3.15).

Exchange-traded derivatives provide another avenue for banks to reduce counterparty exposures to each other. London Clearing

Chart 3.15
Large UK-owned banks' interbank exposures to UK-resident banks relative to Tier 1 capital, as at June 2004

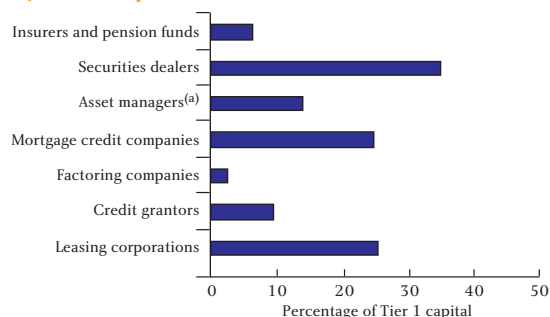


Source: Published accounts.

(a) End-2003.

(b) Net OTC derivative exposures are trading positions net of margining and collateral held.

Chart 3.16
Large UK-owned banks' stock of lending to UK-resident non-bank financial sectors, as at June 2004



Sources: Bank of England and published accounts.

(a) Asset managers comprise investment and unit trusts, money market mutual funds and fund management activities.

(1) For example, see Wells, S (2002), 'UK interbank exposures: systemic risk implications', Bank of England *Financial Stability Review*, December.

House (LCH), for example, plays an integral role in clearing securities and derivative transactions, as illustrated by the initial margin deposited with LCH by its members (Chart 3.17). The central counterparty must itself meet high standards of risk management.¹

Payment and settlement exposures

Large UK-owned banks participate in payment and settlement systems both in the United Kingdom and overseas. The two largest UK payment systems by value, CREST for sterling securities settlement and CHAPS sterling for cash settlement, are real-time gross settlement systems, which do not give rise to credit exposures between settlement banks (Chart 3.18). However, exposures of settlement banks to non-members, arising while those customers' payment instructions are being processed, still need to be managed.²

The Continuous Linked Settlement (CLS) system, which was launched in September 2002, helps reduce foreign exchange settlement risk between system users by settling their transactions on a payment-versus-payment basis. With a few exceptions due to seasonal declines in market activity, values of foreign exchange transactions settled in CLS have continued to increase (Chart 3.19), but a significant amount is still settled outside CLS.³ The Hong Kong dollar, Korean won, New Zealand dollar and South African rand are due to be included in the CLS system by early 2005, increasing the number of settled currencies to 15.

In October 2003, CREST broadened the range of securities that it settles to include money market instruments. Since then, there has been rapid growth in the value of US dollar settlement in CREST. The resulting US dollar obligations between settlement banks are not settled in real time over the Bank of England's accounts. Settlement instead takes place over accounts in the United States, with exposures between pairs of settlement banks persisting until those bilateral payments have been made. The settlement banks and CREST, with the support of the Bank of England, are exploring ways of reducing the credit risk that this process entails.

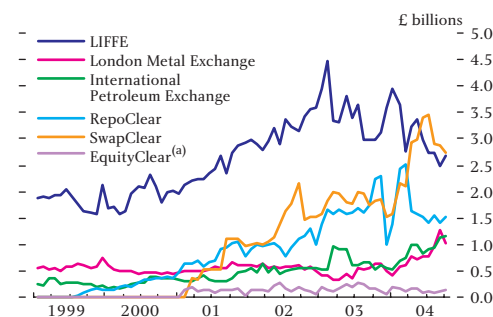
As well as minimising settlement exposures between banks, well designed payment and settlement systems can reduce the threat of system-wide disruptions. Measures to strengthen these key elements of the financial infrastructure are among the issues covered in the following article in this *Review*.

(1) In November, the Committee on Payment and Settlement Systems (CPSS) and the Technical Committee of the International Organisation of Securities Commissions (IOSCO) published a set of risk-management Recommendations for Central Counterparties. See the article on *Strengthening financial infrastructure* in this *Review*.

(2) See *Strengthening financial infrastructure* in this *Review*.

(3) Sawyer, D (2004), 'CLS and foreign exchange settlement risk', Bank of England *Financial Stability Review*, December.

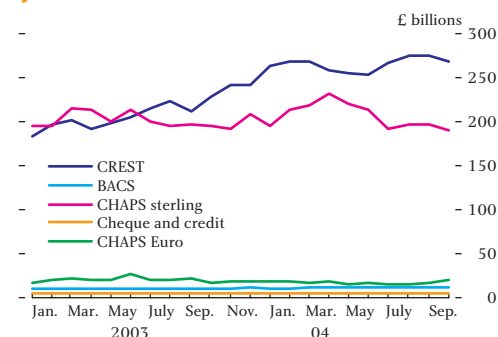
Chart 3.17
Initial margin required by LCH for its largest cleared markets at end-month



Source: LCH.Clearnet Limited.

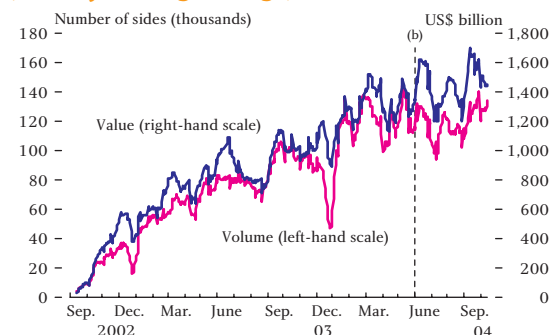
(a) Since 5 May 2003, Equity Clear initial margin includes margin held against trades on the virt-x exchange, as well as against trades on the London Stock Exchange.

Chart 3.18
Monthly daily average domestic payments by value



Sources: APACS and CREST.

Chart 3.19
Daily volumes and values settled in CLS (ten-day moving average)^(a)



Source: CLS Bank International.

(a) Volume figures report the number of sides before splitting (the process of breaking down into smaller parts transactions of high value in order to improve settlement efficiency).

(b) June 2004 *Review*.

Strengthening financial infrastructure

The continued stability of the financial system relies on robust infrastructure. In particular, effective regulation of financial institutions and strong risk management within payment, clearing and settlement systems reduce both the likelihood and severity of episodes of financial instability. This article describes recent developments on these fronts.

The article in this *Review* about the financial stability conjuncture and outlook discusses a number of potential sources of credit, liquidity and market risk. Analysing how regulatory arrangements can improve the resilience of the financial system in the face of such risks is one strand of the Bank's work on *strengthening financial infrastructure*. A second strand seeks to ensure that payment and settlement systems are designed in a way that helps to prevent financial difficulties from spreading between financial institutions.

Disintermediation and the future reform of prudential regulation

The traditional business of banking is to intermediate between depositors and borrowers. In recent years, there has been a pronounced trend towards financial disintermediation; examples include securitisation, growth of corporate bond markets and credit risk transfer through loan sales or credit derivatives. The resulting increased dispersion of financial risks has many benefits. The development and deepening of markets for a wide range of risks (interest rate, credit and volatility, for example) create welfare gains from a more efficient allocation of capital, and benefits financial and macroeconomic stability through the greater dispersion of risk. As US Federal Reserve Chairman Alan Greenspan has commented,¹ the benign nature of the 2000 economic downturn may in part be attributable to this phenomenon. But these benefits are put at risk if financial regulation or accounting standards fail to keep pace with financial innovation. Outdated regulation or standards that fail to recognise the economic substance of transactions can slow the growth of markets for risk, either by reducing the benefits that flow from risk

transfer or by diverting resources towards the non-productive exploitation of arbitrage opportunities.

The Basel I standards for capital adequacy, for example, do not make fine distinctions between the level of credit risk on loans to different borrowers. While the introduction of internationally-agreed minimum capital standards greatly strengthened banking systems, this lack of risk sensitivity also created an incentive for banks to retain higher risk exposures in the banking book, while securitising or hedging exposures to lower risk borrowers. This arbitrage distorted the market for credit risk, because a bank's choice of which exposures to retain and which to hedge was, in part, driven by the cost of the disproportionate level of regulatory capital that had to be held against better quality credit risks, relative to the expected returns on those risks.

Prudential regulation of credit risk

The Basel II framework has made great progress in bringing prudential regulation of credit risk in the banking book up to date. The new framework seeks to link capital requirements more closely to risk and to achieve a degree of neutrality of treatment of on and off-balance-sheet exposures. In this way, the framework supports sound and efficient credit risk management within banks. And both objectives, address distortions of the type discussed above.

For example, the framework contains a new treatment of securitisation of assets. Securitisation is a well-established form of disintermediation. But one of the newer developments in the market for credit is the growth of credit derivatives. Products such as

(1) Speech to the Conference on Bank Structure and Competition, Chicago, Illinois, 8 May 2003.

credit default swaps now complement more traditional guarantees and insurance contracts in facilitating the transfer of credit risk to those agents able to bear and manage it most efficiently.

In principle, the growth of the market in credit derivatives is beneficial for both economic welfare and financial stability. However, it presents multiple challenges for prudential regulation. One of these challenges is part of a wider issue, which is how to assess the risks that arise in the trading book when it acts as the conduit for the dispersion of risks. Trading of all forms of derivatives creates counterparty credit exposures which persist for the life of the contracts; credit derivatives, while often a tool for reducing concentrations of credit risk, may also create direct credit exposures. And the inclusion of illiquid positions in the trading book – for example certain tranches of collateralised debt obligations (CDOs) or loans temporarily warehoused ahead of securitisation – brings with it market and credit risks which do not fit comfortably within the current market risk regime. The Basel II framework concentrates on the banking book, so these issues are being treated in a separate Trading Book Review. This Review is being undertaken jointly by the Basel Committee and the International Organisation of Securities Commissions (IOSCO), which is a welcome recognition of the need to integrate the prudential regulation of both commercial and investment banks.

The second challenge is to devise a prudential treatment for loans or other credit exposures in the banking book that are hedged by credit protection. This is an area in which the mid-year text of the Basel II framework currently applies the ‘substitution’ approach, which essentially assumes that a hedged exposure becomes a direct exposure to the provider of credit protection. This is a conservative treatment, because it does not take account of the ‘double default’ effect: in order for a bank to suffer a loss on a hedged loan, both the original borrower *and* the provider of credit protection must default. So, with the exception of the special case where the two defaults are perfectly correlated, the hedged loan is less risky than a direct exposure to *either* the original borrower *or* the protection provider. The question of when to recognise the double default effect has been included in the remit of the Trading Book Review, although it clearly applies primarily to banking book exposures.

It is in principle attractive to recognise the double default effect in capital requirements for a broad range of transactions. It would increase risk sensitivity and establish neutrality between the different forms that credit protection can take, and so avoid retarding or distorting the development of the market in credit risk. However, a substantial degree of conservatism must be embedded in the treatment adopted, and this inevitably will limit the scope and degree of recognition. Neither supervisors nor firms can robustly estimate the values under stressed conditions of the correlations that are required as parameters of a quantitative estimate of double default effects. There must therefore be substantial margins for error in the estimates of correlation used. And the scope of recognition must also exclude those transactions where it is not possible to rule out, with a reasonable degree of certainty, that there is no material economic link (direct or indirect) between borrower and protection provider: in those cases, it is only prudent to use the substitution approach.

There are also systemic concerns over introducing too broad a scope for recognition of double default effects at this stage in the development of what cannot yet be considered a mature market. Some credit risk transfer will redistribute risk to other regulated financial firms: policymakers need to be sure that any reduction in aggregate system capital reflects the actual reduction in aggregate risk to the financial system that has occurred. And some of the risk transfer will be to non-financial firms, representing complete disintermediation. Policy makers will continue to need to be sure that this represents a genuine transfer of credit risk: that non-financial providers of credit protection will be able to meet their obligations under stressed circumstances.

Notwithstanding any reform of the regulatory treatment, accounting standards do not currently deal well with the hedging of credit risk. Specifically, the hedge accounting rules of IAS 39 impose strict criteria which may prevent some credit derivatives which are being used as hedges, from being accounted for as such. In these cases, the derivative and the loan would probably not be measured on the same basis. There are two possible consequences to this, both of them undesirable. Firms that are concerned about volatility of reported profits or asset values may be reluctant to engage in credit risk transfer, despite the economic benefits. That could

slow the growth of the market, and delay the resulting welfare gains. Alternatively, firms that do hedge credit risk may transfer illiquid credit exposures, together with full or partial credit hedges, to the trading book, where they can be marked to market. Such a practice creates a problem that will be discussed in the next section. This example illustrates the need for both prudential regulation and accounting standards to evolve in parallel if the benefits of financial innovation are to be fully realised.

The trading book boundary

The issue facing the Trading Book Review that potentially has the most far-reaching consequences for the future development of regulation is the treatment of the non-traditional assets, characterised by low liquidity, that are increasingly allocated to the trading books of banks.

The Basel II framework defines the trading book as consisting 'of positions in financial instruments and commodities held either with trading intent or in order to hedge other elements of the trading book.' However, banking regulators have noted a trend towards the inclusion in banks' trading books of a widening range of instruments and positions, some of which may be relatively illiquid. This trend may have a number of causes, including the focus by some banking organisations on an investment banking business model, increased trading book hedging of traditional banking book positions, and risk management or capital incentives for placing positions in the trading book as opposed to the banking book. It is also in part motivated by accounting standards that place artificial constraints (in the sense that they are unrelated to economic substance) on the extent to which fair value can substitute for historical valuation, and so encourage the reassignment of assets to different parts of the balance sheet. The implications of hedge accounting rules in IAS 39 have been discussed above. An example that works in the opposite direction is the US accounting interpretation EITF Issue 03-1 on asset impairment: before recent amendments, this might possibly have had the consequence of encouraging the switching of liquid, marketable securities (eg US Treasuries) into the held-to-maturity book, in order to avoid certain impairment charges.

Securities regulators, meanwhile, note that while investment banks traditionally book most of their

exposures in the trading book, some of these positions may be relatively illiquid. More generally, market developments since the 1996 Market Risk Amendment to the Basel I Accord (such as continued strong growth in OTC derivatives markets, especially in 'exotic' products) have probably contributed to illiquid assets accounting for a higher proportion of firms' trading books. And even instruments that are normally liquid can become illiquid if a large position is held by a single firm. The final section covers these and other broader liquidity issues, and considers the need for responses by firms and authorities.

The immediate issue that faces the Trading Book Review is the correct combination of valuation adjustment and Value-at-Risk (VaR) holding period to apply to an illiquid position, in order to provide a realistic estimate of the loss that might be incurred in the process of selling or hedging that position. It will be important to achieve an improved treatment for exotic derivatives whose risk profile is not accurately captured by standard VaR, but this task is outside the scope of what the Review can achieve in the time available.

Looking beyond the work of the Review, it is not clear where to draw the dividing line between trading and banking books: that divide is increasingly an artefact of regulatory and accounting treatments, rather than the reflection of an underlying economic reality. Seeking to sustain it in the long term risks the growth of perverse incentives. What underlies the need to define a treatment for illiquid positions or exotic derivatives in the trading book is the growing unreliability of the neat identifications that, broadly speaking, capital adequacy standards make of banking book with credit risk and trading book with market risk. The challenge for the future reform of regulation is to recognise credit and market risk wherever they occur in one firm or, indeed, in the financial system as a whole.

Implications for liquidity

These trading book developments have implications not only for market and credit risk but also for liquidity risk. There are implications for liquidity in two senses: market liquidity – the ability to transform assets into cash without a significant price discount or 'one way' markets developing; and institutional liquidity – the ability of firms to provide payment when contracts are due, whether routinely from management of cash flows and access to money

markets or, in times of pressure, from a cushion of liquid assets.

As Sir Andrew Large outlined recently,¹ the greater holding of illiquid assets (as part of the search for yield) is just one of the recent developments that may have heightened market liquidity risk. Trading strategies based on a similar rationale could increase the prospect of one-way markets developing and market liquidity evaporating across a variety of markets in response to a given shock; and with new products and globalisation, the complexity of markets has increased, raising questions about the robustness of liquidity in the face of shocks. Such issues can crystallise by impacting upon financial institutions' balance sheets and impairing their ability to make payments.

Market developments offer firms more flexibility in managing their liquidity risk and it is clear that approaches to managing risk in funding structures are evolving. But firms, their regulators, and central banks increasingly will need to take account of the potential for liquidity problems. Many have done so in a domestic context, for example, in the United Kingdom, the FSA's new systems and controls requirements and the Bank's reform of its operations in the sterling money markets.² However, while many of the issues identified are international, there is currently no international agreement on requirements.³ There is a clear case for public authorities and market participants to direct more attention to the concept of liquidity management.

Tiering in infrastructures

The Bank has sought to ensure that the most systemically important UK payment systems satisfy the risk management standards set out in the Core Principles for Systemically Important Payment Systems published by the Committee on Payment and Settlement Systems (CPSS). The UK's large-value payment systems, CHAPS Sterling and CHAPS Euro, and the embedded payment mechanism in CREST, satisfy the Core Principles relating to the control of credit and liquidity risk. For example, all three systems enable transactions to be settled intraday over accounts at the Bank of England, so that the

settlement asset is risk free. And they have also been designated under the Financial Markets and Insolvency (Settlement Finality) Regulations, so that these intraday payments enjoy protection against legal challenge under insolvency law.

Relative to large-value payment systems in some other developed countries, however, relatively few banks settle directly at the central bank. In the United Kingdom these banks are sometimes described as 'first-tier' or 'settlement' members. Other banks form a 'second tier' and use one of these settlement members to receive and make payments.

A tiered payment structure of this sort can give rise to several types of risk relative to a structure in which all banks are settlement members:

- *Credit risk:* Credit exposures arise when settlement banks offer their customer banks overdraft facilities when making outward payments on that customer's behalf. Conversely, when customer banks hold positive intraday balances at their settlement bank, the customer bank is exposed to the settlement bank.
- *Operational and liquidity risk:* When payment activity is concentrated in a limited number of settlement banks, an operational disruption affecting one of them could affect a large number of other banks. On the other hand, a non-tiered structure increases dependency on the single central infrastructure.
- *Legal risk:* In some cases, for example a payment between two second-tier banks settled across accounts at the same CHAPS settlement member, the payment would not enter the large-value payment system and so would not enjoy the additional protection against legal challenge to its finality that is granted in systems designated under the Settlement Finality Regulations.

A tiered structure can however offer benefits. For example, it may not be cost efficient for banks which make small volumes of payments to pay the infrastructure and other costs associated with settlement membership. These include the indirect

(1) Large, A, 'Why we should worry about liquidity', Financial Times, 11 November 2004.

(2) www.bankofengland.co.uk/markets/money/smmreform041125.pdf.

(3) As discussed in Bank of England *Financial Stability Review*, December 2003.

costs of holding collateral necessary to access central bank liquidity. There may also be some risk management benefits from tiering. Second-tier banks often rely on uncollateralised intraday credit lines from their settlement banks. To retain access to these credit lines some second-tier banks might be induced to maintain higher risk management standards than they would otherwise. More generally, except where the associated risks have clear systemic consequences, it would be wrong for the public authorities to seek to curtail tiering and thereby constrain banks' commercial provision of payment services.

The next two sections focus on the risk implications of tiering in CHAPS Sterling and CREST Sterling. The final section explores whether similar risks arise in LCH.Clearnet Ltd and the Continuous Linked Settlement System (CLS), two other key infrastructures for UK wholesale financial markets.

CHAPS Sterling

Twelve¹ commercial banks and the Bank of England are settlement members of CHAPS Sterling. This is small relative to the number of UK-resident banks, making the UK large-value payment system one of the more highly tiered in the G10 countries (Table 1).²

Table 1
Number of direct participants in large-value payment systems

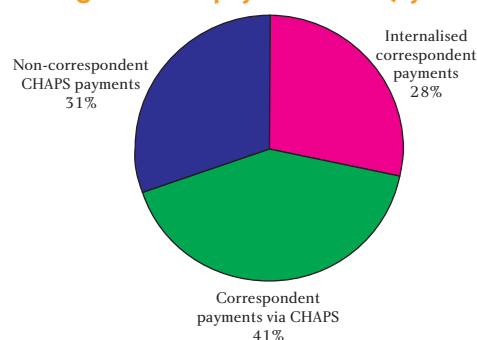
Country	System	Number of direct participants ^(a)
United Kingdom	CHAPS Sterling	13
	CHAPS Euro	19
Belgium	ELLIPS	16
Canada	LVTS	14
France	TBF	156
	PNS	21
Germany	RTGS plus	93
Italy	BIREL	204
Japan	BOJ-NET	371
Netherlands	TOP	106
Sweden	E-RIK	13
	K-RIX	19
Switzerland	SIC	307
United States	Fedwire	7,736

Source: CPSS Statistics on payment and settlement systems in selected countries (2004).

(a) Includes central banks. Data for end 2003.

Survey evidence suggests that payments made on behalf of customer banks account for more than half of the £200 billion of payments which are on average settled in CHAPS Sterling each day. But not all high-value, same-day interbank payments in the United Kingdom go through CHAPS. When both the payer and the payee have accounts with the same settlement bank, these payments are 'internalised' and settled across the books of the settlement bank. Survey data from 2003 collected by the Bank suggest that around 30% of all same-day payments are internalised correspondent payments (Chart 1).

Chart 1
Sterling interbank payment flows (by value)



Sources: 2003 correspondent banking survey and Bank calculations.

The risk exposures that arise between settlement and customer banks depend on the size of credit positions. Some customer banks are not offered intraday credit by their settlement bank. Where intraday overdrafts are offered, these are typically subject to credit limits. Survey data reveal, however, that these exposures of settlement banks to their customer banks can be large, even if they are often short-lived. The highest recorded intraday peak exposure to a single second-tier customer bank (averaged across the sample period of the survey) was between £3.5 and £4 billion. And, in general, these overdrafts are unsecured: the survey revealed few examples of collateralisation.

The survey showed that intraday overdraft facilities offered to customer banks were far higher than overnight credit limits. In stressed situations, however, a settlement bank may find itself unable to avoid an intraday overdraft becoming an overnight exposure. And, unlike overnight or longer-term credit

(1) Counting the memberships of National Westminster Bank and The Royal Bank of Scotland separately.

(2) In some countries, banks with direct access to large-value payment systems sometimes use other settlement banks rather than their own central bank accounts to make payments. This means that figures in the table may understate the degree of tiering in routine circumstances.

exposures, intraday credit attracts no regulatory capital charge.

Comparing the survey evidence on intraday exposures with settlement banks' capital, it appears that under normal circumstances the exposures to a single second-tier bank are not large enough to threaten the solvency of settlement banks. In a stressed situation, these exposures may rise considerably however. In addition to the potential overnight exposure of the settlement banks to the second-tier bank, the second-tier bank could find its ability to continue to make payments highly dependent on the provision of credit from the settlement member. At the same time, the settlement member might be under pressure to cut rather than extend credit.

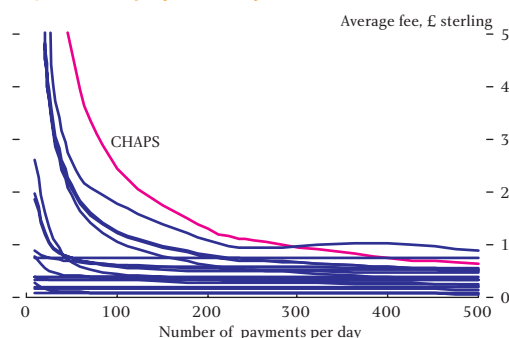
Concentration of customer bank payments also tends to increase the potential impact of operational disruption at one of the settlement banks. This operational risk can be offset by investment in information technology infrastructure and contingency arrangements. Research carried out by the Bank has found that operational problems at individual CHAPS settlement members would not in general prevent the remaining banks from making payments to each other. Nonetheless, the operational failure of a key node bank would still disrupt all of its own customers and those to whom they were making payments.¹ Customer banks can reduce this risk by holding accounts with more than one settlement bank.

The Bank's proposed reforms to its operations in the sterling money markets, announced in summer 2004, may encourage some banks to become settlement members of CHAPS Sterling.² As part of these reforms, UK banks and building societies will be offered access to reserve accounts at the Bank remunerated at the Bank's repo rate. The intention is that these reserves could be available to support intraday payments in CHAPS Sterling and the Bank hopes that, as a consequence, more banks will join as direct settlement members.

In parallel, the Bank is analysing the fee structures in CHAPS to assess whether these may pose a potential barrier to new members. The direct costs of joining

CHAPS are not the main costs of direct membership, and are a less significant factor than, for example, the cost of maintaining an appropriate liquidity management team. But the current CHAPS fee structure falls more heavily on banks with small volumes than those in other countries, including G10 ones (Chart 2).³

Chart 2
Average fees per transaction across eighteen large-value payment systems^(a)



Source: Bank calculations.

(a) Four types of fee are included: entry fees (assumed to be spread over a ten-year period); periodic fees; transaction fees; account fees. Messaging costs are not included.

Beyond that, it might be worth considering whether further regulatory or prudential policies could be used to strengthen incentives to mitigate the risks associated with payment tiering. For example, closer monitoring of the intraday exposures which arise on the balance sheets of settlement banks may help improve risk management.

CREST Sterling

There are two 'legs' to each transaction in securities settlement systems: a payment leg and a securities leg. There is some degree of tiering in both legs.

In the payment leg, tiering in the UK securities settlement system, CREST, is similar to that in CHAPS. Thirteen commercial banks are settlement members of CREST Sterling (including all of the twelve CHAPS Sterling settlement members), settling their own and their CREST customers' sterling securities transactions across accounts at the Bank. CREST has over 41,000 other members, however, including 2,000 banks and brokers. CREST members make and

(1) James, K (2003), 'A Statistical Overview of CHAPS Sterling', Bank of England *Financial Stability Review*, June; and Bedford, P, Millard, S and Yang, J (2004), 'Assessing Operational Risk in CHAPS Sterling: a Simulation Approach', Bank of England *Financial Stability Review*, June.

(2) www.bankofengland.co.uk/markets/money/smmreform040507.pdf, and www.bankofengland.co.uk/markets/money/smmreform041125.pdf.

(3) It should be noted that CHAPS running costs and the NewCHAPS development costs have been funded by its users.

receive payments for securities by credits or debits to accounts that each member must hold with one of the settlement banks.

