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Financial Stability Review

December 2003

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/fsreview/themesandissues and the *Financial stability conjuncture and outlook overview* is at: www.bankofengland.co.uk/fsreview/overview.

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By post: *Financial Stability Review*,
Bank of England HO-3,
Threadneedle Street,
London EC2R 8AH

By e-mail: fsr_enquiries@bankofengland.co.uk

Other general *Financial Stability Review* enquiries should go to fsr_enquiries@bankofengland.co.uk, or by telephone to +44 (0)20 7601 3095.

Bank of England authors can be contacted at forename.surname@bankofengland.co.uk.

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themes and issues

The stresses afflicting financial systems have continued to abate over the past six months, and the strengthening global economic outlook should help to contain credit risk. Most financial institutions in the United Kingdom and overseas appear to have weathered the episodes of equity market, interest rate and exchange rate volatility during 2003. But the past and prospective rises in market interest rates pose risk-management challenges for both lenders and borrowers, particularly in the light of the historically high ratio of household debt to income in many countries, including the United Kingdom. These issues are explored further in the Bank's regular assessment of *The financial stability conjuncture and outlook*. Some of the continuing efforts of the UK and other authorities to make financial systems more resilient – for example, by improving banking liquidity regulation – are reviewed in *Strengthening financial infrastructure*.

One way in which the authorities can promote systemic stability is by being clear about their objectives and demonstrating that they are acting to achieve them. In *Transparency and financial stability*, Prasanna Gai and Hyun Shin argue that greater transparency, in general, acts as a discipline for policy-makers and financial market participants. For policy-makers, the discipline derives from the desire to preserve and enhance reputation; whereas, for the private sector, discipline tends to be imposed through market prices. However, disclosures can be a two-edged sword, particularly with respect to financial stability. If a financial institution or system is fragile, the provision of information can act as a lightning conductor that co-ordinates and channels the pessimistic expectations of market participants. The authors argue that a central bank can guard against this threat by presenting its analysis of financial stability and its policy stance as a whole regularly and in a coherent format. Thus financial stability reports, for example, can be of some assistance in trying to guard against short-run market movements brought about by incentive or information problems affecting private economic agents.

It may also help to mitigate stresses on a financial system if private agents are confident that the authorities would act effectively in the event of a financial crisis, systemic or otherwise. Glenn Hoggarth, Jack Reidhill and Peter Sinclair, in *Resolution of banking crises: a review*, consider the merits of the various techniques that have been used by authorities in different countries. The article draws on information gathered at a workshop organised by the Bank of England's Centre for Central Banking Studies, involving officials from a number of developed

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and emerging market economies. In widespread banking crises, the authorities often face a trade-off between maintaining financial stability today through intervention and increasing financial fragility in the future by increasing moral hazard. Amongst other challenges, this also complicates the authorities' communication strategies (illustrating Gai and Shin's thesis). The authors draw out four main conclusions about system-wide banking crises. First, central banks have usually provided liquidity at an early stage to failing banks and extended government blanket guarantees to depositors. In nearly all cases, investor panics have been quelled, but at a fiscal and moral hazard cost. Second, open-ended central bank liquidity support seems to have prolonged crises, thus increasing rather than reducing the output cost to the economy. Third, bank restructuring has usually occurred through mergers, often government-assisted, and some government capital injection or increase in control. Bank liquidations have been rare and creditors – including uninsured ones – have rarely made losses. Fourth, resolution measures have been more successful in financial restructuring than in restoring banks' profitability or credit to the private sector.

Even where banking crises have been resolved quickly, there has been a lingering impact on credit conditions and the effectiveness of financial intermediation. This highlights the importance of effective surveillance by the authorities, and an understanding of when problems in individual financial institutions could be symptomatic of systemic difficulties. Two articles in this *Review* contribute to that goal by examining aspects of the interrelatedness of banks.

In Large complex financial institutions: common influences on asset price behaviour?, Ian Marsh, Ibrahim Stevens and Christian Hawkesby investigate the behaviour of some key financial firms' share prices and credit default swap (CDS) premia. Their goal is to establish to what extent large complex financial institutions (LCFIs) appear to be influenced by common factors. If, statistically, common factors turn out to be important, that would suggest that LCFIs share exposures to similar shocks, or that, because of links amongst them, adverse shocks can be propagated from one to another. In either case, a fall in the share price of an individual institution, or a rise in its CDS premium, would be of greater concern to a central bank. The authors find that there is indeed a relatively high degree of common asset price behaviour amongst most LCFIs, especially when compared with non-financial companies (matched with the LCFIs for size and country of origin). But some LCFIs are more closely related than others on this metric; for example, US LCFIs appear closely related to each other, but less so to European LCFIs.



Asset price correlations cannot by themselves reveal why particular financial institutions seem vulnerable to the same shocks. One possible explanation is linkage through counterparty relationships. That is one reason to investigate the extent to which banks fund their lending by borrowing from other banks. With this in mind, George Speight and Sarah Parkinson examine changing funding strategies in *Large UK-owned banks' funding patterns: recent changes and implications*. They point out that, in recent years, borrowing by the UK corporate and household sectors from banks and building societies has outstripped deposits from those sectors. The large UK-owned banks have increasingly funded the growth in their assets by drawing on a variety of wholesale sources (including other banks and foreign currency money markets) and borrowing at a range of maturities. The Financial Services Authority's ideas for changes to the quantitative elements of UK bank liquidity regulation, outlined in a recent discussion paper, address the need for an all-currency approach to liquidity monitoring and control, as summarised in *Strengthening financial infrastructure*.

Wholesale counterparty relationships are a possible route for contagion in the event of adverse shocks hitting an individual bank. But systemic problems are also more likely to arise in the event of common shocks to several banks at the same time. One possible source of such shocks is an unexpected deterioration in business conditions. In *Company-accounts-based modelling of business failures*, Philip Bunn considers how to identify companies with a relatively high probability of failing. He estimates a model using a dataset of up to 12,000 UK public and private non-financial firms, covering the period 1991–2001, to generate firm-level probabilities of failure. These are found to depend on profitability, capital gearing, interest cover, liquidity, company size and structure, industry and overall macroeconomic conditions. An aggregate measure of 'debt at risk' is then constructed by multiplying each firm's debt by the corresponding failure probability. It turns out that debt at risk is concentrated amongst a small number of mainly large firms. The overall debt-at-risk measure derived in this way performs better in predicting the aggregate corporate default rate than does a model that does not utilise company-level information. Aggregate debt at risk as a proportion of total corporate debt was at its highest in the early 1990s, fell back in 1993 and then remained fairly stable. But, using post-sample data, it appears that this ratio may have increased modestly since 2001.

In emerging market economies (EMEs), sovereign debt is often the main focus of concern. In *Assessing sovereign debt under uncertainty*, Gianluigi Ferrucci and Adrian Penalver make the point that it is desirable when assessing the sustainability of debt to take account of the uncertainty about the future path of the economy. The inherent uncertainty about future debt dynamics is illustrated by developing explicit probability distributions for

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the evolution of debt over time, calibrated using historical means and variances of key determinants of debt sustainability, such as GDP growth, interest rates and exchange rates. These distributions are analogous to the so-called 'fan charts' for probabilistic inflation forecasts published in the Bank of England's quarterly *Inflation Report*. The method offers some improvement over the standard techniques commonly used to assess debt sustainability. It considers, for example, the persistence of and interrelationship between shocks to explanatory variables. The method could prove useful in helping to evaluate the likely success of IMF programmes, especially in the context of exceptional access to IMF funds.

Another aspect of assessing EME debt sustainability is judging whether IMF programmes are likely to lead to renewed private sector capital flows. In *The catalytic effect of IMF lending: a critical review*, Catherine Hovaguimian considers the theoretical and empirical evidence about the effectiveness of IMF finance as a catalyst for such capital flows. Theory suggests that the window of opportunity for such effects is a narrow one. And the empirical evidence tends to conclude that catalytic effects have rarely been evident in practice. Against this backdrop, other means of dealing with capital account crises may need to be considered carefully in cases where the probability of the catalytic effect working is low.

Finally, the *Review* reprints a speech on *Financial stability: maintaining confidence in a complex world* by Sir Andrew Large, Deputy Governor for Financial Stability. Sir Andrew sets out some of the broad challenges faced by the Bank in pursuing financial stability, one of its three core purposes, and discusses some examples of its recent work. The speech reflects the Bank's continuing efforts to promote the kind of transparency about financial stability policy advocated by Gai and Shin.

The financial stability conjuncture and outlook

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The financial stability conjuncture and outlook

Overview: risks to financial stability

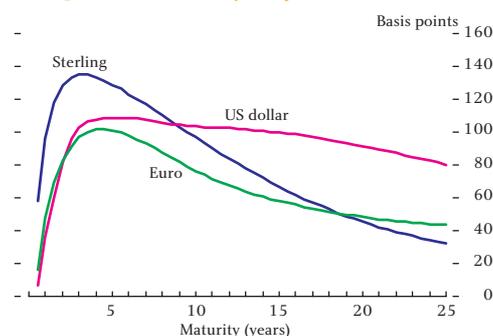
After signs of marked pressure on financial systems in autumn 2002, some of the stresses began to abate. However, conditions remained uncertain in the early months of 2003, partly reflecting the prospect, and then the fact, of conflict in Iraq. Equity prices in many countries reached a low point in March, and views about the short-run economic outlook continued to weaken until mid-year. But since June, the prospects of a renewed economic downturn have receded and with them for the time being the macroeconomic risks to financial stability. Consensus forecasts for GDP growth in 2003 and 2004 have been revised up for the United Kingdom, United States and Japan as the outlook has strengthened, and stock markets have risen. In response, market yield curves have shifted upwards around the world, while steepening at the short end (Chart A). During the summer, that triggered an episode of unusually high bond market volatility. Financial institutions weathered this period and, reflecting the improved macroeconomic outlook, their credit default swap (CDS) premia have generally fallen (Chart B).

The pattern of growth across regions remains uneven, however. Related to that, there seems to be increased uncertainty about the sustainability of the current pattern of global capital flows and, to some extent, the future path of exchange rates (Chart C). It also adds to uncertainty about prospects for credit risk. Immediate concerns about credit risk generally have decreased, however, reflecting the improved prospects for corporate profits and employment, as well as some strengthening of corporate balance sheets on both sides of the Atlantic. But the upward shift in yield curves around the world raises questions about the robustness of borrowers' finances, given the widespread and substantial increases in debt in recent years. The increases in interest rates expected by market participants over the medium term, together with more uncertainty at times about their course, have also led to greater focus on the interest rate risk facing financial institutions.

Exposures to corporate sectors

Over the past couple of years, banking systems have had to absorb the impact of a number of large corporate bankruptcies amid widespread concern about the creditworthiness of

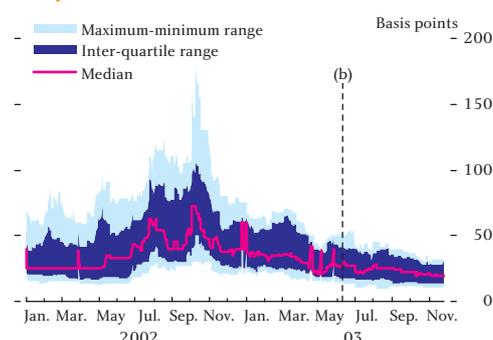
Chart A:
Changes in zero-coupon yields^(a)



Sources: Reuters and Bank calculations.

(a) Changes between the Jun. 2003 and Dec. 2003 Review.

Chart B:
CDS premia for LCFIs^(a)

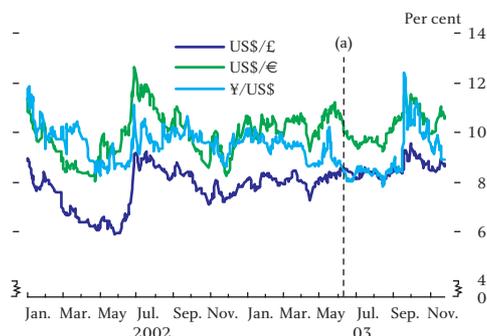


Sources: CreditTrade and JP Morgan Chase & Co.

(a) Annual premia for credit protection on issuers using ISDA documentation, measured as mid-point between last bid and ask quotes. The group comprises: ABN Amro, Bank of America, Barclays, BNP Paribas, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan Chase, Lehman Brothers, Merrill Lynch, Morgan Stanley, Société Générale and UBS.

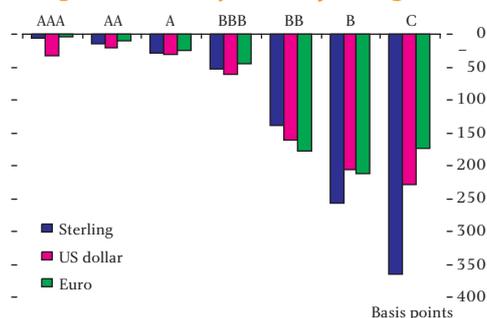
(b) Jun. 2003 Review.

Chart C:
Three-month US dollar exchange rate implied volatilities



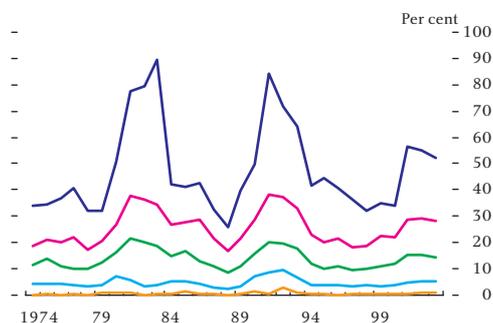
Sources: NatWest Markets and Bank calculations.
 (a) Jun. 2003 *Review*.

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



Source: Merrill Lynch.
 (a) Spread over swaps.
 (b) Changes between Jun. 2003 and Dec. 2003 *Reviews*.

Chart E:
Income gearing of profitable UK firms with 2003 accounts^{(a)(b)}



Sources: Thomson Financial Datastream and Bank calculations.
 (a) Beginning at the highest line, the 90th, 75th, 50th, 25th and 10th percentiles of income gearing are shown.
 (b) Based on a sample of 469 quoted PNFCs in 2003; the sample diminishes for earlier years depending on the existence of those companies at that time.

borrowers in highly geared sectors like the telecoms, merchant energy and motor industries. The environment appears to have been improving; the rates of corporate bankruptcy have been declining recently in the United States and the United Kingdom, although not in continental Europe. The improvement in short-run demand prospects for firms is likely to have reduced the risks of corporate default. Particularly in Europe, some troubled firms, including in the insurance sector, have strengthened balance sheets by issuing equity capital. There have also been further efforts by many firms to extend the maturity of their borrowing. But often they have not locked in fixed interest rates over the longer term, instead having chosen to swap back to a floating-rate liability. Hence the upward shift in yield curves points to the likelihood of future increases in debt-servicing costs, at least for some firms. Overall, market indicators suggest that increased profitability is expected to have a greater impact than higher interest rates. Equity markets have risen around the world, and corporate and sovereign credit spreads have narrowed, particularly towards the higher-risk end of the spectrum (Chart D).

Areas of potential concern remain, however. There is, for example, some evidence of increased pressure on continental European small and medium-sized enterprises (SMEs); this may reflect both the weakness of demand and the fact that SMEs are more reliant on bank lending and have less access to capital markets than do large companies. In the United Kingdom, income gearing has remained high for the most vulnerable firms (Chart E). The most indebted firms in the least cyclical sectors may find it more difficult than others to accommodate any future rise in debt servicing payments. And, in general, capital gearing remains high by historical standards.

Exposures to household sectors

Household sector borrowing around the world has in general been growing more rapidly than corporate borrowing. Household debt has been increasing faster than nominal GDP, and debt-to-income ratios are high by historical standards in North America, much of the euro area and the United Kingdom (see, for example, Charts F and G). However, in many countries, including the United Kingdom, lower interest rates have so far broadly offset the rise in debt, so income gearing has not risen significantly. Most new household borrowing has been secured against property; in the United Kingdom, unsecured borrowing – on credit cards, for example – has also been increasing rapidly. Historically, banks have tended to suffer relatively low and more predictable losses on mortgage lending than on loans to companies. As long as this pattern persists, the shift from corporate to household lending at the margin may mean that banks face lower overall credit risk.

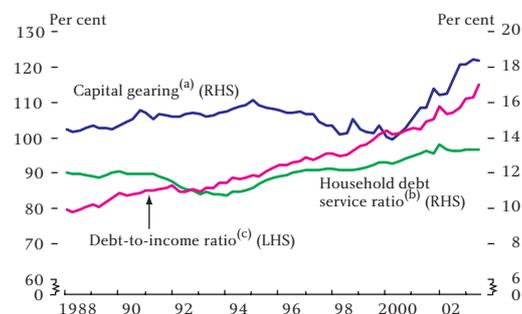
Current household sector credit risks depend on the balance between improved labour market prospects and the likelihood of households having to pay higher interest rates on their borrowing, in a situation where aggregate debt-to-income ratios are unusually high, and some households' finances are under much more strain than others. It is difficult to generalise across countries. The prospects for real disposable incomes and employment, probably the two most important determinants of the household sector's debt-servicing capacity, vary significantly. Also, levels of indebtedness probably depend to some extent on the degree of financial liberalisation and other structural factors that vary from country to country. But there seems to have been a widespread willingness amongst borrowers to take on more risk.

In the United States, households have been taking advantage of historically low nominal interest rates, both to lock in low mortgage interest payments and to increase their indebtedness relative to income and, until very recently, wealth. The aggregate household debt service ratio has risen to relatively high levels since the mid-1990s (Chart F), in contrast to much of Europe. Consumers may also have been borrowing in anticipation of strong real income growth, given recent high rates of productivity growth (although the rise in unemployment since spring 2000 may have lowered expectations for some households).

There is a possibility, in countries where debt-to-income ratios have increased particularly rapidly, such as the United Kingdom, that households' expectations of future income growth and ability to service debt payments will turn out to have been optimistic. As a result, there is a risk of a sharp rise in household saving rates at some point. That would have adverse consequences for aggregate demand, to the extent that policy-makers were not able to anticipate and counteract the rise quickly enough. In such a scenario, the credit risks facing lenders would be likely to increase across the board rather than just in relation to their household exposures.

Another reason why there is a risk of a marked rise in UK household saving rates lies in the housing market. The accumulation of debt in the United Kingdom has been accompanied by a rapid rise in house prices (although the pace has slowed somewhat this year). New borrowing has been used partly to finance the purchase of homes at higher prices, but it has also been associated with high rates of mortgage equity withdrawal (Chart H). If house prices were to increase less rapidly than households expect, or even fall, thus eroding housing equity, that might trigger a sharp adjustment in spending.

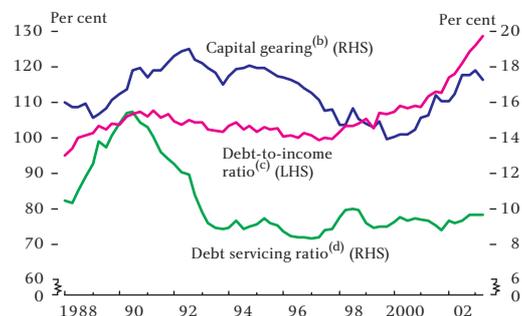
Chart F:
US household sector gearing ratios



Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2003 Q2.

- (a) Total liabilities as a proportion of gross total assets.
- (b) Interest and minimum contractual repayments of principal as a proportion of personal disposable income.
- (c) Total liabilities as a proportion of personal disposable income.

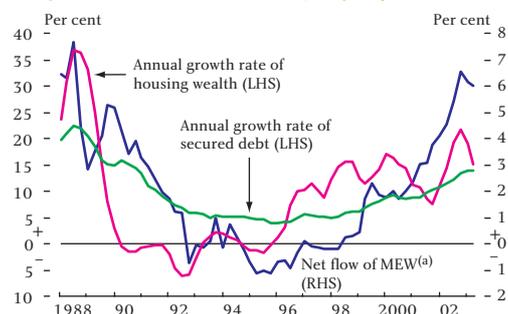
Chart G:
UK household sector gearing ratios^(a)



Source: ONS.

- (a) Includes sole proprietors, which are excluded from Chart F.
- (b) Total liabilities as a proportion of total assets.
- (c) Total liabilities as a proportion of annualised post-tax income.
- (d) Debt interest payments plus regular mortgage principal repayments as a percentage of post-tax income. See page 82 of the Jun. 2002 *Review* for details of how this series is constructed.

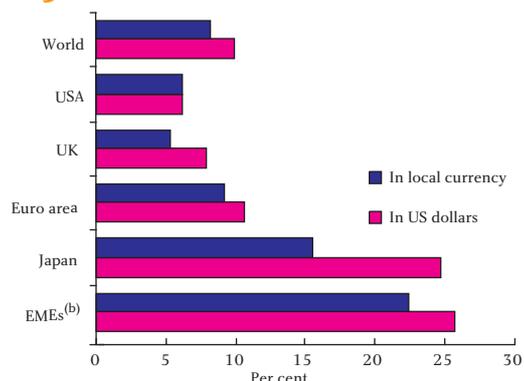
Chart H:
UK mortgage equity withdrawal and components of net housing equity



Sources: ONS and Bank of England.

- (a) As a percentage of post-tax income.