Settlement banks often allow their customers to run overdrafts on their accounts when purchasing securities. The resulting exposures raise similar risk issues to those in CHAPS. As in CHAPS, some settlement banks use uncollateralised debit caps to control their exposures to other CREST members. But in CREST there is the additional option of collateralising the exposure by taking a charge over the securities purchased. The Bank intends to study further the scale and nature of these exposures. CREST itself extends no credit to its members – in line with best risk management practices, as described in the Standards for Securities Clearing and Settlement Systems issued recently by the European System of Central Banks (ESCB) and the Committee of European Securities Regulators (CESR) (October 2004).¹

The ESCB-CESR Standards also address the issue of protection of securities purchased by customers – that is, custody risk. All CREST members hold securities accounts. But a subset of less than 300 act as securities custodian for counterparties that are not CREST members. They represent an inner tier in the securities settlement process. This degree of tiering in the securities leg is not, however, peculiar to the United Kingdom.

Other systems

CHAPS and CREST Sterling systems are designed to prevent credit exposures arising between settlement members. In addition, neither CHAPSCo nor CRESTCo is itself a counterparty to transactions with settlement members. LCH.Clearnet Ltd (LCH), on the other hand, is a central counterparty to transactions and takes on credit exposures, which are fully margined, to its clearing members. CLS is a settlement agent rather than a counterparty to foreign exchange transactions, but it can still incur exposures during the settlement process if the positive value of a member's account is eliminated by exchange rate variations. These potential exposures of the infrastructure itself to the inner-tier members mean that there are arguments for restricting membership to institutions that meet certain credit quality and liquidity management standards.

Trading exposures between LCH and members are managed through the collection of margin, both at the start of the day and, potentially, intraday. There is some tiering in the provision of clearing services, with clearing members acting on behalf of non-members. In the case of General Clearing Members (GCMs), the separation in an omnibus client account of segregated client positions from the GCM's own or 'house' positions facilitates the protection of segregated clients in the event of a default by the GCM caused by losses on the house account. The GCM, however, retains some credit exposure to its customers. Anecdotal evidence suggests that GCMs manage such exposure in a variety of ways, with strict access criteria and margin calls on customers (often the pass-through of LCH margin calls) the tools most commonly employed. To the extent that there is a timing mismatch between the customer's trade and the payment of margin, some daylight exposure may remain.

Exposures can also arise as a result of LCH's payment arrangements. There are exposures between LCH and the Protected Payment System (PPS) banks (depending on which party is in credit), between the PPS banks and the banks that on behalf of LCH concentrate payments in each of the key currencies (LCH's concentration banks) and between the PPS banks and other members while margin payments are collected and disbursed. A project is under way to consider whether the Bank of England could become LCH's concentration bank in Sterling and Euro, thus eliminating potential exposure to the risk of concentration bank default. The project also considers the introduction of tighter timetables for collection and disbursement of margin payments that could help reduce potential exposures further.

CLS had 53 settlement members at end-October 2004, of which around a third were providing third-party services to about 180 indirect or third-party users. Settlement members can be exposed to third-party users, or vice versa, depending on whether currency balances owed are paid before or after currency balances owing. Anecdotal evidence suggests that, for the largest providers of CLS third-party services, the intraday credit exposures are typically incurred by the settlement members rather than by third-party users. This is also an area where

(1) www.ecb.int/pub/pdf/other/escb-cesr-standardssecurities2004en.pdf.

the Bank intends to do more work to understand better the scale and nature of the exposures.

Other infrastructure issues

The June 2004 *Review* considered how multinational providers of market infrastructure can be effectively supervised. Progress on this debate and on establishing specific arrangements for the co-operative oversight of the international groups Euroclear and LCH.Clearnet, of which the UK securities settlement system and central counterparty are part, are among the initiatives reported in Box 1.

Securities settlement systems and central counterparties play particularly important roles in maintaining safe, liquid and efficient financial markets. Over the past year, the Bank, together with the FSA, has contributed to international work to design appropriate risk-control standards for both types of entity. In October 2004, the European System of Central Banks (ESCB) and the Committee of European Securities Regulators (CESR) published their 'Standards for securities clearing and settlement in the European Union'.¹ A method of assessment for measuring systems' compliance with these standards is now being developed. In November 2004, the central banks of the Group of Ten countries and the Technical Committee of the International Organisation of Securities Commissions (IOSCO) published risk-management Recommendations for Central Counterparties, and guidance for assessing central counterparties' implementation of these recommendations.²

Box 1 also details progress on a number of initiatives intended to strengthen the UK financial infrastructure. These range from developments in capital and liquidity regulation and accounting, to measures to reduce settlement risk in payment and settlement systems used in the United Kingdom.

(1) www.ecb.int/pub/pdf/other/escb-cesr-standardssecurities2004en.pdf.

(2) www.bis.org/publ/cpss64.htm.

Box 1: Update on initiatives in the financial infrastructure

Issue	Significance	Progress
ESCB-CESR standards for securities clearing and settlement systems	The ESCB-CESR standards will be used by regulators, overseers and firms to ensure that EU clearing and settlement systems are both safe and efficient.	In October 2004, the ESCB-CESR standards were approved by the ECB Governing Council and the CESR chairmen. Work can now begin on developing a method of assessment for measuring a firm's compliance with the standards.
CPSS-IOSCO recommendations for Central Counterparties	Central Counterparties (CCPs) can play a key role in reducing risk in financial markets. National authorities are expected to assess CCPs' implementation of these recommendations.	<p>Following a public consultation that elicited more than 40 responses to the draft recommendations, a final version of the report, containing 15 headline recommendations and a method for assessing implementation of the recommendations, was approved by the G10 Governors and was published on 24 November 2004.¹</p> <p>These recommendations are likely to be evaluated by securities regulators and central banks before they are implemented in the EU.</p>
Basel II capital adequacy framework	Bank capital requirements help to mitigate the moral hazard and externalities inherent in banking activities. The establishment of global capital requirements ensures competition among internationally active banks is not distorted. It is hoped that one of the major benefits of the more risk sensitive Basel II framework will be the strengthening of risk management practices across the banking industry.	The Basel Committee endorsed the Basel II framework on 26 June 2004. The next stage for European implementation is transposition into the EU capital adequacy regime. The European Commission published its draft text, recasting earlier Capital Adequacy Directives, on 14 July 2004. Meanwhile, the joint IOSCO-Basel Trading Book Review is expected to result in proposals for consultation in March 2005.
Capital regulations and accounting for life insurance	<p>The robustness of the life insurance sector is important for consumer confidence in the financial system. Insurers also have significant asset holdings.</p> <p>Six of the ten largest UK-owned banks have life insurance subsidiaries. The performance of these business investments will affect the banks' Tier 1 capital through capital injections or changes in embedded value. Embedded value can account for a significant proportion of Tier 1 capital.² The treatment of embedded value therefore has a direct impact on the group's capital, and its rigorous measurement will increase the robustness of capital as a measure of solvency and as a buffer against insolvency.</p>	<p>From 31 December 2004, all life insurance firms with with-profits liabilities over £500 million must comply with 'realistic' capital requirements. The Policy Statement³ which sets out these new risk-based capital requirements was published on 2 July 2004. The underlying principles were set out in the 2003 Consultation Paper, CP195.</p> <p>In July 2004, the UK Accounting Standards Board (ASB) published their proposed accounting standard on life assurance (issued as a Financial Reporting Exposure Draft – FRED 34), which will affect the value of in-force life insurance (VIF), a component of embedded value.⁴ Currently bancassurers are permitted, by the ASB, to recognise VIF as an asset. FRED 34 proposes to permit the recognition of VIF as an asset, but restricts the inclusion of future investment returns and future investment management fees. This will reduce the embedded value of banks' life insurance businesses and therefore the book value of bancassurers' Tier 1 regulatory capital.</p>

(1) www.bis.org/publ/cpss64.htm.

(2) For example, at end-2002, Lloyds TSB's Tier 1 capital of £9.49 billion included £2.2 billion embedded value.

(3) FSA Policy Statement 04/16.

(4) The embedded value of life insurance consists of the current period surplus and an estimate of future profits from current business.

Issue	Significance	Progress
Implementation of the Financial Groups Directive	Effective consolidated supervision of groups that engage in multiple financial activities is an important element in maintaining financial stability. It controls the risks to systemic functions that arise through contagion within a wider group.	The Financial Groups Directive comes into force on 1 January 2005. The new measures, which build on key aspects of the prevailing sectoral regimes (banking, investment and insurance), will consider the group as a whole in determining capital adequacy and assessing whether conglomerates have adequate systems and controls to monitor intra-group exposures and risk concentrations across all sectors. The FSA has decided that this group-level capital requirement will be satisfied by compliance with the existing consolidated capital requirement applicable to the group's dominant business.
International Accounting Standards (IAS)	The use of a single set of modern accounting standards is likely to be beneficial to financial stability through enhanced transparency and market discipline. A complete set of accounting standards is fundamental to ensuring reliable information is provided to users of financial statements. ¹	<p>On 19 November 2004, the European Union adopted the international accounting standard for measurement of financial instruments, IAS 39. The adopted standard includes carve outs, proposed by the European Commission, relating to certain hedge accounting provisions and the option to fair value instruments that would otherwise be at cost.²</p> <p>On 29 October 2004, the FSA issued Consultation Paper 04/17, outlining its planned areas for adjustments from IAS data for regulatory capital purposes.</p>
Prudential regulation of liquidity	The resilience of the banking system to liquidity shocks is a key concern for central banks, both because of their role as the ultimate provider of liquidity and because of the potential systemic consequences of liquidity shocks.	<p>In September 2004, the FSA confirmed that changes to the systems and controls requirements for banks' management of liquidity risk will be implemented from 31 December 2004.³ Originally the changes were to encompass the full spectrum of risk management but will now be limited to some aspects of liquidity. These include provisions requiring firms to have adequate stress testing, scenario analysis and contingency funding plans.</p> <p>The FSA's future work on liquidity risk is to implement the above provisions and to participate further in the international work on liquidity, under the auspices of the Joint Forum.</p>
Cross-border supervision of multinational entities	Ensuring effective and efficient arrangements for the supervision of cross-border institutions is central to managing potential risks as the EU financial services markets become more integrated.	Recent contributions to the debate on the appropriate model for supervision of cross-border institutions have come from Callum McCarthy's Gresham Lecture, ⁴ industry bodies such as the European Financial Services Round Table ⁵ and the UK response to the 'Four expert group reports' on the post-FSAP agenda. ⁶

(1) The impact of accounting standards on financial stability was discussed in Michael, I (2004), 'Accounting and Financial Stability', Bank of England *Financial Stability Review*, June.

(2) Sir Andrew Large, Deputy Governor for Financial Stability, gave a speech on 'Financial Instrument Accounting' on 22 November 2004, reprinted in this *Review*.

(3) www.fsa.gov.uk/psb/psb_letter_15sept04.pdf.

(4) www.fsa.gov.uk/pubs/speeches/sp196.html.

(5) www.efr.be/members/upload/publications/997322RepSV04.pdf.

(6) www.bankofengland.co.uk/publications/fsapukresponse.pdf.

Issue	Significance	Progress
Co-operative regulation and oversight of the Euroclear Group	<p>The Euroclear Group comprises the national Central Securities Depositories (CSDs) for the United Kingdom, Ireland, France and the Netherlands and the international CSD, Euroclear Bank.</p> <p>The operational reliability of CSDs is fundamental to both financial stability and to the implementation of monetary policy operations.</p>	<p>Euroclear Group plans to implement a new corporate structure whereby CRESTCo (the UK and Irish CSD) and the other operating entities within the group would become subsidiaries of a newly created holding company (Euroclear SA), incorporated in Belgium. The new structure, which is due to be in place in early 2005, is subject to regulatory approval, but could affect the ability of the UK authorities to regulate and oversee CREST.</p> <p>The supervisors and overseers of the various Euroclear Group entities are developing a framework for the co-ordinated supervision and oversight of Euroclear SA. This framework will be supported by a memorandum of understanding between the relevant authorities.</p> <p>The new holding company would be the operator of Euroclear Group's new single processing system, the Single Settlement Engine (SSE), which is due to go live during 2006 and which will eventually serve all entities within the group. It is important for systemic risk purposes that the Bank is able to oversee effectively the embedded payment systems that support CREST settlement after the underlying processing of transactions has migrated to the SSE.</p>
Default arrangements for BACS and the Cheque and Credit Clearing (C&CC)	<p>BACS and the C&CC currently have no procedures to ensure that settlement can complete, or for apportioning any resulting losses, if a member in a net debit position failed to make its pay-in. In the absence of such procedures, it is likely that the systems would have to remain closed whilst agreement was reached on how to fund the shortfall. In line with the CPSS Core Principles for Systemically Important Payment Systems, the Bank has encouraged members to implement these procedures as a matter of urgency.</p>	<p>Members have reached agreement on the business principles upon which the <i>Liquidity Funding and Collateralisation Agreement</i> will be based. This will establish a mechanism to complete settlement in the event of a member pay-in failure. The members aim to produce an agreement ready for signature in December 2004.</p>
Foreign Exchange (FX) settlement risk and new CLS currencies	<p>The CLS (Continuous Linked Settlement) system significantly reduces settlement risk in foreign exchange transactions.</p>	<p>Preparations continue for the inclusion of four new currencies (the Hong Kong dollar, Korean won, New Zealand dollar and South African rand) in CLS. The target is to start settling foreign exchange transactions involving these currencies in the last quarter of 2004 or by early 2005, bringing the total number of currencies in the system to 15.¹</p>
US Dollar Settlement in CREST	<p>The current arrangements for US dollar settlement in CREST generate bilateral exposures between settlement banks.</p>	<p>CRESTCo and the settlement banks are exploring the mechanics of instituting a multilateral net settlement for US dollar-denominated transactions in CREST. This would reduce the inter-bank exposures in the present bilateral settlement arrangements.</p>

(1) A detailed discussion of the impact of CLS in reducing foreign exchange settlement risk is discussed in Sawyer, D, 'Continuous Linked Settlement (CLS) and foreign exchange settlement risk' in this *Review*.



Continuous Linked Settlement (CLS) and foreign exchange settlement risk

David Sawyer, Market Infrastructure Division, Bank of England

CLS – the international foreign exchange settlement system – was successfully launched in September 2002. Two years on, the volumes and values of transactions settled in CLS continue to grow. However, well over half of global foreign exchange settlement still appears to take place outside CLS, especially for transactions involving non-bank financial institutions such as investment funds and hedge funds. The G10 central banks and banking supervisors have made clear their interest in how banks manage settlement risk in such transactions. They continue to monitor whether enough has been done to reduce this risk, and to consider what further action might be necessary.

G10 CENTRAL BANKS set out a strategy to reduce foreign exchange settlement risk in the 1996 Allsopp Report.¹ One strand of this strategy was a call for action by private sector industry groups to provide risk-reducing multi-currency settlement services. The successful launch of CLS in September 2002 has been the banking sector's main response to that requirement.² This article explores how far CLS's market coverage has expanded, and examines which sectors of the market have not so far taken up the risk-reduction benefits offered by CLS. For sectors and institutions not participating in CLS, central banks and supervisors continue to be interested in the magnitude of settlement exposures and how the consequent risks are being managed. For those participating in CLS, different risk management issues arise. The article considers how the liquidity needs of CLS settlement membership are managed through the Inside/Outside swap mechanism – at the cost of reintroducing a limited amount of settlement risk – and reviews how CLS controls the operational risk inherent in a single system linking multiple financial markets.

CLS market coverage

Chart 1 shows that volumes and values of transactions settled in CLS grew strongly in the first year of its operation and have continued to increase

over the past year. In 2004 Q3, total sides settled averaged US\$1.4 trillion – representing turnover of US\$0.7 trillion given that each transaction has two sides. It is not possible to measure precisely CLS's share of the global market for foreign exchange settlement because up-to-date figures for the market as a whole are not available. However, the results of the latest BIS Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity indicated that total daily turnover in the foreign exchange market averaged some US\$1.9 trillion in April 2004.³ Although the two sets of figures are not directly comparable, the survey results suggest, when taken together with the CLS settlement data, that a substantial share of global foreign exchange transactions is still being settled outside CLS. Which types of transactions are not settled through CLS and which counterparties remain exposed to foreign exchange settlement risk are questions of interest to central banks and supervisory authorities.

Gaps in CLS market penetration

Since there are costs as well as benefits for institutions from participating in CLS,⁴ transferring settlement of foreign exchange business into CLS will not be appropriate for every company trading foreign exchange, particularly for those with a low volume of

(1) Bank for International Settlements, 'Settlement Risk in Foreign Exchange Transactions', March 1996. The Report was produced by a Steering Group chaired by Peter Allsopp of the Bank of England.

(2) CLS removes the risk of loss of principal in a foreign exchange transaction by ensuring simultaneous, or payment-versus-payment, settlement of both sides of the transaction. This process and other features of the CLS system are described in more detail in Box 1.

(3) Fifty-two central banks and monetary authorities participated in this survey. They collected data on turnover in traditional foreign exchange markets – spot, outright forwards and foreign exchange swaps – and in over-the-counter (OTC) currency and interest rate derivatives.

(4) Settlement members of CLS must purchase a shareholding in CLS Group Holdings, as well as meet the system set-up and operational costs of settling transactions in CLS. A per-item fee is charged for each transaction settled. Costs for third-party users are subject to agreement with their settlement member.

business or making transactions of small aggregate value. However, the BIS Triennial Survey data, together with discussions with current settlement members of CLS,¹ suggest that there are institutions with significant volumes and values of business which continue currently to settle outside CLS.

Participation by such institutions in CLS, either as members or as third-party users, could reduce risk to these institutions, their counterparties and the system as a whole.

Chart 1
Daily volumes and values settled in CLS
(ten-day moving average)^(a)



Source: CLS Bank International.

(a) The unit of measurement for trade volumes is 'sides'; there are two sides to each transaction. Both sides are counted in the value figures.

Despite the absence of comprehensive statistics on CLS's share of the individual sectors of the market for foreign exchange settlement, CLS's own studies indicate three main gaps in its market penetration. CLS has managed to capture a significant portion of the foreign exchange transactions between the world's largest banks. There has, however, been less success, so far, in extending its services to other banks, to non-bank financial institutions and to non-financial companies.

Banks

The list of members and third-party users in CLS at end-October 2004 gives some insight into use of CLS in the inter-bank foreign exchange market.² All of the 55 members are commercial or investment banks, while close to 80% of around 180 third-party users are also banks. In the G10 countries, most major banks active in the foreign exchange market are settlement members

or third-party users of CLS.³ The BIS Triennial Survey found that 53% of trades were between reporting banks, representing a turnover of around US\$900 billion. Taken with the value of transactions settled in CLS, this suggests that the larger part by value of total inter-bank trades are settled in CLS.

As the home authority, the Bank of England has a particular interest in the sterling business settled in CLS. The average daily value of sterling transactions settled in CLS in April 2004 was equivalent to some US\$147 billion. This compared with an average sterling turnover estimated by the BIS at some US\$320 billion equivalent. A raw comparison of figures for the sterling market suggests that a marginally higher share of sterling business is settled in CLS than the share for all currencies combined. Nevertheless, that still leaves well over half of all sterling business settled outside CLS.

Four of the major UK-owned clearing banks (Barclays, HSBC, RBS and Standard Chartered) joined CLS as shareholders and became settlement members from the outset. A few UK-owned banks which are significant, but not among the largest, traders in foreign exchange, are absent from the current list of CLS settlement members and third-party users. The most significant of these are in the process of becoming third-party users. Nevertheless, participation in CLS by UK institutions still contrasts with some other countries – for instance Switzerland, where many banks, including some with only a small presence in the foreign exchange market have chosen to participate in CLS, usually as third-party users.

Non-bank financial institutions and non-financial corporations

The most obvious gaps in CLS's current coverage are in the area of non-bank financial institutions and non-financial corporations. This is perhaps not surprising given that regulatory pressure for the reduction of foreign exchange settlement risk was directed in the first instance at banks.

There are less than 30 non-bank financial institutions already participating in CLS. The BIS 2004 Triennial

(1) Settlement members are those that hold an account at CLS Bank.

(2) These data are provided and updated regularly by CLS on its website: www.cls-services.com

(3) Most large Canadian banks are not yet participating in CLS, but have indicated that they intend to begin submitting trades for settlement in 2005. One possible reason why Canadian banks have not so far used CLS is that it does not yet have the capacity to settle same-day value trades in Canadian/US dollars. CLS is investigating the feasibility of introducing additional (later) settlement sessions in which some same-day trades could be settled, including those involving the Canadian dollar.

survey found, however, that foreign exchange trading between reporting banks and their (non-reporting) financial customers had risen markedly since the 2001 Survey, accounting for one third of total turnover in April 2004. The survey suggested that this may to a large extent reflect a significant increase in activity by hedge funds and commodity trading advisers, as well as the robust growth of trading by investment/fund managers. Very few such institutions currently participate in CLS.

CLS has worked with user groups to enable investment/fund managers to settle foreign exchange deals in CLS via custodian banks that are CLS settlement members or have arrangements with a settlement member.¹ In due course, this may help encourage greater participation by such institutions. For funds with a higher risk appetite, for example some hedge funds, the additional costs of using CLS may however exceed the value that they attach to eliminating settlement risk incurred when trading with large banks, making them unlikely future third-party users.

The presence of a few major non-financial companies in the list of third-party CLS users indicates that there is a business case for participation in the system by some non-financial firms. Besides risk-reduction and the potential savings from netting of liquidity requirements, third-party participation can offer scope for savings in processing costs.

The number of non-bank institutions participating in CLS as third-party users seems likely to grow over time, although the extent and speed of that growth are not yet clear. One way for banks to encourage counterparties who remain outside CLS to join would be to use differential pricing, or lower trading limits, for non-CLS participants to reflect the extra risk of dealing with these counterparties. But for counterparties which remain outside CLS, banks need to employ other ways of managing and containing foreign exchange settlement risk.

Managing foreign exchange settlement risk outside CLS

Banks, and their supervisors, have an interest in ensuring that they measure, monitor and control

foreign exchange settlement risk. The Basel Committee on Banking Supervision published supervisory guidance on principles and methods for reducing foreign exchange settlement risk in September 2000.² The guidance expects banks to measure foreign exchange settlement exposures accurately and set settlement limits for all counterparties. Collateral arrangements and legally sound netting arrangements are identified as other possible ways of reducing risk. The guidance envisages action by supervisors where they determine that a bank's settlement risk management is not adequate or effective. It notes that if settlement exposures remain at levels considered by supervisors higher than necessary, tools such as large exposure limits or additional capital requirements could be used.

Extending CLS to new currencies

Adding new currencies to the CLS settlement process could provide another way of extending CLS's risk reduction benefits. Currently, CLS can settle foreign exchange transactions that involve any two of eleven currencies. Four more currencies are scheduled to start settling by early 2005 (these are listed in Box 1). Figures from the BIS's 2004 Triennial Survey suggest that trade in the currencies outside these 15 currently accounts for only around 5% of total turnover in the global foreign exchange market. Given that there are fixed costs to CLS and its settlement members of introducing new currencies, this may weaken the business case for adding further currencies to CLS. At the same time, simple comparisons of values and volumes for these currencies with those for currencies already settled in CLS do not give an accurate measure of the relative risk-reduction that could be achieved. Besides the size of the currency exposure, the probability of non-receipt also needs to be taken into account. Members and prospective users of CLS, as well as central banks and other regulators, may consider that risk-reduction benefits warrant the inclusion in CLS of other currencies.

For a currency to be included in CLS, it must meet certain risk-related eligibility criteria. These include:

- a sufficient number of liquidity providers (their role is described in Box 1) in that currency;

(1) The work included agreement on an industry standard coding for SWIFT messages to help identify the fund counterparty in a foreign exchange transaction.

(2) Basel Committee on Banking Supervision, 'Supervisory Guidance for Managing Settlement Risk in Foreign Exchange Transactions', September 2000.

Box 1: Main features of the CLS System

CLS is a complex system and it is not possible in this short article to give a full account of its rules. The following is therefore a summary of its main features.

Legal structure, participation and oversight

The Continuous Linked Settlement (CLS) system is designed to eliminate principal risk on the foreign exchange transactions that it settles. The service is provided by CLS Bank International (CLS Bank), a US-incorporated special-purpose bank with a sister operations company (CLS Services Ltd) in the United Kingdom. Its parent company (CLS Group Holdings AG, incorporated in Switzerland) is currently owned by 69 of the world's largest financial organisations (mainly commercial banks). CLS Bank operates as a settlement agent for foreign exchange transactions; it does not become a counterparty to its users' transactions.

Participation in the CLS system can take two main forms, as a member or as a third-party user.¹ A settlement member's foreign exchange transactions are settled directly across its accounts at CLS Bank, while those of a third-party user (which has no direct relationship with CLS Bank) are settled by a settlement member on its behalf.

CLS is overseen on a co-operative basis by the central banks which issue the currencies settled in the system, under the leadership of the Federal Reserve.² The framework for this oversight is that of the Principles for Co-operative Central Bank Oversight of Cross-border and Multicurrency Netting and Settlement Schemes set out in the 'Lamfalussy Report' published by the BIS.³

The settlement and funding process

CLS currently settles transactions involving eleven 'eligible' currencies. These are the Australian dollar, Canadian dollar, Danish krone, euro, Japanese yen, Norwegian krone, Singapore dollar, sterling, Swedish krona, Swiss franc and US dollar. Four more

currencies – the Hong Kong dollar, the Korean won, the New Zealand dollar and the South African rand – are due to be admitted by early 2005.

CLS Bank uses the large-value payment systems of the currencies that it settles to make and receive payments to and from members, so CLS's daily settlement process takes place over a short (five hour) period during which these systems are concurrently open (although not all are open for the full five hours). In Central European Time (CET), this is 07.00 to 12.00 (one hour earlier in UK time).

Each settlement member holds a multi-currency account at CLS Bank, with balances in each currency (these balances are normally zero at the start and end of the settlement day). Settlement of a foreign exchange transaction is effected on a gross basis by simultaneous credits and debits across the accounts of the two parties to the transaction in the relevant currencies, subject to the risk management controls outlined below being met. This ensures that principal risk is eliminated for each transaction. However, there is a clear distinction between settlement and the funding process. To ensure an efficient use of liquidity, members have to fund only their net short currency positions for the day, and CLS Bank pays out to members the amounts corresponding to their net long currency positions. Furthermore, the system minimises the liquidity impact on members and local payment systems of the funding requirements by allowing each settlement member to spread its funding over several instalments ('pay-ins'), subject to a minimum schedule issued at the start of each day to each member for each currency. Net long currency positions are also paid out to members in instalments ('pay-outs') as long balances in the appropriate currencies become available. There is no schedule set at the beginning of the day for a member's pay-outs since it is not possible to forecast the exact time at which members will make their pay-ins.

(1) There are two forms of membership: settlement membership and user membership. The transactions of a user member, like those of a third-party user, are settled across a settlement member's account. Unlike those of a third-party user, they are submitted directly to CLS Bank. Currently, there is one user member of CLS.

(2) The Federal Reserve Bank of New York is also the supervisor of CLS Bank.

(3) Bank for International Settlements, 'Report of the Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten Countries', November 1999.

Risk controls

Transactions submitted by members are queued at the beginning of the day. The settlement of each transaction proceeds in turn from 07.00 CET as long as certain risk controls are satisfied once the transaction is settled. These are:

1. Members can run debit balances in individual currencies but these cannot exceed given limits. These are called Short Position Limits, or SPLs – although a better name might be short balance limits. The SPL for a given currency is the same for all members, and is a function of the liquidity available in that currency from liquidity providers to CLS Bank (the role of liquidity providers is explained below).
2. The aggregate of each member's short balances across all currencies cannot exceed a specified limit – the Aggregate Short Position Limit, or ASPL – for that member. This is calculated as a function of, amongst other criteria, the member's credit rating.
3. Each member must retain net positive value overall on its account across all currencies at all times during the settlement process. This ensures that short balances in currencies are collateralised by long balances during the settlement process, and that CLS Bank (and by implication other members) is not extending credit to the member on its account. Haircuts are applied to a member's currency balances to help protect the account's overall positive value against exchange rate variations.

Failure management: liquidity providers

CLS has a range of additional measures to limit the impact of a payment default by a member on other members. Liquidity providers are banks that commit to provide liquidity in a given currency to CLS Bank to enable it to make timely pay-outs to members in these currencies in certain scenarios in which other members fail to meet their pay-in requirements. Such a scenario could occur, for example, if a member fails to meet one of its scheduled pay-ins for a currency after all transactions have settled across members'

accounts at CLS Bank,¹ leaving the member with a short balance in that currency on its account. CLS Bank could then be left with a liquidity shortfall in that currency, preventing it from completing the pay-outs to other members. The liquidity provision mechanism involves CLS Bank selling some of the positive balances that the non-paying member retained on its account in other currencies to a liquidity provider in exchange for the required amount of the currency expected from the non-payer. The transaction initially takes the form of an overnight foreign exchange swap, so it is reversed the following day, on the assumption that the problem experienced by the non-paying member is temporary and the non-payer will by then have funded its currency shortfall. If, however, the member's problem proves to be more serious and it continues to fail to pay in the missing amount, CLS Bank will eventually convert the foreign exchange swap with the liquidity provider into an outright purchase of the currency.

The commitments available from liquidity providers in a given currency are sufficient to ensure that, even in the event of the failure of the liquidity provider with the largest commitment to meet its obligation, the other liquidity providers' commitments will be enough to cover the short balance of the non-paying member.

Loss sharing arrangements

Despite the extensive facilities from liquidity providers (which have, at the time of writing, not been used by CLS since the start of its operations), exceptional circumstances could still lead CLS Bank to record a loss. This would be the case if, for example, exchange rate variations were sufficient to exceed the volatility haircuts on the balances on the failing member's account and cause its overall value to become negative. CLS Bank would then have insufficient positive balances to fund the swap transactions with liquidity providers. In this case, CLS would allocate these losses to the surviving members according to a loss allocation scheme. There are several stages to this, including an initial pro rata allocation of losses to members who had dealt with the failing member and then a further allocation to all surviving members if the first allocation raised insufficient funds.

(1) Settlement is normally completed, with finality, by 09.00 CET.

- satisfaction that the currency's relevant large-value payment system meets CLS Bank's operational requirements, including that it provides Real Time Gross Settlement (RTGS) or equivalent;
- adequate access to liquidity in that currency;
- acceptability to CLS Bank of any restrictions or conditions on the transferability of the currency;
- acceptability to CLS Bank of any restrictions on convertibility;
- an assessment satisfying CLS Bank that volatility in the currency can be managed with practicable haircuts;
- receipt of a satisfactory legal opinion on the finality of settlement instructions between members and the finality of payments made to and received by CLS Bank in the subject currency.

These criteria are designed to ensure that the inclusion of currencies achieves the intended settlement risk reduction benefits without introducing risks of disruption to CLS users, or to other currency areas and their payment systems connected to each other via CLS.

To accommodate a wider range of currencies without unacceptable additional risk of disruption to the settlement process, CLS has worked with its members, liquidity providers and central banks over the past two years to develop a revised Framework for Eligible Currencies. The framework complements the currency eligibility criteria by providing a clear articulation of the CLS system's risk design components for existing and new currencies. It includes provisions to mitigate the potential credit and currency risks faced by liquidity providers.¹ These include, for example, the possibility of assigning a Short Position Limit (Box 1) of zero to a 'deteriorating' currency (one for which the relevant sovereign credit rating has fallen below the equivalent of BBB), so that an instruction involving that currency can settle only on a cash basis.

Like the eligibility criteria, the revised framework seeks to ensure that any new currencies do not increase the operational, liquidity, legal, market or

credit risks to CLS settlement members, liquidity providers and other stakeholders beyond acceptable levels. The framework thus makes it possible for a wide range of currencies to be considered for inclusion in the CLS system.

The new risk-management challenges of continuous linked settlement

Principal risk has been eliminated in the foreign exchange transactions settled through CLS. But successful settlement requires management of some other risks by settlement members and by CLS itself. Meeting potentially large timed pay-in requirements depends on reliable liquidity management. The settlement process also involves new operational interdependencies – with operational failures potentially having a wide cross-border impact. The success of CLS therefore also depends on robust operational risk management.

Liquidity management and the Inside/Outside swap mechanism

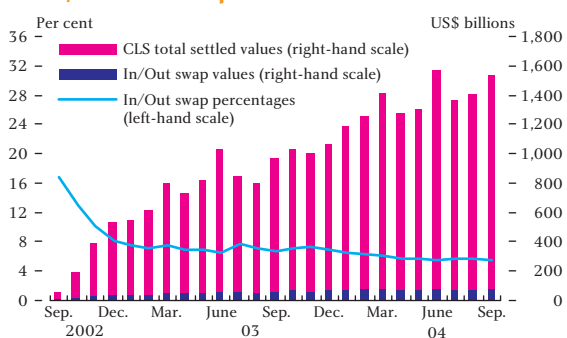
CLS reduces the size of members' liquidity needs by requiring them to pay to CLS Bank amounts corresponding to only their net short currency positions. However, as Box 1 explains, CLS also requires members to make their pay-ins according to a minimum schedule. Members therefore still need to ensure that they have sufficient liquidity in place to meet this minimum schedule. Inside/Outside (I/O) swaps are a mechanism that allows settlement members to trade down their short net currency positions in CLS Bank through bilateral trades in an effort to ease the time-specific liquidity pressures generated by their CLS pay-in requirements. The swap consists of an 'in' leg settled in CLS, in which the two members buy some or all of their respective short currencies and sell some or all of their respective long currencies, and an 'out' leg for the same amounts and currencies in the opposite direction settled outside CLS where time pressures for settlement and liquidity are less intense.

A certain amount of principal risk is reintroduced by the I/O swap mechanism since one leg of each swap must be settled outside CLS. Members expected the mechanism to form an essential tool for alleviating the liquidity pressures caused by possible large imbalances between their 'inside' and 'outside' CLS positions. It was thought, however, that as the

(1) Box 1 describes the CLS settlement process and the role of liquidity providers.

number of users of the system grew these imbalances would diminish and members' 'in' positions would gradually resemble their overall foreign exchange market positions, reducing the need for the I/O swap mechanism. Chart 2 shows that the value of I/O swaps as a percentage of the total values settled in CLS did indeed fall sharply in the first few months of CLS's operations, reflecting increases in the system's netting efficiency as settled values grew. However, the share has since stabilised at around 6% and the average absolute value of I/O swaps has in fact increased slightly.

Chart 2
Inside/Outside swaps^(a)



Source: CLS Bank International.

(a) The chart compares the value of Inside/Outside swaps with the values of sides settled in CLS. It also shows the percentage of principal risk reintroduced outside the system by the Inside/Outside swap mechanism.

Given that CLS aimed to eliminate principal risk, central banks have needed to consider whether it is appropriate that CLS incorporates a mechanism that re-introduces a proportion of principal risk into foreign exchange market positions. The Bank's meetings with UK members of CLS indicate that they see the reintroduction of a small proportion of foreign exchange principal risk as an acceptable cost of reducing the liquidity risk that could otherwise result from having to make large pay-ins by tight deadlines. Like many payment and clearing systems designed to reduce credit risk, CLS can make new demands on liquidity management. There is a trade-off between reducing credit risk and minimising liquidity risk. For the time being, the extent of the trade-off in CLS seems in the Bank's view to be acceptable. However, the role and impact of the I/O swaps mechanism will be kept under review as the values settled by the system increase.¹

Operational risk

Operational risk is widely recognised as an important and growing risk within the financial system, and one that can be particularly concentrated in payment and settlement systems. Given the potential cross-border impact via CLS of an operational failure, appropriate management of operational risk in CLS is given a high priority by regulatory authorities and CLS itself. The central banks that co-operatively oversee CLS (Box 1) have therefore worked closely with CLS and its settlement members to ensure that the system maintains a high level of resilience.

CLS's infrastructure is designed to provide for a high availability of service. CLS has processes to mitigate the risk from key dependencies on both its own systems as well as on various external parties, including SWIFT, the RTGS systems through which it receives and makes its currency payments, settlement members and their nostro agents, and its liquidity providers. The unavailability of CLS's own operations centre or primary processing system can be recovered from quickly. CLS has also agreed a set of contingency arrangements with each RTGS system provider to cope with an RTGS outage or with the loss of links to an RTGS system, and settlement members have to satisfy high operational requirements set by CLS. Contingency arrangements are regularly reviewed and tested with all members.

Conclusion

CLS is still evolving, recruiting new users and introducing new currencies. This increased use of CLS will contribute further to the reduction of foreign exchange settlement risk. But large parts of the foreign exchange market are not yet settling through CLS and it is not clear that CLS will reach all these parts. The central banks that oversee CLS continue to monitor the success of the overall G10 strategy and to assess what further action might be necessary to ensure its success. One option may be to review whether there is a need for greater use of the supervisory tools identified in the Basel Committee guidance.

(1) CLS itself is endeavouring to find ways to reduce the extent to which settlement risk is reintroduced by I/O swaps. This includes investigating the feasibility of introducing additional (later) CLS settlement sessions, in which some of the current out legs of I/O swaps could be settled, thus eliminating the principal risk currently reintroduced by these legs.

Securities settlement systems: assessing their relative riskiness

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Securities settlement systems are a fundamental piece of the financial infrastructure of an economy. The Bank therefore has an interest in ensuring that adequate risk mitigation techniques are employed by the securities settlement systems most used by UK market participants. In this article, we identify these systems and propose a framework for assessing the quality of their risk controls.

SECURITIES SETTLEMENT SYSTEMS¹ (SSSs) provide a means of transferring the ownership of securities. This occurs through three, normally linked,² steps: (a) the securities are delivered to the buyer, usually through entries on the SSSs' books; (b) the funds are paid to the seller, on the books of either the central bank or a commercial bank; and (c) the legal record of ownership is updated.

Settlement is an essential part of the post-trade process and as such its resilience is fundamental to the efficient functioning of financial markets. But institutions using SSSs face a number of risks, or potential 'settlement shocks'. Broadly speaking, settlement shocks can be mitigated in two ways: either *ex ante* by decreasing the likelihood of the risk crystallising, or *ex post* by reducing the impact of the risk once it has occurred. Table 1 summarises the risk mitigants relevant for each type of shock.

For example, participants in settlement systems could encounter *operational risks*, which might cause delays and affect market liquidity. An *ex ante* approach to mitigating operational risk is to ensure that systems and controls meet minimum requirements. The impact of operational risks can be reduced by ensuring that there are effective *ex post* contingency plans to continue a system's operations at alternative sites.

There is also *financial risk*, or the possibility of insolvency of the SSS. This arises if the SSS takes credit risks, either by acting as principal in lending or implicitly through the operation of a net settlement process.³ Other financial shocks could be caused by a severe loss of revenue or a significant increase in costs. The likelihood of financial failure can be reduced by ensuring the system has an adequate capital base and by adopting credit risk controls. Procedures to replace a failed system rapidly with a safe and efficient substitute are an example of an *ex post* mitigant.

There are several other types of risk which affect members of SSSs. Participants using a commercial bank to finalise payment obligations face settlement bank risk, or the possibility of a failure of that bank. This risk can be mitigated *ex ante* by using central bank accounts to settle the cash leg of a securities transaction.

Members of an SSS also face principal risk: the risk that DvP arrangements are inadequate and assets are delivered to a defaulting counterparty before receipt of payment (or vice versa). Replacement cost risk is the risk that securities are not delivered by the seller on the due date and the buyer has to replace the transaction at the current market price. Shortening the length of the settlement cycle, the time between the execution of a trade and its settlement, reduces the time in which a counterparty default or delivery failure could take place.⁴

(1) For the purposes of this article, a SSS is defined as the central securities depository or international central securities depository in each country.

(2) Linking these steps ensures 'delivery versus payment' (DvP) – the principle whereby final delivery of securities occurs if and only if payment of funds also occurs.

(3) In net settlement systems, credit can effectively be provided by the SSS as agent for other participants in the system. In the event of a failure of a participant with a net debit position, the remaining participants could face a shortfall in funds or securities.

(4) Although shortening the settlement cycle has *ex ante* benefits for a counterparty default, it is possible that it could lead to an increase in the likelihood of an operational shock if there are delays and inefficiencies in processing trade information.

Table 1

Settlement shocks and the risk mitigants available to SSSs^(a)

Shock	Description	Ex ante mitigants	Ex post mitigants
Operational failure	A system outage could cause liquidity problems for all participants in the market.	Systems and controls (11)	Continuity plans (11)
Financial failure	A financial failure of an SSS could cause liquidity problems for all market participants.	Credit risk controls (9) Capital base	Replacement procedures
Settlement bank failure	The clients of the settlement bank would not be able to settle and would suffer liquidity problems and, potentially, credit losses.	Central bank money (10)	
Counterparty default ^(b)	Could cause disruption in the markets if sufficient losses are suffered.	Settlement cycle (3) Risk-based access criteria (14)	DvP (7) Timing of finality (8) ^(c)
Replacement cost ^(b)	Market participants face costs resulting from changes in market prices.	Trade confirmation (2) Settlement cycle (3) Risk-based access criteria (14)	Securities borrowing (5) Timing of finality (8) ^(c)

Source: Bank of England.

(a) The risk mitigants in this table are similar to the recommendations published by the Committee on Payment and Settlement Systems (CPSS) and the Technical Committee of the International Organisation of Securities Commissions (IOSCO) in 2001. A working group of the Committee of European Securities Regulators (CESR) and the European System of Central Banks (ESCB) recently developed EU standards from these recommendations. The figures in brackets are the numbers of the relevant recommendations in CPSS and IOSCO (2001) and the standards in ESCB and CESR (2004).

(b) Counterparty default and replacement cost risk can also be mitigated by the use of a central counterparty (CPSS and IOSCO recommendation 4). In a few cases, the SSS also acts as a central counterparty.

(c) The timing at which a transaction is finally settled affects the impact of a counterparty default or the replacement cost. System participants that know the effect of the default early in the day will be able to resolve any problems more quickly than participants with information late in the day.

Settlement also entails important *legal risks*: losses can arise if the legal framework is incompatible with the practices in an SSS or its implications are uncertain. This article does not consider legal issues further as the associated risks are not readily quantifiable.

The settlement shocks in Table 1 could have the potential to disrupt financial markets and the wider economy, particularly if the shock was prolonged. For example, central banks use SSSs to take delivery of collateral used by banks to obtain intraday liquidity in payment systems and in market operations to implement monetary policy.¹

The UK financial system is exposed to systems in other countries. First, UK market participants trading in foreign securities use the relevant system(s) in that country. They access the foreign SSS either directly by becoming a remote member, or indirectly – through a custodian, international central securities depository, or via links with the UK SSS – CREST. Second, the increasing consolidation and interoperability in the securities market infrastructure mean that problems in foreign systems can affect the UK SSS.² Third, disruption in foreign securities markets could affect UK payment systems, as UK banks can obtain intraday credit based on collateral

held in both CREST and foreign SSSs. The Bank accepts foreign collateral for its intraday credit operations, either through the accounts with the international central securities depositories or via the Correspondent Central Banking Model.³

For a comprehensive assessment of the settlement process, all of the arrangements used to settle securities across borders, such as custodians and links between SSSs, should be considered. Furthermore, the final impact of any settlement shock might include disruption to the wider economy if the shock causes a SSS member to default on commitments with its counterparties. But, as a first step, this article focuses only on the initial impact of shocks in SSSs on UK market participants, ignoring other entities involved in the process and these potential second-round effects on the financial markets.

Method

The framework outlined here analyses a country's SSSs according to 'SSS relative riskiness' (SRR), an estimate of the impact of disruption in SSSs on UK markets.

SRR is defined as the product of the impact and probability of a settlement shock, and can be proxied

(1) The implications for monetary policy are not discussed further.

(2) An example of consolidation is the merger of CRESTCo and the Euroclear group in September 2002. Interoperability can be achieved by the use of links between SSSs in different countries.

(3) The Correspondent Central Banking Model is a mechanism whereby securities held in a SSS in one country can be used to collateralise intraday credit in another country. European Central Bank (2003) provides more information.

by the product of ‘exposure at settlement shock’ (EAS) and a ‘settlement system rating’ (SSR):

$$SRR_i = EAS_i \times SSR_i$$

where i denotes each of the countries assessed (around 90 in total).

EAS is an estimate of the UK financial system’s exposure to a system; it is assumed that the impact of a shock is proportional to this exposure. SSR is an overall assessment of the quality of the *ex post* and *ex ante* risk mitigants used in a SSS, and thus is related to the probability and impact of a settlement shock.

This method is similar to that devised by Buckle, Cunningham and Davis (2000), which ranked countries according to ‘expected default loss’, the product of the size of credit exposures of UK lenders to borrowers in each country and the credit risk attached to them. But in that study ‘expected default loss’ was derived from the market assessments of default risk embodied in credit ratings and credit spreads.

‘Exposure at settlement shock’

Investors are more exposed to settlement shocks the greater the volume of securities that they settle, so it would be desirable to measure the UK financial system’s exposures using the volume of UK market participants’ securities settlement in each SSS around the world. However, this information is not publicly available. The approach taken here is to proxy exposures using the Co-ordinated Portfolio Investment Survey (CPIS).¹ The CPIS includes statistics on the level of the UK’s foreign portfolio investment (equities, debt and money market instruments) by country.

There are three main caveats to consider when interpreting these data. First, as country data on flows are not published, figures on the volume of securities settled are estimated using data on the level of securities owned. This implicitly assumes that investors with larger holdings settle securities more frequently. However, this may not necessarily be the

case. For example, pension funds and unit trusts hold large stocks of securities, but probably need to settle these securities less frequently than banks and securities firms, which tend to trade more often. Calculating the change in the level of exposure over a given period would not measure the relevant settlement activity either. The change in the net value of purchases and sales made is not the same as the total gross value of securities settled, and would include any revaluations following changes in asset prices.

Second, the CPIS allocates data to countries according to the location of the issuer, rather than the system in which the securities are settled. This means that UK investment in bonds issued by a French company, but settled in the international central securities depositories, Euroclear Bank or Clearstream Banking Luxembourg, is allocated to France, not Belgium or Luxembourg. The UK exposures to Belgium and Luxembourg are likely to be significantly under-estimated by the CPIS data.

Third, the CPIS excludes direct investments, defined as a holding of 10% or more of the ordinary shares or voting power of an enterprise. This means that merger and acquisition activity is not included.

Exposures to the UK SSS are estimated using data on the UK economy’s domestic portfolio investment. These statistics are published by the Office for National Statistics each quarter.

The resulting data are heavily concentrated (Chart 1). Over half of the total exposures of the economy to settlement systems are with the UK SSS. Almost one-third of total exposures are with other developed countries in Europe; approximately 15% of exposures are with non-European developed countries and offshore centres; and only around 3% of exposures are with developing countries.²

Settlement system ratings

How are the *ex ante* and *ex post* risk mitigants used to reduce the probability and impact of various settlement shocks to be addressed? Again, precise data are not available. But one way of quantifying

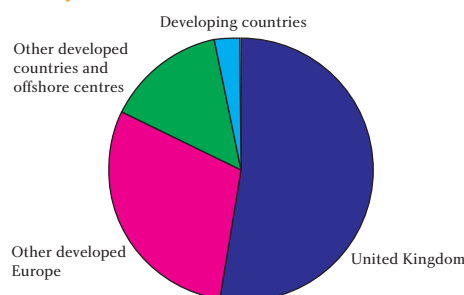
(1) IMF (2002) explains this survey in more detail. Only end-year data are published in the CPIS. Quarterly estimates can be produced by extrapolating forward from the latest annual data using the growth rates implied by the data on UK banks’ consolidated external portfolio investment claims. These quarterly estimates are grossed to the UK’s total foreign portfolio investment, published by the Office for National Statistics.

(2) Although these results are calculated for the end of 2004 Q2, they would not change significantly if different dates were chosen.

them is to use the 'Risk Exposure Assessments' (REAs) produced by Thomas Murray as part of the Capital Market Infrastructure Risk Ratings service.

Chart 1

UK exposures to SSSs^{(a)(b)}



Sources: IMF, ONS and Bank calculations.

(a) Data are for the end of 2004 Q2.

(b) Country groups are those defined by the BIS.

The REAs assess the risk exposures of market participants using the SSSs in different countries. The REAs consider six types of risk and their mitigants, which are similar to those identified in Table 1:

- Operational risk includes the impact of an operational error and a system's ability to resume processing following disruption. The factors assessed are equivalent to the mitigants used to counter operational shocks.
- Financial risk contains an assessment of whether a SSS's capital and financial resources are sufficient. Capital is a risk mitigant for financial failure shocks.
- Counterparty risk includes an evaluation of the DvP procedures used by the system, a mitigant for counterparty default shocks.
- The process and timing of final securities and funds settlement and the length of the settlement cycle are used to determine asset commitment risk. These items are comparable to the risk mitigants for settlement bank, counterparty default and replacement cost shocks.

- Liquidity risk comprises an assessment of a failure to deliver securities or cash on time. The factors considered are similar to the risk mitigants for replacement cost shocks.
- Finally, a consideration of the risk of losses associated with the processing of corporate actions (eg the handling of dividends) determines asset servicing risk.

The system rating is calculated as a weighted average of the first five REAs outlined above.¹

The full Capital Market Infrastructure Risk Ratings were not used, for two reasons. First, asset servicing risk is excluded, as the handling of corporate actions is not part of the settlement process. Second, certain shocks have a greater impact on financial markets than others. The weights used in the calculation are selected to reflect the relative potential importance of these settlement shocks to the financial system. The highest weighting is given to operational and financial risk (as these affect all system participants), followed by asset commitment and counterparty risk (as these only affect some system participants – for example, those trading with a defaulting participant or those using a failing bank for settlement of funds) and liquidity risk (this only affects the participant expecting the delivery of assets).²

The settlement system rating is defined as:

$$SSR_i = \frac{\sum_{j=1}^n (r_j \times w_j)}{\sum_{j=1}^n w_j}$$

where r_j and w_j are the REAs and their weights, respectively, j denotes each of the settlement shocks and i is the country being assessed.

The ratings are presented using the scale developed by Thomas Murray (Table 2).³ A lower risk exposure assessment implies that there are higher quality risk mitigants in that system.

(1) The Bank has not independently verified these assessments.

(2) A sensitivity analysis was conducted to determine the precise value of these weights. The overall ranking was not significantly affected when the weights were changed.

(3) The REAs are published using the alphabetic ratings scale (Table 2). These ratings are converted to a numeric scale to calculate SSR. However, the alphabetic ratings scale is still used for presentation.

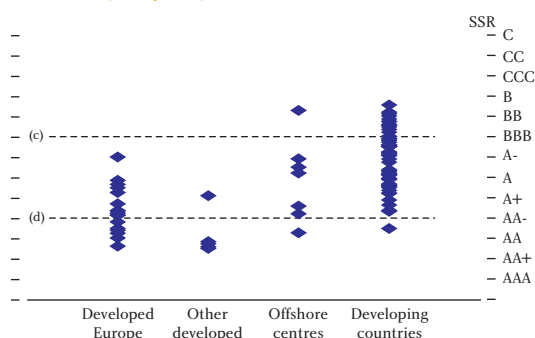
Table 2
Settlement system rating scale

Rating	Risk exposure	Mitigant quality
AAA	Extremely low	Excellent
AA+	Very low	Very good
AA		
AA-		
A+	Low	Good
A		
A-		
BBB	Acceptable	Acceptable
BB	Less than acceptable	Less than acceptable
B	Quite high	Rather poor
CCC	High	Poor
CC	Very high	Very poor
C	Beyond acceptable	Unacceptable

Source: Thomas Murray.

The system ratings are less skewed than the exposure data, with just under a quarter of the systems studied receiving a rating of 'AA-' (very good risk mitigants) or above (Chart 2). Most of these SSSs were located in developed countries. The majority of systems (54%) have an 'A' rating (good risk mitigants). Around one-fifth of systems were rated 'BBB' (acceptable risk mitigants) to 'B' (rather poor risk mitigants). Virtually all of these systems were located in developing countries (the only exception was a system in one of the offshore financial centres). No systems have a rating of 'CCC' (poor risk mitigants) or below.

Chart 2
SSS ratings by region^{(a)(b)}



Sources: Thomas Murray and Bank calculations.

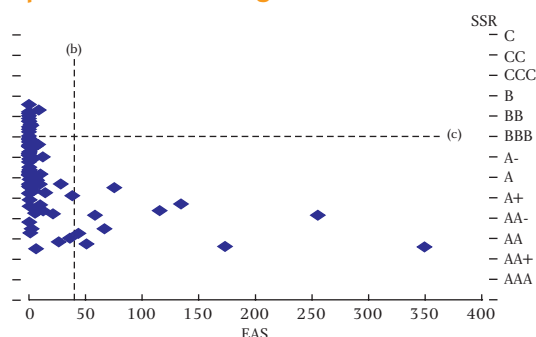
- (a) Data are for 2004 Q2.
(b) Country groups are those defined by the BIS.
(c) Lowest acceptable rating (BBB).
(d) Lowest rating with 'very good' risk mitigants (AA-).