Chart I:
Changes in world equity indices since June 2003 Review^(a)

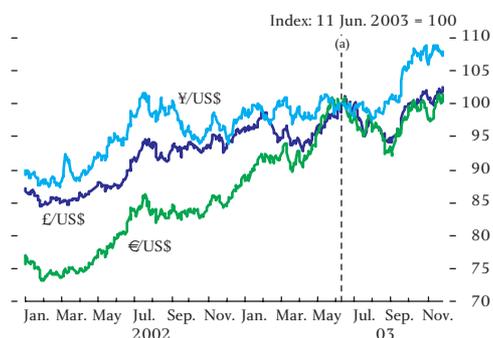


Sources: Morgan Stanley Capital International and Bank calculations.

(a) Percentage change between Jun. 2003 and Dec. 2003 Reviews.

(b) Emerging market economies.

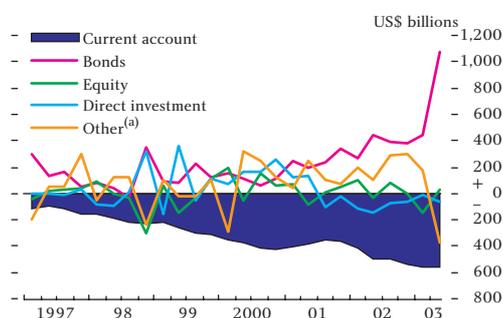
Chart J:
US dollar exchange rates



Sources: Thomson Financial Datastream and Bank calculations.

(a) Jun. 2003 Review.

Chart K:
US balance of payments



Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2003 Q2.

(a) Includes external transactions of the banking sector.

Risks from changes in global capital flows

Although the global outlook for credit risk in the near term has been broadly positive, there have been significant variations across regions. The euro area's economic performance has been weaker than expected and Japan's appears to have been stronger. In parallel, equity indices for Japan (and for the emerging market economies) have risen more than in other major regions (Chart I). The different experience of various regions has been accompanied by episodes of somewhat higher volatility of actual and expected exchange rates, and, since the beginning of September, a significant depreciation of the US dollar (Chart J).

From the point of view of financial stability, pressures can arise from abnormally high or rapidly changing actual and expected exchange rate volatility, and from unexpected changes in capital flows leading to abrupt movements in exchange rates. Over the past six months, however, volatility has not been especially high; liquidity has been maintained; and there seem to have been no major difficulties in managing foreign currency exposures. There remains, however, the risk of a more substantial exchange rate realignment, particularly of the US dollar, if foreign investors become less willing to finance the US current account deficit, now running at more than 5% of GDP. That possibility may also be bearing on market participants' uncertainty about the future path of US interest rates.

Assessing the risk of a major realignment is difficult. On the one hand, in the light of relative GDP and productivity growth, investors may still regard investment returns in the United States as likely to be relatively high, justifying the United States' absorption of world saving. It cannot be ruled out that, at some point, investors may become uncomfortable with the increasing scale and concentration of their exposures and any associated foreign exchange risk, although a reduction in net capital flows to the United States need not necessarily imply a marked fall in the US dollar. That would depend on whether at the same time US domestic saving happened to increase, bringing about some offsetting reduction in domestic absorption. On the other hand, recent capital flows to the United States have been predominantly into bonds, which suggests that expectations of faster US relative growth may no longer be the main factor behind them: such expectations would more easily explain inflows into equities or direct investment (Chart K). Also, capital flows have depended to a significant extent in recent quarters on increases in official dollar-denominated reserves, at a pace that may not be sustained in the medium term.

A sharp realignment of the US dollar in the near term does not appear to be the central expectation of market participants. But they do seem to judge that a major realignment of exchange rates in the near term is somewhat more likely than it was six months

ago – although still improbable (Chart L). Market participants may expect policy-makers to seek to manage any changes of exchange rate policy in such a way as to avoid abrupt realignments, so that market indicators of exchange rate risk may not necessarily fully reflect market assessments of underlying imbalances. The main financial stability risks probably arise from the impact that a currency realignment, particularly a fall in the US dollar, would impose on exports and demand in countries with appreciating exchange rates, and hence on private sector creditworthiness; and from the consequences for any financial institutions with unhedged dollar exposures – not just in the trading book, where unhedged exposures are said typically to be small, but also as a result of international diversification of the banking book and investment in subsidiaries around the world.

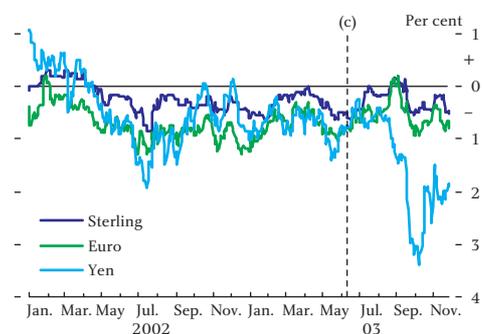
The search for yield

Spreads on high-yield and emerging market economy bonds have continued to narrow since June, and estimates of the equity risk premium in some countries, including the United Kingdom, have declined. There has been a sharp increase in inflows to hedge funds (Chart M) although, on the whole, there is little evidence of such funds materially increasing their leverage. These developments could reflect an increase in risk appetite and a continuing search for yield; but other explanations are also possible. On the one hand, market contacts describe some investors as willing to take more credit, interest rate or exchange rate risk in order to increase returns in the short run. And ratings revisions have not been conveying quite such an optimistic picture as credit spreads. On the other hand, there has also been positive news about fundamentals, including, for example, about the sustainability of debt in some emerging market economies; pressures have diminished somewhat for financial institutions that have guaranteed nominal returns to customers, because of the upward shift in medium- and long-term interest rates; and some of the demand for high-yield assets has come from investors, including some pension funds, attempting to diversify their portfolios and thus reduce aggregate risk for any given return. At present, it is not possible to conclude which factors have been the more important, but it seems probable that, in the face of still low risk-free interest rates, some searching for yield has continued. In consequence, credit spreads may be vulnerable to any adverse macroeconomic or other news.

Interest rates and financial institutions

The rise in medium- to long-term interest rates has had a mixed impact on financial intermediaries. On the one hand, for banks, the ‘endowment effect’ from unremunerated deposits has risen. Some long-term savings institutions will also have benefited, not only because it is easier to meet guaranteed returns, but also because the duration of their liabilities is often longer than that of their assets. On the other hand, for many financial firms, more

Chart L:
US dollar risk reversals^{(a)(b)}



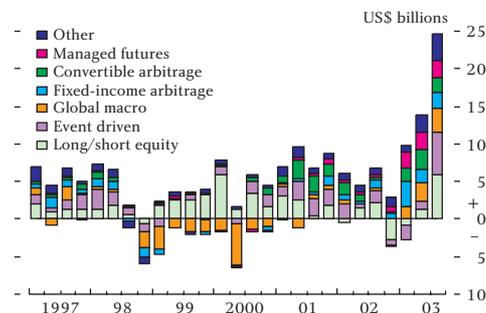
Source: Morgan Markets.

(a) Implied from three-month option prices.

(b) A ‘risk reversal’ is an indication of the extent to which investors are prepared to pay more for protection on one side of potential rate moves than on the other. In this case, a negative risk reversal indicates protection bought against US dollar depreciation.

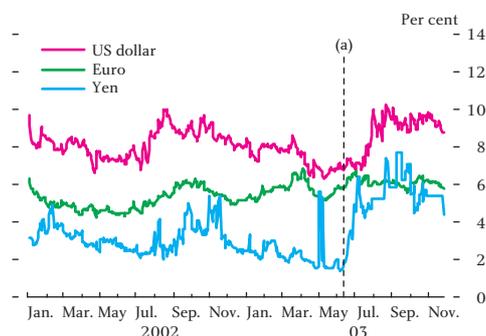
(c) Jun. 2003 *Review*.

Chart M:
Quarterly flows into hedge funds



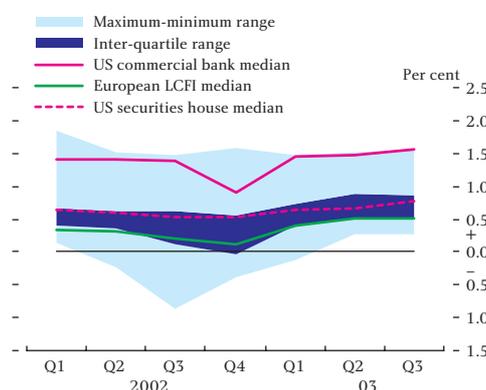
Source: TASS Research.

Chart N:
Ten-year government bond yield implied volatility



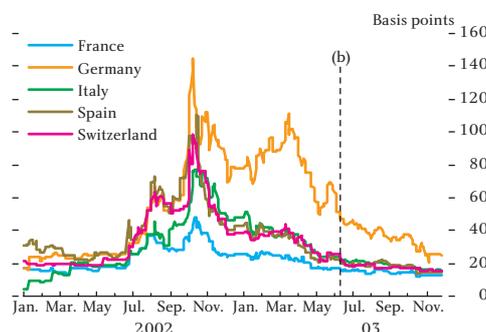
Source: Bloomberg.
 (a) Jun. 2003 *Review*.

Chart O:
Quarterly return on assets for non-UK LCFIs^(a)



Sources: Bloomberg, earnings releases and Bank calculations.
 (a) Net income divided by average assets, annualised.

Chart P:
CDS premia for European banking sectors^(a)



Sources: CreditTrade, JP Morgan Chase & Co, Bureau van Dijk, Bankscope and Bank calculations.
 (a) Average for each country of available bank and bancassurer credit default swap premia, weighted by 2002 total assets.
 (b) Jun. 2003 *Review*.

liabilities than assets can be subject to price changes over short horizons.

There have been episodes of heightened actual and expected interest rate volatility since yields began to rise (Chart N), exposing financial institutions to more market risk and making hedging more difficult. As a result of dynamic hedging by firms holding US mortgages and mortgage-backed securities¹, the increase in volatility was greater and more sustained in dollar markets, where, for a brief period in mid-summer, liquidity was impaired. With the path of market interest rates uncertain, there remain hazards on this front.

The robustness of financial systems

The financial results available so far for large complex financial institutions for 2003 Q3 (Chart O) suggest that they have remained robust, with profits supported by fixed-income business and revenues from consumer lending (although various accounting practices sometimes make it difficult to assess the underlying economic consequences for financial firms of movements in interest rates and spreads). According to a recent survey, the largest, globally active, banks have been net buyers of credit risk protection (while the insurance sector and some regional banks have been net sellers). But investment banks are reported as taking on more market risk via proprietary trading, block equity trades or purchase of distressed debt, and in some cases have taken more illiquid assets on to their balance sheets.

The 2003 H1 results for a wider range of internationally active banks were also reassuring, especially given the turbulence in financial markets and greater uncertainty about economic prospects during that period. Market concerns about strains among German banks seem to have eased somewhat (Chart P), although some problems remain, particularly given continuing structural change and in the light of the relatively subdued macroeconomic outlook for the euro area. In Japan, where the banks have been under pressure for some time, there are still uncertainties about the true scale of banks' non-performing loans. The threat they could pose to counterparties remains small, however, given the government's continuing commitment to stand behind them.

Some large reinsurers have suffered rating downgrades, although several have been able to raise new equity capital, and new entrants in the market have not yet bid down reinsurance rates (which have risen since late 2001).

1: See pages 20–22 of this *Review*, and pages 258–259 of the *Bank of England Quarterly Bulletin*, Autumn 2003.

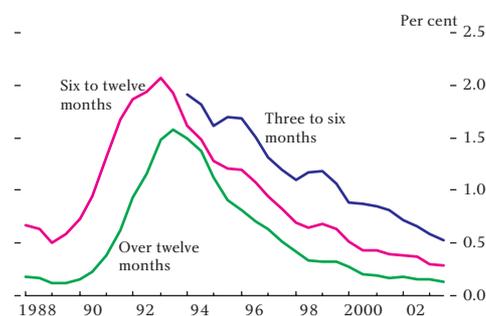
For large UK-owned banks, backward-looking indicators suggest that, in aggregate, credit quality has remained broadly stable. For the largest single class of exposure – retail mortgages – arrears, as a share of the total mortgage stock, have fallen to near-record lows (Chart Q). Credit-card arrears have also edged down in recent months. Write-offs on corporate lending have not increased materially.

Forward-looking indicators are also broadly reassuring. CDS premia for large UK-owned banks have fallen, and are low relative to those of many other banks elsewhere (Chart R). The proportion of new mortgages arranged at high loan-to-value ratios has fallen, and lenders report that the ratios on existing mortgages would provide a substantial cushion were house prices to fall. The default risk associated with unsecured debt, notably on credit cards, may be higher, but banks believe that they have priced their lending to allow for this. A survey recently carried out for the Bank² suggests that the biggest increases in debt have been amongst higher-income households; and that the share of households reporting debt to be a burden has changed little since the mid-1990s. However, there are some households who are much more vulnerable than average to any rises in interest payments; some low-income households, for example, have high ratios of credit-card debt to income. Estimates of corporate default probabilities derived from financial market prices suggest that risks on lending to domestic businesses have diminished. One caveat is that an increasing proportion of some large UK-owned banks' lending to the UK non-financial corporate sector (PNFCs) is to commercial property (Chart S) or secured on property, and the rate of growth of such lending has been particularly high for some time. The risk of tenant default may decline with the improving economic outlook, but the bunching in refinancing requirements over the next few years and the weakening of property rental values in some sectors suggest that vulnerabilities remain.

In the light of the increased uncertainty about interest rates over the medium term, it is notable that measures of value-at-risk in large UK-owned banks' trading books have fallen (from already low levels by international standards). However, the level of unhedged market risk in their banking books, defined-benefit pension funds and via investment in subsidiaries is more uncertain.

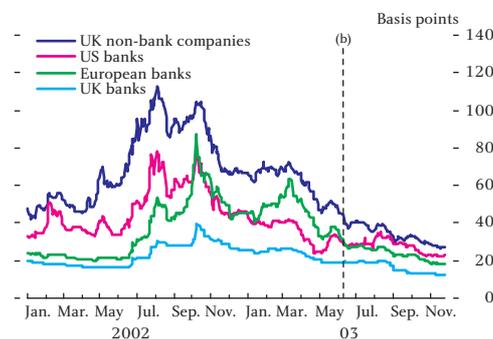
Overall, then, some of the major downside risks to UK-owned banks from the economic environment have probably diminished. And the banks have strong buffers in place in the event of any of the risks materialising. Tier 1 capital ratios have remained high, with little dispersion across banks (Chart T). Profitability has also remained high, including in relation to the

Chart Q:
Mortgages in arrears^(a)



Source: Council of Mortgage Lenders.
(a) As a percentage of all mortgages.

Chart R:
CDS premia for large UK-owned banks and other firms^(a)

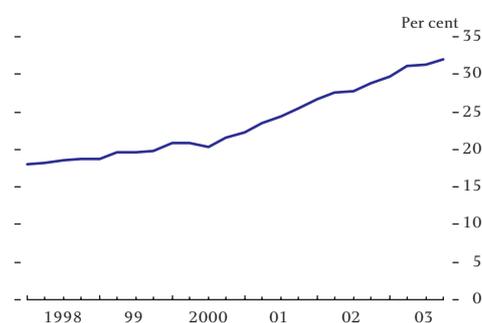


Sources: JP Morgan Chase & Co, CreditTrade and published accounts.

(a) Data are available for seven large UK-owned banks, 33 other FTSE-100 companies, 28 continental European and seven US banks. Individual company and European banks' data are weighted by assets using latest available data.

(b) Jun. 2003 Review.

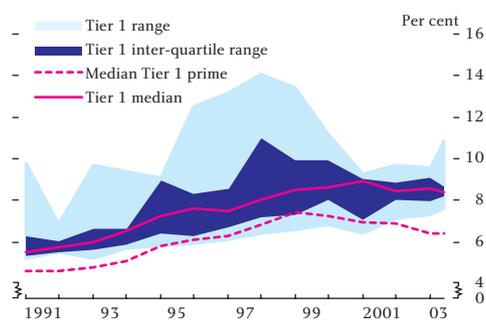
Chart S:
Large UK-owned banks' lending to the commercial property sector, as a proportion of their total lending to UK PNFCs



Source: Bank of England.

2: The survey was carried out by NMG Research. See Box 6 on page 60 of this Review.

Chart T:
Large UK-owned banks' Tier 1 capital ratios^{(a)(b)}



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

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

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

banking systems of many other industrial countries. Banks' holdings of high-quality liquid assets comfortably exceed the regulatory minima (although they currently apply only to sterling business).

Conclusions

The risks to financial stability in the near future appear to be less than in June. Perhaps the most important factor has been the improving economic outlook in the United Kingdom and abroad. However, signals from credit markets may be exaggerating the reduction in risks somewhat, given the search for yield; and some particular borrowers and lenders are vulnerable in the event of changes in interest rates. Further ahead, there remain uncertainties – in the international environment, about the stability of global capital flows, currency risk and the uneven pace of growth; and in the domestic environment, about the implications for lenders of high debt-to-income ratios amongst corporate and household borrowers.

1 The international environment

1.1 International financial markets

The market environment

Over the past six months, world GDP growth has picked up against a background of historically low official interest rates. The outlook has generally strengthened, with expectations of growth in 2003 and 2004 in the United States, Japan and the United Kingdom revised up, although expected growth in the euro area has fallen slightly (Chart 1).

The stronger macroeconomic outlook prompted revisions in market expectations of monetary policy, with yield curves and the implied path of rates over the next few years shifting upwards materially (Chart A in the Overview). But monetary policy in the main currency areas is expected to remain accommodative for some time (Chart 2), so yield curves are still low at the shortest-dated maturities and then steepen sharply.

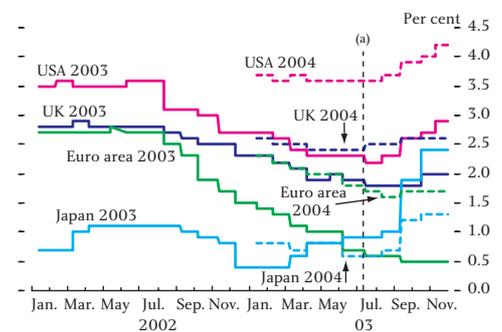
Credit risk and the 'search for yield'

The prospect of stronger economic growth, combined with balance sheet restructuring facilitated by low yield curves, has helped to reduce corporate credit risk, as evidenced for example by fewer ratings downgrades (Chart 3), especially in the euro area. Consistent with this, corporate credit spreads have continued to narrow on investment-grade and, to a greater extent, sub-investment-grade bonds (Chart 4). Notwithstanding the rise in medium-to-long risk-free rates, borrowing costs have fallen for many companies, particularly sub-investment-grade.

There are fewer distressed sectors. Firms in some of the hardest hit industries have been able to strengthen balance sheets – by, for example, extending the maturity of their debt; restructuring bank loans (notably in merchant energy); asset sales; and, more commonly in Europe than the United States, equity issues (for example, by several European insurers). Much of the auto industry is still reported to have significant underlying problems – both in core businesses and pension obligations – but telecoms, insurance and merchant energy seem, to varying degrees, to have gained some respite from their difficulties (Chart 5).

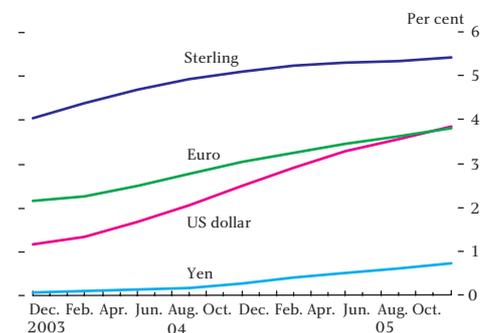
Capital markets have been used to refinance bank loans and bond debt. While activity in the syndicated loan market was subdued for much of last year, there has been some revival in demand for credit to support private-equity-sponsored leveraged buy-outs (Chart 6). Issuance of sub-investment-grade bonds has also been high since the previous Review. But, overall, net debt

Chart 1:
Expected real GDP growth



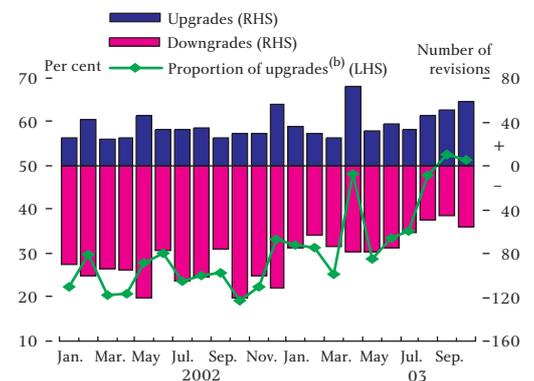
Source: Consensus Economics Inc.
(a) Jun. 2003 Review.

Chart 2:
Forward interest rates^(a)



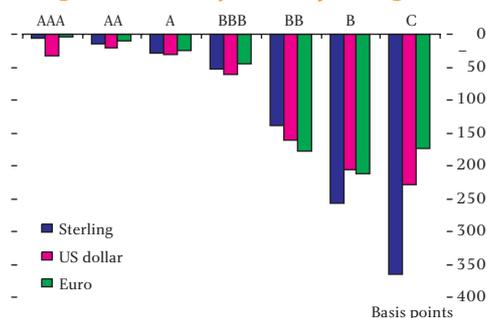
Sources: LIFFE and Chicago Mercantile Exchange.
(a) Based on short-term interest rate futures.