Results

Chart 3 considers exposures to SSSs (EAS) and the rating (SSR) of systems together. The systems most used by UK market participants have either 'very good' or 'good' risk mitigants (right-lower quadrant).

Furthermore, the systems with ratings below BBB ('acceptable risk mitigants') are not used significantly.

Chart 3
Exposures to and ratings of SSSs^(a)



Sources: IMF, ONS, Thomas Murray and Bank calculations.

- (a) Data are for the end of 2004 Q2. Chart excludes United Kingdom to aid presentation. The United Kingdom has an EAS of 1817 and an SSR of AA.
(b) Mean EAS (calculation includes United Kingdom).
(c) Lowest acceptable rating (BBB).

The ordering implied by the SRR statistics is driven by the relative importance of the UK's exposures to the systems rather than the quality of risk mitigants.

Unsurprisingly, the domestic SSS (CREST) is clearly the most important system in terms of UK impact (Table 3); on the SRR metric, it is around six times more important than the system ranked second.

Table 3
Key SSSs for United Kingdom markets^(a)

Country	SRR statistic ^(b)
United Kingdom	100.0
United States	16.3
Germany	16.0
Netherlands	9.2
France	8.1
Italy	7.5
Belgium	5.8
Switzerland	3.7
Luxembourg	3.7
Japan	2.8

Sources: IMF, ONS, Thomas Murray and Bank calculations.

- (a) Top ten SSSs by SRR in 2004 Q2.
(b) Presented as an index where United Kingdom = 100.

Following this, there are three groups of systems, ranked similarly, that are more significant for UK markets than the other SSSs studied. The first group comprises the SSSs in the United States and Germany; the second, the systems in the Netherlands, France, Italy and Belgium; and the third, the SSSs in Switzerland, Luxembourg and Japan.

Belgium and Luxembourg should probably have a higher ranking, as exposures to the international central securities depositories are likely to be greater than estimated by the method of this article.¹

The remaining SSSs are less important; just over half of the systems studied have a ranking statistic below 0.1 (ie these SSSs are estimated to be approximately one thousand times less important than the domestic system).

These results are unlikely to change significantly over time, unless there is an important change in a SSS's procedures (eg major alterations to processing systems or a change in the DvP mechanism) or a substantial reallocation of portfolios to different countries. For example, a decision by UK market participants to increase considerably the amount of trading in developing countries' securities would raise their exposures to settlement systems with lower ratings.

Conclusions

This article has presented a framework for identifying which SSSs are most important for UK markets. It finds that the domestic settlement infrastructure is much more important than foreign systems. This explains why the Bank concentrates on developments

in UK market infrastructure, for example, in *Strengthening financial infrastructure* in the Bank's *Financial Stability Review*.

This analysis also suggests, however, that SSSs in around ten foreign countries are important for UK markets. The Bank, therefore, has an ongoing interest in ensuring that adequate minimum requirements for mitigating risks continue to be met by foreign SSSs. This has been achieved to date through the implementation of recommendations such as CPSS and IOSCO (2001) and G30 (2003). The standards in ESCB and CESR (2004) are intended to be used for the regulation and oversight of EU systems in the near future. The Bank will be participating in the work to implement these standards.

It is possible that, in the near future, minimum risks standards for SSSs could be placed on a statutory basis. The EU Commission (2004) recently stated that 'high-level principles for the authorisation, regulation and supervision of securities clearing and settlement systems' should be included in a directive. If a directive is drafted, the Bank will work to ensure that any such requirements are set at an appropriate level, given the potential settlement risk both domestic and foreign systems pose to UK financial stability.

(1) As explained in the third page of this article, the CPIS data are based on the country of issuer, not the country of settlement.

References

- Bank for International Settlements (2004)**, *Delivery versus payment in securities settlement systems*, Basel: Bank for International Settlements.
- Buckle, S, Cunningham, A and Davis, P (2000)**, 'A possible international ranking for UK financial stability', Bank of England *Financial Stability Review*, June.
- European System of Central Banks (ESCB) and Committee of European Securities Regulators (CESR) (2004)**, *Standards for securities clearing and settlement in the European Union*, Frankfurt and Paris: ECB and CESR.
- Committee on Payment and Settlement Systems (CPSS) and Technical Committee of the International Organisation of Securities Commissions (IOSCO) (2001)**, *Recommendations for securities settlement systems*, Basel: Bank for International Settlements.
- EU Commission (Commission of the European Communities) (2004)**, *Clearing and settlement in the European Union – the way forward*, Brussels: Commission of the European Communities.
- European Central Bank (2003)**, *Correspondent central banking model – procedures for Eurosystem counterparties*, Frankfurt: ECB.
- G30 (Group of Thirty) (2003)**, *Global clearing and settlement: a plan of action*, Washington: Group of Thirty.
- Hills, B and Rule, D (1999)**, 'Counterparty credit risk in wholesale payment and settlement systems', Bank of England *Financial Stability Review*, November.
- IMF (International Monetary Fund) (2002)**, *Co-ordinated portfolio investment survey guide*, 2nd edition, Washington: International Monetary Fund.

Collateral posting decisions

in CHAPS Sterling

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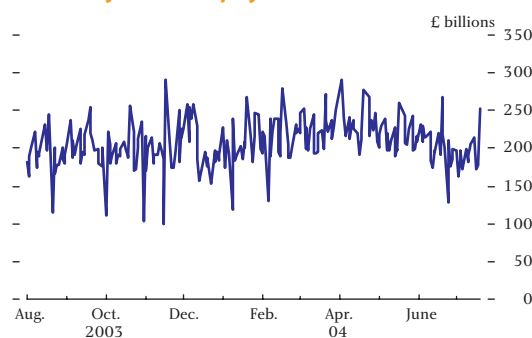
The smooth functioning of payment systems, and in particular large-value payment systems, is important to maintaining financial stability. In the UK, the CHAPS Sterling system allows banks to make real-time sterling payments on their own behalf or on behalf of their customers. CHAPS Sterling member banks support their payments activity in CHAPS Sterling by borrowing intraday from the Bank of England. A member bank can borrow from the Bank of England if it posts collateral. But member banks post much more collateral than they appear to need to support their payment activity. As a result, CHAPS Sterling should be robust to operational incidents that temporarily prevent a member bank from making payments. A possible explanation for member banks posting more collateral than they need is that the costs of posting collateral are less than the cost of failing to make timely payments. The empirical evidence is consistent with this explanation.

BANKS wishing to make real-time sterling payments either on their own behalf, or on behalf of their customers, use the CHAPS Sterling payment system.¹ The total value of payments settled is very large, with CHAPS Sterling handling on average approximately £200 billion of payments every day (Chart 1). CHAPS Sterling is used to make various types of payments. For example, a consumer may use it to buy a house, or a bank may use it to repay an overnight interbank loan. A disruption to the smooth functioning of CHAPS Sterling would affect the ability to make timely payments, which in turn might lead to the disruption of economic activity that depends upon timely payments being made (such as the interbank loan market).

The possible consequences of such a disruption have led researchers at the Bank of England to examine the resilience of CHAPS Sterling to events that temporarily prevent a member bank from making payments.² These studies have found that CHAPS Sterling is highly robust to such disruption. This robustness arises in large part because CHAPS Sterling member banks individually post more collateral with the Bank of England than they generally need to support their payment activities. While the fact that member banks behave in this

manner is undoubtedly good for system robustness, why they behave in this way demands explanation. In this article we explore why CHAPS Sterling member banks choose to post the amount of collateral they do.

Chart 1
Total daily value of payments settled in CHAPS Sterling



Source: MID payments database.

The role of collateral in CHAPS Sterling

CHAPS Sterling is a Real-Time Gross Settlement (RTGS) payment system. In the CHAPS Sterling system, a given member bank A can make a payment of £x to another member bank B only if its available cash at the time at least equals £x. If a member bank can make the payment, it is made immediately – the

(1) Although there are only twelve banking groups that are direct members of CHAPS Sterling, all UK resident banks (and so their customers) have access to CHAPS Sterling through (direct or indirect) correspondent relationships with member banks. Payments between CHAPS Sterling member banks and banks that are not direct members, and payments between banks that are not direct members but have a correspondent relationship with the same member, are settled across the accounts of CHAPS Sterling members rather than in the CHAPS Sterling system itself.

(2) See, for example, James (2003) and Bedford, Millard, and Yang (2004).

Bank of England deducts £x from A's account and credits £x to B's account – and with finality. Each payment instruction is settled sequentially and in gross terms (ie payments from A to B and from B to A made at the same time are not netted against one another).

A member bank's available cash at a given time T equals the sum of the value of (eligible) securities it has repoed to the Bank of England before T and net payments the member bank has received by T. As a shorthand, we use the term 'posting collateral' to describe the process by which a member bank puts cash into its CHAPS Sterling account by repoing securities to the Bank of England.¹ To illustrate: if at T a member bank has £100 of collateral posted, and if in the period between the start of the day and T it has made payments of £50 and has received payments of £75, then its available cash at T equals $£100 + (£75 - £50) = £125$. It follows that at T, the member bank could make payments with a value up to £125. If it did so, it could not make any further payments until either it posted further collateral with the Bank of England or it received a payment from another member bank.

As a member bank's available cash is the sum of the collateral it posts and the net payments it receives, a member bank can use incoming payments to provide the cash it needs to make its payments. A member bank need only draw upon the cash it obtained by posting collateral to make payments at a given time if the value of payments it has made up to then is more than the value of payments it has received.

The difference between the value of payments received and the value of payments made is equal to the member bank's settlement account balance at the Bank of England. So, the amount of collateral a bank must post to enable it to make its payments on a given day will equal the maximum overdraft on its settlement account during that day. When we say that banks post more collateral than they use, we mean that the amount of collateral that a bank posts exceeds the maximum overdraft on its settlement account.

To illustrate: consider the following pattern of incoming and outgoing payments. At T_1 , the bank

receives a payment of £50 and does not make any payments of its own. At T_2 , the bank makes a payment of £25 leaving it with £25 in its settlement account. At T_3 , the bank receives another £100 payment leaving it with £125 in its settlement account. At T_4 , the bank wishes to make a payment of £200. Making it will result in an overdraft on the bank's settlement account of £75. For this payment to go through, the bank must have posted at least £75 of collateral before T_4 ; if not, it would have lacked the amount of cash it needed to make the T_4 payment.

As payment activity redistributes cash across member banks, it is at least possible for a significant proportion of total system cash to end up at a single member bank at some point in time. During normal times, interbank payment flows tend roughly to balance out, so if net payment flows to bank A had been high prior to time t, then net payment flows from A would tend to be high after time t. However, if A were to suffer an operational problem that prevented it from making payments at a time when it had absorbed a significant proportion of total system cash, this redistribution could not occur through this normal payment activity. Without additional postings of collateral, the remaining member banks would have to support their payment activities with the (smaller) amount of cash they had in their accounts. If the amount of cash remaining in the accounts of the functioning banks were too small, the flow of payments may be disrupted. For example, consider the extreme case in which a single bank has received payments from the remaining banks that equal all of their available cash and then suffers from an event that prevents it from making payments. In this case no other member bank could make a payment until the problem bank made a payment, or until the other member banks posted additional collateral.

The probability that a member bank finds itself with insufficient cash to enable it to make its payments decreases as the amount of collateral it posts increases. In the limit, if a bank were to post collateral equal to the total value of payments it wished to make, then it would have the available cash needed to make all those payments, even if no other

(1) To post collateral, a CHAPS Sterling member bank will repo eligible securities to the Bank of England, and the Bank of England will in turn credit the bank's account with an amount equal to the value of the repoed securities (minus a haircut). The repoed securities serve as collateral for the account deposit, ensuring that payments made are backed by good funds. The repo is unwound at the end of the day, and the Bank of England acts as the custodian for the securities overnight. The process can then be repeated the next day.

bank sent a payment to it. If a member bank posts more collateral than it needs given normal conditions, it will have a cushion of available cash that it can use in the case of an operational event that temporarily reduces the flow of incoming payments from other member banks.

For example, to return to the illustrative case above, suppose that an operational disruption prevented the bank from receiving the £100 payment in T_3 . In this case the maximum overdraft on its settlement account, if it made all its payments, would be £175. If the bank had posted collateral just equal to the £75 it needed in normal times (no operational disruption), it would not have been able to make its T_4 payment unless it posted additional collateral. However, if the bank had initially posted enough collateral over and above what it needed in normal circumstances (say £200), then the operational disruption that prevented the T_3 payment from arriving would not hinder the bank's ability to make its T_4 payment.

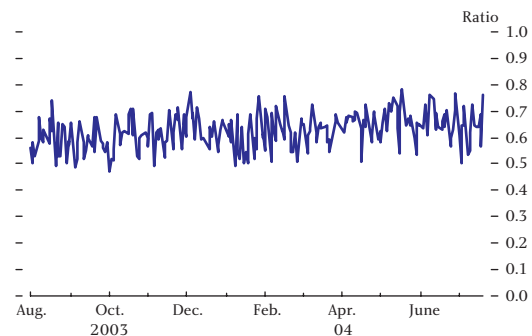
Banks in CHAPS Sterling generally post more collateral than they use. Chart 2 shows the ratio of the maximum level of collateral used to the maximum level of collateral posted during the day for the average CHAPS Sterling member bank. This ratio averages about 0.6.¹ That is: on average, banks use only 60% of the collateral they post.² Chart 3 shows overall collateral usage in CHAPS Sterling by plotting total collateral for all member banks and total collateral used for the system as a whole. Again, total collateral posted exceeds total collateral used.³

Charts 2 and 3 suggest that CHAPS Sterling could continue to function smoothly even in the face of an operational event that temporarily deprived banks not directly affected of incoming payments. Bedford, Millard, and Yang (2004) investigated this hypothesis by using simulations based on CHAPS Sterling payment flows. In particular, they explored the extent to which an operational event preventing the member bank with the largest net payment inflow from making

payments would disrupt the ability of the remaining member banks to make payments. They found that functioning banks still had the cash available to make all the payments they had in fact made.

Chart 2

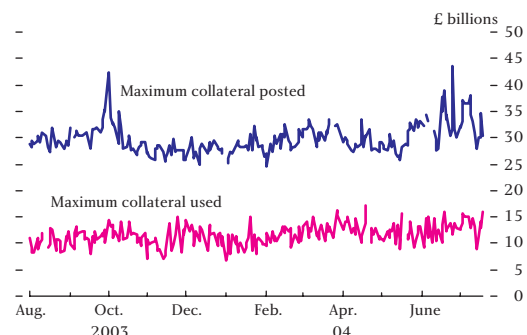
The ratio of maximum collateral used to maximum collateral posted



Source: MID payments database.

Chart 3

Maximum collateral used and maximum collateral posted for CHAPS Sterling as a whole



Source: MID payments database.

CHAPS Sterling member banks benefit collectively from the resilience that high collateral postings create. However, it is harder to see why any individual bank finds it worthwhile to post the collateral needed to ensure this system-wide resilience. First, the probability of such an event occurring is small. Second, much of the cost of any disruption may be borne by banks' customers rather

- (1) There are complications in measuring collateral posted and used in CHAPS Sterling because CHAPS Sterling also serves as a gateway to the CREST securities settlement system. Banks use CHAPS Sterling to transfer cash they use to support securities settlement in CREST. As this cash is only temporarily held in CHAPS Sterling it does not make sense to include these transfers when calculating the amount of collateral posted and used in CHAPS Sterling. We therefore measure collateral posted in CHAPS Sterling as total collateral posted minus the transfers to CREST. We also adjust collateral used in CHAPS Sterling to take account of transfers to CREST. It is also possible to simplify the measurement of collateral posted because banks do not normally vary significantly the amount of the collateral posted during the day. We take as our measure of collateral posted the amount of collateral posted at 7 am (after the CREST transfers) which is before most CHAPS Sterling payments are made.
- (2) The ratio between the maximum level of collateral used and the maximum level of collateral posted varies across banks and over time. However, in our sample, only one CHAPS member consistently uses nearly all of its posted collateral. For most member banks, the ratio rarely exceeds 90%.
- (3) The ratio of collateral used to collateral posted for the system as a whole is lower than the average of collateral used to collateral posted for individual banks because banks do not all hit their point of maximum collateral usage at the same time.

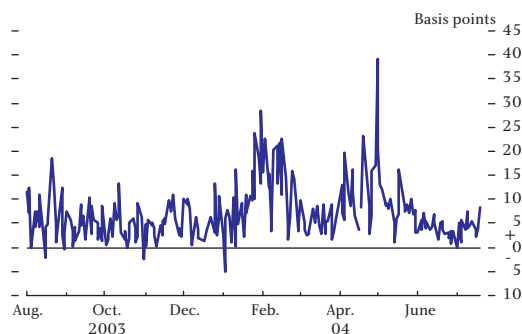
than by the banks themselves. And third, each bank individually would tend to prefer that other banks post the extra collateral needed to keep the system functioning, if collateral posting has a cost. So why might member banks find it privately worthwhile to post more collateral than they generally use?

The costs and benefits of posting collateral in CHAPS Sterling

A bank can obtain collateral to post with the Bank of England (ie eligible securities) through different channels. First, a bank may already have eligible securities outright on its books. In this case a bank can simply repo those securities to the Bank of England. A second channel, if a bank lacks eligible securities on its books, is for it to borrow money on the interbank loan market, use that money to reverse-repo in eligible securities and then repo those securities to the Bank of England.

The opportunity cost of obtaining collateral through the reverse-repo channel equals the cost of obtaining an interbank loan minus the rate the bank gets by lending the money out again through reverse-repo. We assume that banks can borrow at the London Interbank Offered Rate (Libor) and that they can lend at the secured-lending repo rate.¹ The cost of obtaining eligible sterling-denominated securities through this channel thus equals Libor minus the repo rate. A bank with eligible sterling-denominated securities could, instead of using them as collateral, use those securities to borrow money at the secured lending repo rate and then lend that money on the interbank market at Libor. It follows that a bank that uses existing sterling-denominated eligible securities forgoes a return equal to Libor minus the repo rate. So, one measure of the opportunity cost of posting collateral equals Libor minus the repo rate.² Using overnight Libor and repo rate data from the British Bankers Association, the spread averages around seven basis points over the period (Chart 4).³

Chart 4
The overnight Libor/repo rate spread



Source: BBA.

So far we have discussed the costs of posting collateral. The benefit of posting additional collateral is that member banks can avoid the costs associated with delaying or cancelling payments. We can measure this benefit as the probability that the bank uses the marginal unit of collateral to make a payment multiplied by the cost that would have been associated with being unable to make that payment or only making it with a delay. For example, these costs might result from a bank failing to provide time-sensitive payment services to its customers; not meeting its CLS payment obligations on time⁴; or failing to satisfy throughput guidelines.⁵ Given the cost of posting collateral and an assumed cost of delaying and cancelling payments, one can then determine how much of a collateral buffer it would be worth a member bank posting.

Consider the marginal costs and benefits of posting an additional £1 million of collateral. If the opportunity cost of posting collateral equals seven basis points, then the cost of posting this collateral for one year equals £700. If the loss the bank suffers from being unable to make a payment equals 1% of the value of that payment (£10,000 for the £1 million of collateral), then the bank would be willing to post a marginal £1 million of collateral

(1) The Libor and repo rates, at a particular maturity, capture the interest rates charged on unsecured and secured inter-bank loans, respectively, at that maturity. For more details on the calculations see <http://www.bba.org.uk/bba/jsp/polopoly.jsp?d=141>

(2) The opportunity cost for eligible euro-denominated securities obtained through the reverse-repo channel should be the Euribor/euro repo rate (eg Eurepo) spread.

(3) Although we focus on the overnight Libor/repo rate spread, banks can obtain sterling-denominated collateral through the reverse-repo channel at longer maturities.

(4) The Continuous Linked Settlement (CLS) system is a system for the settlement of foreign exchange transactions. Member banks must make payments to CLS Bank by scheduled times during the day. If a bank fails to make its CLS payments by the deadlines it may incur penalties levied by CLS Bank International. For more details on CLS see <http://www.cls-group.com>.

(5) The throughput guidelines are that CHAPS Sterling members must, over a calendar month, ensure that on average 50% of its daily payments, by value, are made by 12 pm and that 75%, by value, are made by 2.30 pm.

even it only had to use the collateral once every 14 years. Even if the costs were as low as the Libor/repo rate spread (seven basis points), the bank would be willing to post the £1 million even if it were used only once a year.

In a competitive market, where customers can switch banks in the event of poor service (and not making time-sensitive payments for customers would count as poor service) and where banks face other costs from not making timely payments, a seven basis point or higher cost penalty on missed payments seems plausible. If this is the case, then banks will find it privately worthwhile to post collateral that they seldom use. If all CHAPS Sterling member banks behave in this way, and do not realise extreme collateral demands simultaneously, then the system as a whole will have more collateral available than is ever used. This additional collateral in turn provides the resilience that we observe in practice in the CHAPS Sterling system.

Determinants of collateral posting decisions

We can test what factors explain CHAPS Sterling banks' collateral posting behaviour using econometric techniques. Specifically we can look at the relationship between collateral posted, demand factors and the cost of posting collateral. Summary statistics on these variables are in Table 1.

Table 1
Summary statistics

	Mean	Interquartile range
Collateral posted at 7 am (£ billions)	2.48	0.34 – 3.71
Mean maximum collateral used (£ billions)	1.86	0.26 – 2.88
Variance of the maximum collateral used	0.72	0.03 – 1.10
Libor/repo spread (basis points)	7	3 – 9

The sample period covers 1 July 2003 to 30 July 2004. We measure the collateral each member bank could reasonably expect to need by supposing that this is related to a bank's mean maximum collateral used and the variance of its

maximum collateral used. These factors might be thought to capture, respectively, member banks' average transaction demand for collateral and their precautionary demand for collateral. We expect collateral posted to be positively related to both of these variables.¹ We use a 30-day window to estimate the value of the collateral a bank can reasonably expect ever to use because the bank's payment business may change over time.²

We use one measure of the cost of posting collateral, the overnight Libor/repo rate spread.³ However, in practice, this cost could apply to CHAPS Sterling member banks to varying degrees because of differences in the regulatory requirements to which banks are subject. In particular, UK retail banks are subject to liquidity requirements set by the Financial Services Authority. These requirements – the Sterling Stock Liquidity Regime (SLR) – require the relevant banks (SLR banks) to hold liquid assets on their balance sheets to cover possible liquidity demands.⁴ The set of assets a bank may hold to meet the SLR requirements largely overlaps with the set of assets the Bank of England accepts as eligible collateral for CHAPS Sterling. Moreover, the value of the assets SLR banks hold to comply with these regulations exceeds the value of collateral they post in CHAPS Sterling. Since the SLR requirements apply only at the end of the day, SLR banks can use these SLR assets as CHAPS Sterling collateral during the day, but they cannot repo these assets to obtain cash to lend overnight on the interbank market. Hence, for SLR banks, the opportunity cost of posting collateral in CHAPS Sterling may be less than the Libor/repo rate spread. Banks in the United Kingdom that are not subject to the SLR are subject to the Maturity Mismatch (MM) Regime instead.⁵ The liquidity requirement under the MM Regime is based upon net outflows over short future time horizons. A mismatch occurs if contracted outflows exceed contracted inflows within a specified time band (eg day T to day T+8). If a bank's outflows and inflows balance, liquidity regulations will not require it to hold assets

(1) This is a very simple way of modelling how banks form expectations about how much collateral they need and we do not claim that it precisely reflects how banks do form their expectations. Banks could process the information provided by past payments flows in a much more sophisticated way than the model suggests and also base expectations on information that we cannot observe, such as payment requests that they know that they will receive over the day.

(2) The mean and variance of the maximum collateral used on day t is calculated over the 30 previous days in the sample.

(3) We lag the Libor/repo rate spread by one day because we are examining the levels of collateral posted at the beginning of the day.

(4) The CHAPS Sterling member banks that are subject to the SLR regime are Barclays, Clydesdale, Co-operative Bank, HBOS, HSBC Bank, Lloyds TSB, Royal Bank of Scotland/Nat West and Standard Chartered.

(5) The CHAPS Sterling member banks that are subject to the MM regime are ABN-Amro, Citibank and Deutsche Bank.

that it could also use as collateral in CHAPS Sterling. For MM banks the Libor/repo spread could be much closer to their true cost of posting sterling-denominated collateral.

We would expect collateral posting behaviour to vary between member banks. So we control for bank specific factors by estimating collateral posting behaviour with a panel estimator, which allows for bank-specific fixed effects. The regression results are shown in Table 2.

Table 2
A fixed effects panel regression of collateral posted at 7 am: all banks

	Coefficient	t-statistic
Mean maximum collateral used	0.47	12.61
Variance of the maximum collateral used	0.30	7.65
Libor/repo spread (basis points)	-0.0127	-4.21
R ² = 0.84		

The demand-side measures of collateral use have the correct sign and are all highly significant in both a statistical and an economic sense. To illustrate: increasing mean maximum collateral used from its 25th percentile value of £0.26 billion to its 75th percentile value of £2.88 billion leads to a £1.23 billion rise in collateral posted at 7 am. Increasing the variance of the maximum collateral

used from its 25th percentile value to its 75th percentile value leads to a £0.32 billion increase in collateral posted at 7 am. The transactions and precautionary demand for collateral therefore appear to be important determinants of collateral posting behaviour.

The opportunity cost of posting collateral (measured by the Libor/repo spread) variable also has the economically correct sign (as the opportunity cost of posting collateral increases) and is statistically significant. However, this effect is economically small. Increasing the spread from its 25th percentile value to its 75th percentile value leads to a fall in collateral posted at 7 am of only £0.07 billion.

Conclusions

CHAPS Sterling could continue to function even in the face of an operational event that temporarily prevented a single member bank from making payments. This robustness occurs largely because member banks post more collateral than they normally need to support their payment activities. This puzzling behaviour can be explained if the reputation cost to a bank of failing to provide time-sensitive payment services to customers is high relative to the cost of posting collateral. Empirical evidence supports this explanation. This liquidity cushion in turn provides CHAPS Sterling with its resilience.

References

Bedford, P, Millard, S and Yang, J (2004), 'Assessing operational risk in CHAPS Sterling: a simulation approach', Bank of England *Financial Stability Review*, June.
James, K (2003), 'A statistical overview of CHAPS Sterling', Bank of England *Financial Stability Review*, June.

Collective Action Clauses (CACs): an analysis of provisions included in recent sovereign bond issues (summary)

John Drage and Catherine Hovaguimian, International Finance Division, Bank of England

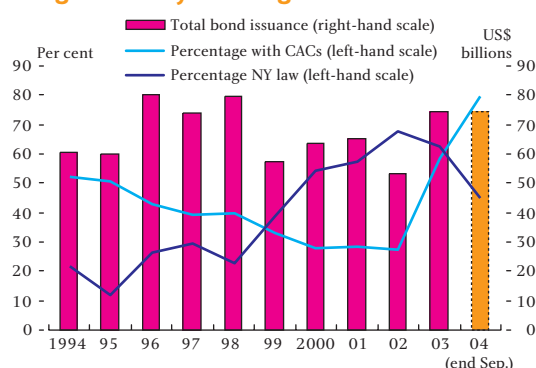
A recent Financial Stability paper published by the Bank assesses the extent to which recent contractual innovations in foreign currency sovereign bonds issued under New York law may contribute to the creation of a more orderly framework for restructuring sovereign bonds. Contractual clauses can be designed to facilitate collective agreement between all creditors to achieve a comprehensive restructuring; improve information exchange between a sovereign and its creditors; and discourage disruptive individual litigation.

A RECENT paper published by the Bank, by John Drage and Catherine Hovaguimian analyses the provisions contained in recent sovereign bond issues, focusing on the inclusion of collective action clauses. The financial stability paper is available at <http://www.bankofengland.co.uk/fsr/fsr17art9.pdf>

The proposition that the introduction of Collective Action Clauses (CACs) could improve the crisis resolution framework came to prominence in the aftermath of the Mexican crisis in 1995 through the publication of the Rey Report.¹ While CACs have been common in several jurisdictions where sovereign bonds are issued (England, Luxembourg and Japan), they were uncommon in sovereign bonds issued under New York law. And, despite the growing recognition that the framework for resolving crises was deficient, there was little change in New York market practice in the years immediately following the Mexican crisis. In 2002, G10 Ministers and Governors asked a Working Group to develop a set of model CACs for sovereign bond issues, with the aim of catalysing a change in market practice. Around the same time, seven private sector trade associations developed their own 'model features' for CACs in sovereign bonds issued under New York and English law.² Shortly afterwards, in February 2003, Mexico issued a foreign currency sovereign bond under

New York law containing CACs. Mexico's bond issue proved to be a turning point and, as Chart 1 shows, the majority of foreign currency sovereign bonds issued in New York and elsewhere now contain CACs.

Chart 1
Foreign currency sovereign bond issuance with CACs^(a)



Source: Dealogic.

(a) Central government only.

Drage and Hovaguimian analyse the clauses included in foreign currency sovereign bonds issued under New York law since February 2003, comparing them with three key objectives identified by the 2002 G-10 Working Group.³ The Working Group concluded that contractual clauses had the potential to make the process for restructuring sovereign bonds more

(1) See www.bis.org/publ/gten03.pdf for a copy of the 1996 G10 Report on The Resolution of Sovereign Liquidity Crises – the 'Rey Report'.

(2) The Institute of International Finance (IIF); the International Primary Market Association (IPMA); Emerging Markets Creditors Association (EMCA); Trade Association for the Emerging Markets (EMTA); the Securities Industry Association (SIA); the International Securities Market Association (ISMA); and the Bond Market Association (TBMA). See www.emta.org/ndevelop/Final_merged.pdf for their draft model clauses dated 31 January 2003.

(3) The Report of the G10 Working Group on Contractual Clauses was published in March 2003 and is available at: www.bis.org/publ/gten08.htm#pgtop

orderly by: (1) fostering early dialogue, coordination, and communication among creditors and a sovereign caught up in a sovereign debt problem; (2) ensuring that there are effective means for creditors and debtors to re-contract, without a minority of debt-holders obstructing the process; and (3) ensuring that disruptive legal action by individual creditors does not hamper a workout that is under way, while protecting the interests of the creditor group.

The paper shows that the most important of the three objectives, providing effective means for creditors and debtors to recontract, has been achieved through the widespread inclusion of majority action provisions (thus binding in minorities and hold-out creditors). Market standards are also evolving with regard to disenfranchisement provisions (excluding bonds held directly or indirectly by the issuer from being voted), hurdles for acceleration and deceleration, and rules for voting on non-reserved matters – all of which contribute to this objective.

However, the analysis in the paper also shows that the actual clauses adopted thus far by issuers do little to further the other two key objectives identified by the G10 Working Group: fostering early dialogue, coordination, and communication between creditors and sovereigns involved in a sovereign debt problem; and ensuring that disruptive legal action by individual creditors does not hamper a workout that is under way. Drage and Hovaguimian therefore conclude that the collective action clauses now being included in sovereign bonds issued under New York law are a most welcome step, but that there is scope for further beneficial market innovation.

The authors highlight three areas where innovation could help improve the framework for sovereign debt restructuring.

- First, the introduction of provisions for the appointment of a bondholder representative (who is empowered to act on behalf of all bondholders when requested to do so by an agreed percentage of the holders of an issue) could help to minimise the prospects of disruptive individual litigation against the sovereign and ensure the equal distribution of the benefits of any litigation to all bondholders.
- Second, given the number of bonds some countries can have outstanding simultaneously, clauses that

facilitate the aggregation of majority action provisions over a number of different issues could also help facilitate comprehensive restructurings. If achievable, aggregation could significantly contribute to the speed at which sovereign restructurings are negotiated. Thus far only the new bonds issued by Uruguay have contained limited forms of aggregation clauses.

- Third, the inclusion of some more explicit collective action provisions in the original documentation for syndicated loans could help because sovereigns also need to have ways in which to restructure their other (non-bonded) debts if the objective of creating an orderly system for sovereign debt restructurings is to be realised fully. (Although the Working Group did not address this directly, it expressed the “expectation that practices developed with respect to sovereign bonds could be implemented with appropriate modifications in other types of debt over time.”)

Financial instrument accounting

Sir Andrew Large, Deputy Governor, Financial Stability, Bank of England

This is the text of a speech delivered by Sir Andrew Large, the Bank of England's Deputy Governor for Financial Stability, to the thirteenth City of London Central Banking Conference on 22 November 2004. He emphasises the part which well-designed accounting standards can play in maintaining financial stability. He also notes the differences of view on IAS 39 (a standard dealing with financial instruments), which persist despite the efforts of the International Accounting Standards Board to achieve consensus, and suggests that in looking longer term towards a revision of IAS 39 it might be helpful to take a pace or two back and seek a shared understanding on a number of fundamental issues. These include the question of who and what accounts are for, whether, and if so how, fair value measures can be accommodated alongside historic cost measures and the implications of a wider application of fair values for the volatility of accounting results.

Introduction¹

The recent furore over IAS 39 – the international accounting standard for financial instruments – has resulted in a situation which I think all agree is unsatisfactory. We now effectively have two versions of IAS 39, one proposed by the IASB, the other by the European Commission.

I probably do not need to emphasise that meaningful accounting standards and their effective implementation are highly relevant to any central bank's responsibilities for financial stability. They help to ensure the safe and efficient functioning of the financial system. So it is essential that accounting standards have a clear economic rationale, promote comparability and secure adequate disclosure. Only in that way can investors, creditors and others judge the positions and risks being run by financial institutions and hence exert market discipline, and perverse incentives be avoided. Together these can make an important contribution to financial stability.

I suggest later that, despite intensive work to improve accounting standards for financial instruments in recent years, fundamental issues with financial stability implications remain to be resolved. One crucial question is: 'Who and what are accounts for?' Another more specific issue is the appropriate role of fair value data. So what I want to do this morning is to discuss these issues in turn before commenting on the way forward regarding IAS 39. I should add that

while IAS 39 applies to all users of financial instruments, I illustrate its implications below with particular reference to banking.

Who and what are accounts for?

It is widely accepted that published audited accounts are prepared first and foremost for the owners of a business, that is the shareholders. However, it is often maintained that this information also meets the needs of other stakeholders, including creditors, customers, employees and so on.

And so it does up to a point. Yet there are many users who have an interest in the financial position of a firm. On the face of it, it would be rather surprising if a single presentation was ideal for all of them. Let me try to illustrate this for the financial world – where the Bank's financial stability remit runs – by looking at the respective needs of shareholders, depositors and regulators of banks.

Shareholders are particularly interested in the returns being earned by a bank (its profitability), both current and prospective. They are looking mainly at the economic value of the going concern. The focus of depositors, regulators and authorities concerned with systemic stability, on the other hand, is likely to be on whether bank liabilities will be repaid on demand or when due. Two specific examples may help to illustrate these different perspectives: the treatment of 'own-credit risk' and the valuation of sight deposits.

(1) The author is grateful to his colleagues Alastair Clark and Ian Michael for their help in preparing this speech.

'Own-credit risk' arises from the 'fair value option' in IAS 39, which allows an entity to fair value not only its assets but also its liabilities. On that basis, the value of liabilities, including deposits, should fall as an entity's creditworthiness deteriorates. Here we find a difference of perspective between shareholders on the one hand and debt holders, including depositors (and by extension regulators and central banks), on the other. In an *economic* sense, given that the equity interest in a company cannot fall below zero, as net worth diminishes debt holders bear a growing proportion of reductions in asset values. But this approach is in tension with the understandable concern of bank depositors and regulators about the capacity of banks to repay liabilities at par when due, and who therefore want measures of net worth constructed on that basis.

A separate issue arises in arriving at a fair valuation of *sight deposits*. For such deposits, there is typically a difference between the contractual maturity (zero) and the behavioural maturity (the time over which sight deposits are held in practice). Since the interest paid on such deposits is almost always less than the market discount rate, once any maturity greater than zero is admitted the fair valuation of the deposit will be less than par. But once again, depositors are likely to be more interested in the financial strength of a bank assessed on the basis that deposits are ascribed their full *nominal* value. Moreover, any suggestion in public accounts that deposits are worth less than par could undermine the confidence on which the whole construct of banking is based.

These illustrations suggest that different users of accounts may, at least to an extent, want information produced on different bases. And the simple fact is that we will not be able to make progress if different users all assert that their way of calculating or presenting the numbers is uniquely correct. I suggest, therefore, that the users of accounts should recognise that they may in reality need to adjust them to suit their particular purposes – something ratings agencies and other analysts have done for many years. It is encouraging that the Basel Committee on Banking Supervision has adopted precisely that approach in promulgating various adjustments for regulatory purposes to data based on IAS 39.

Against that background, it would seem helpful if accounting standard setters required supplementary disclosures in published accounts which would allow

different users to make such adjustments. This is important given that, unlike regulatory, fiscal and other public authorities, many private sector users are not in a position easily to obtain information beyond that put in the public domain.

Let me turn now to IAS 39 itself as it impacts on the banking industry.

IAS 39 and the banking industry

IAS 39 has proved controversial with bankers for reasons which stem partly from specific features of banking, and partly from the implications of the wider use of fair values, particularly in accounting for hedges and in so far as they may lead to greater volatility of published profits.

Some pros and cons of fair value accounting

The debate about the use of fair values raises a number of important issues, including the relevance of unrealised valuation changes, the appropriate assumptions on the holding period and the reliability of fair values. It also raises a question about the extent to which accounting valuations should move away from a going concern paradigm to break-up valuations, which, at least at first sight, is closer to what 'fair values' represent. But at the same time, fair values are in some ways more forward looking, since expectations about the future performance of assets and liabilities are reflected in market valuations. It will not have escaped you, however, that the move in recent years to a more securitized world, with increased capacity for rapid risk transfer, encourages the appetite for a more forward looking approach.

A fair value approach has a number of other attractions. For example, it promotes consistency of valuation of instruments in different financial sectors, something increasingly important given the fungibility between banking, securities and insurance. It will generally lead to more timely recognition of losses (for example, on bank loans), and it captures the crystallisation of market risk in non-trading positions. Moreover, fair value accounting is consistent with the increasing use of mark-to-market techniques in risk management. Such techniques in part reflect a progressive but fundamental shift from the traditional banking approach of holding assets until maturity to today's approach of managing on the basis of continually assessing the opportunity cost of maintaining the existing balance sheet. It is clearly beneficial to transparency if publicly available

accounting information as far as possible reflects the basis on which management actually run a business.

However, there are a number of complications associated with the wider use of fair values.

First, there is a question as to how one can obtain robust fair values for instruments which are not priced, even indirectly, in reasonably deep and liquid markets. Model-based valuation techniques may be used, but they may not be analogous to genuine market clearing prices. The issues here include determining the conceptual basis for valuation ('the model'), obtaining the necessary inputs, and avoiding slavish adherence to a model which may in some circumstances deliver misleading results. In other words how, and to what extent, can human judgement properly be used to modify the model?

Second, there is the question of the economic relevance of unrealised gains and losses – particularly if they are not immediately realisable. For example, while information on changes in the fair value of bank loans conveys useful economic insights, it needs to be interpreted carefully. In many cases, a gain cannot be realised 'up front' given the absence at present of developed secondary markets in bank loans – even if securitisation may be increasing in that area.

Volatility

Further concerns about wider use of fair value accounting relate to the possible implications for volatility in financial markets and in the economy more widely. In my view, there is an important distinction to be drawn between accounting rules which capture accurately the volatility inevitably present in the real world, and 'spurious' volatility introduced by the accounting rules themselves.

Few I hope would suggest that we should remove *genuine* economic volatility from accounting numbers. It is surely better for users to apply their own smoothing to data if they think that is justified rather than impose smoothing rules, which can both be arbitrary and may serve to obscure the underlying data, through obligatory accounting standards.

Recent experience in the US and the UK is encouraging in these respects. The widening use of fair values does not seem to have had an adverse impact on the stability of the US financial system, on the equity prices of US banks, or on banks in Europe

which have adopted US or international accounting standards. And the move in the UK to a pensions standard with a strong fair value flavour (FRS 17) initially led to strong reactions, but over time I think has led to a better understanding of the actual economics of pension arrangements.

At the macro-economic level, concern has been expressed that greater use of fair values could have a procyclical impact. Banks' assets might be marked up in booms, as perceived credit risk declined, so boosting banks' capital base and capacity for further lending. However, for the concerns about intensifying economic cycles to be realised two linkages would need to operate. First, the impact on bank capital would have to increase the volume of bank lending *and*, second, the increase in bank lending would need to have significant implications for real activity. Neither linkage can be taken for granted, and in any case discretionary policy action, whether monetary or prudential, by the authorities may mitigate any pro-cyclical effects.

As I have indicated, we do, however, need to avoid accounting rules which introduce *spurious* volatility. An example, to which I will return in a moment, is the hedge accounting under IAS 39.

The 'mixed attribute' model

The drawbacks of fair values in some contexts have led to widespread support in the banking industry for retaining the current 'mixed attribute' accounting approach. While IAS 39 requires trading instruments, derivatives and many securities to be measured at fair value, bank loans generally continue to be measured at historic cost. However, the debate about IAS 39 has highlighted some difficulties with this mixed approach as it is presently formulated.

The area of greatest difficulty has proved to be hedges which straddle the two measurement bases, where so-called hedge accounting comes into play.

One example of this is the use of interest rate swaps to manage the interest rate risk in a portfolio of fixed rate loans funded from floating rate deposits. Without modification of the mixed attribute model, such hedges could actually create, not reduce, accounting volatility, because derivatives are required to be marked to market, that is measured at 'fair value', while loans are generally booked at cost. This to me would seem perverse indeed!

Another important example arises with the use of credit derivatives as hedges. This has proved difficult more generally to fit into the IAS 39 framework.

I should add that the sheer complexity of the hedge accounting rules is also an issue, as the debate in Europe about the treatment of sight deposits and prepayments, and the problems at Fannie Mae and Freddie Mac in the US, well illustrate. We need to ensure that the rules themselves do not result in perverse behaviour as people try to find a way around them.

The way forward

So where do we go from here?

All of the above factors have complicated the debate on IAS 39. And in my view, the only way forward is first to take a few steps back, before work starts on re-engineering the standard. I believe that many of those interested in the debate would be supportive of this approach.

We perhaps need to look again at the process for considering, and reaching a conclusion about, the fundamental 'design parameters' some of which I have touched on today. This is no small task, but if agreement could be reached on the fundamentals, these could be stated as clear principles in a preamble to any new standard, to guide the more detailed requirements. And it might enable the widely-held vision of a less detailed and prescriptive standard to be realised, to replace the hundreds of pages of complex rules.

To address this, however, raises three questions:

(i) On what is early consensus necessary? (ii) How should the transition be approached? And (iii) What does this mean in institutional terms?

Early consensus

Early agreement seems to me particularly important in three areas.

The first is to review the conventional understanding on who the accounts are for, and clarify how the different interests of different stakeholders are to be met.

The second is to agree where the standard should be placed along the spectrum between historic cost and fair value measurement. A particularly difficult conceptual question in this area is: precisely what

economic meaning is there in so-called fair valuation of instruments in which (a) there is little or no secondary market, or (b) there is a market, but a clear intent to hold an instrument to maturity?

Finally, the implications of any increase in measured volatility will need to be assessed. Here, I see a need for a process of communication and education by companies and others to shareholders, analysts and other interested parties, which should form part of the transition to any new standard.

Transitional considerations

Once the above objectives have been agreed, it will be important to articulate where we are, and where we want to be, and then to identify the optimal migration path. Is it to be a gradual transition or a big bang? Such decisions would need to consider: the rapidly moving environment of the financial industry, and regulatory techniques; how to ensure comparability is maintained; and the costs, especially in system terms, of alternative migration paths.

Procedures for setting international accounting standards

A final issue concerns the procedures for setting accounting standards. Concerns have been expressed by some about whether public sector interests, in particular, are adequately represented in the process. There is of course a clear public interest in meaningful reporting and adequate disclosure.

I am sure that standard setters in this, as in other areas, are alive to these issues. Equally they have – and in my view quite rightly – a concern to avoid, or at least minimise, the influence of overtly political factors. In considering the future of the IASB's governance, I am sure that the Trustees will be reflecting carefully on the issue of what constitutes legitimate public policy interests and how best to respond to them.

Concluding remarks

To sum up, the importance of meaningful and reliable accounting information is clear. It reflects the growth of publicly-traded markets, coupled with rapid growth in innovation and complexity. The potential for opacity has therefore increased, so it is essential that accounting standards are clear and capture the economic substance. This is important for the various stakeholders, and for financial stability generally.

It is also important that the actual processes for developing accounting standards command widespread support from companies, investors, creditors and the public authorities. I have set out a few steps that might be of relevance in achieving this.

On IAS 39 specifically, it would seem to me sensible to try first to reach consensus on the *fundamental* issues I started with before moving to detailed drafting of a new accounting standard. This will require a continuing effort on the part of standard setters to engage all interested parties, flexibility from everyone involved and a high level of transparency within the process. A lofty goal perhaps, but important if the benefits are to be secured and we are to avoid the cacophony of today.

In conclusion, although I have focused on controversies in accounting, we should recognise that we may be on the threshold of a truly significant step forward in accounting practice. From next year, companies throughout the European Union will be using the same set of high quality, international accounting standards. And there is the tantalising prospect of convergence between international and American standards. The challenge now is to realise the full potential of these changes.

Bank stability and transparency

Erlend Nier, Financial Industry and Regulation Division, Bank of England

A number of recent policy initiatives have called for enhanced transparency of banking firms. While the hope is that enhanced transparency may improve incentives *ex ante*, it is less clear whether transparency is necessarily a good thing *ex post*, when a bank might have hit hard times and provision of information could have a destabilising effect. This article provides a synopsis of these different effects and also provides some new evidence in an attempt to clarify empirically whether in the long run, taking *ex ante* and *ex post* effects together, transparency is likely to reduce or increase bank stability. The analysis suggests that, on balance, transparency reduces the chance of severe banking problems and thus enhances overall financial stability.

IN THE WAKE of the experience of the banking crises in Mexico (1994) and the south east Asian and east Asian economies (1997), official bodies, including the IMF (see Fischer, 1999) and the Basel Committee on Banking Supervision (2003) have called for increased transparency of banking firms. These calls relate to the suspicion that 'recent crises owe some of their intensity to a general lack of transparency about the sizes of positions that had been built up by both borrowers and lenders' and that 'practices and policies responsible for the depth of recent crises would not have been undertaken, had they been required to be made public' (Fischer, 1999, page 563). As a policy response, the stated aim of Pillar 3 disclosures introduced by the revised Basel Accord is to provide incentives for banks to 'more prudently manage their risks'.

However, there could be an important trade-off relating to increases in transparency. In particular, while the hope is that enhanced transparency may improve incentives *ex ante*, it is perhaps less clear whether transparency is necessarily a good thing *ex post*, when a bank might have hit hard times and provision of information could perhaps have a destabilising effect. This article provides a synopsis of these different effects and also provides some new evidence in an attempt to clarify empirically whether 'net', transparency is likely to reduce or increase bank stability.

Ex ante effects of transparency

A number of papers have explored the idea that transparency could be beneficial *ex ante*. The main

idea is that increased transparency enhances market discipline on banks.¹ In particular, the key argument is that bank transparency increases the sensitivity of the bank's funding terms to the risk it takes and that this in turn can create incentives for the bank to control its risk (*ex ante* discipline). For instance, in Boot and Schmeits (2000) the degree of transparency determines the likelihood that investors in bank liabilities learn the extent of the monitoring and screening effort invested by the bank. This effort in turn determines the bank's risk of default, as increased monitoring is assumed to be associated with a lower probability of failure. Since effort is costly, in the absence of transparency the bank will choose low levels of monitoring, resulting in high risk. As transparency increases, monitoring effort and thus risk become more easily observable, implying that the bank will face a higher short-term funding cost for low levels of screening effort. Consequently, at high levels of transparency, the bank will choose a higher expected monitoring effort and thus a lower risk profile. Similarly, Cordella and Yeyati (1998) present a model where a bank's funding terms are more favourable if the bank chooses lower levels of risk. In this model the funding terms are determined after the bank has chosen its risk of default. When depositors can observe the level of risk chosen by the bank, the bank chooses low levels of risk since it would otherwise be punished by a high required interest rate on its funds. By contrast, when the level of risk cannot be observed by lenders, the bank has no way to commit to a low level of risk. In equilibrium lenders assume that the bank will choose a high level of risk and charge an interest rate appropriate to that. The

(1) See, for example, Cordella and Yeyati (1998), Boot and Schmeits (2000), Hyytinen and Takalo (2003).

bank, in turn, knows that it will not be rewarded for a low level of risk and chooses a high level of risk in equilibrium.

These arguments, relating transparency to improved *ex ante* incentives, have also started to be documented empirically. In particular, a paper by Baumann and Nier (2003) showed that banks that disclose more information about their risk profile tended to choose a lower risk of default.

Ex post effects of transparency

While these studies suggest that increasing the level of transparency may reduce bank risk-taking and improve bank stability *ex ante*, it may be less clear whether transparency is a good idea *ex post*, ie when an adverse shock has occurred and the bank is already in difficulty. There are two arguments here.

On the one hand, transparency could be ‘bad’ *ex post* if it further destabilises banks that are hit by exogenous shocks. In particular, one may be concerned that market responses may aggravate the position of a bank which is suffering from temporary and recoverable weakness and that market responses are more accentuated when more information is provided.¹ Indeed, in their paper, Cordella and Yeyati (1998) show that when the bank’s risk profile is hit by a shock outside of the bank’s control – such as a macroeconomic shock – bank transparency reduces bank stability since it results in investors demanding higher yields in response to the shock, compounding the bank’s problems. But since the shock to the bank is assumed to be exogenous, there is no offsetting ‘dividend’ in terms of a lower choice of risk *ex ante*. In a similar spirit, Furman and Stiglitz (1998) suggest that ‘greater transparency would have greatly aggravated the banking crisis in the United States in the 1980s, because many major banks would have had to shut down, greatly curtail their lending or receive substantial injections of equity’ (page 69).

On the other hand, transparency could be ‘good’ *ex post* if it limits informational contagion to banks that are not exposed to the same shock. That is,

transparency could help markets and depositors distinguish between those banks that are insolvent and those banks that are fundamentally sound. With poor transparency depositors need to make such a distinction based on a limited set of information, increasing the risk that a crisis spreads from one bank to another. With high transparency the problem may be more easily contained. This point can be made more formally using the model by Gorton and Huang (2002). In this paper, there are many banks that are hit by both a systematic (macroeconomic) shock and a bank-specific (idiosyncratic) shock. Depositors can observe the former, but not the latter. This means that for a bad enough realisation of the common macroeconomic shock, all the banks in the system face a depositor run. In this model, if banks were transparent enough to allow depositors to observe the idiosyncratic shock – which might be favourable for some banks – only a fraction of the banks would be hit by a run. In a similar vein, Giannetti (2003) has formalised the idea that international capital flows are subject to contagion as a result of asymmetric information between international investors and emerging market banks.²

Empirical evidence

In sum, both theory and evidence suggest that transparency is ‘good’ *ex ante*, but it is less clear whether transparency might potentially be ‘bad’ *ex post*. This begs the question: what is the *net* effect? In particular, what is the effect of transparency on the likelihood and depth of banking problems and crises?

In a recent paper, Barth, Caprio and Levine (2002) analysed the cross-sectional link between transparency and the incidence of banking crises in a cross-country sample of 51 countries during the late 1980s and 1990s. Across countries, the incidence of a banking crisis was defined using an account of crises compiled by Caprio and Klingebiel (2003), while transparency was measured at the country level as a summary variable that included information on a number of features relating to the market’s ability to monitor banks.³ The

(1) Morris and Shin (2002) formalised the idea that provision of public information may lead markets to overreact to potentially noisy public signals.

(2) In the context of the recent emerging market crises, Ferguson (1998) suggested that: ‘Standards for the transparency of and disclosure of private financial information were extremely lax. Once problems arose, it was difficult for creditors to distinguish good risks from bad and this caused them to withdraw their funds indiscriminately.’

(3) These were (i) whether banks’ accounts were required to be audited, (ii) the percentage of a country’s top 10 banks that were rated by a rating agency (iii) whether or not the country had an explicit deposit insurance scheme (iv) whether banks were required to disclose off-balance-sheet items, risk management procedures and non-performing loans and (v) whether subordinated debt counted as regulatory capital.

authors did not find a significant effect of transparency in these cross-country crises regressions. This could suggest that *ex ante* and *ex post* effects cancel each other out.