Chart 3:
Global corporate ratings revisions^(a)



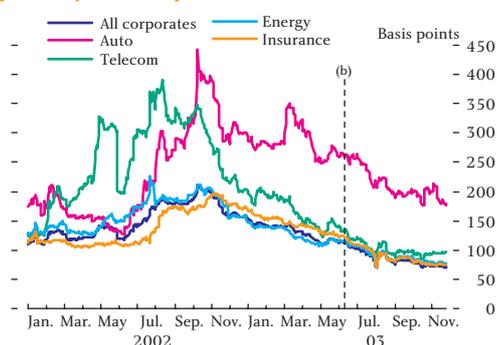
Sources: Moody's Investors Service and Bank calculations.
(a) Excludes structured finance and US public sector.
(b) Upgrades as a percentage of total revisions.

Chart 4:
Changes in credit spreads by rating^{(a)(b)}



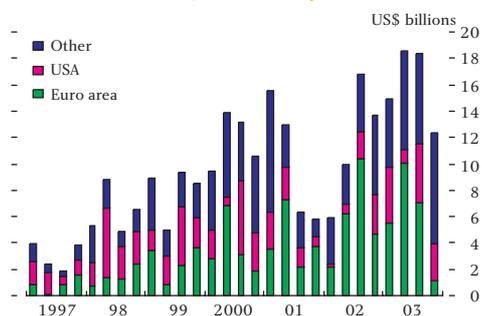
Source: Merrill Lynch.
(a) Spread over swaps.
(b) Changes between Jun. 2003 and Dec. 2003 *Reviews*.

Chart 5:
US dollar investment-grade corporate bond yield spreads by sector^(a)



Source: Merrill Lynch.
(a) Spread over swaps.
(b) Jun. 2003 *Review*.

Chart 6:
New syndicated lending for leveraged and worldwide management buy-outs^{(a)(b)}



Source: Dealogic.
(a) Split by business nationality.
(b) Data for 2003 Q4 to 26 Nov. 2003.

issuance has been low. For example, in 2003 Q3, over half of the US\$124 billion of new euro-area loan issuance comprised refinancing. Contacts report that the supply of credit has outstripped demand and that this, alongside credit market dynamics (see Box 2), may have contributed to a compression in credit spreads beyond that resulting from improvements in credit risk.

There were, for example, strong flows into US high-yield bond mutual funds in the first half of the year (Chart 7). US and UK life insurance companies have continued to have strong demand for credit instruments – in some cases, following asset reallocations from equities or reflecting attempts to increase portfolio diversification. And hedge funds and other investors seem to have become more actively involved in credit markets. This activity has been reflected in pricing in the primary and secondary US loan markets. Some banks have also been returning to the investment-grade market, where maturities have lengthened somewhat, undrawn-facility commitment fees have remained low and, contacts suggest, covenants have been selectively relaxed to some degree.

Some of these developments seem to be part of the continuing global search for higher-yielding assets discussed in the June *Review*, also seen at times in yield-curve ‘carry’ trades, investment in emerging-market debt and demand for structured notes.

Equity markets

Since the Iraq war, equity market indices have rebounded strongly worldwide (Chart 8), consistent with the improved outlook for the global economy and for corporate sector risk. The rate of price increase has slowed substantially since the June *Review*, but the world equity index is 9.9% higher in US dollar terms. This has been associated with stronger flows into US equity mutual funds. So far, investigations into ‘late trading’ and ‘market timing’ abuses, and the withdrawal of mandates by some US state pension funds, have had little impact on net flows or on market volatility.

The initial public offering (IPO) market has remained quiet, but perhaps with signs of life, and mergers and acquisition transactions have picked up a little. Secondary offerings have also been more active – particularly in Europe – with dealers offering very competitive terms, possibly anticipating a pickup in equity market activity in 2004 (see below).

Equity-index implied volatilities¹ have fallen since 2003 Q1, although they remain above the levels of the early 1990s (Chart 9). That suggests that actual volatility in equity markets is

1: Implied volatility is a measure of an option's price inferred from a Black-Scholes model; it indicates the expected volatility in the observed market price for an option of given expiry date and strike price.

not expected to return to the levels of the first quarter of the year, and, together with the higher level of markets, may indicate greater investor confidence that current market conditions are sustainable.

The rise in equity indices is not, however, easily explained by upward revisions to the expected long-run growth rate of dividends. If the equity risk premium were assumed to be unchanged, and given the higher level of long-term real interest rates, the long-run real growth rates of dividends would have to have risen since 1 March 2003 by nearly a percentage point for the FTSE 100, the S&P 500, the Topix, and the Eurostoxx 50. This suggests that the equity risk premium may have edged down, possibly after rising earlier in the year.

Exchange rates and uncertainty about global capital flows

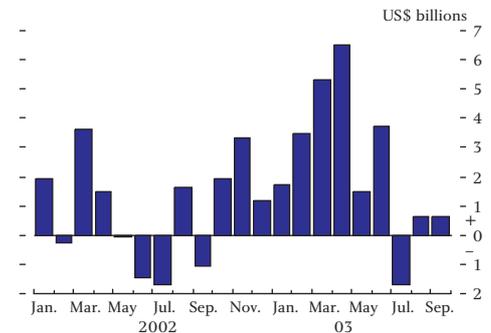
If there is perhaps less focus amongst market participants on credit risk and equity market uncertainty than during the first half of the year, there may be more on exchange rates and interest rates.

Exchange rate changes since the June Review (Chart 10) have drawn attention again to the long-standing risk of sharp shifts in global capital flows, given the large and growing US current account deficit. In the early part of the period under review, the US dollar reversed some of the decline of the first half of 2003. Later it fell back, following a G7 statement in late September interpreted by some in the market as implying acquiescence in some currency realignment. At much the same time, the yen appreciated significantly, despite official intervention being apparently at a higher level than previously. At the end of the review period, the US dollar was continuing to show signs of weakness.

Judging from US flow-of-funds data, private-sector financing of the external deficit was stable in the first half of 2003, augmented by official purchases of Treasury bonds (Table 1), but more recent (incomplete) data have raised some questions in the market place (see Section 1.2). Given that the US current account deficit reached record levels of over 5% of GDP in the first half of this year, the question is whether the United States can continue to attract a disproportionate share of world saving from abroad (reflecting expectations of relatively strong US growth and productivity), or whether that share might diminish, and do so in a way that triggers disorderly adjustments in exchange rates.

Financial market prices reflect increased concern about this issue. As well as some decline in the dollar, historical volatility in foreign exchange markets has risen somewhat since the first half of 2003, though not unusually so. However, expected volatility, as implied by option prices, has remained rather low. Some in the

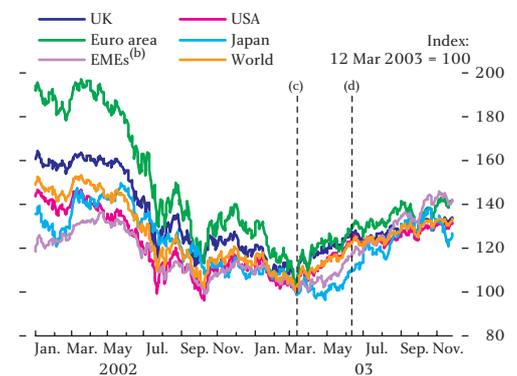
Chart 7:
Monthly net asset flows into US high-yield bond mutual funds^(a)



Source: Investment Company Institute.

(a) Net new cash flow including net exchanges.

Chart 8:
World equity indices^(a)



Sources: Morgan Stanley Capital International and Bank calculations.

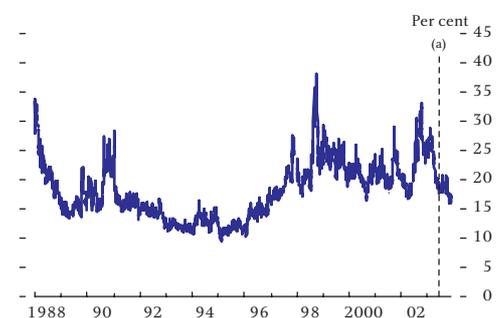
(a) In local currency terms.

(b) Emerging market economies.

(c) Trough of world equity markets.

(d) Jun. 2003 Review.

Chart 9:
Six-month implied volatility for the S&P 500



Sources: Chicago Mercantile Exchange and Bank calculations.

(a) Jun. 2003 Review.

Chart 10:
US dollar exchange rates



Sources: Thomson Financial Datastream and Bank calculations.

(a) Jun. 2003 Review.

Table 1:
US capital flows

US\$ billions	2001	02	03 H1 ^(a)
Direct investment:			
Inward	152	40	93
Outward	-120	-138	-133
Net	32	-98	-40
Portfolio investment by private sector:			
Inward	399	388	436
Outward	-85	16	-36
Net	315	404	400
Foreign official sector's assets in the USA^(b)	5	95	197
Net foreign liabilities of US banks^(c)	-17	70	-77
All other flows, net	81	58	98
Total flows, net	416	528	579
Statistical discrepancy plus net capital transfers	-22	-47	-24
Current account balance (deficit -)	-394	-481	-555

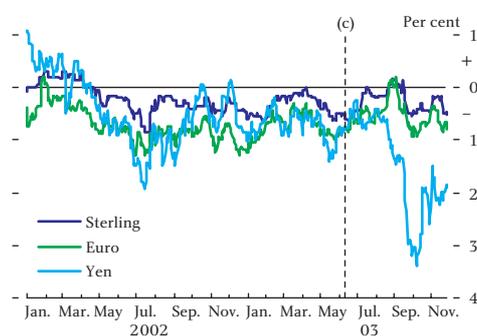
Source: Bureau of Economic Analysis.

(a) At seasonally adjusted annualised rate.

(b) Includes lending to US-resident banks.

(c) Other than transactions with foreign official institutions.

Chart 11:
US dollar risk reversals^{(a)(b)}



Source: Morgan Markets.

(a) Implied from three-month option prices.

(b) In this case, a negative risk reversal indicates protection bought against US dollar depreciation.

(c) Jun. 2003 Review.

market suggest that this may reflect an expectation amongst traders that any exchange rate adjustment will occur smoothly, perhaps because of official management. But a more abrupt decline cannot absolutely be ruled out.

Speculative positions, contacts suggest, have generally been short the US dollar and long the yen and euro. Risk reversals (a measure of the skew in probabilities, as implied by exchange rate options)² have indicated that a higher probability is attached to a substantial rise in the yen against the US dollar than to a substantial fall (Chart 11).

As the yen has appreciated, there has been discussion of the potential for sharp exchange rate moves caused by dynamic hedging associated with so-called power reverse dual-currency bonds, which some Japanese investors buy as a way of obtaining higher immediate coupons (from the premium for writing an embedded option).³ Market participants suggest that the risk remains that hedging could amplify exchange rate movements.

Volatility and liquidity in interest rate markets

Uncertainty about the path of short-term US dollar interest rates has risen somewhat since the summer (Chart 12), against the background of, on the one hand, improving US and global growth prospects, but, on the other, policy rates that remain below most estimates of their long-run steady-state averages. The shifts in yield curves during the summer triggered by better macroeconomic data were accompanied by episodes of exceptionally high volatility, putting some strains on liquidity.

In the dollar market, where ten-year yields rose by over 100 basis points between June and August (Chart 13), the volatility was exacerbated by hedging of mortgage-backed securities (MBS). It spilled over to other markets (such as US dollar inflation-indexed bonds and euro and sterling interest rate futures contracts) as traders and others sought hurriedly to reduce their positions, including by closing out carry trades along the yield curve.

The possibility of such an episode had been apparent for some time (see, for example, the [June 2002 Review](#), page 72). But in the event, there were few signs of financial distress. While there are no doubt lessons for risk management, losses appear to have been neither particularly concentrated nor large relative to capital. This may owe something to the greater sophistication of prepayment models, although they remain imperfect, and to otherwise robust earnings. Comparing the episode with 1994, when extreme bond market volatility was accompanied by major

2: A 'risk reversal' is a combination of a bought out-of-the money call and sold out-of-the money put (or vice versa). Its price is an indication of the extent to which investors are prepared to pay more for protection on one side of potential rate moves than on the other.

3: [June 2003 Review](#), page 43.

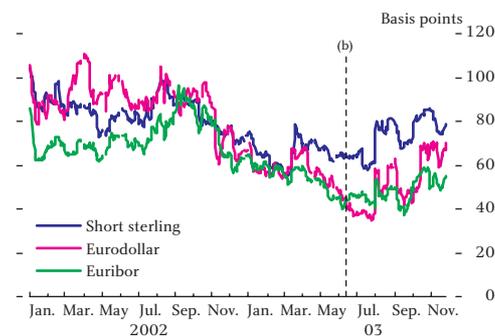
losses, some contacts have pointed to the fact that official interest rates remained low this summer. In consequence, it has been suggested, yield-curve carry trades remained profitable and so intact amongst portfolio investors, although there may have been some unwinding of such positions by dealers and hedge funds, as noted above.

The episode did, though, underline the question of the market's capacity to absorb sizeable sales over very short time horizons. While the US housing government-sponsored enterprises (GSEs) seem successfully to have contained their interest-rate exposures within pre-announced average monthly duration targets over this volatile period, the large volume and size of transactions they, together with other large MBS investors (such as some US banks), were required to execute may have contributed to the volatility and strains (see Box 1). So, additionally, may have anticipation by other participants. A variety of indicators point to impaired liquidity. Swap spreads spiked sharply higher as holders of MBS hedged via swaps (Box 1, Chart B). Some MBS holders allegedly found it difficult to swap in the desired size because of counterparty limits. And, apparently, on occasion it was difficult for traders to mark books to market because of highly dispersed price quotes.

There was also a rapid build-up of failed trades in the Treasury bond repo market⁴, estimated to have reached roughly US\$700 billion at one point. Broadly, as rates rose, MBS portfolio holders hedged via entering into pay-fixed swaps (equivalent to selling a bond) and dealers hedged, in turn, by short-selling the most liquid ten-year Treasury bond (the 'on-the-run' bond).⁵ Coupled with other heavy selling of Treasuries by investors and traders as prices fell sharply, this required massive reverse-repos⁶ amongst dealers and between dealers and customers to deliver into the short-sold positions. A complex network of fails resulted, exacerbated by the low economic cost of failures to deliver stock given that interest rates (and so the penalty on not having the cash collateral returned) were low, and possibly by some large holders of Treasuries not participating actively in the repo market.

Overall, given the extent of the price move and volatility, market functioning held up reasonably well, although it could plausibly have been worse in different circumstances. The effect of mortgage-convexity hedging on volatility may be reduced in the period ahead as, given the rise in bond yields, the prepayment option in many mortgages is now out of the money. But the

Chart 12:
Implied volatility of short-term interest rates six months ahead^(a)

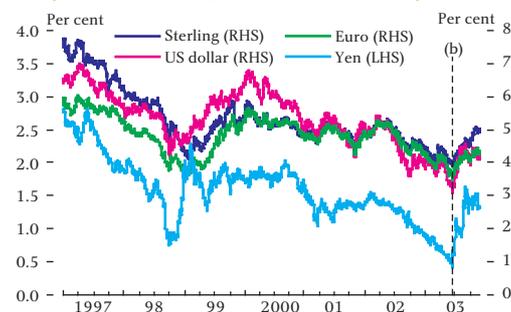


Sources: LIFFE, Chicago Mercantile Exchange and Bank calculations.

(a) Implied from option prices on short-term interest rate futures.

(b) Jun. 2003 Review.

Chart 13:
Ten-year nominal government bond yields^(a)



Source: Thomson Financial Datastream.

(a) Ten-year government benchmark bonds as defined by Thomson Financial Datastream.

(b) Jun. 2003 Review.

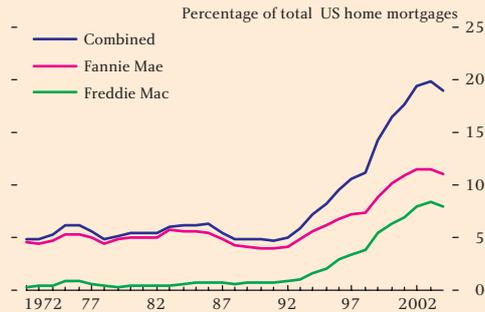
4: The failure to deliver Treasury bonds in a transaction.

5: The on-the-run bond is the most recently auctioned Treasury bond of a particular maturity.

6: A reverse repo is a transaction to buy and resell a security at an agreed price and date. In economic terms, it involves borrowing the security against cash 'collateral'. The interest rate paid on the cash by the bond-lender reflects the scale of the demand to borrow the bond relative to the stock available for loan by investors and other holders.

Box 1: The dynamics of US dollar interest rate adjustment

Chart A:
Government-sponsored enterprises' share of US mortgage market^(a)



Sources: Office of Federal Housing Enterprise Oversight, financial reports, Board of Governors of the Federal Reserve System and Bank calculations.

(a) Includes both mortgages and mortgage backed securities (MBS).

(b) Data for 2003 are Bank estimates using 2003 H1 data.

Chart B:
US dollar swap spreads and swap rates



Source: Bloomberg.

Chart C:
Implied volatility of US dollar swaptions



Source: Bloomberg.

(a) Three-month option to engage in a ten-year interest rate swap.

(b) Five-year option to engage in a ten-year interest rate swap.

The dynamics of the dollar fixed-income markets are heavily affected by the characteristics of US mortgage-backed securities (MBS). Because US households can prepay mortgage debt, there is a structural imbalance between the long option position of mortgage borrowers and the short option position of financial system holders of MBS.¹ For the financial system as a whole, a perfect hedge of MBS and mortgage-servicing rights is not available because markets do not currently exist in sufficient scale to sell the optionality back to the household sector and because borrowers' prepayment behaviour is hard to model. In consequence, dynamic hedging – imperfect and subject to liquidity risk – is intrinsic to the market. The influence of such hedging on market prices can be increased by a distinctive characteristic of MBS. As yields rise, the rate of mortgage prepayment falls and in circumstances where the prepayment rate is very sensitive to interest rate changes, the duration of an MBS may be extended. To maintain desired asset-liability duration matches, holders of MBS therefore tend to sell fixed-income securities as yields rise, which can amplify the rise in yields.

This feature of the dollar market has grown in significance as the MBS market has more than doubled in amounts outstanding over the past decade. MBS guaranteed by GSEs amounted to US\$3.3 trillion outstanding at end-September 2003, and the total market (including so-called 'private label' MBS issued by banks) to US\$3.8 trillion, compared with outstanding Treasury bonds and notes of US\$3.5 trillion. The volume of MBS hedging activity has increased disproportionately, reflecting in part developments in hedging markets, including an increase in the use of interest-rate swaps and swaptions. That may be related in part to the scale of, and rapid growth in, the holdings of MBS by the GSEs themselves (Fannie Mae and Freddie Mac), which undertake to maintain their asset-liability duration gap within a narrow range (Chart A).

As Treasury yields rose in the summer (discussed in the main text under 'Volatility and liquidity in interest rate markets'), so did the expected duration of MBS. Swap spreads spiked and then fell back, whereas swap rates rose and remained higher (Chart B). That spreads declined while rates remained high is suggestive of a one-off hedging operation. Demand to hedge convexity positions also led to an increase in the implied volatility of swaptions. Volatility increased more at short (three month) option maturities than at longer ones, suggesting that the disturbance was expected to be short-lived (Chart C).

¹ *Financial Stability Review June 2002, page 72.*

underlying issue may become more pressing in the longer run if the mortgage market continues to grow rapidly and holdings remain concentrated in a few hands (Box 1).

In the light of this experience, market participants will need to manage the risk of future yield curve movements, whether triggered by macroeconomic developments or as and when policy changes – or expectations of them – materialise.

Leverage and hedge funds

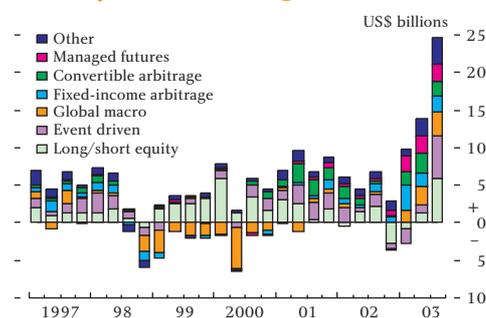
One recipe for market instability is a combination of high leverage with ‘crowded trades’ (active market traders all positioned the same way) in low-liquidity markets. For that reason, the Bank tries to follow developments in the hedge fund market and other potential diagnostics of system leverage.

Net inflows to hedge funds have increased sharply across the various strategy types (Chart 14). Contacts describe increased hedge fund activity in exchange rate and commodity markets as well as notably in credit markets – both distressed debt and structured credit (see Box 2). The scale of fund leverage is said generally to remain moderate, but there continue to be interesting developments in hedge fund financing. Market contacts suggest that the larger funds are seeking agreement from prime brokers that, say, 30 or 60 days’ notice will be given of any change to margining policies. There is a trade-off to be struck between the funds’ desire for stable and so predictable margining at times of market stress, and the ability of brokers to cut their exposure in such conditions. The larger funds are also said to have become progressively less likely to use a single prime broker as they seek best execution by specialists in different market segments and as new entrants prompt greater competition in the brokerage-services market. In consequence, it seems likely that no single prime broker will have a complete picture of a fund’s liquidity and positions, potentially making any impending problems harder to identify at an early stage. Contacts nevertheless stress that, as well as leverage being lower, transparency is better than in the run-up to the LTCM problems in 1998.