However, such cross-country analysis faces a number of difficulties. First, whether or not a country experienced a banking crisis in a given year is hard to define with precision and requires judgement.¹ Second, transparency of banks is a concept that is very difficult to measure. Third, the incidence of banking crises is likely to be affected by a large number of factors, including macroeconomic influences.² Fourth, in the face of these difficulties, the marginal impact of structural factors such as transparency is likely to be difficult to isolate in a cross-country set-up that offers only a small number of observations.

Bank-level approach

Recent research carried out at the Bank of England³ addresses some of these difficulties. This research used annual data on 550 listed banks from 32 countries⁴ over the years 1994–2000. A number of the countries in the sample experienced a banking crisis during the sample period – eg Argentina, Brazil, Indonesia, Japan, Korea, Malaysia, Taiwan, Turkey and Thailand – but most banks in the sample are from countries that did not experience a banking crisis during the period under study. However, rather than analysing stability at the country level, this research defined crisis at the bank level, resulting in a large number of observations.

A market indicator of bank crises

In this study, large changes in banks' stock prices were used as a *market indicator* of financial distress. Arguably, a bank is experiencing a crisis when its stock price drops dramatically in any given year. And crucially, the stock price response not only measures the extent to which risk has materialised, but should also incorporate the effect of any resulting

responses in credit spreads the bank might be subject to.

A bank was thus defined to be in crisis if its stock return fell into the lowest 5% of the unconditional distribution of annual equity returns for all banks and years in our sample.⁵ Using this, an indicator variable $c(i,t)$ was constructed for each bank and year where $c(i,t)=1$ if the bank is in a crisis and $c(i,t)=0$ if it is not. Box 1 provides an analysis of the distribution of this variable across countries and time. In so doing it also explores how the frequency of bank crises, as defined here, is related to the incidence of country-wide banking crises, as defined by Caprio and Klingebiel (2003). While *a priori*, there is little reason to expect this relationship to be exact, it turns out that there is a reasonably close mapping between the frequency of bank crises in our sample and the incidence of banking crises as identified by Caprio and Klingebiel.

Bank-level measure of transparency

The measure of transparency used in the study was based on how much information on its risk profile a bank provided in its annual accounts. In particular, a disclosure index was constructed that records for 17 categories of possible disclosure whether or not the bank provides information in its published accounts as they are represented in the BankScope database. Each of the chosen 17 categories is related to one or more dimensions of the bank's risk-profile (interest rate risk, credit risk, liquidity risk and market risk). By summing across categories a composite measure of disclosure was created which was then normalised to take values between zero and 1. This variable was evaluated bank by bank and for each year of our sample.⁶

As regards the disclosure index as a measure of transparency three caveats are in order. First, the disclosure index only measures hard, quantifiable information and does not record differences in the

(1) A number of lists of banking crises exist that differ in detail. Eichengreen and Arteta (2000) analysed how these differences appear to affect the results of cross-country research into the causes of banking crises.

(2) Barth, Caprio and Levine (2002) controlled for inflation prior to the onset of the crisis.

(3) Nier (2004).

(4) These are Austria, Australia, Argentina, Belgium, Brazil, Canada, Chile, Finland, France, Germany, Greece, Hong Kong, Indonesia, Ireland, Israel, Italy, Japan, Korea, Malaysia, the Netherlands, Norway, Poland, Portugal, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, the United Kingdom and the United States.

(5) It turned out in these cases the stock price fell by some 50% or more. A return that is worse than minus 50% would therefore need to be thought of as a tail event that would indicate a severe problem.

(6) A more detailed description of this variable can be found in Baumann and Nier (2004).

Box 1: Market indicators of bank crises and banking crises

One way of validating market indicators of banking problems is to compare how they perform against a benchmark of known cases of banking crises *ex post*. Table A provides a heat-map of the distribution of our bank crisis variable across countries and years. For each country and year it shows the average of $c(i, t)$ or, equivalently, the frequency of a bank crisis under our measure. While the definition of crisis in this paper is based on market returns, Caprio and Klingebiel (2003) define a systemic banking crisis as a situation where much or all of bank capital in a given country is exhausted. Using some judgement in applying this definition, they provide an account of systemic and smaller banking crises across countries. According to this, systemic banking crises occurred in the following countries during our sample period: Argentina (1995), Brazil (1994–99), Finland (1991–94), Indonesia (1997–2002)¹, Japan (1991–2002), Korea (1997–2002), Malaysia (1997–2002), Poland (1990s), Taiwan (1997–98), Thailand (1997–2002) and Turkey (2000–2002)¹. Applying a threshold of 10 percent to the average of $c(i, t)$, ie 10% of banks in a country experienced stock returns of -50% or worse,

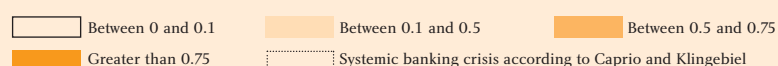
provides a reasonably close map between the market indicator we use and the account offered by Caprio and Klingebiel (2003). In particular, the market indicator catches the crises in Brazil, the south-east Asian crises in Indonesia, Malaysia and Thailand, the east Asian crises in Taiwan and Korea, as well as the European crises in Turkey and Poland. It does not, however, catch Argentina's 1995 crisis, nor the crises in Japan and Finland. The latter two crises started well before our sample period begins, which may be one reason why one does not see stock market reactions during our sample period. Moreover, in both countries banks have enjoyed continued government support, which might have limited stock market reactions: see Hoggarth, Jackson and Nier (2003). In addition, in some cases the market indicator records a crisis when there is none according to Caprio and Klingebiel (2003). For instance, Hong Kong did not, during the 1990s, experience a banking crisis, even though there was a large bank failure in 1998. High values on the market indicators for the years 1994 and 1997 and 1998 might conceivably be due to contagion in this case.

Table A
Average of $c(i, t)$

Year	Argentina	Australia	Austria	Belgium	Brazil	Canada	Chile	Finland	France	Germany	Greece	Hong Kong	Indonesia	Ireland	Israel	Italy
1994	0	0			0.14	0	0	0	0.08	0		0.60	1.00	0		0
1995	0	0			0.09	0	0	0	0.07	0	0	0.08	0	0		0
1996	0	0	0	0	0.20	0	0	0	0.07	0	0	0.29	0.50	0	0	0.04
1997	0	0.13	0	0	0.22	0	0	0	0	0	0	0.07	0.60	0	0.25	0
1998	0.25	0	0	0	0	0	0	0	0	0	0	0.20	0.60	0	0	0.07
1999	0	0	0	0	0	0	0	0	0	0	0.20	0	0.60	0	0	0.07
2000	0	0.17	0	0	0	0	0	0	0.06	0.05	0.17	0	0.75	0	0	0.03
Total	0.05	0.04			0.11				0.04	0.01	0.08	0.13	0.57		0.05	0.02

Year	Japan	Korea	Malaysia	Netherlands	Norway	Poland	Portugal	Singapore	Spain	Sweden	Switzerland	Taiwan	Thailand	Turkey	United Kingdom	United States	Total
1994	0	0	0	0	0	0	0	0	0.07	0	0	0	0	1.00	0	0.02	0.04
1995	0	0	0.17	0	0.13	0	0.25	0	0	0	0	0	0	0	0.09	0	0.02
1996	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0.01	0.01
1997	0	0	0.67	0	0	0	0	0.17	0	0	0	0.75	0.50	0	0	0	0.07
1998	0.01	0	0	0	0	0	0	0	0	0	0	0.14	0	0.80	0	0.07	0.06
1999	0.03	0.27	0	0	0	0.10	0	0	0	0	0	0.09	0	0	0	0.08	0.05
2000	0.03	0.55	0.20	0	0	0.13	0	0	0	0	0	0.36	0.29	0.83	0	0.05	0.08
Total	0.01	0.14	0.17		0.02	0.05	0.03	0.03	0.01			0.25	0.17	0.40	0.01	0.04	0.05

Source: Bank calculations.



(1) According to Caprio and Klingebiel (2003), both Indonesia and Turkey suffered smaller or borderline systemic crisis in 1994.

amount of qualitative information provided by the banks or differences with respect to quantitative information that is not comparable across banks.¹ Second, the disclosure index is based on the amount of information banks provide in annual accounts and does not take into account other potential channels of disclosure, such as information provided by rating agencies and supervisors. Third, the disclosure index is based on an unweighted sum, which does not attempt to introduce a measure of the relative importance of the various components.²

Econometric analysis

As explained above, in theory the effect of transparency is ambiguous. Transparency may temper moral hazard and thus reduce the likelihood of crisis. Transparency may also decrease the likelihood of information contagion, on average. However, for any individual bank hit by an exogenous shock transparency may be destabilising if it results in sharper market reactions than would otherwise occur.

In order to investigate the net effect, probit regressions were undertaken that analysed the link between transparency and the likelihood of a bank experiencing a crisis. The analysis accounted in addition for a number of macro- as well as bank-level factors in an attempt to isolate the effect of transparency from potentially confounding influences. In particular, the results (Table 1, Column 1) account for differences at the macro level as regards the growth rate of real GDP, the current account position and the nominal short-term interest rate and differences across banks in size, exposure to general stock market movements (Beta) and profitability (ROA).

Regression results

The regression results shown in Table 1, Column 1 are statistically strong and suggest that more transparent banks are less at risk of crises, a finding that is statistically significant at the 5% level (with a P-value of 1%). This is consistent with the argument that banks that disclose more

information have better incentives to manage their risks (*ex ante*). But it is also consistent with the idea that transparency reduces the risk of informational contagion that arises due to limited information on the part of depositors and investors (*ex post*). Taken together these effects appear to dominate a potentially competing effect according to which (*ex post*) market reactions could be more pronounced for more transparent banks.

Table 1

Probit regressions: the effect of transparency on crises

	(1) Probit	(2) Probit (IV) ^(a)
Dependent variable	$c(i, t)$	$c(i, t)$
Disclosure ^(b)	-0.5644 **	-1.0483 **
Time trend ^(c)	0.1710 ***	0.1796 ***
Log of TA ^(d)	-0.079 **	-0.0629 **
Beta ^(e)	0.2717 *	0.2795
ROA ^(f)	-7.2689 **	-8.0971 *
Current ^(g)	-0.0030 *	-0.0035 *
Interest ^(h)	0.0001	0.0001
GDP growth ⁽ⁱ⁾	5.1397 *	4.1358
Constant	-341.9816 ***	-359.0691 ***
Number of observations	2531	2466.0
Number of banks	537	519.0

Source: Bank calculations.

* Indicates significance at the 10% level.

** Indicates significance at the 5% level.

*** Indicates significance at the 1% level.

(a) Probit regressions using instrumental variables (IV).

(b) Disclosure = disclosure index, lagged one year.

(c) Time trend = time trend variable.

(d) Log of TA = log of the bank's total assets.

(e) Beta = bank's beta, lagged one year.

(f) ROA = bank's return on assets, lagged one year.

(g) Current = current account position, lagged one year.

(h) Interest = nominal short-term interest rate, lagged one year.

(i) GDP growth = real GDP growth, lagged one year.

Furthermore, the sign and size of macroeconomic and bank-specific control variables appear plausible. In particular, the current account variable is assigned a significantly negative sign, suggesting that a high current account deficit – and the resulting capital inflows – tend to have a destabilising effect on banks.³ Likewise, high short-term interest rates and high growth rates appear to increase the

(1) For instance, many banks publish Value at Risk (VaR) numbers relating to their market risk in annual accounts. However, there is no standard governing the presentation of this information. The key assumptions underlying the VaR calculations, such as investment horizon and confidence level are not uniform across banks. As a result the numbers are not comparable across banks and the information is not recorded in the BankScope database. See Hoggarth *et al* (2003) for further discussion.

(2) If disclosure is a noisy measure of true transparency, this would bias our findings against finding a significant effect. In other words, the effect of transparency might be stronger than is measured by the disclosure index.

(3) Further discussion of this point can be found in Radelet and Sachs (1998).

likelihood of banking problems, consistent with prior evidence that such problems tend to emerge close to the peak of the economic cycle, (Berger and Udell, 2002, Borio and Lowe, 2002). In addition, as expected, larger and more profitable banks are less at risk of crises, while banks that are more exposed to general stock market movements – ie banks with a high beta – are more likely to experience dramatic stock market declines.

The findings discussed above turned out to be robust to a number of changes to the detailed specification¹. However, one potential concern with the analysis is that the disclosure variable might be endogenous. An endogeneity problem might arise if there is an unobservable, or latent, variable that determines both the decision to disclose information and the likelihood of crisis. In particular, it is conceivable that banks that are crisis-prone decide to provide little information, because they want to hide their true state, and that those same banks are more likely to experience a crisis for the same underlying reason.

In order to investigate this possibility instrumental variables regressions were run, as follows: in a first step, the disclosure variable was regressed on a number of observable exogenous regressors. In a second step, the predicted value of this regression of the disclosure variable, which is a function of observable exogenous variables only, was used in the probit regression². Table 1, Column 2 reports the second stage regression using the predicted value of the first stage regression in lieu of the disclosure variable. The results in Table 1, Column 2 suggest that endogeneity is not a major issue for our regression. The coefficient on the instrumented disclosure variable retains both its sign and its level of economic significance, when compared to the benchmark result presented in Table 1, Column 1.

Conclusions

Policymakers have identified increases in bank transparency as one potential way to increase bank stability. The idea is that more transparency strengthens market discipline and that this creates

beneficial incentives *ex ante*. However, policymakers might be concerned that the market discipline provided through more transparency might often be detrimental *ex post*, when market responses might tip ailing banks over the edge.

This article has attempted to clarify this potential trade-off by examining, for a large sample of banks, whether transparency increases or decreases the chance of severe banking problems. Our results suggest that to the extent that such a trade-off exists, the benefits of transparency for bank stability outweigh its costs. We have found that banks that disclose more information are less at risk of falling into crisis. This result suggests that transparency is able to improve bank stability and reduce the incidence of banking crisis. These results thus also suggest that Basel II Pillar 3 disclosures could bring major dividends for overall financial stability, which should be protected when it comes to implementing Basel II.

(1) This is discussed in more detail in Nier (2004).

(2) The variables used in the first stage regressions include a number of bank-specific variables (loan ratio, return on equity, size, market share and the cost-income ratio). In addition, we exploit the cross-country dimension of our dataset and include country dummy variables, which would reflect the average level of the disclosure in each country. Since we know that disclosure varies through time, we also include a linear time trend as an explanatory variable. Finally, to make sure that as a result of including year we do not create a variable that has a simple time trend, we interact year with the set of country dummy variables. As a result the predicted change in the instrumented variable through time will be specific to each country and therefore mimic the actual change in that variable at the country level. Again, this approach is motivated by a finding that the average change in disclosure is very different across countries.

References

- Barth, J R, Caprio, G and Levine, R (2002), 'Bank regulation and supervision: what works best?', *World Bank Working Paper*.
- Basel Committee on Banking Supervision (2003), 'Overview of the new Basel capital accord', Bank for International Settlements, April.
- Baumann, U and Nier, E (2003), 'Market discipline and financial stability', Bank of England *Financial Stability Review*, June.
- Baumann, U and Nier, E (2004), 'Disclosure, volatility and transparency', *Economic Policy Review*, Federal Reserve Bank of New York.
- Berger, A N and Udell, G F (2003), 'The institutional memory hypothesis and the procyclicality of bank lending behaviour', *BIS Working Paper no. 125*.
- Boot, A W A and Schmeits, A (2000), 'Market discipline and incentive problems in conglomerate firms with applications to banking', *Journal of Financial Intermediation*, Vol 9, pages 240–73.
- Borio, C and Lowe, P (2002), 'Asset prices, financial and monetary stability, exploring the nexus', *BIS Working Paper no. 114*.
- Caprio, G and Klingebiel, D (2003), 'Episodes of systemic and borderline financial crises', World Bank, January.
- Cordella, T and Yeyati, E L (1998), 'Public disclosure and bank failures', *CEPR Discussion Paper no. 1886*.
- Eichengreen, B and Arteta, C (2000), 'Banking crises in emerging markets: presumptions and evidence', University of California, Berkeley, mimeo. Available at: iber.berkeley.edu/wps/ciderwp.htm.
- Ferguson, R (1998), 'The Asian crisis: lessons to be learned and relearned', Address before America's Community Bankers, Washington D.C., 4 March.
- Fischer, S (1999), 'Reforming the international financial system', *The Economic Journal*, Vol 109, pages 557–76.
- Furman, J and Stiglitz, J E (1998), 'Economic crises: evidence and insights from East Asia', *Brookings Papers on Economic Activity*, pages 1–136.
- Giannetti, M (2003), 'Bank-firm relationships and contagious banking crises', *Journal of Money, Credit and Banking*, Vol 35, pages 239–61.
- Gorton, G and Huang, L (2002), 'Bank panics and the endogeneity of central banking', *NBER Working Paper 9102*.
- Hoggarth, G, Jackson, P and Nier, E (2003), 'Market discipline and financial stability' in: Litan, R E, Pomerleano, M and Sundararajan, V (editors), *The future of domestic capital markets in developing countries*, Brookings Institution.
- Hyytinen, A and Takalo, T (2003), 'Preventing systemic crises through bank transparency', *Bank of Finland Discussion Paper 25*.
- Morris, S and Shin, H (2002), 'Social value of public information', *American Economic Review*, Vol 92, pages 1521–34.
- Nier, E (2004), 'Banking crises and transparency', mimeo, Bank of England. Available at: www.frbatlanta.org/news/conferen/fsc04/nier.pdf.
- Radelet, S and Sachs, J D (1998), 'The east Asian financial crisis: diagnosis, remedies, prospects', *Brookings Papers on Economic Activity*, Vol 1, pages 1–90.

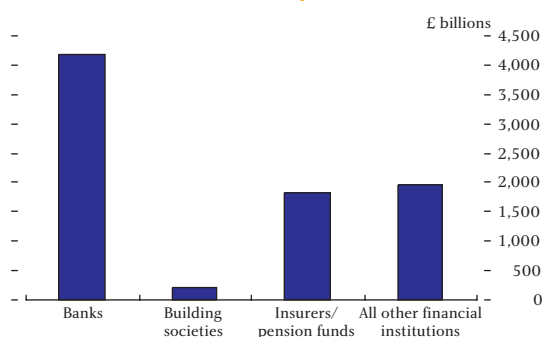
Assessing risks from UK non-bank financial sectors

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The assessment of the robustness of the UK financial system in each *Financial Stability Review* focuses primarily on the banking system, reflecting the importance of this sector for the maintenance of financial stability. But there are many other types of financial institution resident in the United Kingdom, and these non-bank financial sectors may also have the potential to affect financial stability – both through their direct role as providers of financial services and through their links to other participants in the financial system. This article sets out the framework we follow for assessing the risks to financial stability from UK-resident non-bank financial sectors. In focusing on UK-resident sectors, this article does not cover non-UK institutions that may also pose risks to UK financial stability.

MUCH OF THE DISCUSSION of the UK financial system in the *Review* concentrates on the domestic banking sector, but there are many other financial institutions owned or operating in the UK. Some engage in activities that are different to commercial banking, such as general insurance companies, which provide insurance for a range of risks; pension funds, which support long-term saving; and securities dealers, active in wholesale financial markets. Others, such as credit unions and building societies, are quite similar to small domestically focused banks. These varied sectors play a significant role in the economy, reflected in part by the scale of their financial liabilities (Chart 1).

Chart 1
Unconsolidated financial liabilities of UK-resident financial institutions, 2004 Q2



Source: ONS.

Most domestically owned banks focus primarily on retail banking, providing a range of services, such as savings products and loans or intermediation in payment systems, which are important for households

and corporations. They are also a potential conduit for the transmission of financial stresses through the financial system to the rest of the economy. Banks have significant direct links to one another through interbank lending, and they have a key role in the operation of payment systems. Moreover, banks are indirectly connected too. Their role as monetary intermediaries – transforming deposits into illiquid loans – leaves them vulnerable to liquidity risk if there is a loss of confidence in the sector. As such, while individual institutions might not be systemically important, the banking sector as a whole clearly is. And, given that disorder in the banking sector is typically manifested in pressures on the liquidity of individual institutions and the system, central banks' role as liquidity providers means that they have a key part to play in dealing with such problems.

While the potential knock-on effects of bank failures are reasonably clear, the wider disruption arising from the failure of non-banks is less obvious. The potential for customers to withdraw their investments quickly is typically more limited, reducing the opportunities for strains in one non-bank to be quickly transmitted to other institutions in the sector. This means that the failure of one institution is less likely to disrupt a sector's provision of financial services. But there is still the potential for problems in non-bank sectors to threaten systemic financial stability. Previous *Reviews* have discussed specific threats. For example, in 2001 and 2002, falling UK and global equity prices reduced the solvency margins of the UK-resident life insurers. The *Review* noted the potential threat posed by the industry's

response to lower solvency levels, discussed the regulator's response and highlighted links between insurers and banks.

That episode also illustrated the potential for global financial markets to affect UK financial institutions adversely, and hence UK financial stability. Global markets are, in turn, affected by non-UK financial institutions. Foreign non-bank financial institutions have significant roles in capital markets, either as investors or as traders, where disruption to their activity could have a sufficiently large adverse impact on market functioning to threaten financial stability. In addition to the links through markets in which UK-resident institutions are participants, some individual foreign institutions, such as securities dealers or reinsurers, may have counterparty links to UK-owned banks which could have implications for domestic systemic stability. Chapter two of the assessment article therefore discusses risks to and from these institutions and global financial markets more broadly.

This article presents a framework for assessing which non-bank financial sectors have the greatest potential to threaten the stability of the UK financial system as a whole. It focuses on UK-resident non-bank financial sectors, and so does not consider the risks to financial stability from non-UK financial institutions or international capital markets.

Financial stability in theory and in practice

A well functioning financial system should allow individuals to smooth their consumption across time or states of nature, and allow the efficient financing of investment projects with saved resources.¹ And a financial system is stable if its capacity to fulfil these functions is robust to shocks to individual institutions' balance sheets.

Financial instability can arise when a shock does sufficient damage to the operations of an institution (or group of similar institutions) to cause substantial disruption to the functioning of the financial system. This can either be a direct result of the affected institution's failure to provide services, or the result of links within the financial system, which spread disruption beyond the originally affected institution and thus indirectly inhibit the functioning of the whole system.

Direct transmission through provision of financial services

The UK-resident non-bank financial sectors provide a wide range of services, such as the provision of lending, asset management services, or insurance. The loss of these services could have a significant direct impact on the wider economy. But this depends on two factors. First, the service must play an important role in the economy. This may be in terms of households' and corporations' holdings of financial assets or in their ability to undertake certain activities (for example, some activities require compulsory insurance under health and safety and other legislation). Second, the failure of an individual non-bank must cause significant disruption to the provision of a financial service by other firms in that sector or other sectors. Or the concentration of the sector and barriers to entry must be sufficient to make it difficult for other economic agents to arrange replacement provision of the affected financial services.

Applying these criteria to banks, it is clear they meet the first criterion through their role as monetary intermediators and the use of bank deposits as stores of wealth and a means of payment. Some banks might also meet the second criterion, depending, of course, on their size, the business they undertake and their links to other banks and capital markets. Households and corporations use banks as intermediaries in the payment system, and so the failure of a bank could also disrupt the ability of its customers to make payments.

The failure of a non-bank may also meet the criteria above, but the case is often less clear cut. For example, the failure of a general insurer usually results in a limited direct loss: unless a claim has been lodged, a policyholder only loses the cover they had purchased. The main disruption is the effect on individuals'/institutions' activities as a result of a loss of insurance cover. But the barriers to entry to the general insurance market are likely to be low, allowing substitute provision to be provided relatively quickly.

The loss from the failure of a life insurer could be significant because of the large amount of wealth managed by such institutions. However, because insurance contracts restrict policyholders' ability to withdraw their investments quickly, problems in this

(1) Haldane, A, Saporta, V, Hall, S and Tanaka, M (2004), 'Financial stability and macroeconomic models', Bank of England *Financial Stability Review*, June.

sector usually develop over a long period of time. By giving consumers and markets longer to adjust, the impact of any problem is spread over time, reducing the potential for spill-over effects.

Links to other financial sectors

Even if disruption to a non-bank sector's provision of financial services is unlikely to pose a direct threat to the financial system, such disruption may still have financial stability consequences through transmission to other financial sectors/markets that *are* systemically important. There are three channels by which stresses from one financial sector could be transmitted through the rest of the financial system: counterparty exposures; links through markets; and effects on confidence.

Counterparty exposures between firms expose them to a risk of default. These exposures may arise through a variety of channels, such as banks' lending to non-bank financial institutions or reinsurance provided to general and life insurers. Financial conglomerates may also be exposed through their own participation in non-bank financial markets as owners of non-bank subsidiaries or as intermediaries selling third-party services. In the event of a shock, a subsidiary may call on funds or capital from its parent. So, for example, banks' exposures to the life insurance sector through their ownership of life subsidiaries have been discussed in previous *Reviews*.

In *capital markets*, sudden large asset sales by one financial institution, or the unwinding of major derivative positions, could, at least temporarily, distort asset prices and lead to a significant decline in market liquidity. Sharp falls in asset prices could also affect other financial institutions by lowering the value of their assets (hence eroding their capital) or limiting their ability to hedge risks in capital markets.

Confidence in financial service providers is an additional indirect connection between financial institutions. Concerns that problems in one financial institution might be symptomatic of problems in a wider group of firms may lead households or corporations to reallocate their investments or reduce their take-up of financial services – resulting in wider disruption to other institutions. This is a key externality in the failure of a bank. Because banks have liquid liabilities, they are vulnerable to bank runs resulting from a loss of confidence, so problems in one institution may spread quickly to others. Shocks to

consumer confidence may also affect non-bank sectors. For example, sales of long-term savings products have fallen in recent years as a result of problems in the life insurance industry. However, the less liquid nature of insurers' liabilities means that this is unlikely to lead to a rapid withdrawal of funds.