There are no directly available measures of aggregate leverage in the fund sector. An assessment is made more difficult by the use, alongside cash-funded positions, of total return swaps⁷, which can be a cheaper and operationally more efficient way of obtaining a desired position and leverage. For funded positions, various crude proxies do nevertheless exist, including lending to the Cayman Islands, where many funds are legally domiciled. Since the mid-1990s, the maturity structure of banks’ exposures

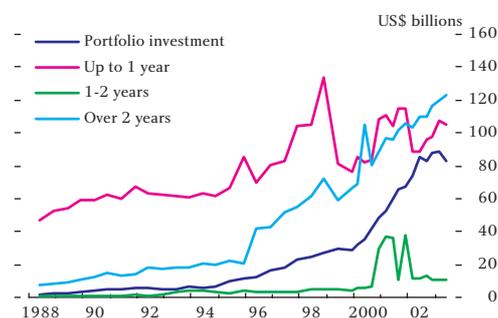
7: An agreement in which one party agrees to pay another all the cashflows on an asset (eg an equity) in exchange for a floating interest rate; the parties also agree to make periodic payments (which could be in either direction) linked to any changes in the market value of the asset.

Chart 14:
Quarterly flows into hedge funds



Source: TASS Research.

Chart 15:
Portfolio investment and total loans to Cayman Islands^{(a)(b)(c)}



Source: BIS.

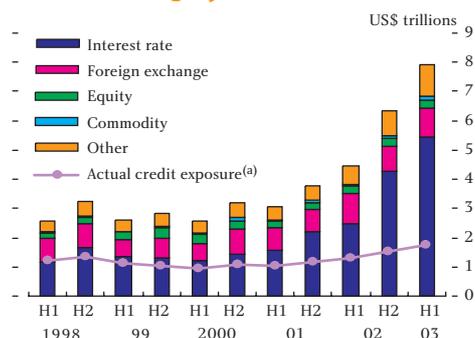
(a) Loans split by maturity.

(b) Lending unallocated by maturity is being used as proxy for portfolio investment.

(c) Consolidated data.

to the Cayman Islands has changed significantly, with a strong rise in securities and loans of over two years maturity (Chart 15). In contrast, lending of less than a year has grown relatively slowly. Part of the change may be associated not with hedge funds but with transactions to special-purpose entities established as part of collateralised debt obligations (CDOs) or other structured credit transactions.

Chart 16:
Gross market value of OTC derivatives by broad risk category



Source: BIS.

(a) Actual Credit Exposure is the gross market value after taking into account legally enforceable bilateral netting agreements and other collateral arrangements.

Some additional clues on leverage in the system more generally are offered by estimates of the size of the over-the-counter (OTC) derivatives market. Growth slowed a little in the first half of 2003, but was still rapid, both in terms of notional amounts (up 20% to US\$169.7 trillion, and gross market values (24% to US\$7.9 trillion) (Chart 16). By far the most significant products are interest rate swaps, which grew 20% in the first half of 2003 to reach US\$95 trillion notional outstanding; however, much of this growth appears to reflect offsetting of existing swap positions. The ratio of gross market values to notional amounts outstanding rose from 4.2% to 4.5% over the first half of the year, suggesting a modest increase in leverage.

Major financial intermediaries

The insurance sector

In contrast to most banks, the earnings and capital of the insurance sector came under widespread pressure during 2001–02. European life companies were more exposed to the decline in equity markets than those in the United States. In both Europe and the United States, higher interest rates will ease the burden of meeting high nominal guaranteed returns on policies and annuities written by life companies when market interest rates and inflation were significantly higher. Underlying exposures to market risk may remain, however, and pressure to address them may increase if revised regulatory regimes in the UK and Europe address more directly the mismatches between asset and liability portfolios, and, in particular, take account of embedded optionality (often long-dated) in portfolios of complex retail products (see Section 3).

After sustaining significant credit losses over the past couple of years, the insurance sector more widely will also have been a beneficiary from the fall in credit risk and credit spreads. The distribution of credit losses outside banks is, however, hard to determine.⁸ In presenting their accounts, insurance companies typically combine capital gains and losses from all sources. So credit losses on bonds can be indistinguishable from market losses on equities.

As discussed in the June Review, the reinsurance industry also faced severe pressures on its earnings and capital during the economic slowdown. Since June, problems have occasionally become more

⁸ See Section 1.2 for credit losses of US life insurers.

apparent. For example, in August Gerling was unable to pay an interest coupon to bond holders and the Bermuda-based Trenwick Group went into Chapter 11 bankruptcy.

Nevertheless, in 2003 H1 large property and casualty insurers and the global reinsurers reported strong investment income and, in most cases, positive underwriting earnings, against a background of hardening insurance rates since late 2001 (Chart 17). Higher premiums have provided conditions for companies to raise new capital (for example, Munich Re concluded a large rights issue in November). They have also attracted new capacity into the industry, particularly new Bermuda-based companies, which have been able to raise new capital through IPOs. According to contacts, the ability to raise premiums further may now be waning as the entry of the new companies, unburdened by legacy claims, begins to exert downward pressure on rates. Despite recent improvements in earnings, the industry in general remains less well capitalised than earlier and there have been further ratings downgrades (Table 2). Concerns about counterparty risk to weaker reinsurers have now assumed a somewhat higher profile (Chart 18), with some market suggestions of inclusion of ratings triggers in contracts.

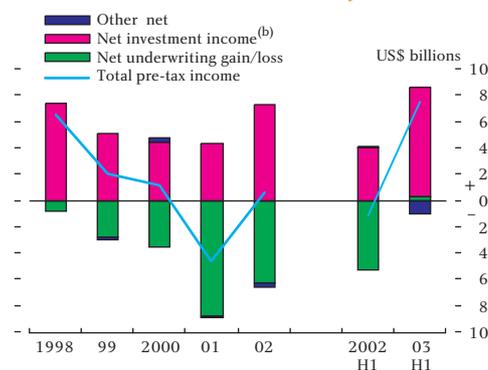
The ratings downgrades have also been accompanied by a withdrawal from derivatives, other capital markets and 'alternative risk transfer' markets by a number of firms whose business model depended on a high parental credit rating.⁹ Some, with still highly-rated parents, remain active.

Credit risk transfer and bank risk management

For most banks – and perhaps for the system as a whole – the largest source of risk in recent years has not been leverage or market volatility but credit. Nevertheless, despite a number of large corporate failures, large banks' loan losses have generally proved less severe than in previous cycles. This partly reflects the underlying economic and sectoral characteristics of the downturn, notably the relatively short and shallow recession in the United States and a concentration of credit problems within large firms that maintained access to capital markets and/or bankers and so to a menu of restructuring options. However, in degree it has also reflected a redistribution of credit risk, both within the banking sector and to non-bank financial institutions – not only via well-established mechanisms such as syndication and securitisation, but also via credit derivatives and structured credit products sold to non-bank investors. The credit markets – and so the capacity to manage credit risk – have continued to develop during 2003. With more institutions seeking to utilise

9: For a discussion of so-called alternative risk transfer and capital markets/insurance convergence, see Rule, David (2001) 'Risk transfer between banks, insurance companies and capital markets: an overview', *Financial Stability Review*, December, page 137, and Swiss Re's Sigma study (2001) 'Capital market innovation in the insurance industry'.

Chart 17:
Income of US reinsurance companies^(a)



Sources: Reinsurance Association of America and Bank calculations.

(a) Data for 2002 H1 and 2003 H1 are at an annual rate.

(b) Includes realised net capital gains.

Table 2:
Ratings actions on selected large insurers and reinsurers since June 2003 Review^{(a)(b)(c)}

Insurer	From:	To:	Notches:	Date:
Munich Re	AA-	A+	-1	27 Aug.
Partner Re	A+	A	-1	3 Sep.
XL Capital	A+	A+ (neg)	0	17 Oct.
Employers Re	A	A-	-1	3 Sep.
Loews Corp	A	A (neg)	0	7 Aug.
Scor ^(d)	A-	BBB-	-3	6 Nov.
Travelers	A-	A- (neg)	0	17 Nov.
St Paul	A- (neg)	BBB+ (pos)	-1	17 Nov.
Swiss Life	BBB- (neg)	BBB-	0	2 Jul.

Source: Bloomberg.

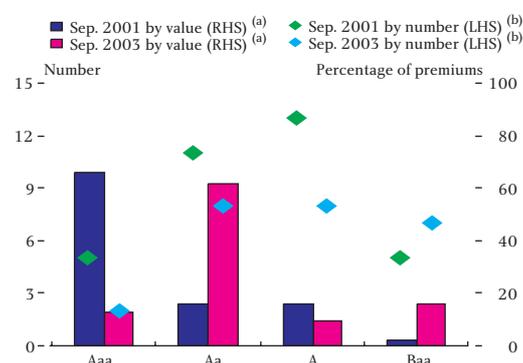
(a) Standard & Poor's (long-term local issuer) rating.

(b) (neg)/(pos) represents credit watch negative/positive.

(c) Rating at holding company level where available. Date shows last rating action. Ratings sorted by initial rating.

(d) Since the data cut-off for this Review, Scor was upgraded to BBB+.

Chart 18:
Ratings distribution of reinsurers

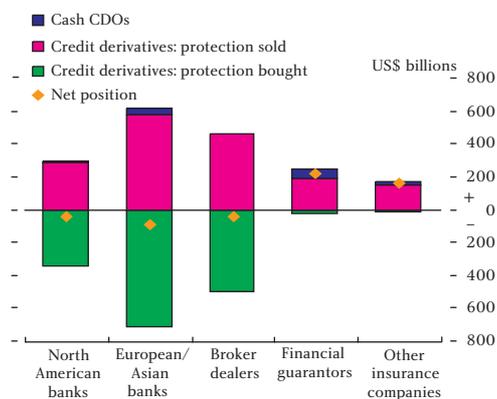


Source: Moody's Investors Service.

(a) Percentage of total net reinsurance premiums written attributable to firms in each ratings bracket.

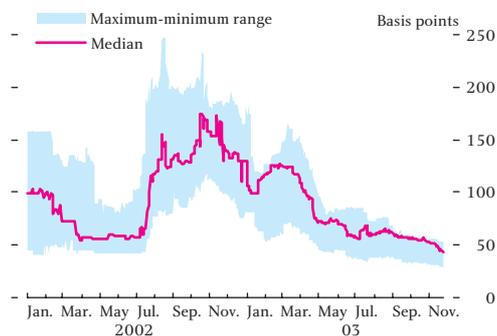
(b) Number of reinsurance firms in each ratings bracket.

Chart 19:
Credit risk transfer



Source: Fitch Ratings.

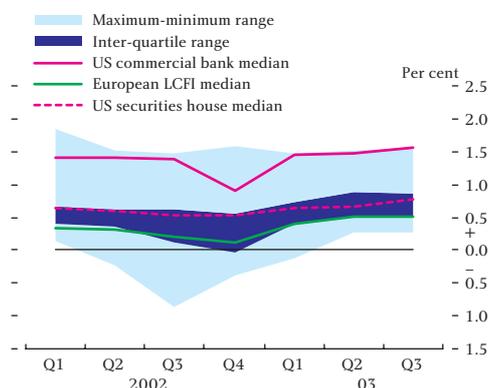
Chart 20:
CDS premia for financial guarantors^(a)



Sources: Mark-it Partners and Bank calculations.

(a) Includes FSA, Ace Ltd, Ambac, XL Capital and MBIA Inc.

Chart 21:
Quarterly return on assets for non-UK LCFIs^(a)



Sources: Bloomberg, earnings releases and Bank calculations.

(a) Net income divided by average assets, annualised.

the potential of credit derivatives, intermediaries have responded both by offering increasingly flexible and customer-tailored products and by standardising some features of the market in order to promote liquidity. Some developments are reviewed in Box 2.

A recent survey¹⁰ found that the outstanding gross stock of credit protection sold – in the form of credit derivatives and CDOs – was around US\$1.8 trillion (Chart 19). While intermediaries – large banks and broker dealers – have large gross positions, banks overall were net buyers of protection and insurance companies (and other non-banks) were net sellers.

The degree of involvement varies considerably across companies and countries. Parts of the life industry participate in the CDO-tranche business described in Box 2. One effect of the development of single-tranche structures may, however, be less demand for credit protection on the ‘super senior’ tranches of risk in structured credit, which is typically provided by monoline insurers (financial guarantors). However, the monolines are still involved in the credit markets in various ways, reflecting demand for credit that is rated AAA – for example, wrapping municipal debt issues and public infrastructure project risk, and selling protection in some portfolio CDO transactions. Given the breadth and variety of this business, bankers and others are reconsidering the way they measure and monitor their monoline exposures. As for most significant financial institutions, protection against monoline risk can be bought in the single-name CDS market (Chart 20).

The survey data also suggest some transfer of risk to smaller banks, particularly in Europe, which have perhaps been seeking to diversify their credit exposure or, alternatively, just seeking higher yields via the riskier CDO tranches. Large banks were disproportionately represented amongst the net buyers of protection. Facilitated in part by the establishment or strengthening of group-level credit portfolio units, large banking groups seem to be more actively managing credit concentrations at the moment than in the late 1990s.

Large complex financial institutions

The robustness of the earnings, and continued capital strength, of LCFIs¹¹ has been a feature of the recent downturn (Chart 21) and has been reflected in a further tightening in the price of credit default swaps referenced to them (Chart 22).

10: Global Credit Derivatives: A Qualified Success, Fitch Ratings, 24 September 2003. Respondents to the survey generally reported positions around end-2002 or end-March 2003. www.fitchratings.com

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

Box 2: Developments in portfolio credit risk transfer markets

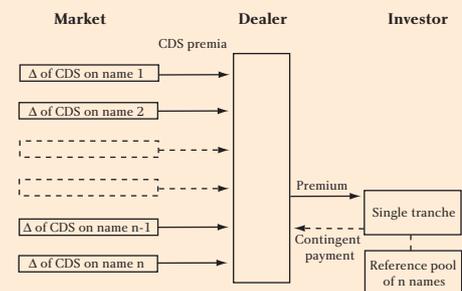
Whereas the single-name credit default swap (CDS) market has been a traded market for some time, portfolio credit risk transfer via collateralised debt obligations (CDOs)¹ has been more bespoke. Recently, though, a traded market for portfolio credit risk has been developing. Three important elements of this have been (i) dealers being willing to buy credit protection on single tranches of CDOs; (ii) trading based on standardised indices of CDS prices; and (iii) an increase in CDOs of asset-backed securities (ABS) and of other CDO tranches.

Single tranche CDOs

For some time, dealers have put together CDOs motivated by the desire of an investor to take risk on one tranche, for example the mezzanine or 'second loss', where for example the investor bears any credit losses in the underlying portfolio between, say, 4% and 7%. Originally, the dealers would seek investors for the other tranches so that they retained no, or little, risk. But recently they have dispensed with those steps, meaning that they can create the single tranche for the investor very quickly. Having bought credit protection from investors (short credit risk), dealers now typically use single-name CDSs to 'delta hedge' the risk on the single tranches by selling, and constantly adjusting, protection on some fraction of some of the names (based on models) in the underlying portfolio (Diagram A). The intention is that the profit or loss on this hedge should offset that on the retained tranches as credit spreads move. As the value of the so-called equity tranche is most exposed to credit risk, its delta will be much higher than that for the more senior tranches. Moreover, the delta hedge for the equity tranche will include a higher proportion of the credits judged most likely to default whereas that for the more senior tranches will include more of those less likely to default, on the assumption that these tranches would bear losses only if the most risky credits had already defaulted – so that the lower tranches had been eliminated. As with all delta hedging strategies, the dealers rely on good CDS market liquidity. One risk – greatest for the equity tranche – is so-called 'jump to default' ie where an apparently creditworthy company suddenly defaults, leaving the dealer under-hedged.

Some contacts have suggested that this delta hedging has been occurring on a sufficient scale, particularly in the first half of 2003, to add to the recent compression of spreads, as intermediaries were net sellers of protection via the CDS market (equivalent to an increase in the supply of credit). But the effect

Diagram A:
Structure of an unfunded single tranche CDO



In order to hedge its short credit position on the single tranche, the dealer will sell protection on each of the reference names in an amount equal to the modelled 'delta' of each credit. This is intended to immunise the dealer against small changes in credit spreads (ie any change in the value of the single tranche will be matched by offsetting changes in the value of the dealer's position in the individual names). Larger changes in spreads, or defaults, require adjustments in the size of positions in CDS to restore the hedge.

¹: A CDO is a portfolio of bonds, loans or CDSs on which the risk and return have been allocated to tranches of ascending seniority. Eg the 'equity' tranche is the first to bear any losses but receives the highest expected returns; more senior tranches are protected against losses by the equity tranche but receive lower expected returns. See Rule, D (2001) 'The credit derivatives market: its development and possible implications for financial stability', *Financial Stability Review*, June, page 117.

of delta hedging flows on credit spreads could vary over time, depending on the seniority of the tranches that the dealers are hedging.

CDS indices

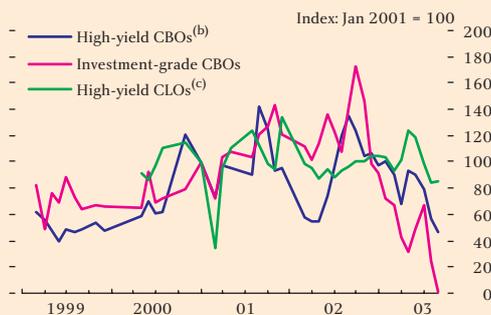
A second recent market development has been the growth of trading in standardised credit indices (such as TRAC-X and iBoxx). They are based on CDSs on large, equally-weighted baskets of names traded in the market. A number of dealers are willing to quote two-way prices, both on whole indices and on tranches of indices. That standardisation is potentially bringing greater liquidity to the portfolio credit risk market. Users include commercial banks, to manage portfolio concentrations; asset managers, which for example take exposures via the index when they have large, and so uninvested, flows of funds; and dealers hedging bespoke CDO tranches. Contacts say that greater liquidity has also attracted traders such as hedge funds, which might take positions in, for example, the equity tranche of the index against positions in single name CDS or common-stock equity options, or to balance positions in distressed-debt portfolios. Apparently, the involvement of hedge funds in the market has recently enabled dealers to shed some of the retained positions on equity tranches of CDOs which they were previously seeking to delta hedge.

In time, a liquid market in portfolio credit might yield valuable price information. For example, the relative prices of different tranches over time could reveal changes in views about future correlation of corporate defaults, perhaps a valuable indicator of macro risks.

CDOs of ABS and of CDOs

One consequence of lower credit spreads has been a reduction in returns on the equity tranches (Chart A), and a decline in issuance, of CDOs based on corporate bonds/single name CDSs. However, CDOs of existing, highly-rated senior CDO and ABS tranches (so called 'CDO-squared') have been popular (probably because spreads on these tranches have not fallen so much). Other things being equal, these structures might be expected to add leverage, although risk should in principle be reduced by diversification of portfolios driven by rating agency models.

Chart A:
Expected returns on collateralised debt obligations^(a)



Source: Moody's Investors Service 'Third Quarter 2003 US CDO Review'.

(a) The chart shows the expected return for equity investors, as calculated by Moody's.

(b) Collateralised bond obligations (CBOs).

(c) Collateralised loan obligations (CLOs).

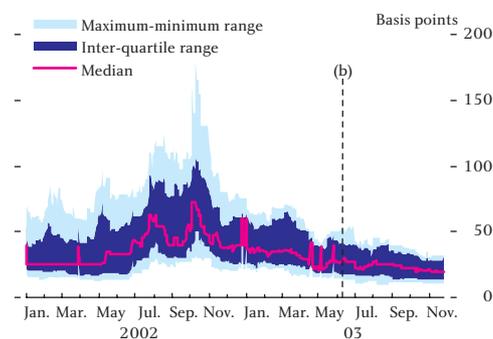
Virtually all were helped by the strength, until the middle of the year, of fixed-income markets, which offset weaker equity-related business lines or credit impairment. In degree, some European LCFIs have continued to operate against a background of relatively weak economic growth and banking returns in their domestic markets, and of difficulties with insurance operations. Steps have been taken to strengthen insurance capital adequacy, and perceptions of risk have remained low (see Section 1.3). For some of the more diversified US LCFIs, the strength of the US consumer sector, and especially the mortgage market, has proved significant. With equity and advisory business quieter than during the late 1990s, firms have also cut costs via extensive lay-offs: for example, the number of full-time employees in the top five US securities firms fell 20% between end 2000 and 2003 Q3.

Nevertheless, various challenges confront the LCFIs. First, they will need to negotiate the risks stemming from the environment, described above, affecting interest-rate, currency and credit markets. For example, while the yield-curve carry trade may be less prevalent than before the summer's volatility, it remains potentially attractive for banks operating in euro and dollar interest-rate markets, in the face of still weak demand for credit from the corporate sector. It is not clear to what extent such risks are fully captured in trading-book published value-at-risk (VaRs). (Few banks publish more comprehensive measures of VaR. Those available typically show higher overall VaRs than those in the trading book.)

Second, equity market participants seem to expect LCFIs to produce persistently high returns. That may have been one element behind the perception that many firms seem to have been taking somewhat greater proprietary trading risk in fixed-income and currency markets, partly via 'in-house' hedge funds, as suggested in recent quarters by changes in VaR estimates (Chart 23). Trading profits in the first three quarters of 2003 were larger than in the comparable periods in 2002, and in some cases firms have allocated more assets to trading activities.