An assessment of UK-resident non-bank financial sectors' potential threat to UK financial stability

In gauging the potential for disorder in a UK-resident non-bank financial sector to spread through various channels and threaten financial stability, this article splits non-banks into nine distinct sectors, grouped into three broad categories by type of activity:

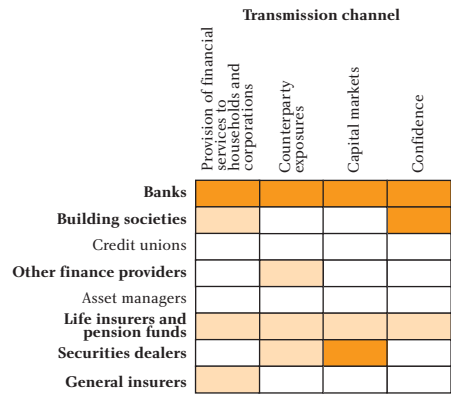
1. Credit grantors – building societies, credit unions, and 'other finance providers';
2. Investment institutions – life insurers and pension funds, asset managers, securities dealers, and hedge funds; and
3. Non-life insurers – general insurers, and reinsurers.

The variety of activities undertaken within the domestic non-bank financial sectors is reflected in the differences in the structure of the sectors and the source of the risks to which they are exposed. For example, UK credit unions operate almost entirely in the United Kingdom, and are mainly exposed to purely domestic risks. Other types of UK-resident financial institution, such as life insurers, operate in the United Kingdom, but are exposed to global risks through their investments in international capital markets. And hedge funds, securities dealers and reinsurers operate in global markets and are thus exposed to global risks. These varied domestic and global risks are discussed regularly in the assessment article in the *Review*.

The significance of each financial sector's links to the financial system is assessed using the framework set out above. The materiality of the risks to financial stability from a sector can be assessed by considering both the number of potential channels of contagion and the possible extent of financial stability risk for each channel. Using this method, five UK non-bank financial sectors appear to warrant regular surveillance (Chart 2). Other non-bank sectors, such as hedge funds, may also be relevant to UK financial stability and are regularly discussed in the assessment article in the *Review*. But, as they are mainly

domiciled and operated outside the United Kingdom, they largely fall outside the scope of this article.

Chart 2
Summary assessment of UK-resident financial sectors’ potential threat to UK systemic financial stability^{(a)(b)}



- (a) The potential disruption to financial stability is indicated by the shading: the greater the potential for disruption, the darker the shading.
- (b) Reinsurers and hedge funds are not included in this table as they are predominantly foreign-owned and operated, and therefore largely fall outside the scope of this article.

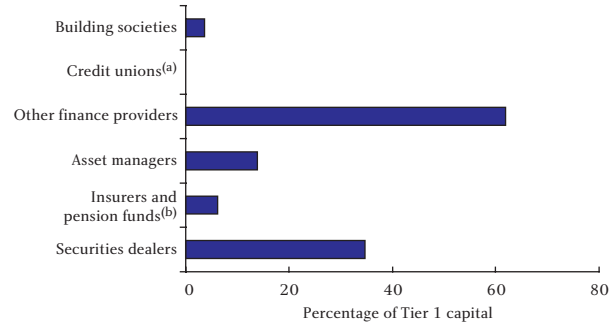
The impact on financial stability is not uniform. For example, the focus on banks is warranted by the materiality of their role in the financial sector across all four channels. In contrast, ‘other finance providers’ have more limited connections to the rest of the financial system (through their association with banks). And, while life insurers and pension funds also have links to the financial sector through all possible channels, these channels of contagion are not likely to be as significant as those for the banking sector. So, while regulators will want to ensure that consumers are treated fairly and their investments are protected, from a systemic financial stability viewpoint life insurers and pension funds are unlikely to be as critical as banks.

Credit grantors

Building societies

Building societies’ activities are similar to domestically focused banks, accepting deposits and providing lending (primarily mortgages). They are, however, typically much smaller than banks, as indicated by the difference in the scale of their financial liabilities – UK-resident banks’ liabilities exceed £4.1 trillion, compared with just under £220 billion for building societies (Chart 1). And banks’ direct exposures to the sector are small, with lending to building societies equivalent to less than 4% of Tier 1 capital (Chart 3).

Chart 3
Large UK-owned banks’ lending to UK-resident non-bank financial sectors, 2004 Q2



Source: Bank of England.
 (a) Lending to credit unions is less than 0.001 % of Tier 1 capital.
 (b) Includes lending to both life insurers and general insurers.

Nevertheless, building societies have significant links to households through both lending and deposit taking. For example, they provided around 16% of secured lending during the first half of 2004 (Chart 4). Moreover, the failure of a major building society may have confidence effects that could spread to the banking sector.

Credit unions

Credit unions are another form of deposit taker, but they are universally small in size. At end-2002, the sector as a whole had total assets of less than £320 million, and the majority of credit unions have assets of less than £100,000. Bank lending to such institutions is negligible, and the mutual ownership of credit unions means that there are no ownership links with the banking or non-bank financial sectors. As a result, disruption to the sector is unlikely to pose a threat to the financial system more broadly.

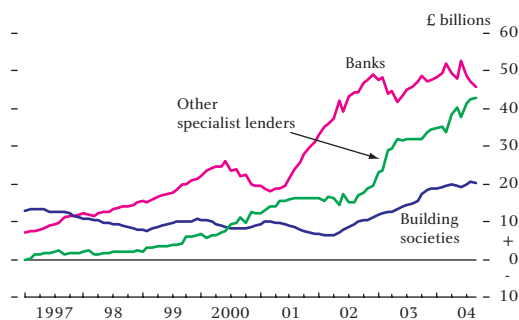
‘Other finance providers’ (OFPs)

This sector is composed of non-deposit-taking institutions that provide credit to households and corporations. It includes financial leasing corporations, non-bank credit grantors and housing credit corporations. OFPs have potentially important links to non-financial corporations and households as providers of credit. In the first half of 2004, ‘other specialist lenders’ (a subset of OFPs) accounted for around 17% of unsecured lending and 44% of secured lending (Chart 4). The sector also has significant links to banks through on-balance-sheet exposures and ownership links. Loans to OFPs are equivalent to over 60% of the large UK-owned banks’

Tier 1 capital (Chart 3), and all the large UK-owned banks own at least one OFP. Because banks and OFPs both engage in domestic lending, the two sectors' credit risk exposures are likely to be correlated. So it is likely that any default by OFPs would occur at a time when banks' domestic lending portfolios were themselves under strain, magnifying the impact on banks' robustness.

OFPs may therefore affect financial stability adversely because of their links to banks and their provision of lending to non-financial corporations and households. However, because alternative sources of credit are readily available – limiting the potential for the failure of an individual OFP to disrupt any particular market – it is sensible for surveillance of this sector to focus on the links between OFPs and banks.

Chart 4
Net lending secured on UK residential property^{(a)(b)}



Source: Bank of England.

(a) Rolling twelve-month total.

(b) Includes transfers and securitisations.

Investment institutions

Investment institutions are firms whose prime activity is trading or investing in financial assets. This covers a range of institutions. At one end of the spectrum are asset managers, who manage assets on behalf of other institutions/individuals and do not carry any market risk on their own books. Life insurers and pension funds also manage assets on behalf of others, but they carry at least some of the market risk associated with these investments. And at the other extreme are securities dealers which, in addition to trading on behalf of others, also trade on their own behalf and carry any of the unhedged market risk from their investments.

Asset managers

The asset management sector covers a range of activities from managing assets for retail investors, to managing hedge funds. But differences in the

investment strategies of hedge funds, compared with other asset managers, may present different financial stability risks. So hedge funds are considered separately.

Although asset managers manage a large proportion of the asset holdings of life insurers, pension funds and individuals, they have limited asset holdings on their own balance sheet. Their ability to initiate disruptive changes to asset holdings is limited by the terms of management contracts and their accountability to trustees, who define the range of asset classes in which they can invest. Any disruption to financial markets caused by asset managers' activities is therefore likely to be a result of a change in mandates received from clients. And this will be driven by factors affecting the client rather than the asset manager. Some banks and insurers own asset managers, but there is little risk of contagion through this channel as asset managers do not take market risks on their own book (reflecting the agency nature of the business). So such subsidiaries pose little immediate risk to their parents' solvency.

Life insurers and pension funds

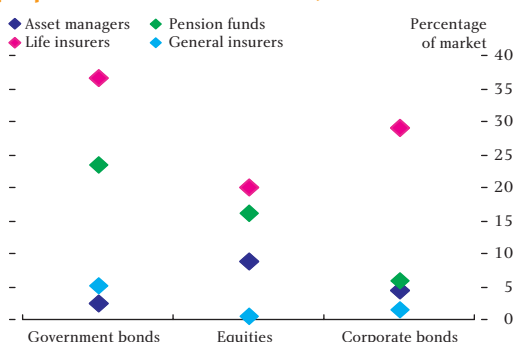
Life insurers and pension funds are considered together as they have similar characteristics. Both manage assets on behalf of others, and have significant freedom over their investment strategy. And both often hold at least some market risk on their books (rather than passing it onto the end investor). This is particularly the case for defined-benefit pension schemes and with-profits products, where guaranteed payments and the smoothing of investment returns mean that the value of an institution's assets and its liabilities to policyholders may not always be equal.

There are, however, some significant differences between life insurers and pension funds. The most important is their capital base. While life insurers have their own capital, defined-benefit pension funds' deficits are a liability on their parent corporation's balance sheet. This adds to the leverage of the parent and is therefore an important part of any analysis of corporate balance sheets.

Both UK-resident life insurers and pension funds have substantial holdings of marketable assets: at end-2003, they had asset holdings of £972 billion and £693 billion respectively. Together they hold approximately 35% of UK shares and 60% of gilts

(Chart 5). The large scale of the sector's asset holdings means that an asset reallocation by life insurers and pension funds may have the potential to affect asset prices, at least temporarily, if large asset reallocations are made over a short period of time.

Chart 5
Invested assets of UK-resident financial sectors as a proportion of the UK market, end-2002



Sources: ONS, Bank for International Settlements, Debt Management Office and Bank calculations.

In addition to their involvement in capital markets, life insurers and pension funds also have an important role as managers of long-term savings. The sector manages around 50% of UK households' financial assets. It is also a provider of annuities – which are a legal requirement of private pension saving. And the failure of a large life insurer has the potential to disrupt the annuity market.

The sector also has some links to banks. UK-owned banks' lending to life insurers and pension funds is limited (at less than 7% of Tier 1 capital), but there are significant ownership links between life insurers and the UK banking sector. Six of the large UK-owned banks have life insurance subsidiaries, with some accounting for over 10% of total group assets.

Given the sector's involvement in capital markets, links to banks, and the service they provide to households and corporations, life insurers and pension funds may have the potential to threaten UK financial stability. But the recovery in equity markets over the past year has alleviated the immediate solvency pressure on insurance companies – reducing the risk from the sector.

Securities dealers

Banks may operate in wholesale markets, making transactions across their balance sheets, but there are also non-bank institutions which operate as

stand-alone investment firms. These institutions assist in the financing of investment through their management and underwriting of firms' equity and debt issues, and through provision of consultancy services in mergers and acquisitions. Securities dealers are also at the heart of many wholesale markets, both acting as market makers and trading on their own account. In their proprietary trading, securities dealers take material positions and often follow trading strategies similar to hedge funds. Disruption to these activities could affect market liquidity or price volatility, inhibiting the efficient operation of markets.

In addition to their involvement in markets, the sector also has significant links to UK-owned banks through on-balance-sheet exposures. Lending to the sector is equivalent to over 30% of the ten large UK-owned banks' Tier 1 capital, although much of this lending is likely to be collateralised.

Given their substantial role in capital markets and strong links to banks, the sector may have the potential to pose a threat to financial stability and so warrant close surveillance. The UK-resident sector is dominated by the activities of US securities dealers. While the US Securities and Exchange Commission has recently announced plans to introduce consolidated supervision of the US securities dealers, the current lack of consolidated supervision leaves a need for monitoring of the UK-resident sector over and above reviews of global market robustness.

Hedge funds

Like other asset managers and life insurers, hedge funds also manage assets on behalf of others. But, like securities dealers, they typically take greater risks and trade over shorter time horizons – giving them the potential to amplify capital market volatility. And, by using leverage, hedge funds are more vulnerable to shocks to the market. This may force them to close out positions quickly, potentially creating market instability if their positions are large relative to the size of the underlying markets.

Although there is no hard-and-fast definition of what differentiates a hedge fund from other asset managers, surveys indicate that global hedge funds' assets under management worldwide are small relative to UK-resident life insurers – managing investments of approximately £480 billion (\$870 billion) worldwide in mid-2004. However, globally active

hedge funds have been growing rapidly in recent years, with around £45 billion (\$80 billion) flowing into hedge funds worldwide in the first half of 2004. And hedge funds' leverage – which may result from various trading activities, including borrowing, short selling, and derivatives – allows them to take positions that are far larger than their capital subscriptions. They also usually trade more actively than other asset managers, so they typically account for a much greater proportion of market activity than their assets under management suggest. And they often take similar positions, and chapter two of the assessment article in the *Review* routinely discusses the potential for such 'crowded trades' to cause disruption in specific global markets.

Aside from their investment in international markets, hedge funds also have counterparty links to other financial sectors. UK-owned banks' direct exposure to hedge funds is limited. But hedge funds have growing links to other non-bank financial sectors. Securities dealers are the main providers of 'prime brokerage' to hedge funds.¹ And an increasing number of life insurers and pension funds are investing in hedge funds, although the sums involved are usually only a small percentage of the investing funds' total assets.

While a significant minority of hedge funds are managed in the United Kingdom, they are active in global (rather than specifically UK) markets and are mainly domiciled in offshore financial centres to take advantage of lower levels of tax and regulation. As a result, despite their potential relevance to UK financial stability, they largely fall outside the scope of this article.

Non-life insurers

General insurers

General insurers have an important role as providers of insurance to households and corporations (eg employer's liability insurance). But, while general insurers have significant links to non-financial corporations and households, risks via the other transmission channels are limited.

Most UK banks' have little exposure to the sector (Chart 3), and the potential for UK-resident general insurers to disrupt capital markets is also limited. The sector's asset holdings are much smaller than those of life insurers and pension funds, with non-life insurers owning less than 1% of UK equities and 5% of gilts (Chart 5).

Some insurers, known as monolines, specialise in writing financial guarantee insurance, such as insuring PFI-backed bonds in the United Kingdom.² But monolines are mainly US-owned insurers, and much of their business is in the United States, underwriting US municipal debt. The activity of the UK-resident monolines is relatively limited and unlikely to pose a systemic threat to the UK financial system.

The UK-resident reinsurance industry

Reinsurers enable life and general insurers to lay off some of the risks they underwrite so risks can be dispersed more widely. The UK-resident reinsurance industry is dominated by Lloyd's of London. In 2003, Lloyd's underwrote net reinsurance premiums of over £4.3 billion – nearly 60% of the total UK reinsurance market.³ The sector has links to other non-bank financial sectors, particularly other insurers. For example, UK reinsurers provide reinsurance to life and general insurance sectors. And some UK insurers conduct a limited amount of reinsurance business in the United Kingdom. The sector also has some involvement in capital markets through its ownership of assets, but the link is limited. UK reinsurers' asset holdings are less than a third of UK general insurers' assets.

The UK-resident sector is only part of an international reinsurance industry, where insurers can obtain reinsurance from providers around the globe. And the UK-resident sector is only a relatively small proportion of the global market: in 2000, the London Market accounted for less than 10% of global reinsurance premiums written. But the global industry may have the potential to threaten financial stability through its effects on international capital markets.

(1) 'Prime brokerage' covers a variety of activities, but most commonly refers to lending to hedge funds against a portfolio of securities.

(2) Private Finance Initiative: arrangements where risks associated with public service projects are transferred to the private sector in part or in full in return for a long-term contract to supply services to the public sector.

(3) Where institutions, such as Lloyd's of London, engage in both general and reinsurance business, the assessment of the financial stability risks from the different activities are considered separately. The general insurance business of Lloyd's is assessed as part of the assessment of the UK-resident general insurance sector.

Conclusion

The most likely sources of risks to UK financial stability in the UK-resident financial system lie in the banking system and in five non-bank sectors: securities dealers, building societies, life insurers and pension funds, 'other finance providers', and general insurers. The risks arising from these non-bank sectors will be covered in the assessment section of future *Reviews* when the situation warrants it.

Risk appetite:

concept and measurement¹

Prasanna Gai and Nicholas Vause, Financial Stability Assessment Division, Bank of England

This article critically reviews the analytical underpinning and measurement of investor ‘*risk appetite*’. We reconcile a number of different approaches with asset pricing theory, and articulate a new measure based on the variation in the ratio of risk-neutral to subjective probabilities used by investors in evaluating the expected payoff of an asset. The measure distinguishes risk appetite from *risk aversion*, and is reported in *levels* rather than *changes*. A preliminary application of the approach is assessed alongside other indicators of market sentiment and appears to yield generally plausible results.

FINANCIAL MARKET practitioners often cite market sentiment as a key factor driving broad trends in asset prices. The prices of financial assets frequently move together, even though many of the factors affecting valuations in different asset markets can be quite different. The Asian financial crisis of 1997 illustrates how shifting perceptions of risk can generate correlation among the prices of seemingly unrelated assets. Following the devaluation of the Thai baht in July 1997, investors reduced their risk exposures across a range of emerging markets, causing a rise in the cost of borrowing beyond Asia, and into Latin America and Emerging Europe. The spillover of financial stress across borders could not be explained by trade links and financial interconnections and coincided with claims that a decline in ‘risk appetite’ was an underlying reason for this contagion.

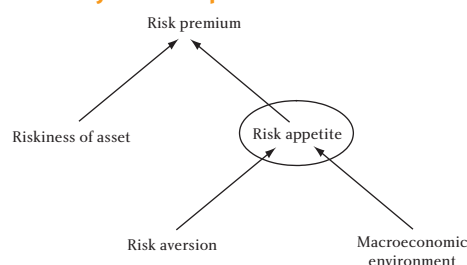
The terms ‘risk appetite’, ‘risk aversion’ and ‘risk premium’ are frequently used interchangeably to refer to sentiment in asset markets. But the concepts are very distinct and inappropriate use makes it difficult to assess and convey the true extent of the willingness to hold risky assets. Fundamentally, investors dislike uncertainty about the level of consumption that will be possible in the future given their asset holdings. *Risk appetite* – the willingness of investors to bear risk – depends on both the degree to which investors dislike such uncertainty *and* the level of that uncertainty. The level of uncertainty about consumption prospects depends on the macroeconomic environment. And the degree to

which investors dislike uncertainty reflects underlying preferences. This *risk aversion* is part of the intrinsic make-up of the investor. It is a parameter that our theoretical priors suggest should not change markedly, or frequently, over time.

Risk appetite thus reflects somewhat more than the notion of risk aversion in microeconomics. It shifts periodically as investors respond to episodes of financial distress and macroeconomic uncertainty. In adverse circumstances, an investor will require higher expected excess returns to bear risk and risk appetite will be low. Conversely, high risk appetite will be associated with low expected excess returns.

The expected excess return required to compensate an investor for holding a risky asset is, in turn, known as the *risk premium*. The risk premium is determined partly by the inherent riskiness of the asset, and partly by the level of risk appetite. The higher the appetite for risk, the lower the risk premium. Figure 1 illustrates how these concepts are linked.

Figure 1
Summary of concepts



(1) We are grateful to Manmohan Kumar, Michael Metcalfe, and Kostas Tsatsaronis for generously sharing data underpinning the risk appetite measures used in this paper. We also thank Frank Milne and Hyun Shin for helpful comments and encouragement.

This article critically assesses the concept and measurement of risk appetite. It draws on asset pricing theory to distinguish risk appetite from risk aversion and risk premia. It then outlines a preferred measure, before contrasting some preliminary calculations based on this method with other indicators of risk appetite advanced in the literature.

The concept of risk appetite

Textbook treatments of asset pricing theory (eg Cochrane, 2001) state that in an efficient market, with fully rational and informed investors, the current price of an asset, p_t , should equal the expected present value of its possible future payoffs, x_{t+1} . These payoffs comprise income (such as dividend payments) received over the horizon, plus the *ongoing* value of the asset as implied by its future price, p_{t+1} . The payoffs of an asset vary across future states of the world, such as whether a boom or recession develops. The rate at which investors discount in order to relate future purchasing power to present purchasing power varies among states of the world as well. More formally, the price of an asset can be expressed as

$$p_t = E_t(m_{t+1}x_{t+1}) \quad [1]$$

where m_{t+1} denotes the *stochastic* discount factor that investors use to translate future payoffs in present value terms. States of the world in which high levels of future consumption are available to investors are states in which future payoffs are discounted at high rates. This is because asset payoffs are not required to support the level of consumption as much as would otherwise have been the case.

The asset pricing relationship described above can be expressed in terms of gross returns,¹ R_{t+1} , by dividing (1) by current prices. Thus

$$1 = E_t(m_{t+1}R_{t+1}). \quad [2]$$

All assets have the same expected *discounted* return in equilibrium (of unity), even though different assets generally have different expected returns. Since both the gross return and the stochastic discount factor are random variables that depend on states of the world, we can write (2) as:

$$1 = \underbrace{E_t(m_{t+1})E_t(R_{t+1})}_{\text{risk-neutral component}} + \underbrace{cov_t(m_{t+1}, R_{t+1})}_{\text{risk adjustment}}. \quad [3]$$

If an asset were completely risk free, returns would not vary, and the gross risk-free return would be given by

$$R_{t+1}^f = 1 / E_t(m_{t+1}). \quad [4]$$

And if investors were neutral towards risk – so that they were indifferent between the particular states of the world in which asset returns were high or low – the rate of return of an asset would not be correlated with the stochastic discount factor. The covariance term in (3) would then be zero and all assets would offer the same expected rate of return, given by equation (4).

In reality, however, investors prefer to receive higher returns in some states than in others. Most commonly, investors prefer excess returns in those states of the world that deliver low consumption, since the payout in these circumstances is particularly valuable. An asset that pays a high return in good times when consumption is relatively high, but fails to pay out in bad times, has an unfavourable distribution of payoffs. In these situations, the stochastic discount factor and asset returns are negatively correlated. Investors then require a *risk premium* over and above the risk-free rate to compensate them for holding such an asset. Rearranging (3) and making use of the definition of the risk-free rate in equation (4) allows us to write the risk premium as:

$$\underbrace{E_t(R_{t+1}) - R_{t+1}^f}_{\text{risk premium}} = -R_{t+1}^f cov_t(m_{t+1}, R_{t+1}). \quad [5]$$

The risk premium can, in turn, be decomposed into the quantity of risk associated with each asset, β_i^j , and the unit price of risk, λ , that is common across all assets. In particular, we can re-write (5) as:

$$E_t(R_{t+1}) - R_{t+1}^f = - \underbrace{\frac{cov_t(m_{t+1}, R_{t+1})}{var_t(m_{t+1})}}_{\beta_i} \underbrace{var_t(m_{t+1}) R_{t+1}^f}_{\lambda}. \quad [6]$$

(1) The gross return on an investment is its current value expressed as a proportion of its initial value. This is equal to one *plus* the net rate of return.

The price of risk is the expected excess return that investors require to hold financial wealth at the margin. We can, therefore, define *risk appetite* – the willingness of investors to bear risk – as the inverse of the price of risk. So when investors' risk appetites fall, they require larger expected excess returns to hold risky assets.

It is immediately apparent from equation (6) that the behaviour of risk appetite hinges on the volatility of the stochastic discount factor. Since the stochastic discount factor specifies the marginal rate at which the investor is willing to substitute uncertain future consumption for present consumption, risk appetite depends on the *degree* to which investors dislike uncertainty about their future consumption and on factors that determine the overall *level* of uncertainty surrounding consumption prospects. *Risk aversion* reflects the former, since the more risk averse the investor, the more valuable is additional income in bad states of the world relative to good states, as reflected by the curvature of the investor's utility function. These are innate preferences over uncertain future prospects. As such, they are unlikely to vary significantly over time.

The factors underpinning risk appetite can be seen more clearly by imposing some structure on the stochastic discount factor. In particular, if consumption growth is log-normally distributed with variance σ_p^2 and investors have utility functions that depend only on their consumption and capture impatience and aversion to risk, then the price of risk can be expressed as¹

$$\lambda_t = \gamma \sigma_t, \quad [7]$$

where γ is the coefficient of absolute *risk aversion*.² So a rise in γ would mean a fall in risk appetite. But risk appetite will also fall if uncertainty about consumption growth, σ_p , increases. The expected volatility of future consumption is likely to depend on factors such as unemployment prospects, the stance of macroeconomic policy, and so on. So the shifts in market sentiment that are witnessed over time are more likely to be driven by the macroeconomic environment than the risk aversion of investors.

The discussion so far has shown how the price of an asset depends on the subjective probabilities assigned by risk-averse investors to future payoffs. The same price may be deduced by treating this risk-averse investor as a risk-neutral investor who attaches increased probability to bad outcomes and reduced probability to good outcomes. These adjusted probabilities are known as 'risk-neutral' probabilities and, importantly, can be readily inferred from the prices of financial options.

So we can either try (i) to estimate investors' best guesses of probabilities in order to compute expected returns, or, equivalently, (ii) consider the behaviour of a typical risk-neutral agent, discount by the risk-free rate, but evaluate the expected payoffs of an asset using a set of adjusted probabilities. Suppose there are S possible future states of the world, indexed $s=1,2,3\dots S$. The expected discounted return of an asset can be expressed either as the sum of the discounted returns in each state, weighted by investors' subjective probability of the state occurring,

$$1 = E_t(m_{t+1}R_{t+1}) = \sum_{s=1}^S m_{t+1}(s)R_{t+1}(s)\pi_{t+1}(s); \quad [8]$$

or in terms of adjusted risk-neutral probabilities $\pi_{t+1}^*(s)$, discounted with the risk-free interest rate,

$$1 = E_t(m_{t+1})E_t(R_{t+1}) = \sum_{s=1}^S \frac{1}{R_{t+1}^f} R_{t+1}(s)R_{t+1}(s)\pi_{t+1}^*(s). \quad [9]$$

Taken together, equations (8) and (9) imply that the ratio of the risk-neutral to subjective probabilities is proportional to the stochastic discount factor, where the constant of proportionality is given by the gross risk-free rate of return, ie

$$\frac{\pi_{t+1}^*(s)}{\pi_{t+1}(s)} = m_{t+1}(s)R_{t+1}^f. \quad [10]$$

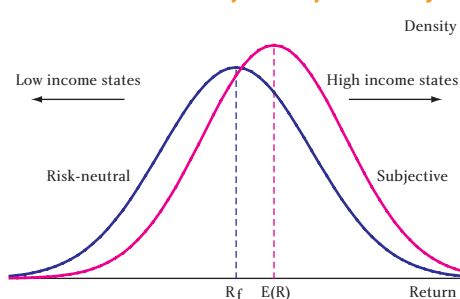
(1) More specifically, investors have utility functions that are defined over consumption of the form: $u(c) = (c^{1-\gamma})/(1-\gamma)$. These utility functions have the convenient property that the composition of consumption is not affected by wealth, but depends only on relative prices.