Third, competitive pressures appear, for the moment at least, to have induced greater risk-taking in the market for equity block trades and secondary offerings, where very narrow discounts have been achieved by some sellers (Chart 24). In part, this may reflect a structural shift from a commission-based to a principal-risk-taking business model for sales of the most liquid stocks. The intensity of recent competition may also owe something to league table positioning. It is not yet clear how this will develop as issuing houses balance the demands of issuers and investors and their own risk management and return objectives. In the meantime, there is some risk of unusual losses from this source.

Chart 22:
CDS premia for LCFIs^(a)

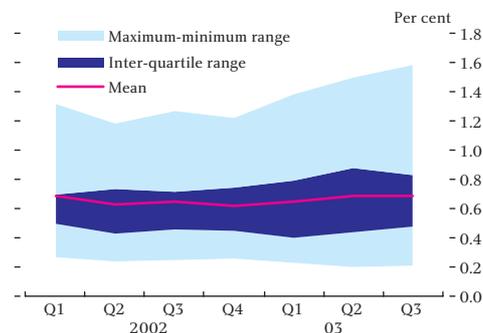


Sources: CreditTrade and JP Morgan Chase & co.

(a) Annual premia for credit protection on issuers using ISDA documentation, measured as mid-point between last bid and ask quotes.

(b) Jun. 2003 Review.

Chart 23:
Value-at-risk^{(a)(b)}, relative to shareholders' equity

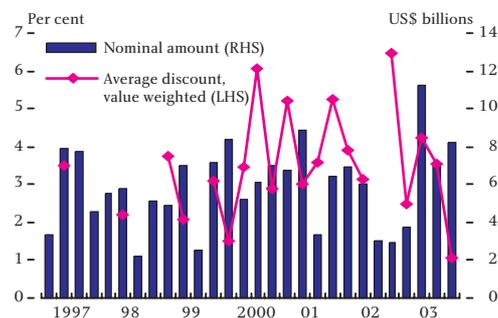


Sources: Earnings releases and Bank calculations.

(a) Adjusted to ten-day holding period and 99% confidence interval.

(b) For non-UK LCFIs reporting quarterly value-at-risk.

Chart 24:
Global^(a) block equity trades and discounts^(b)

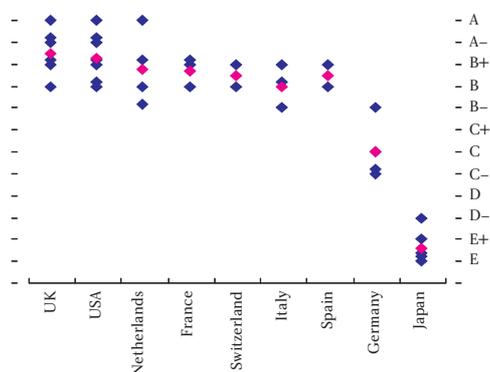


Sources: Thomson SDC and Bank calculations.

(a) US, European and International.

(b) Value-weighted average discount shown when more than ten issues have discount data available.

Chart 25:
Financial strength ratings of large internationally active banks^{(a)(b)}



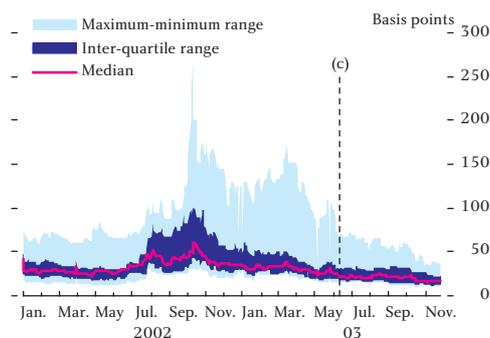
Sources: Moody's Investor Service and Bank calculations.
 (a) Ratings exclude consideration of government support.
 (b) Blue dots represent individual banks, while red dots represent country averages.

Fourth, it is possible that balance sheets are, at the margin, becoming slightly less liquid through, for example, moves into distressed debt in Japan and elsewhere, real estate and other physical assets.

Fifth, in the United States, various judicial and regulatory investigations are still under way. Developments in the US mutual fund sector have underlined the importance of reputational factors in maintaining market confidence in individual institutions.

Finally, there remain challenges from the accounting sphere. There are, for example, concerns about the effect on the volatility of accounting measures of earnings of the asymmetric accounting treatment of credit derivatives (marked-to-market) and the underlying loans (accrual); and about the treatment of market versus model-based valuations of structured transactions (EITF 02-03). US firms are also still awaiting resolution of whether and how asset-backed commercial paper conduit vehicles – a US\$700 billion market overall – will need to be consolidated. A new interpretation (FIN 46) by the US Financial Accounting Standards Board has the potential effect of requiring consolidation (as discussed in the June *Review*).

Chart 26:
CDS premia for internationally active banks, excluding LCFIs^{(a)(b)}



Sources: CreditTrade and JP Morgan Chase & Co.
 (a) Annual premia for credit protection.
 (b) Japanese banks excluded.
 (c) Jun. 2003 *Review*.

Internationally active banks

As measured by rating agencies, the financial strength of internationally active banks generally, not just LCFIs, is not much changed since the June *Review* (Chart 25). Credit default swaps present a slightly more optimistic picture, although outliers remain (Chart 26).

Market contacts suggest that the trading book exposure of IABs to exchange rate volatility is probably modest. Potentially greater would be the indirect impact of a sharp currency realignment on the competitiveness and/or balance sheets of customers, leading to higher risk in the credit portfolios of firms whose business was weighted towards the economies whose currency appreciated. Also affected would be the home-currency value of their direct investments in overseas subsidiaries as well as the associated net earnings stream. Unrealised translation gains or losses arising can affect a bank's equity and regulatory capital ratios. Banks seem to vary in the degree to which they hedge these 'structural' exposures, partly because of illiquid hedging markets or because they are regarded by shareholders as a source of international diversification.

The latest BIS data suggest that banks' international lending to the non-bank private sector remains generally subdued, with claims on the public sector growing faster than those on the non-bank private sector – a pattern consistent with the emphasis that private sector borrowers have placed on restructuring balance sheets via bond markets. Over the three-month period to

June 2003, there was generally only a modest increase in the US dollar value of banks' international exposures to their main geographical markets. European banks increased their lending to the United Kingdom; and Japanese banks' exposures to European countries (around a quarter of their foreign claims) also rose quite strongly (Chart 27); these changes are, however, not adjusted for exchange rate movements. US banks continued to build claims on Japan, perhaps reflecting involvement in bank debt restructuring. The growth of bank exposures to emerging market economies (EMEs) was modest. However, market contacts report a rise in investment in EMEs by institutional investors, such as US pension funds, and by hedge funds. These developments in international banking and capital flows are explored further in the following sections.

Chart 27:
Three-month percentage changes to
2003 Q2 in consolidated foreign claims of
banks^{(a)(b)(c)}

	Reporting country			
	UK	USA	Europe	Japan
All countries	3.4	2.6	7.9	4.7
Claims vis-à-vis				
Europe	6.6	7.4	7.6	12.4
Germany	-0.6	2.6	5.1	19.6
France	9.3	10.0	8.1	9.8
Italy	-1.9	7.2	9.8	14.2
Switzerland	21.5	25.6	3.7	1.5
Japan	-7.0	9.1	17.8	
UK		-9.7	12.1	10.2
USA	1.8		5.4	-0.1
EMEs	0.7	1.6	5.1	1.5
Hong Kong	0.1	-3.1	8.3	-4.9

Sources: BIS and Bank calculations.

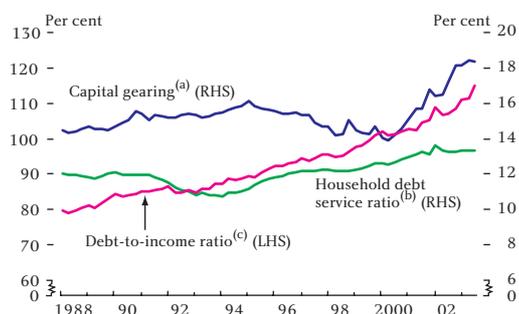
(a) Europe excludes UK.

(b) EMEs include offshore centres.

(c) Positive changes marked dark orange, negative changes lighter orange.

1.2 The United States

Chart 28:
US household sector gearing ratios



Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2003 Q2.

- (a) Total liabilities as a proportion of gross total assets.
 (b) Interest and minimum contractual repayments of principal as a proportion of personal disposable income.
 (c) Total liabilities as a proportion of personal disposable income.

Although the US slowdown was protracted, the period of actual recession was fairly short in comparison to past episodes and the euro-area downturn.¹² Consensus forecasts have remained more sanguine about growth in the United States than in the other major economies, and a broad-based recovery seems to be under way, with strong growth in 2003 Q3. Some risks to the outlook for investment arise from low capacity utilisation in the manufacturing sector and to consumption from earlier employment weakness and reduced mortgage refinancing, but these risks have moderated somewhat since the June Review.

The sustainability of the growing US current account deficit – that is, the ability of the United States to continue to attract a disproportionately large share of global saving – rests on continued expectations of relatively strong productivity growth (implying higher expected returns from investment in the United States than in other countries). The current yield curve – steeper in the United States than elsewhere – is consistent with such a relative strengthening of economic activity and corporate earnings. However, some borrowers in both the household and corporate sectors (both of which remain highly geared overall relative to long-term averages) are vulnerable in the event of either higher interest rates or lower-than-expected economic growth.

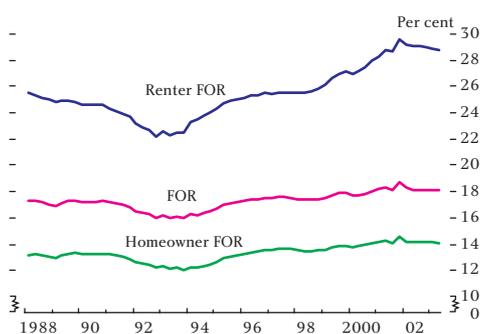
Domestic financial balances

The household sector

In 2003 Q2, US capital gearing fell slightly because of gains in net worth. But the debt-to-income ratio rose further (Chart 28), reflecting a record increase in mortgage debt and concomitant mortgage equity withdrawal, and now stands at 115%, compared with around 85% during the early-1990s recovery. Despite lower interest rates, and recent revisions that reduced the estimated debt-service ratio (DSR) by nearly 1.5 percentage points on average from 1980 to 2002, the ratio remains high, at just over 13% in 2003 Q2.¹⁵

The Federal Reserve's newly reported 'financial obligations ratio' (FOR) – a broader measure of households' obligations – is also high, but has been broadly stable for 18 months. Whereas the DSR measures minimum debt payments, the FOR also includes recurring obligations such as automobile lease payments, rental payments on tenant-occupied property, homeowners' insurance and property tax payments. There is a marked difference between

Chart 29:
US household sector financial obligations ratio^(a)



Source: Board of Governors of the Federal Reserve System.

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

12: The NBER Business Cycle Dating Committee dates the peak of the cycle at March 2001 and the trough as November 2001. The eight-month duration of the contraction compares with a peace-time average of ten months for recessions between 1945 and 2000.

13: The 2001 Survey of Consumer Finances – published earlier this year – revealed lower average interest rates on some types of consumer loan, and longer personal loan maturities than had been earlier assumed.

the average home-owner FOR and the much higher renter FOR (Chart 29).¹⁴

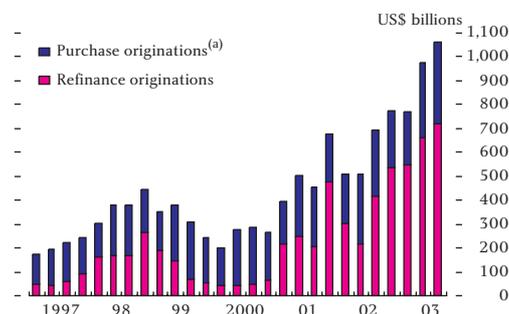
High household income gearing entails risk from rising interest rates or loss of employment. Risk is mitigated, however, for those households that have locked in low long-term mortgage rates. While households have increased mortgage debt by over 30% since end-2000 (to US\$6.4 trillion), around 85% was taken out at long-term fixed rates, which have averaged (a historically low) 6.5% over that period. Moreover, although the proportion of adjustable-rate mortgages increased (to 18% in 2003 Q3) after fixed-rates rose from mid-June, most are now 'hybrid': the rate is fixed only for the first few years (as with 'fixed-rate' mortgages in the UK). Risk is also mitigated for those households that have used (low fixed-rate) mortgage borrowing to pay down other consumer debts, which are generally subject to higher floating rates. A Federal Reserve survey found that, in 2001–02, 26% of equity withdrawn in mortgage refinancing was used for this purpose. This is likely to have continued in the year to 2003 Q2, when a high proportion (around two-thirds) of mortgage originations were for refinancing rather than home purchase (Chart 30). The rise in long-term mortgage rates from mid-June, however, induced a sharp fall in refinancing applications, which may slow aggregate household debt growth.

The non-financial corporate sector

Real interest rates have been lower in the current business cycle than at the equivalent stages of other cycles in the past two decades, but the recent rise in medium- and long-term yields is likely to have raised the vulnerability of the most highly geared firms. On a replacement cost basis, US non-financial firms are more geared than in the previous slowdown (Chart 31), and have relatively high gearing compared with firms in other countries (Box 3). Moreover, whereas the onset of the previous recession was followed by a period of declining debt, 2002 Q3 was the only quarter when debt contracted during the recent slowdown, and debt grew strongly in 2003 H1 (Chart 32).

A continuing shift from reliance on bank lending to bonds, together with the retirement of commercial paper, ensured that the extension of the maturity of debt continued in 2003 H1. This will have smoothed the profile of future refinancing requirements (Chart 33), and – to the extent that issuance of fixed-rate bonds is not swapped into floating – also reduced the sensitivity of companies' debt servicing costs to changes in interest rates. While interest costs have not been very sensitive to changes in rates historically, anecdote suggests that with short rates so low recently, many companies have swapped into floating. Income gearing moderated from end-2001 to 2003 Q2; in each quarter, the fall was accounted for largely by rising profits, with the

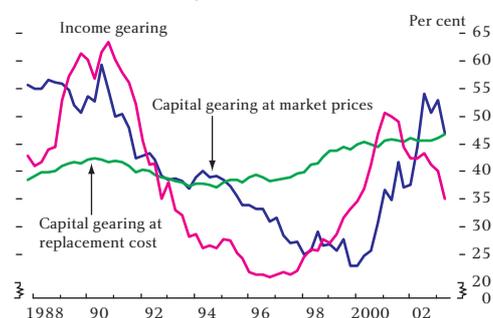
Chart 30:
US mortgage originations



Source: Mortgage Bankers Association of America.

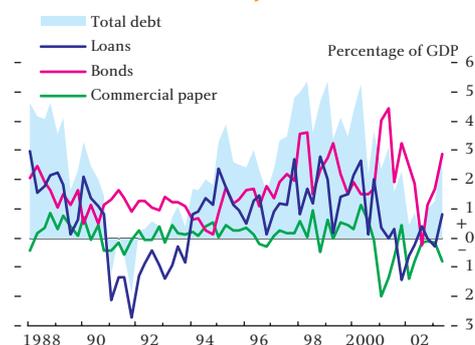
(a) Purpose of loan is to purchase a property.

Chart 31:
Capital and income gearing of US non-financial corporate sector



Sources: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2003 Q2 and Bureau of Economic Analysis, Department of Commerce.

Chart 32:
Net increase in US corporate debt



Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2003 Q2.

14: Similar data do not exist for the UK.

Box 3: Comparing the leverage of US, UK, French and German firms

In the 1980s and early 1990s, non-financial firms in continental Europe were generally regarded as more levered than Anglo-American firms. For example, Borio (1990)¹ writes:

“Traditionally, a distinction has been drawn between what have been referred to as Anglo-Saxon countries (the United States, the United Kingdom and Canada) and the other major economies (Japan, Germany, France and Italy). The former have been found to be characterised by lower [corporate] leverage and greater reliance on retained earnings. ... The data broadly confirm the distinction ...”

Rajan and Zingales (1995)² questioned the ‘traditional’ ranking. They suggested that by the early 1990s, US firms had relatively high leverage, and those in Germany had low leverage. This partly reflected different responses to the boom of the late 1980s: French and German firms used their strong cash flows to retire debt, while US firms issued debt to retire equity (including retirement through acquisitions).

The last year for which Rajan and Zingales have data is 1991. Their database is an earlier version of Compustat (Global)³, used in this box, which has annual firm data from 1992 to 2002. Debt-to-assets ratios from this source for 1992 are close to those of Rajan and Zingales for 1991, especially the book-value ratios⁴ (Table A).

Contrary to the traditional ranking, the US corporate sector was the most levered on the book-value measure. On the market-value measure, the USA and France were the most indebted in the early 1990s.

Rajan and Zingales argued for adjustments to these simple leverage measures. Two in particular were significant.⁵

First, the book-value measure of leverage can be justified as a proxy for the debt of a firm relative to its collateral. But tangible assets are a better proxy for collateral than the total book-value of assets. So intangible assets are deducted from the book-value of assets. Second, cash and short-term investments that are not required for running the business can be regarded as surplus liquidity. If firms in the different countries hold varying proportions of excess liquidity, the comparison of leverage will be distorted. If it is assumed that the entirety of cash and short-term investments are surplus liquidity, then the distortion can be eliminated by deducting these investments from both sides of the balance sheet.

Table A:
Ratio of debt to assets: assets at book-value and market-value

	Compustat: 1992		Rajan and Zingales: 1991	
	Book	Market	Book	Market
Germany	0.15	0.14	0.16	0.13
UK	0.26	0.22	0.24	0.18
France	0.29	0.28	0.29	0.25
USA	0.35	0.25	0.37	0.26

Sources: Standard & Poor’s Compustat and Rajan and Zingales (1995).

Charts A and B display time series of the unadjusted and adjusted book-value ratios. The unadjusted measures are relatively flat in the USA and the UK from 1998, which might seem surprising given the accumulation of debt during the boom. The reason is that the denominator grew rapidly because of the sharp increase in intangible assets associated with the M&A boom. The rate of growth in intangibles was highest in the UK. The adjusted measure deducts intangibles from the denominator, and thus shows a more rapid growth in gearing – particularly in the UK.

1: Borio, C. (1990), ‘Leverage and financing of non-financial companies: an international perspective’, *Economic Papers*, 27, [Bank of International Settlements](#).

2: Rajan, R. and Zingales, L. (1995), ‘What do we know about capital structure? Some evidence from international data’, *Journal of Finance*, Vol. L, No.5.

3: Compustat (Global) used to be called ‘Global Vantage’.

4: Market-value measures move with equity prices, and thus are more volatile than book-value measures.

5: The definitions of the ratios are the following:

Ratio of debt to book-value of assets:

Unadjusted ratio = debt/book-value of assets

Adjusted ratio = (debt – liquid assets)/(book-value of assets – liquid assets – intangible assets – pension liabilities (German))

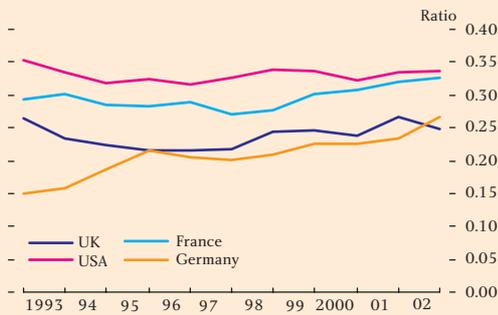
Ratio of debt to market-value of assets:

Unadjusted ratio = debt/(book-value of assets – book-value of equity + market-value of equity)

Adjusted ratio = (debt – liquid assets)/(book-value of assets – liquid assets – pension liabilities (German) – book-value of equity – non-pension provisions – deferred taxes + market-value of equity).

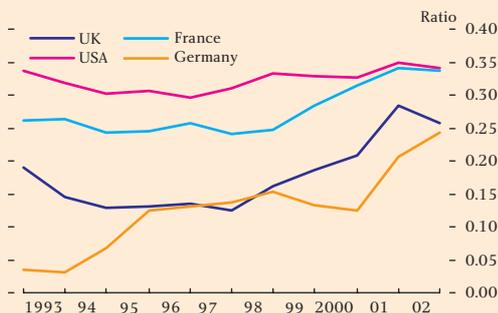
German firms do not net out pension assets from pension liabilities, which inflates their total assets relative to other countries. If it is assumed that pensions are approximately fully funded, the distortion is eliminated by deducting pension liabilities from both sides of the balance sheet.

Chart A:
Unadjusted ratio of debt to book-value of assets



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

Chart B:
Adjusted ratio of debt to book-value of assets



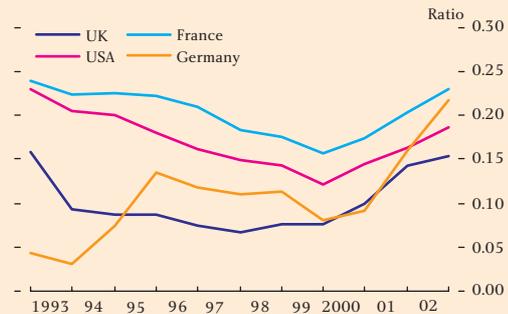
Sources: Standard & Poor's Compustat and Bank calculations.

The time series of adjusted ratios is consistent with the finding in Jaeger (2003)⁶, that the “debt accumulation and the increase in leverage ... in the U.S. corporate sector during 1996–2000 was more restrained than in the euro area, notwithstanding the fact that US net equity financing of corporations was negative throughout the cycle.” The result was that from 1998 to 2002, the adjusted ratio for French firms caught up with the ratio for US firms. Moreover, the gap between the US ratio and the German ratio narrowed significantly. But the adjusted book-value ratios for 2002 still support the broad conclusion of Rajan and Zingales: that the USA and France are the most highly levered countries, with the UK and Germany less levered.

By 2002, this ranking no longer held for gearing measured relative to market-value (Chart C). By 2002, German leverage was approaching that of France. So the

market-value measure of leverage suggests a return to the traditional ranking of continental Europe above the UK and the USA. The change in ranking over the past decade was mainly accounted for by the strong growth in German debt, together with the fact that the market-to-book ratios of German firms remained consistently below those of US firms.⁷

Chart C:
Adjusted ratio of debt to market-value of assets



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

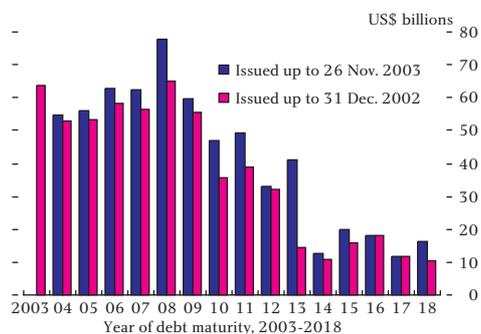
The market- and book-value measures provide different rankings of vulnerability for the four countries. But in assessing the vulnerability of a corporate sector, both book-value and market-value measures should be considered. The market-value ratio measures the debt relative to discounted expected future cash-flows, capturing the expectation of firms' capacity to service their debt. The book-value ratio is a proxy for debt relative to firms' collateral.

What can be concluded about the relative vulnerability of corporate sectors in the different countries? First, on either measure, French firms appear highly levered, and those in the UK have relatively low leverage. But mixed indications are provided for US and German firms. Despite the lower book-value leverage of German firms, US firms have a lower leverage at market value. This is because the market expectation of future earnings, as embodied in share prices, is higher in the USA: of the four countries, US firms have the highest market-to-book ratio, and German firms have the lowest.

6: Jaeger, A. (2003), ‘Corporate Balance Sheet Restructuring and Investment in the Euro Area’, *IMF Working Papers*, June.

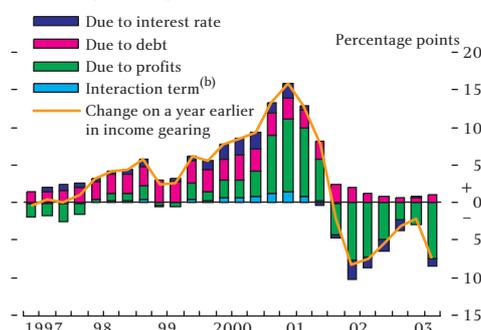
7: In addition, the liquid assets of US firms grew faster than in the other countries, partly accounting for the slower growth in the adjusted ratio of debt to book-value of US firms.

Chart 33:
Outstanding domestic debt issued by US non-financial companies



Source: Thomson SDC.

Chart 34:
Decomposition of changes in US corporate income gearing^(a)

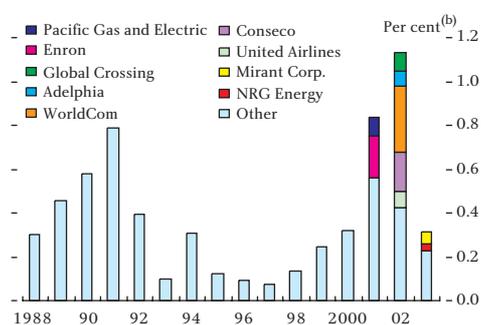


Sources: Bureau of Economic Analysis, Board of Governors of the Federal Reserve System and Bank calculations.

(a) Income gearing is net interest payments divided by pre-tax profits with inventory valuation and capital consumption adjustments. The decomposition allows each component to vary, while keeping the others constant.

(b) That part of the change due to the interaction of the other three components.

Chart 35:
Chapter 11 business bankruptcy filings^(a)



Sources: Thomson SDC and Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2003 Q2.

(a) 2003 data up to Q3; annualised.

(b) Chapter 11 filings as a percentage of total assets of companies.

effects of lower interest rates broadly offset by rising debt (Chart 34). According to Compustat (Global) data, while larger US firms have not reduced capital gearing (at replacement cost), small firms are, as a whole, less geared than in 1999.

No major sectoral concerns have emerged since the June *Review*, but some previously troubled sectors continue to face difficulties. Corporate bankruptcies (measured by the value of assets) were significantly lower in 2003 Q1–Q3 (annualised) than in 2002 and 2001 (Chart 35), with the largest being that of merchant energy firm Mirant in July 2003. With limited access to capital markets, merchant energy companies have been reliant on banks rolling over debt. In the auto sector, despite a strong liquidity position, rating agency assessments have highlighted anxiety about core earnings performance, and longer-term concerns about the burden of (defined-benefit) pension scheme funding and healthcare commitments. In 2003 Q3, large auto companies' earnings were reliant on profits made by their finance subsidiaries on auto loans and mortgage lending. Prospects for the telecom sector appear stable, although fixed-line operators face competitive challenges with limited growth opportunities. Airlines' operating results are still very weak, and their debt and pension-funding burdens remain substantial, but they appear to have sufficient liquidity in the near term (partly due to Federal government assistance).¹⁵

Pension problems are particularly acute for large, capital-intensive companies, especially in mature industries, where companies often have a high proportion of retirees to workers.¹⁶ Efforts to close pension fund deficits by replacing pension liabilities with other debt, such as General Motors' US\$17 billion bond issue in late June, may have helped improve market sentiment. However, the benefit to earnings relies on the assumption that the expected return on the additional assets acquired by the pension fund will exceed the cost of the debt issued.¹⁷ The rise in equity markets, coupled with higher bond yields – used to discount future pension liabilities – will have reduced *ex ante* pension scheme underfunding and associated corporate risks.

Since Enron's bankruptcy two years ago, changes in US corporate governance and accountability have been linked to higher compliance costs and an apparent rise in risk aversion, although the latter seems to be abating. In the longer run, the key (related) questions for financial stability are whether the change will enhance transparency, and so the efficient pricing of risk;

15: Aside from banks, aircraft lessors such as GE Capital and AIG also have exposure.

16: The financial stability implications of US companies' pension deficits were discussed in [Box 2 on pages 30–31 of the June 2003 Review](#).

17: US accounting standard FAS 87 implicitly allows companies to recognise the expected risk and liquidity premia on assets up-front and to amortise gains/losses relative to expectations, typically over five years.

and whether there will be a sustained reduction in complex (and so opaque) structures designed to arbitrage accounting or other rules.

The financial system

The non-bank financial sector

Corporate credit risk is increasingly held by non-banks, facilitated by growth in the bond and secondary loan markets, greater reliance on 'monoline' insurers¹⁸ and strong growth in credit derivatives and the structured credit markets more generally (see Box 2, Section 1.1). A survey by Fitch Ratings¹⁹ found that North American banks had transferred a net US\$56 billion of credit risk (equivalent to 6% of US banks' corporate loans), with financial guarantors and insurance companies the biggest sellers of credit protection globally.

While financial guarantors have retained AAA ratings, several US life insurance companies have been downgraded since 2002, although generally modestly (Chart 36). Sluggish demand for insurance products as interest rates and equity prices fell compounded credit losses on asset portfolios, which were only partially offset by capital gains from lower rates (Chart 37). Insurers' spreads were compressed by the combination of minimum guaranteed returns on policies and low nominal yields on investments. The subsequent rise in equity prices and interest rates will conversely have benefited them.

The mortgage market

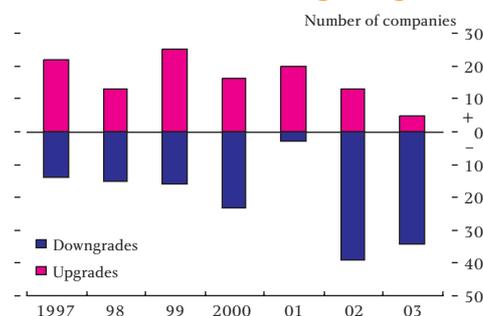
The prepayment option embedded in most US mortgages complicates risk management for investors in mortgage-backed securities (MBS), and participants in dollar fixed-income markets generally, as discussed in Section 1.1. If not perfectly hedged, MBS holders experience losses that increase non-linearly when rates rise. The most significant MBS holders are now the US government-sponsored enterprises (GSEs), Fannie Mae and Freddie Mac, whose share rose from around 1% in 1991 to nearly 30% in 2002 (Table 3). Banks are also significant holders, followed by foreign investors and life insurance companies. The Federal Home Loan Banks (FHLBanks) remain relatively small holders of MBS but around two-thirds of their portfolio is in non-GSE MBS (which are generally subject to somewhat greater credit risk)²⁰ and some have been increasing their mortgage portfolios, absorbing the interest rate risk but dispersing the credit risk with mortgage insurers and the originating member.

18: Monolines' sole business is credit insurance that guarantees the timely payment of interest and principal (see 'Risk transfer between banks, insurance companies and capital markets', December 2001 Review, Box 5).

19: The survey is discussed further in Section 1.1.

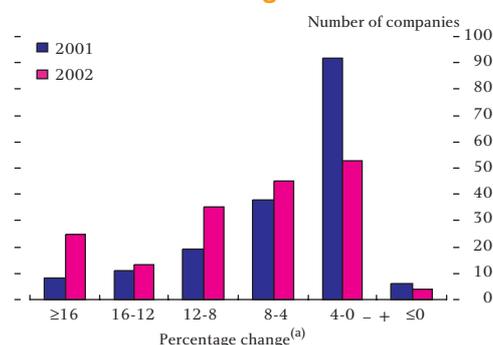
20: In 2003 Q3, the FHLBank of New York cancelled a dividend payment because of credit losses on MBS backed by mobile homes, and two other FHLBanks made accounting losses associated with the hedging of their mortgage portfolio.

Chart 36:
US life insurers' credit rating changes^{(a)(b)}



Source: Moody's Investors Service.
(a) Insurance financial strength ratings.
(b) 2003 data is up to 26 Nov.

Chart 37:
US life insurers' credit gains and losses



Sources: Moody's Investors Service and Bank calculations.
(a) Gross gains and losses from credit risk on bonds, as a percentage of capital, less interest rate gains and losses.

Table 3:
Mortgage-related security holdings^{(a)(b)}

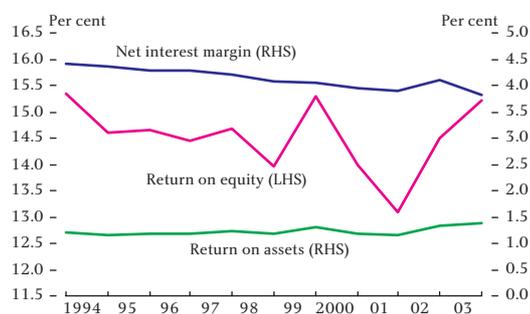
US\$ billions	1991		2002	
	MRS	MRS	MRS	Market Share
Fannie Mae/ Freddie Mac	16.7	1,109.4	29.3	
FDIC insured banks	277.1	702.1	18.6	
Foreign investors	85.0	525.0	13.9	
Life insurance companies	185.1	401.5	10.6	
Public pension funds	109.4	235.0	6.2	
Thrifts	157.2	209.7	5.5	
Mutual funds	78.7	200.0	5.3	
Private pension funds	47.8	115.0	3.0	
FHLBanks	10.2	96.4	2.5	
Finance companies	n.a.	65.0	1.7	
Private individuals	24.0	42.0	1.1	
MBS dealer inventory	53.8	35.0	0.9	
Federal credit unions	15.0	25.3	0.7	
Real estate investment trusts	16.6	17.0	0.4	
Subtotal:	1,066.3	3,778.4	99.9	
All other investors	174.1	4.2	0.1	
Total outstanding	1,240.4	3,782.6	100.0	

Source: Inside Mortgage Finance.

(a) Estimates in italics.

(b) Mortgage-related securities include all securities or debt obligations collateralised by either residential mortgages or MBS.

Chart 38:
US commercial banking indicators^{(a)(b)}

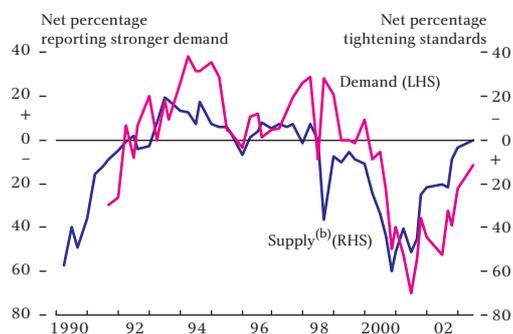


Source: Federal Deposit Insurance Corporation.

(a) Data is for all FDIC insured banks.

(b) Data for 2003 are as at 2003 Q3 annualised.

Chart 39:
US bank lending conditions for commercial and industrial loans^(a)

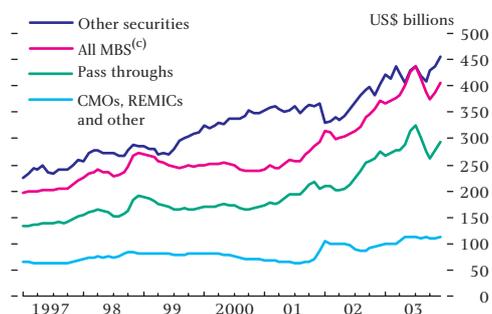


Source: Board of Governors of the Federal Reserve System: Senior Loan Officer Opinion Survey.

(a) To large and medium-sized firms.

(b) Inverted scale.

Chart 40:
Large US banks' securities holdings^{(a)(b)}



Source: Board of Governors of the Federal Reserve System.

(a) Data are not seasonally adjusted.

(b) Data for November are as at 19 Nov.03.

(c) Mortgage-backed securities comprise pass-through securities (on which cashflows are paid pro rata) plus structured securities such as collateralised mortgage obligations (CMOs) and real estate mortgage investment conduits (REMICs).

The 'fair value' accounting requirements for derivatives introduced by FAS 133 with effect from January 2001²¹ have given rise to greater reported earnings volatility for a number of US financial institutions, including, possibly, some US banks (Chart 38). FAS 133 certainly represents a challenge for the US GSEs – given their active use of derivative hedges to manage market risk – because some hedges do not qualify for hedge-accounting treatment under the standard, and the underlying assets are not marked-to-market whereas the derivative hedges are. This has given rise to significant differences between GAAP and 'core' earnings. For 2003 Q3, Fannie Mae reported large GAAP income from hedging gains (broadly offsetting losses on their underlying mortgage portfolio), but significantly lower core earnings. Accounting irregularities at Freddie Mac and a mistake by Fannie Mae in implementing a new accounting standard²² have highlighted the potential market and operational risks faced by these systemically important institutions. Recent proposals have been made to transfer their regulation – and perhaps also that of the FHLBanks – to the US Treasury. This could reinforce the perception that Freddie Mac and Fannie Mae benefit from an implicit government guarantee.

Resilience of the banking system

The banking sector has proven more resilient than in previous downturns, reflecting the moderate (albeit protracted) slowdown and very low short-term interest rates. Banks' published capital ratios remain high, and profitability continues to improve, with rates of return on assets and equity continuing to recover (Chart 38; and see Box 7). This suggests that large US banks are relatively well placed to face any adverse shocks. Although net interest margins have fallen a little, banks have benefited from deposit growth and wider spreads on consumer loans. They have, however, increased reliance on 'non-recurring' items, such as mortgage origination, underwriting and trading.

Weak equity markets in 2000–2003 Q1, together with falling interest rates (which reduced the appeal of money-market mutual funds), resulted in rapid deposit growth, so that banks became more liquid. Banks invested these funds in bonds, notably MBS, given weak corporate loan demand and tighter lending standards (Chart 39). Some large banks now have a significant credit exposure to Freddie Mac and Fannie Mae (the biggest issuers of MBS), and the higher proportion of mortgage assets may also have left them more exposed to interest-rate risk (Chart 40). Large banks may have boosted earnings in 2003 Q2 by realising capital gains on their portfolios of MBS and other securities

21: FAS 133 was originally intended to be introduced in June 1999. It was postponed more than once, but banks were allowed to adopt FAS 133 before 2001 if they wished.

22: FAS 149 recently amended FAS 133, to require mortgage purchase commitments to be recorded as derivatives.

(Chart 41), although some of the fall in unrealised gains on securities reflects the sharp rise in yields from mid-June.

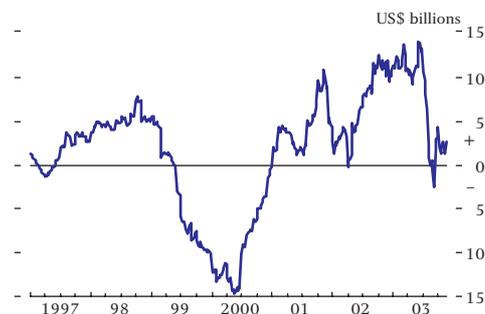
While it lasts, the steeper yield curve should be of net benefit to US banks. When interest rates rise, there may be a negative impact on credit risk, mortgage originations, net interest income from yield-curve carry positions and some losses on securities holdings. But the economic circumstances under which rates would rise are likely to be favourable for borrowers and for banks' non-interest income; higher rates would also increase the value of banks' (zero- or low-interest) core deposits.

Bank lending to consumers rose further in 2003, and the value of residential mortgages grew particularly fast. In contrast, bank lending to commercial and industrial companies continued to decline, with the share of loans of less than US\$1 million (a proxy for loans to small and medium-sized enterprises) falling. This shift towards the household sector is likely to have reduced expected loss rates, as mortgages tend to benefit from low credit risk. Although charge-off rates on consumer loans and credit cards have been high (Chart 42) – including on sub-prime and 'near-prime' loans in which firms like Household International (acquired by HSBC earlier this year) specialise – banks have been improving the profitability of such business by charging wider spreads.

There is some evidence that smaller banks may have attempted to maintain rates of return by expanding lending to higher-risk sectors such as commercial real estate (CRE) (Chart 43). Since late-2000, market fundamentals in the office, industrial and hotel sectors have weakened considerably. Demand for office space in particular has declined sharply, with vacancy rates high and rental yields low. Despite this, loans secured on CRE have so far continued to perform well on the whole. According to the FDIC and some market participants, this has been aided by low interest rates, a lower proportion of lending to 'speculative' property (not pre-leased), and greater participation from real estate investment trusts and issuers of commercial MBS (improving market data and transparency).

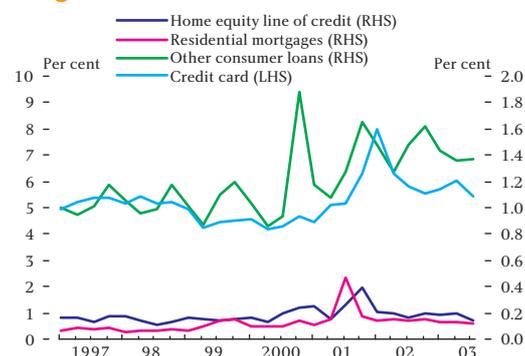
The US regulators' Shared National Credit (SNC) Review, published in September, indicated that the stock of large syndicated loan commitments fell in the year to 2003 Q2. 'Classified' (substandard, doubtful and loss) commitments also fell, but by less than total loans, so that the proportion of classified loans rose. There were improvements in the quality of manufacturing and telecoms loans (though still weak), and some deterioration in energy loans. The SNC Review indicated that classified loans have been significantly lower as a share of total commitments for banks than non-banks (Chart 44). Since 2002, the credit quality of syndicated loans held by non-banks and foreign-owned banks has deteriorated, while that of US banks has

Chart 41:
Large US banks' net unrealised gains and losses on securities holdings



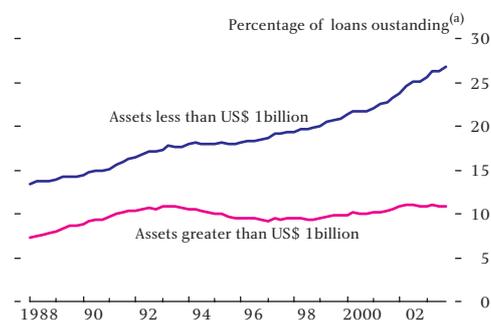
Source: Board of Governors of the Federal Reserve System.

Chart 42:
Charge-off rates on consumer loans



Source: Federal Deposit Insurance Corporation.

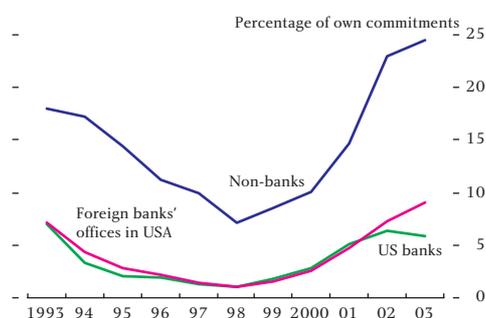
Chart 43:
Commercial real estate loans outstanding by size of US bank



Source: Federal Deposit Insurance Corporation.

(a) Percentage of loans to the commercial real estate sector extended by banks within each of the two asset size classes.

Chart 44:
'Classified' US syndicated loan commitments^(a)



Source: Board of Governors of the Federal Reserve System.
 (a) Loans or loan commitments of at least US\$20 million, that are shared by three or more regulated institutions, rated as 'classified' (substandard, doubtful or loss).