(2) This is a standard result in asset pricing. For a detailed explanation, see Cochrane (2001), page 19. Asset pricing models that employ these restrictions do, however, significantly underestimate the risk premia observed in practice. This is due to the low volatility of consumption. Models with less restrictive utility functions and, hence, stochastic discount factors that depend on a broader set of variables may help to reconcile such anomalies (see, for example, Barberis *et al* 2001).

Note that the adjusted, risk-neutral probability distribution is *pessimistic* in the sense that it assigns excessive probability to low-income states and too little probability to high-income states. The mean of the adjusted (risk-neutral) density is given by equation (4), whereas the mean of the subjective density is given by equation (3). So the difference between the two means captures the risk premium.

The risk aversion of the representative investor also enters the risk-neutral probabilities. Since risk averse investors value additional income more highly in poor states of the world, low-income states receive an increasing weight when computing the expected return of an asset using the risk-neutral asset pricing relationship. When the marginal utility of consumption is high in a poor state, s , the adjusted, risk-neutral probability is greater than the subjective probability and *vice versa*. Chart 1 provides a stylised illustration of the two probability distributions.

Chart 1
Risk-neutral and subjective probability densities



An increase in the ratio between the risk-neutral and subjective probabilities may reflect either an increase in risk aversion, or changes in other variables that increase the marginal utility of consumption. As we have seen, the willingness of the investor to pay for insurance in such states – his risk appetite – depends on the variance of the stochastic discount factor. Since equation (10) provides a measure of that stochastic discount factor across states of the world, it follows from equations (6) and (10) that risk appetite is

$$\lambda_t = \frac{1}{R_{t+1}^f} \text{var} \left(\frac{\pi_{t+1}^*(s)}{\pi_{t+1}(s)} \right). \quad [11]$$

Measures of risk appetite

Existing measures of market sentiment fall into two categories, which can both be nested within the conceptual framework outlined above.¹ The first, typified by Kumar and Persaud (2002), is based on changes in excess returns. Equation (6) shows how the expected excess return required by investors to hold an asset depends on the level of risk inherent in the asset and the risk appetite of the investor. If the level of risk or risk appetite should change, then the required excess return should also change. The second approach, emphasised by Karampatos *et al* (2003) and Hayes *et al* (2003), focuses on a comparison of the risk-neutral and subjective probability densities. They interpret the ratio of the risk-neutral probability of future returns to subjective probability, evaluated within a certain range, as reflecting risk aversion.²

Kumar and Persaud (2002) propose a measure based on the distribution of excess returns across assets. Their hypothesis is that when appetite for risk increases, excess returns of very risky assets increase by more than for less risky assets. In contrast, changes in the overall level of risk across all assets should not have a differential impact on expected returns. So, the degree of correlation between changes in excess returns and the level of risk across a number of assets should indicate any change in the willingness to bear risk.

Kumar and Persaud implement this hypothesis by computing Spearman's rank correlation between the excess returns and volatilities of 17 currencies.³ Excess returns are defined as the difference between actual returns and those implied by futures contracts.

To reconcile their approach with the general asset pricing framework outlined above, it is necessary to

- (1) Index measures, which combine a number of variables thought to correlate with risk appetite into one indicator, are not considered here. Such measures include the Deutsche Bank Currency Risk Appetite Index, Lehman Brothers' Risk Aversion Index and JP Morgan's Liquidity and Credit Premia Index. Another popular index, the VIX, which is a weighted average of several measures of implied volatility of the US stock market, also falls under this category.
- (2) See also Scheicher (2003). Karampatos *et al* (2003) argue that changes in the composition of investors or the introduction of mechanised trading, such as stop-loss sales, could affect the probability ratio in the same manner as changes in risk aversion. They therefore suggest that it is interpreted as a measure of *effective* risk aversion. Hayes *et al* note that the ratio measure may also reflect a willingness to provide liquidity to the market.
- (3) The currencies are those of Argentina, Australia, Canada, the Czech Republic, the euro area, Hong Kong, Japan, Mexico, New Zealand, Norway, Poland, Singapore, South Africa, Sweden, Switzerland, Taiwan and the United Kingdom vis-à-vis the US dollar.

make the simplifying assumption that asset returns are normally distributed, and that investors have exponential utility.¹ This gives rise to the Capital Asset Pricing Model, or CAPM,

$$E_t(R_{t+1}) - R_{t+1}^f = \gamma \text{cov}_t(R_{t+1}, R_{t+1}^m) \quad [12]$$

where γ is the coefficient of absolute risk aversion in the investors' utility function and R^m is the return on the market portfolio, ie the return on all assets in the market portfolio, weighted according to their importance in the index, α_i . In other words,

$$R_{t+1}^m = \sum_i \alpha_i R_{t+1}^i. \quad [13]$$

Combining equations (12) and (13), and assuming that asset returns are independently distributed, the changes in excess returns when risk aversion and asset volatility increase are given by the derivatives

$$\frac{\partial [E_t(R_{t+1}) - R_{t+1}^f]}{\partial \gamma} = \sigma_i^2 \alpha_i, \quad [14]$$

and

$$\frac{\partial [E_t(R_{t+1}) - R_{t+1}^f]}{\partial \sigma_i^2} = \gamma \alpha_i. \quad [15]$$

Equation (14) shows that an increase in risk aversion will increase expected excess returns according to the volatility of the asset's return. This is higher for riskier assets than for less-risky assets. In contrast, equation (15) shows that changes in asset-specific risk will have a uniform effect on expected excess returns, given by the risk aversion parameter. Both responses are also influenced by the weights of assets in the market portfolio. But, there is no strong reason to expect a relationship between the riskiness of an asset and its weight in the market portfolio. So any correlation between excess returns and asset riskiness can be attributed to changes in risk aversion. The Kumar and Persaud technique therefore detects risk aversion, rather than risk appetite in the sense defined in this paper.

Several other issues also need to be borne in mind when interpreting the Kumar and Persaud indicator. First, it indicates changes in risk aversion and does

not suggest what its level might be. Second, the measure does not give an indication of the magnitude of the change in risk aversion. The rank correlation is theoretically unity when risk aversion is driving returns and zero when changing risk is driving returns. And, finally, the rank correlation may be non-zero even when risk aversion is constant, if the level of risk associated with different assets changes to differing degrees.

Karampatos *et al* (2003) and Hayes *et al* (2003) interpret the ratio of the risk-neutral to subjective probabilities on the left-hand side of equation (10) as an indicator of risk aversion. As we have argued, however, the stochastic discount factor, which features on the right-hand side of equation (10), generally reflects more than just investor preferences. So movements in the probability ratio over time are more likely to reflect factors other than risk aversion.

Hayes *et al* argue that one such factor may be the liquidity of investors' wealth. Their hypothesis is that investors discount asset returns less heavily when their wealth is illiquid because it is more difficult to support consumption from retained wealth in such circumstances. They suggest that the importance of an illiquidity factor in the stochastic discount factor is at its greatest in bad states of the world that are characterised by low asset returns. This is supported by the fact that, in such states, there is a positive relationship between implied volatilities (which tend to increase when market liquidity falls) and the estimated probability ratio. In other states of the world, however, a better indication of risk aversion may be obtained, since the liquidity factor is less likely to be important.

Jackwerth (2000) also uses the probability ratio to compute risk aversion. In his model, the representative agent holds the market portfolio. This means that any state of the world that generates a particular market return also generates a particular discount factor and, hence, a particular risk-neutral probability. His analysis points to a risk aversion function, across states, of the form

$$\frac{\pi'(s)}{\pi(s)} = \frac{\pi^{*'}(s)}{\pi^*(s)}, \quad [16]$$

(1) The exponential utility function, $u(c) = e^{-\gamma c}$, has the advantage of allowing the demand for risky assets to be linear in expected returns. See Misina (2003) for a detailed attempt to reconcile the Kumar and Persaud measure with asset pricing theory.

which can be computed from option contracts on the market portfolio.

The drawbacks of this approach are twofold. First, the risk aversion function can take on negative values in some states of the world. In other words, investors are, on occasion, risk loving. This stands in contrast to our normal priors, which suggest that investors become more attracted to gambles as their wealth increases rather than less. Second, a risk aversion schedule does not offer a measure of market sentiment that can readily be tracked over time. Parts of the risk aversion schedule can rise, while others can fall. So it is difficult to gauge whether risk appetite has increased or not.

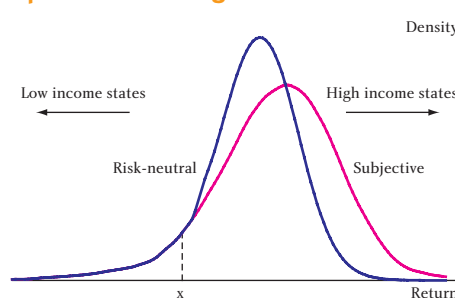
The discussion so far suggests that a measure of risk appetite based on the variance of the probability ratio (equation 11) is appealing, for several reasons. The measure is more commensurate with investors' willingness to pay for risk, rather than their aversion to risk. The focus on the variability of the stochastic discount factor also permits time series estimation in a way that allows changes in the absolute level of risk appetite to be assessed.¹ But the measure does rely on statistical methods to model the risk-neutral and subjective densities, and so may suffer from the same problems of measurement error encountered by studies that estimate a 'ratio' measure (equation 10).²

In contrast to 'ratio' measures, however, the 'variance' measure uses estimates of the stochastic discount factor across many different states of the world, in which asset returns differ. Risk appetite is a summary measure of investors' attitudes to payoffs across many different states of the world. By estimating the stochastic discount factor at only one return level, a 'ratio' measure could misrepresent investors' overall attitude to risk. If the two distributions differ in shape markedly, using all the information in the distributions is likely to offer a more reliable indicator of sentiment.

Chart 2 illustrates this point with an example. A ratio measure evaluated at x would suggest that investors were risk neutral, as the left tails of the risk-neutral

and subjective probability densities coincide. As the densities diverge away from the left tail, however, the variance measure would suggest that investors dislike risk. As we have seen, risk-neutral distributions assign higher probabilities to lower returns than the subjective beliefs of investors. But the utility of risk-averse investors is driven to a greater extent by low returns relative to high returns than if they were risk neutral. As equations (8) and (9) indicate, this is how the two distributions correspond to the same asset and why both distributions imply exactly the same price.

Chart 2
Importance of using whole distributions



Empirical estimates of risk appetite

We now consider how various measures of risk appetite perform in practice. Specifically, we compare a measure of risk appetite computed according to equation (11) against a 'ratio' measure based on equation (10). The performance of other measures in accurately gauging market sentiment is also reviewed.

The 'variance' measure of equation (11) and the ratio measure of equation (10) are both computed by estimating probability density functions for future returns – one risk-neutral and one subjective distribution – on the S&P 500 index. To produce a time series of risk appetite, these distributions are estimated every three months, at the end of each quarter. As the return forecasts for the end of a particular quarter are made at the end of the previous quarter, the corresponding estimate of risk appetite would also be for the previous quarter.

The risk-neutral density function is estimated using three-month option prices (see Breeden and

- (1) Froot and O'Connell (2003) present an alternate measure of risk appetite that relies on cross-border portfolio flows. They obtain an index that compares changes in the risk appetite of cross-border investors with changes in the risk appetite of domestic investors. But, unlike the measure implied by equation (11), it is a relative rather than absolute measure.
- (2) Note, however, that unlike the ratio measure, the variance-based measure does not distinguish between cases where investors suddenly switch from a 'normal' risk-averse state to a risk-loving state – perhaps due to a marked shift in the composition of investors. Such a situation, however, is extremely unlikely and is not observed in the data.

Litzenberger, 1978; Clews *et al*, 2000). Option prices provide us with a forward-looking guide to the likelihood the market attaches to future values of asset prices. So by comparing options with different state prices, we can infer the (risk-neutral) probabilities attached by market participants to an asset being within a range of possible prices at some future date. As equation (9) suggests, this can be done taking the option prices as given and applying a known risk-free rate (such as the US Treasury bill yield) as the discount factor.

In order to determine the ‘true’ subjective density function, we need to estimate its overall shape, along with the mean and variance. We do this by fitting a backward-looking statistical model to historical equity returns and using that model to forecast three months into the future.¹ The essential features of the return distribution of equities are fat tails and negative skewness.² In order to capture these features, we adopt the simplest method possible. Specifically, we model the distribution of equity returns, r_t , as an asymmetric GARCH model of the form

$$r_t = c + \varepsilon_t \text{ where } \varepsilon_t \sim N(0, \sigma_t^2), \quad [17]$$

and

$$\sigma_t^2 = \omega + \alpha \varepsilon_{t-1}^2 + \gamma D_{t-1} \sigma_{t-1}^2. \quad [18]$$

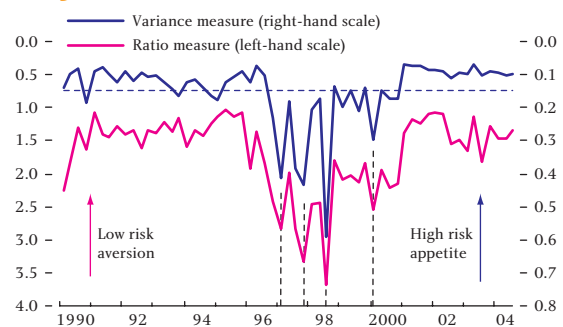
where a dummy variable, D_{t-1} , is included in the final term of equation (18) to generate negative skewness.

Karampatos *et al* (2003) and Hayes *et al* (2003) develop more sophisticated GARCH models that relate both the mean and variance of returns to additional financial and economic variables. But the simple approach outlined here is sufficient to identify key episodes of financial stress and allow consistent comparison across measures. Details of the GARCH model and the method used to generate the subjective density function are provided in the appendix.

Chart 3 illustrates the movement of the variance-based and ratio-based measures during the period 1990–2004. The broad similarity of the two

measures reflects the similar shapes of the density functions during the period under consideration. Nevertheless, the variance measure is significantly more volatile, moving in a limited range during ‘normal’ times and sharply during episodes of financial stress. The large spikes during 1997 Q4 and 1998 Q3 correspond to the Asian and Russian/LTCM crises. Another notable shift in risk appetite in 2000 Q1 coincides with the sharp fall in high-tech stock prices. The pronounced spike in 1997 Q1 is somewhat harder to explain, however.

Chart 3
Variance and ratio-based measures derived from the S&P 500^(a)



Source: Bank of England.

(a) Dotted line denotes sample average.

The variance-based measure also seems to suggest that risk appetite has been above its long-run average value in recent years. While this appears to be broadly consistent with financial stability surveillance that has pointed to a shift towards more risky investments, the measure should be interpreted cautiously. For example, it does not detect the notable reduction in the willingness to bear risk identified in the Bank’s December 2002 *Review*.³ More generally, difficulties in estimating the probability densities mean that the variance-based measure can be disproportionately sensitive to tail probabilities (see appendix).

The ratio-based measure identifies the same episodes. But since the measure implied by (10) reflects risk aversion, as opposed to risk appetite, we might expect it to be much less volatile than is the case in Chart 3. It suggests that the ratio-based measure may be reflecting other factors in addition to risk aversion,

(1) This assumes no structural change in asset markets, so future asset returns behave in the same way as in the past.

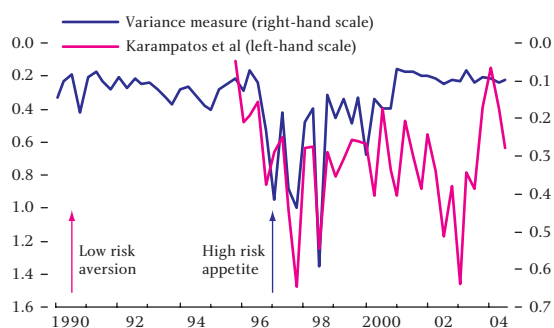
(2) See Alexander (2001) for a detailed discussion of the stylised features of return distributions.

(3) This may, however, equally reflect the localised concentration of risk during the period (within the LCFI sector).

lending credence to the liquidity hypothesis advanced by Hayes *et al* (2003).

Chart 4 compares the variance measure with the more sophisticated ratio measure of Karampatos *et al* (2003). It is immediately apparent that the Karampatos *et al* measure looks quite different from the ratio-based and variance-based measures from our illustrative GARCH. So variations in the construction of the risk-neutral and subjective densities make an important difference to estimates of risk appetite and risk aversion.

Chart 4
Variance-based measure and the Karampatos *et al* indicator^(a)



Sources: Bank of England and BIS.

(a) Dotted line denotes sample average.

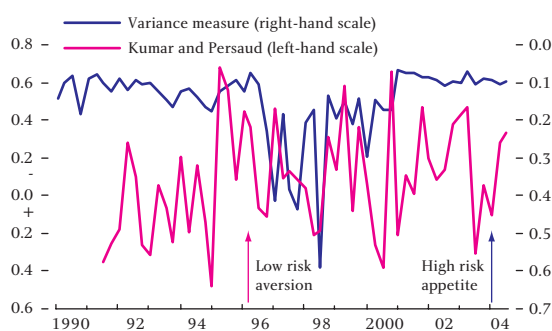
The Karampatos *et al* measure suggests that investor sentiment deteriorated sharply at the time of the Asian and Russian crises. It also appears to pick up the withdrawal from risk since the peak of the equity markets in 2000 reported in various financial stability reports. While the measure has pointed to a marked increase in risk appetite since 2003 Q1, some of this appears to have unwound on the most recent data. By contrast, our simple variance measure suggests that recent appetite for risk has been high but relatively stable. It is difficult to compare any further across indicators since the true subjective probability density of investors is unknown.

Chart 5 plots the variance measure against rank correlation between excess return and risk proposed by Kumar and Persaud. Excess returns are computed as actual returns minus the return implied by forward rates. And risk is taken to be the standard deviation of these excess returns over the preceding year.

The Kumar and Persaud measure is more volatile than either the variance-based or ratio measures, and it is

unclear whether either investors' risk appetite or risk aversion should fluctuate to such an extent. *A priori*, risk appetite is unlikely to change much during normal periods, but can be expected to shift markedly during financial crises. As discussed above, the measure is likely to reflect changing risk aversion, rather than its level. Chart 5 suggests risk aversion increased sharply in 1995 Q1, with the Mexican crisis, but also in 2000 Q3, which is more difficult to explain. And there appear to have been notable declines in investor sentiment during 1995 Q2 and 2000 Q4. The events to which these movements correspond are not readily evident.

Chart 5
Variance-based measure and the Kumar and Persaud indicator



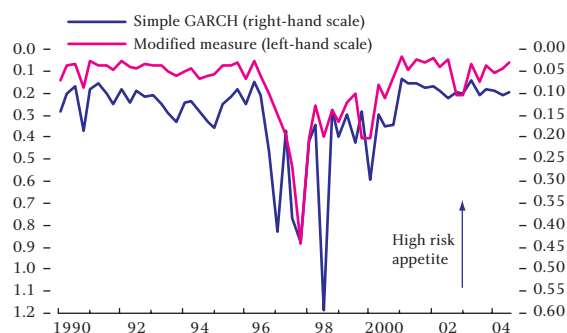
Sources: Bank of England and State Street Bank.

Chart 6 compares the variance-based measure from the simple GARCH model (used in the previous charts) against an alternative GARCH model that estimates subjective probabilities along the lines adopted by Hayes *et al*. In particular, dividend yields are used to help estimate mean returns in equation (17) and the spread between BAA- and AAA-rated corporate bonds is used to help estimate the variance of returns in equation (18). These variables might be helpful in modelling the distribution of returns as the former is a component of gross returns, while yield spreads and equity returns generally move together as they are both determined by the value of corporate assets.

The additional variables identified by Hayes *et al* are found to be statistically significant in helping to explain the statistical distribution of past returns. This suggests that there is scope for improving the measurement of subjective probabilities. Although we do not report details of the modified GARCH equation here, the similar profiles of risk appetite in Chart 6 suggest that the simple model used for illustration in this paper is reasonably robust.

Chart 6

Measures of risk appetite based on different underlying GARCH models



Source: Bank of England.

Conclusion

This article has reviewed the notion of risk appetite in theory and in practice. Unlike existing measures, our approach provides an indicator of market sentiment that is distinct from risk aversion and focuses on levels rather than changes. A further feature of the measure is that it uses all the information in the risk-neutral and subjective probability distributions. This may make it a better gauge of risk appetite.

The preliminary empirical analysis reported here suggests that measures of risk appetite based on this approach seem plausible. But it should be stressed that our findings are a tentative first step in the measurement of perceptions of risk across time. The role of market liquidity and changes in the composition of investors in influencing risk appetite merits further investigation. Further work is also needed to develop better estimates of investors' subjective probabilities over states of the world, and to relate better the mean and variance of asset returns to financial and economic variables.

Appendix

The parameter values of the GARCH model were estimated using quarterly data from 1928–89 (Table 1). The positive value of α implies that large deviations from the average return are more likely to follow previous large deviations. This generates volatility clustering and, hence, fat tails. A positive value for γ generates negative skewness, as D_{t-1} is an indicator variable that equals 1 when the previous quarter's return was below average and otherwise equals 0.

Three steps are required to generate a subjective density function of three-month future returns using

this model. First, the shape of this distribution is given by the actual distribution (rather than the assumed Normal distribution) of the standardised residuals, ε_t/σ_t , from equation (17). Second, this distribution is scaled by a forecast of the conditional volatility obtained by rolling equation (18) forward by one quarter, ie

$$\sigma_{t+1}^2 = \omega + \alpha \varepsilon_t^2 + \gamma \varepsilon_t^2 D_{t-1} + \beta \sigma_t^2. \quad [19]$$

Finally, the distribution is shifted, so that its mean is equal to the mean of the risk-neutral distribution *plus* a risk premium. The estimated mean from equation (18) is disregarded as this is a very simple equation, which is unlikely to forecast accurately. The GARCH model was employed principally for the volatility forecast used in step 2. The equity risk premium was taken as the residual from a Dividend Discount Model of the S&P index level estimated by Panigirtzoglou and Scammell (2002).

Table 1

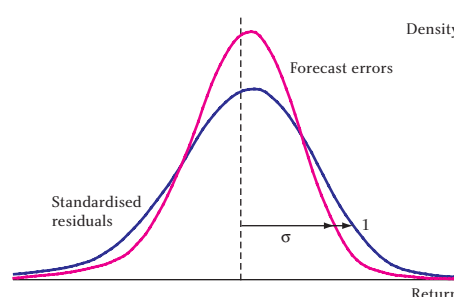
GARCH model parameter values and standard errors

	Parameter	Standard Error
χ	0.017	0.0052
ω	0.0015	0.00048
α	0.083	0.062
γ	0.34	0.12
β	0.60	0.11

The construction of the subjective density forecast is illustrated in Charts 7 and 8.

Chart 7

Probability densities of standardised residuals and return forecast errors



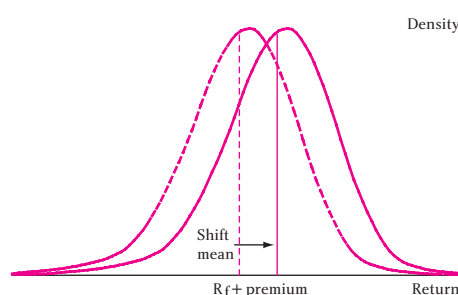
In Chart 7, the standardised residuals from equation (17) are multiplied by the square-root of the variance forecast of equation (19), evaluated at a particular point in time. This has the effect of scaling the distribution of the standardised residuals, as illustrated.

In Chart 8 the estimated subjective distribution (the scaled standardised residuals) is shifted. The estimated mean is disregarded and substituted for the mean of the risk-neutral distribution *plus* the equity risk premium from the dividend discount model. This shift moves the estimated subjective distribution from the dotted pink distribution to the solid pink distribution.

Computing the variance-based and ratio-based measures is then a simple matter of employing equations (10) and (11).¹ Three-month US Treasury bill yields are used as a proxy for the risk-free rate in equation (11).

Chart 8

Correction of the mean of the subjective return density



- (1) Since errors in estimating both the risk-neutral and subjective probability densities can have disproportionate effects in the tails, the variance measure is computed across a wide range of returns. More specifically, we compute our simple measure from two standard deviations below the mean of the risk-neutral distribution to two standard deviations above it. While this may appear arbitrary, it has the benefit of capturing around 95% of probability mass in these densities.

References

- Alexander, C (2001), *Market models*, John Wiley and Sons: Chichester, UK.
- Barberis, N, Huang, M and Santos, T (2001), 'Prospect theory and asset prices', *Quarterly Journal of Economics*, 116, pages 1–53.
- Breeden, D and Litzenberger, R (1978), 'Prices of state-contingent claims implicit in options prices', *Journal of Business*, 51, pages 621–651.
- Clews, R, Panigirtzoglou, N and Proudman, J (2000), 'Recent developments in extracting information from options markets', *Bank of England Quarterly Bulletin*, February, pages 50–60.
- Cochrane, J (2001), *Asset pricing*, Princeton University Press.
- Froot, K and O'Connell, P (2003), 'The risk tolerance of international investors', *NBER Working Paper*, No. 10157.
- Hayes, S, Panigirtzoglou, N and Shin, H (2003), 'Liquidity and risk appetite: evidence from equity index option prices', Bank of England mimeo.
- Jackwerth, J (2000), 'Recovering risk aversion from option prices and realised returns', *Review of Financial Studies*, 13, pages 433–451.
- Karampatos, D, Tarashev, N and Tsatsaronis, K (2003), 'Investors' attitude towards risk: what can we learn from options?', *BIS Quarterly Review*, June, pages 57–66.
- Kumar, M and Persaud, A (2002), 'Pure contagion and investors' shifting risk appetite: analytical issues and empirical evidence', *International Finance*, 5(3), pages 401–436.
- Misina, M (2003), 'What does the risk-appetite index measure?', *Bank of Canada Working Paper*, no. 23.
- Panigirtzoglou, N and Scammell, R (2002), 'Analysts' earnings forecasts and equity valuations', *Bank of England Quarterly Bulletin*, February, pages 59–66.
- Scheicher, M (2003), 'What drives investor risk aversion? Daily evidence from the German equity market', *BIS Quarterly Review*, June, pages 67–74.

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