Table 4:
Large syndicated US loan commitments

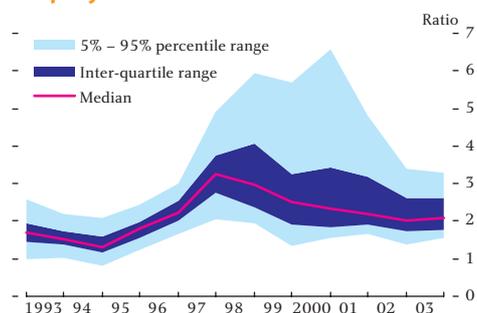
	2000		2003	
	US\$ billions	Percentage share	US\$ billions	Percentage share
Commitments				
US banks	924.0	47.4	745.7	45.4
Foreign banks' offices	884.8	45.4	719.5	43.8
Non-banks	138.7	7.1	178.5	10.9
Total	1,947.5	100.0	1,643.7	100.0

of which are:

	2000		2003	
	US\$ billions	Per cent of total	US\$ billions	Per cent of total
Energy sector				
US banks	78.3	8.5	71.7	9.6
Foreign banks' offices	98.6	11.1	115.2	16.0
Non-banks	7.2	5.2	11.3	6.3
Total	184.1	9.5	198.2	12.1
Telecom sector				
US banks	52.8	5.7	38.7	5.2
Foreign banks' offices	62.3	7.0	44.0	6.1
Non-banks	19.7	14.2	27.3	15.3
Total	134.8	6.9	110.0	6.7

Source: Shared National Credit Program.

Chart 45:
Largest fifty US bank holding companies: ratio of market capitalisation to book value of equity^(a)



Source: Board of Governors of the Federal Reserve System.
 (a) 2003 data are as at 2003 Q2.

improved, mainly because of US banks' relatively low proportion of loans to the energy and telecom sectors (Table 4).

Overall, confidence in the US banking sector remains strong. Large banks' market capitalisation is around double their book value (Chart 45), published capital ratios are high and both credit quality and profitability have improved. Some risks that bear watching include weakness in some corporate sectors, concerns over CRE markets, an expected reduction in mortgage business and rising exposure to market-sensitive income sources.

Following some significant acquisitions, in aggregate the United States now accounts for 13% of UK-owned banks' total on-balance-sheet exposure and 34% of their overseas exposure. While macro-prudential developments in the United States have become increasingly important in the assessment of UK financial stability, the preceding analysis suggests that risks to UK institutions from this source have probably moderated somewhat since the *June Review*.

1.3 Continental Europe

In contrast to other major economies, economic data for much of Europe²³ since the previous *Review* have, until very recently, generally been weaker than expected, with further downward revisions to Consensus forecasts (Chart 46). A pickup in European growth rates is expected in 2004, although a sharper-than-expected appreciation of European currencies could impair the strength of economic recovery and, in turn, increase the credit risk in bank (and other) portfolios.

The non-financial private sector

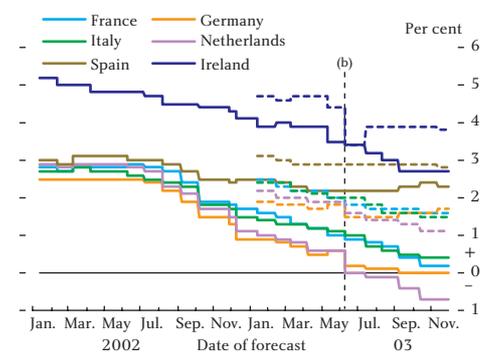
The household sector

As in the United States and the United Kingdom, household debt-to-income ratios rose in a number of European countries during 2002 (Chart 47), particularly those where house prices and mortgage lending increased more rapidly, such as the Netherlands and Spain. During 2003, and since the June *Review*, lending to the household sector, particularly for house purchase, has continued to grow faster than nominal GDP (Chart 48), hence household indebtedness may have increased further. However, unemployment rates have remained relatively stable since June (Chart 49), suggesting an absence of major shocks to household income. Although data on income gearing is less timely, interest payments have remained low in relation to disposable income.

Mortgage debt accounts for approximately two-thirds of total bank lending to European households, so the impact of any rise in interest rates on the ability of households to service their outstanding debt will be related to the terms of their mortgage debt. Potential strains in the household sector thus vary from country to country. In Germany, France and some other economies, the prevalence of long-term fixed-rate mortgages may reduce the adverse effects of rising official interest rates on borrowers. By contrast, in those countries where household indebtedness has risen more rapidly, house purchase has typically been financed through variable-rate or short-term fixed-rate mortgage products. These products make the ability of households to service their debt more sensitive to changes in the cost of borrowing, potentially increasing credit risks facing lenders under a scenario of rising interest rates. If an increase in interest rates were to lead to rising mortgage defaults in these countries, lenders' credit losses would (in the absence of a significant decline in house prices) be limited by the rise in underlying collateral values in recent years.

23: Europe is used here as shorthand for the European Economic Area plus Switzerland, but excluding the United Kingdom. At end-June 2003, Europe accounted for 41% of UK-owned banks' international net risk exposures (excluding portfolio investments and using net local currency claims); as at end-October 2003, European-owned banks accounted for 40% of UK-resident banking sector assets.

Chart 46:
Expected real GDP growth^(a)

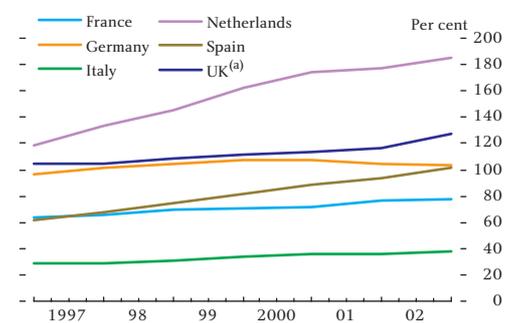


Source: Consensus Economics Inc.

(a) Solid lines: Real GDP projections for 2003; broken lines: Real GDP projections for 2004.

(b) Jun. 2003 *Review*.

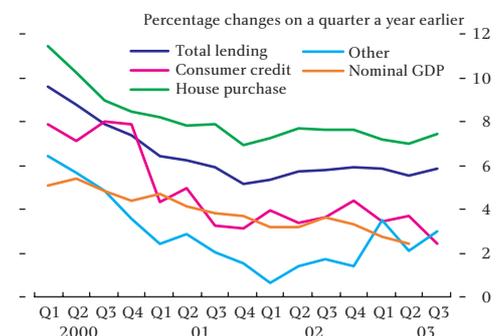
Chart 47:
Household debt-to-income ratios



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

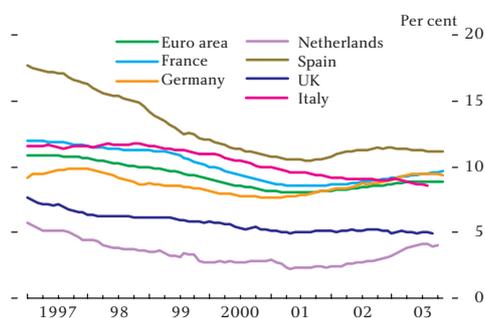
(a) Ratio differs from that in (Chart G) because disposable income used here is not adjusted for changes in net equity in pensions.

Chart 48:
Household lending in the euro area



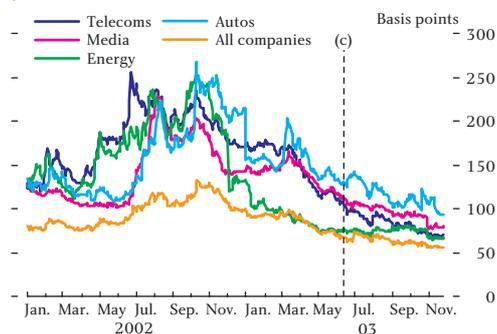
Sources: European Central Bank, Eurostat and Bank calculations.

Chart 49:
Unemployment rates



Source: Eurostat.

Chart 50:
Euro-denominated^(a) investment-grade credit spreads^(b)



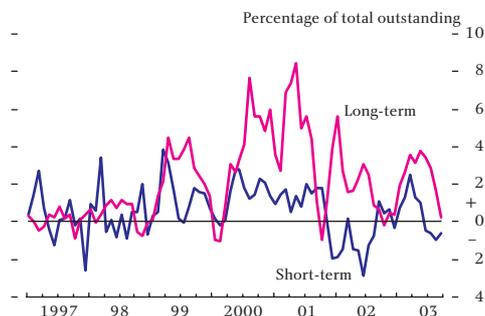
Source: Merrill Lynch.

(a) Mainly by European companies.

(b) Weighted average option-adjusted spread of corporate bonds over government bonds.

(c) Jun. 2003 Review.

Chart 51:
Euro-area private non-financial corporations' net bond^{(a)(b)} issuance



Sources: European Central Bank and Bank calculations.

(a) Three-month net issuance of securities other than shares.

(b) Short-term bonds have maturities of one year or less and long-term bonds have maturities of more than one year.

The corporate sector

Despite downward revisions to forecasts of economic growth, financial market expectations of future profitability and assessments of corporate creditworthiness have continued to improve. European companies' equity prices have risen since June and short-term earnings estimates have been revised upwards. There have been fewer credit rating downgrades since the June Review and bond spreads for European companies have continued to narrow across a range of industries – although at a slower rate than during early 2003 (Chart 50). Also, syndicated lending spreads have remained broadly stable for European companies. These factors have enabled companies to refinance existing debt on more favourable terms and net bond issuance at longer maturities has remained positive (Chart 51). In contrast, balance sheet indicators of corporate creditworthiness have been less robust. Measures of corporate sector capital gearing in a range of European countries rose during 2002 and remain high in comparison to corporate sectors in the United States and United Kingdom on a number of measures (Chart 52 and Box 3, Section 1.2²⁴). Additionally, weaker economic conditions have contributed to a continued rise in corporate insolvencies (Chart 53).

How can this divergence of indicators be reconciled? Narrower corporate bond spreads may reflect a continuing 'search for yield' by market participants, as discussed in the June Review. Spreads of some larger companies may have narrowed also because of increased expectations of support through provision of state funds. Although such support promotes moral hazard on the part of borrowers and diminishes monitoring incentives for creditors, specific instances have arisen in Europe recently. In addition, lower spreads may reflect continued balance sheet restructuring by those larger European companies able to raise funding via corporate bond markets. Industries highlighted in the June Review, including telecoms and large industrial groups, have continued to strengthen their balance sheets by repaying debt and refinancing debt on improved terms, as well as extending average bond maturities and issuing additional equity. But investment grade corporate bond spreads have narrowed by more in the United States than in Europe, suggesting there could be more scope for restructuring by European companies.

The balance sheets of European SMEs, which employ around two-thirds of European workers, may be less robust than those of larger companies. While larger companies have benefited from the reduced costs of bond financing, the size of SMEs impedes

24: Measures of capital gearing for European private non-financial companies (PNFCs) presented here differ from those in Box 3, Section 1.2, because of differences in data sources used. Data here are drawn from national financial accounts, compiled on an unconsolidated basis. Such data include intra-company lending in PNFCs' gross financial liabilities. Data in Box 3 are drawn from Compustat, compiled on a consolidated basis, hence excluding intra-company lending. Additionally, Compustat data cover only listed companies, whereas national financial accounts data cover listed and unlisted PNFCs. Consequently, care should be taken when comparing these measures of gearing.

their access to capital markets. Bank credit remains the primary source of funding for many European companies²⁵, but growth of such lending to the corporate sector has stabilised at lower rates during 2003 (Chart 54). Although companies' demand for bank credit has been impaired by weak economic conditions, banks have also continued to tighten terms of credit for corporate borrowers. This appears to have been in response to the relative weakness of SMEs, which bankruptcy data tend to corroborate. Yet such a tightening may have made it more difficult for those companies to strengthen their balance sheets. Rising bankruptcies amongst smaller European companies may be easier for creditors to absorb than those amongst large borrowers. But a significant increase in the failure rate of SMEs could adversely affect credit risk through an increased risk of spill-overs affecting the household sector.

The financial system

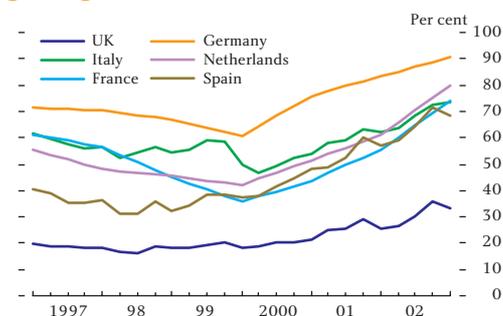
The insurance sector

The June *Review* noted that low nominal interest rates had exacerbated the yield gap between risk-free rates and guaranteed rates of return offered by life insurers, which contributed to the failure of a German life insurer in July.²⁶ The more recent rise in long-term interest rates will have benefited the balance sheets of European life insurers because their liabilities tend to be of longer duration than their assets. Also, the continued rise in equity prices will have had a positive impact on the investment portfolios of European insurers, although these institutions have reduced their holdings of equities following price falls during 2001 and 2002. Write-downs on equity holdings during 2003 have been smaller than last year, but some insurers may still hold substantial unrealised losses, particularly where regulations facilitate forbearance with respect to asset valuation. This may have reduced the risk-bearing capacity of European insurers, at a time when some have sought to hold more corporate credit risk, through both bond portfolios and credit derivative products. But some insurers have sought to strengthen financial buffers through issuance of debt and equity since June, helping to offset adverse capacity changes. Another issue for European insurers is the move to international accounting standards from 2005 and (for EU-based insurers) the introduction of risk-based capital requirements some time after that, although how well insurers and regulators are prepared for these changes may vary between countries.

25: For the euro area in aggregate, at end-2002 bank credit accounted for 51% of private non-financial companies' total liabilities. Debt securities accounted for 8% of total liabilities. For the US, at end-2002 bank credit accounted for 10% of private non-financial companies' total liabilities. Debt securities accounted for 17% of total liabilities.

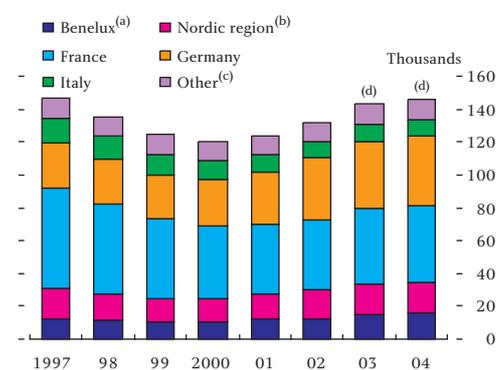
26: By overseeing the institution's failure and invoking the Protektor mechanism, domestic authorities helped contain market disruption and protect the interests of policy holders.

Chart 52:
Private non-financial corporations' capital gearing at market value



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

Chart 53:
Corporate bankruptcies



Source: Euler Hermes.

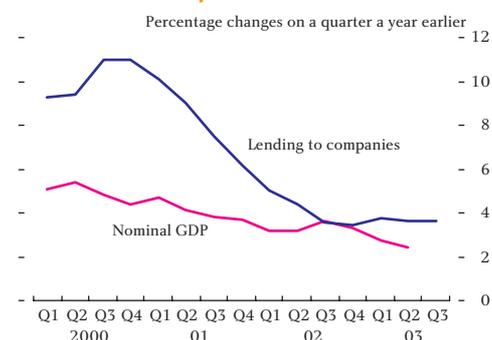
(a) Belgium, Luxembourg and Netherlands.

(b) Denmark, Finland, Norway and Sweden.

(c) Austria, Greece, Ireland, Portugal, Spain and Switzerland.

(d) Euler Hermes estimates.

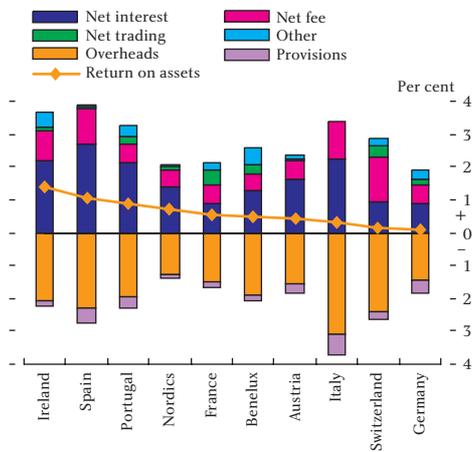
Chart 54:
Bank lending to euro-area private non-financial corporations



Sources: European Central Bank, Eurostat and Bank calculations.

Chart 55:

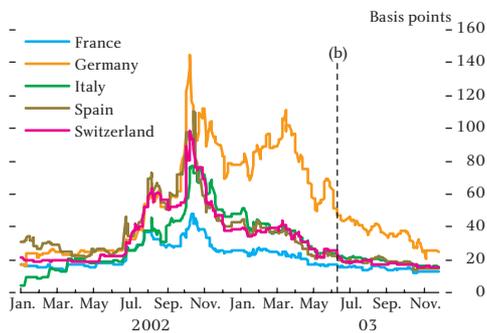
Sources of operating profit in 2002^(a)



Sources: Bureau van Dijk Bankscope and Bank calculations.
(a) Percentage of total assets.

Chart 56:

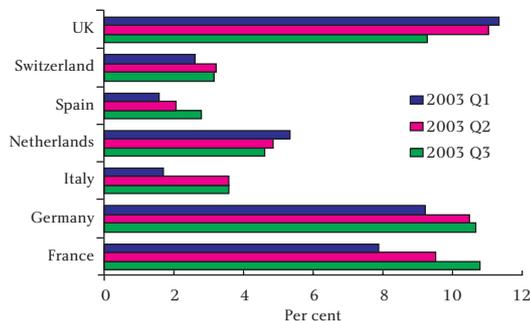
CDS premia for European banking sectors^(a)



Sources: CreditTrade, JP Morgan Chase & Co, Bureau van Dijk Bankscope and Bank calculations.
(a) Average for each country of available bank and bancassurer credit default swap premia, weighted by 2002 total assets.
(b) Jun. 2003 Review.

Chart 57:

European banks' share of new worldwide syndicated lending^(a)



Source: Dealogic.
(a) Where the actual proportions provided by each syndicate member are unknown, loan amounts have been split equally among participating banks.

Several European reinsurers have suffered credit rating downgrades since the June Review, primarily due to concerns over profitability. For some institutions, addressing adverse reserve developments has led to weak financial results, despite higher premiums within the industry and stronger investment income. Concerns over counterparty risk have increased with respect to the weakest reinsurers which, following rating downgrades, have found it increasingly difficult to attract new business (Section 1.1).

The banking sector

During late 2002, financial markets reflected increasing concerns about a number of European banks, as some larger institutions reported weak profits and, in a few instances, significant losses. Those national banking sectors with more exposure to households and a greater reliance on net interest income recorded stronger profitability during 2002 (Chart 55). Results up to 2003 Q3 suggest that this has continued, with steeper yield curves (via greater opportunities for profitable maturity transformation), reduced provisioning charges and continued reductions in costs further supporting profitability. The rise in equity markets and strong debt issuance by non-financial companies has supported capital-market-based banking operations, generating improved fee and trading income. Trading book value-at-risk information disclosed in interim results suggests that the increased interest rate volatility in the United States during July and August did not translate into significant increases in measures of interest rate risk for those European banks with significant US operations. However, the level of market risk in banking books and elsewhere is less clear. Although the depreciation of the US dollar has caused adverse earnings translation effects for these banks, the direct balance sheet impact has proved limited.

The improved performance of European banks has been reflected in financial market assessments of their riskiness. The number of rating downgrades to European banks has fallen since June and credit default swap premia have declined, most notably for German banks (Chart 56). The latter have continued to reduce costs and shed risk-weighted assets, chiefly through disposal of non-core businesses. Some have also written down the value of investments significantly. Restructuring has been pursued more aggressively by private sector banks, which have also reduced domestic lending. In contrast, German public sector banks have continued to increase such lending and sought to acquire further credit risk as net sellers of credit protection. In aggregate, German banks have increased their participation in international syndicated loans markets during 2003 (Chart 57).

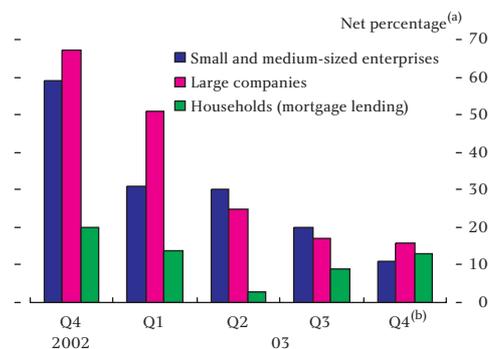
As in the United States and the United Kingdom, bank lending to households has been increasing more rapidly than lending to

companies. European banks continue to view the risk-reward trade-offs within retail banking as attractive, particularly for mortgage lending, given increased collateral values and a low historical loss experience. The October ECB bank lending survey showed that euro-area banks continued to tighten credit standards by more for corporate borrowers than for households (Chart 58). That may reflect an increased focus on risk-adjusted returns by European banks – a positive development in terms of financial stability and helping to improve profitability, as well as in preparation for the prospective Basel capital accord. Yet despite differential rates of lending growth to corporate and household sectors, total claims on the latter account for around 17% of banks' total assets in most European countries, compared with around 25% for claims on the corporate sector. Consequently, banks remain relatively more exposed to corporate credit risk. To help manage this, European banks (German *landesbanks* excepted) have been net buyers of credit protection in aggregate, chiefly through single-name products.²⁷ Banks have also managed credit risk through securitisation, typically in countries where credit growth rates have been strongest (Chart 59).

In aggregate, European banks exhibit a customer funding gap (Chart 60) much like their United Kingdom counterparts (Section 3.2). Although the gap has stabilised during 2003, use of wholesale funding and debt securities funding has increased in recent years. These sources can be sensitive to changes in market sentiment, as highlighted during late 2002. Nevertheless, European banks' financial buffers have remained intact, with regulatory capitalisation benefiting from balance sheet restructuring in those sectors with historically lower Tier 1 capital ratios, such as Germany and Switzerland.²⁸

Overall, confidence in the European banking sector appears to have improved, despite the continuation of a difficult operating environment. Risks to UK financial stability from European banks have probably diminished since the previous *Review* and the expected improvement in economic conditions would further help to reduce the risks posed.

Chart 58:
Euro-area banks' credit standards for lending to private non-financial corporations and households

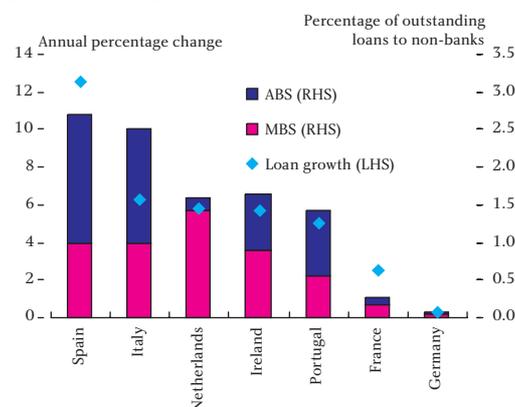


Source: European Central Bank euro-area bank lending surveys.

(a) Difference between share of banks in sample responding 'Tightened' and 'eased'. Positive figure indicates net tightening of credit standards demanded by the lender.

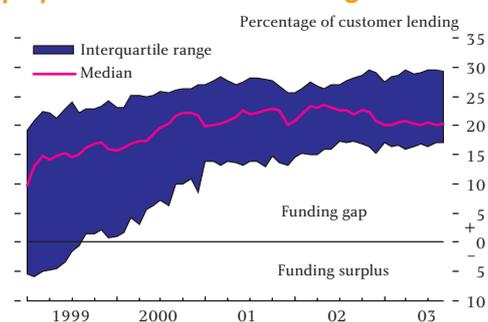
(b) Expectations of survey respondents for 2003 Q4.

Chart 59:
Issuance of ABS and MBS relative to credit growth during 2003 H1



Sources: European Securitisation Forum, European Central Bank and Bank calculations.

Chart 60:
Euro-area customer funding gap as a proportion of customer lending^(a)



Sources: European Central Bank and Bank calculations.

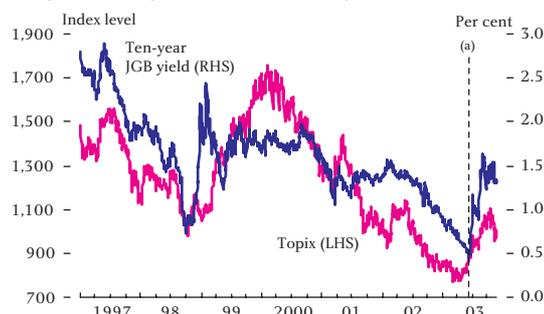
(a) Difference between lending to customers and deposits from customers. A positive number represents a funding gap.

27: Fitch Ratings, 'Global Credit Derivatives: A Qualified Success', September 2003.

28: See the discussion of European banks' Tier 1 ratios on page 38 of the June 2003 *Financial Stability Review*.

1.4 Japan

Chart 61:
Ten-year JGB yields and the Topix index



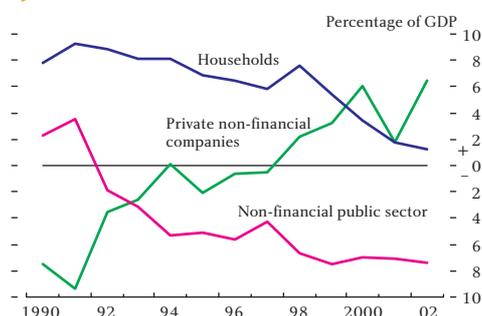
Source: Bloomberg.
(a) Jun. 2003 *Review*.

Chart 62:
Time until the euro-yen rate is expected to be 25 basis points above the current rate^(a)



Sources: Bloomberg and Bank calculations.
(a) Time from each date to the first point on the three-month euro-yen interest rate futures curve (using linear interpolation) where rates are 25 basis points higher.
(b) Jun. 2003 *Review*.

Chart 63:
Japanese financial balances^(a)



Sources: Bank of Japan, Economic and Social Research Institute, Japanese Cabinet Office and Bank calculations.
(a) Financial years to end-March of the following calendar year.

Japan's economy and financial system have suffered from years of slow growth and deflation, but Consensus forecasts for 2003 GDP have been revised up sharply and surveys suggest some easing of deflationary expectations – these developments appear to have been reflected in financial asset prices. In the months following the June *Review*, Japanese government bond (JGB) yields and stock-market indices rose more sharply than in other major markets, but from lower levels, and peaking in September and October respectively (Chart 61). Short-term interest rate futures imply that market participants now expect an earlier end to the Bank of Japan (BoJ) zero-interest-rate policy (Chart 62). When JGB yields rose, banks and derivatives dealers hedged or reduced their duration exposure, probably contributing to the observed increase in volatility. So far, there has been little evidence that lower JGB prices have caused financial strains, as (at least for the major banks) the rise in equities has more than offset the fall in bonds. Life insurers have benefited.²⁹

The yen has also risen (see Section 1.1), appreciating by 7% in trade-weighted terms since the June *Review*. So far, there is little evidence that the stronger yen has caused any financial strains for Japan's banks, which report low net exposure to currency risk and in recent years have scaled back their overseas operations (Box 4). However, derivatives-related gross liabilities (relevant for counterparty risk) are sizeable; such liabilities can vary sharply with movements in interest rates and exchange rates. A stronger yen could also erode the effective coupon on some structured notes³⁰ held by Japanese institutional and retail investors, and could hurt corporate borrowers in externally exposed sectors of the economy.

Japan's non-financial sectors

The household sector

Japan's household sector financial surplus and saving rate have declined in recent years (Chart 63), as reductions in household borrowing were offset by larger falls in gross saving. This could reflect the sharp decline in interest income as high-yielding long-term savings deposits have matured; and current low nominal interest rates provide less incentive to reinvest. It could also reflect some financial strain, which is difficult to quantify given the lack of timely data on income gearing, but would be consistent with recent years' rising unemployment and personal bankruptcies. The latest data show modest declines in personal bankruptcies, improved consumer confidence and higher bonus expectations.

29: Life insurers' liabilities are of longer duration than their fixed-income assets. Hence, their solvency ratios declined in the year to March 2003, but reportedly improved with the subsequent rise in long-term interest rates and in equity prices.

30: For details, see the Box on page 43 of the *June 2003 Financial Stability Review*.

Box 4: UK banking sector links with Japan

The UK banking sector is directly exposed to Japanese risk via a number of channels: through Japanese banks' UK operations, through cross-border lending and investment, and through off-balance-sheet exposures. Since 1997, the scale of links between Japan and the UK banking sector has fallen significantly.

The number of Japanese-owned authorised banks in the UK fell from 36 at end-September 1997 to 12 (five subsidiaries and seven branches) at end-June 2003, while their share of UK banking sector on-balance-sheet assets declined from 8.2% to 2.9%. Over this period Japanese-owned banks' UK offices' assets have fallen by 34%, while their total overseas offices' assets have fallen by 67% (Chart A). 72% of Japanese-owned banks' UK offices' assets comprise lending outside the UK and 44% are intragroup claims. Their presence in the UK interbank market is limited, accounting for just 2.2% of total interbank assets and 3.7% of total interbank liabilities, compared with 5.5% and 10%, respectively, at end-September 1997.

UK-owned banks' consolidated foreign claims on Japan, measured in US dollars and adjusted for risk transfers¹, have fallen by 30% since end-June 1997, because of a sharp fall in lending to Japanese banks' non-Japanese offices. Claims on banks located in Japan have fallen while those on the public sector have risen (Chart B). At end-June 2003, UK-owned banks' consolidated foreign claims on Japan were 3.2% of their total foreign claims, against an average of 5% for G7-owned banks.

Since end-December 1999, BIS-reporting banks' consolidated foreign claims on Japan have fallen by 1% to US\$659 billion, but have increased by 25% if one excludes claims of Japanese-owned banks' overseas offices in BIS-reporting countries on entities located in Japan. Such intra-Japanese claims accounted for 27% of BIS-reporting banks' consolidated foreign claims on Japan at end-June 2003.

Japanese banks' market share in the global derivatives market has fallen from 18% to 8% since end-June 1998 (Table A). The gross mark-to-market value of UK-owned banks' claims on Japan under derivatives contracts has fallen by 37% since end-December 1997, to the equivalent of 0.1% of UK banking sector on-balance-sheet assets and 2.8% of their total derivatives-related exposures at end-June 2003. The magnitude of UK-owned banks' derivatives-related exposures to Japanese counterparties could change materially in the event of any large shifts in Japanese interest or exchange rates.

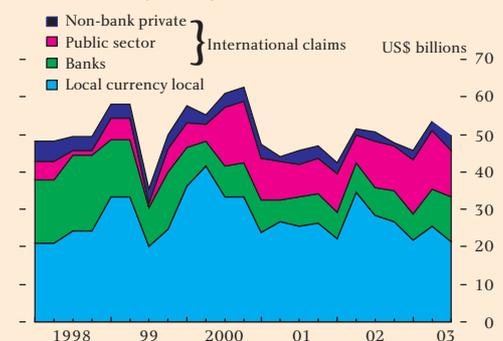
1: Claims on entities in country X which are guaranteed by an entity in country Y are reported as inward risk transfers to country Y. Risk transferred by credit derivatives is not covered.

Chart A:
Assets of Japanese-owned banks' overseas offices



Sources: Bank of England, Bank of Japan and Bank calculations.

Chart B:
UK-owned banks' consolidated foreign claims on Japan by sector^(a)



Source: Bank of England.

(a) Not adjusted for risk transfers.

Table A:
Japanese-owned banks' derivatives-related liabilities at end-June 2003

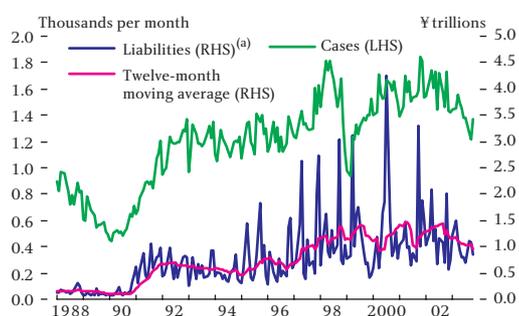
Type of contract	Global market share (per cent) ^(a)	Gross negative market values (US\$ billions)
Foreign exchange and gold	7.9	37.0
Single-currency interest rate	9.3	145.9
of which yen	48.7	63.8
other	3.7	82.0
Equity and commodity	0.2	0.2
Total	7.7	183.1
Memo item: owed to UK banks	2.8 ^(b)	8.3

Sources: Bank of England, Bank of Japan and BIS.

(a) Per cent of global notional amounts outstanding.

(b) Per cent of UK-owned banks' total gross positive market values.

Chart 64:
Corporate bankruptcies



Sources: Bloomberg, Bank calculations and Thomson Financial Datastream.

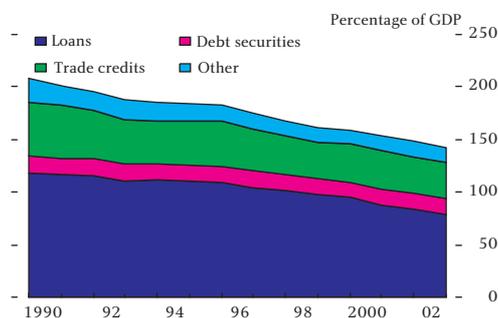
(a) Excluding debt of failed life insurers.

Japanese household debts amount to less than half of GDP, and over three-quarters are housing loans, with traditionally low default rates but with collateral values eroded by the prolonged decline in land prices. Japan's limited consumer credit market is dominated by non-bank finance companies, several of which have been acquired by US institutions. The large domestic listed consumer finance companies reported lower profits for the six months to September due to increased credit losses. For Japanese banks, loans to households amount to only 20% of total loans or 10% of total assets, and 90% are housing loans.

The private non-financial corporate (PNFC) sector

Japan's PNFC sector remains the main credit risk exposure for Japanese banks, accounting for nearly 80% of bank loans. The rise in the stock market and further narrowing of corporate bond spreads since the June Review suggest some reduction in credit risk for listed companies while the decline in corporate bankruptcies (Chart 64) suggests a reduction in bankruptcy risk more widely.

Chart 65:
PNFCs' financial liabilities^(a)

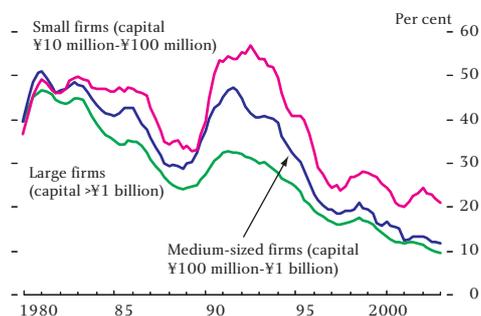


Sources: Bank of Japan and Bank calculations.

(a) Financial years to end-March of the following calendar year.

This apparent improvement in PNFC finances probably reflects a combination of cyclical and structural factors. Japan's listed non-financial companies reported around 18% annual growth in recurring profits for the six months to September, and overall PNFC profit growth has been positive (on a year earlier) since 2002 Q3.³¹ Five consecutive years of financial surpluses have helped to reduce PNFCs' financial liabilities significantly (Chart 65). Higher profits, lower debt and low nominal interest rates have helped corporate income gearing to fall (Chart 66). It remains unclear whether, in aggregate, corporate debt reduction is nearing completion. But the October BoJ Senior Loan Officer Survey does suggest some easing of the decline in corporate loan demand.

Chart 66:
Corporate income gearing^(a)



Sources: Ministry of Finance and Bank calculations.

(a) Gross interest payments divided by operating profits plus depreciation, four-quarter moving average.

However, the improvement in aggregate masks significant dispersion of profitability and indebtedness. Large firms' profits have increased by more than those of SMEs. The real estate, construction and wholesale/retail sectors have been particularly hurt by the decade-long decline in land prices, and the indication is that, although land prices in central Tokyo may be stabilising, regional land prices have been falling further. These three sectors account for only 29% of banks' total loans but 60% of their problem loans.

The public sector

Japan's continuing public sector deficit will increase Japan's general government gross financial liabilities to 155% of GDP by the end of 2003, according to OECD projections. The recent increase in government bond yields will only gradually affect the government's debt service burden, and near-term risks relating to

³¹: According to the Ministry of Finance Corporate Survey.

fiscal sustainability currently seem low, judging by Japan's AA-range sovereign credit ratings and sovereign five-year CDS prices (Chart 67). This is relevant to financial stability given the importance in recent years of public support for Japan's internationally active banks.

Japan's banking system

Since the June *Review*, the CDS premia of major Japanese banks have narrowed markedly (Chart 67), and Japan's banking sector index (which fell to a historic low in late April) has outperformed the broad Topix index and most other sectors (Chart 68) – albeit with strong share-price performance of larger banks and falling share prices for many regional banks (Chart 69). This dispersion may reflect market perceptions that some regional banks have weaker capital adequacy, less exposure to rising equities, more exposure to weaker borrowers (eg SMEs), and have made slower progress on non-performing loan (NPL) disposal. It may also reflect a view that public support might not protect shareholders through Resona-style pre-emptive recapitalisation. On 29 November, Japan's Financial System Management Council decided to nationalise temporarily the failed Ashikaga Bank (Japan's tenth largest regional bank by deposits), reducing existing shareholders' equity to zero, but protecting depositors in full.³² Japanese regional banks' activities are almost purely domestic, and would appear to present little risk to the international financial system.

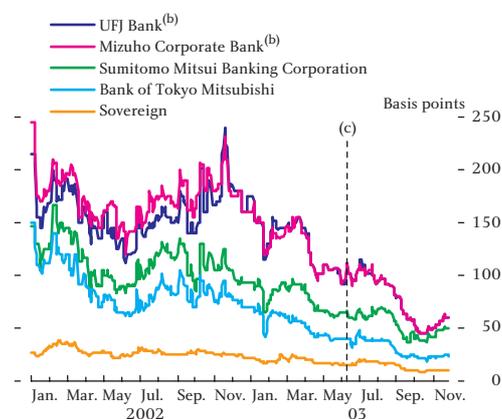
Japanese banks' vulnerabilities, discussed in previous *Reviews*, were analysed further in the IMF's Japan Financial System Stability Assessment.³³ Stress tests (based on publicly-available data) confirmed that Japanese banks' vulnerabilities intensified in the year to March 2003 (Table 5). In aggregate, banks have in recent years increased their holdings of JGBs and reduced those of equities (Chart 70) – partly through sales to the BoJ and the Bank Shareholding Purchasing Corporation. For the six months to September, Japan's major banks³⁴ (after hedging and reducing their duration exposure) reported around ¥1 trillion of domestic fixed-income mark-to-market losses, but more than offset this with ¥2.7 trillion of equity gains. However, as the IMF's stress tests highlighted, Japanese banks remain significantly exposed to market risk, especially if bond and equity markets were to weaken simultaneously.

32: The Deposit Insurance Law Article 102 allows three types of crisis management: (1) pre-emptive recapitalisation (used with Resona), (2) blanket protection of all deposits, or (3) nationalisation (used with Ashikaga).

33: Available online on www.imf.org/external/pubs/ft/scri/2003/cro3287.pdf

34: September interim results analysis is based on the five major commercial banks active in London: the four megabanks (Mizuho, MTFG, SMFG, UFJ) and Sumitomo Trust and Banking.

Chart 67:
Japanese bank and sovereign CDS premia^(a)



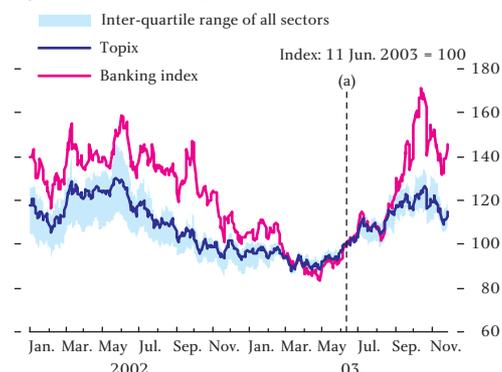
Sources: CreditTrade and Bank calculations.

(a) Average of bid-offer prices of five-year senior debt CDS contracts.

(b) UFJ and Mizuho CDS premia were identical for much of 2003.

(c) Jun. 2003 *Review*.

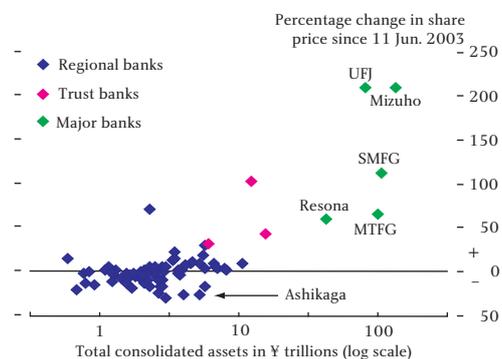
Chart 68:
Topix and banking sector index



Sources: Bloomberg and Bank calculations.

(a) Jun. 2003 *Review*.

Chart 69:
Dispersion of individual bank share price performance^(a)



Sources: Bloomberg and Bank calculations.

(a) Observations taken on 26 Nov. 2003.

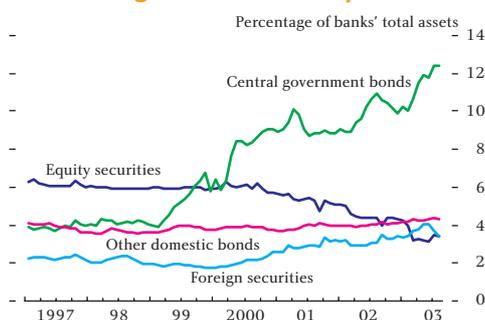
Table 5:
IMF stress test on city banks^(a)

Shock	2002	2003
	Loss (percentage of shareholders' equity)	
20% fall in equity prices	37	44
100 basis points increase in yields	17	33
3% credit loss on loan book	54	94

Source: 2003 IMF Japanese FSAP.

(a) Based on published accounts for end-March for each year. The increase in vulnerability mainly reflects falling shareholders' equity. Portfolios were also rebalanced away from equities and towards bonds, accounting for the greater increase in potential losses arising from an interest rate shock.

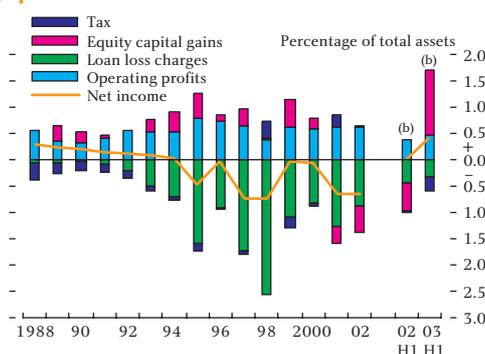
Chart 70:
Bank holdings of bonds and equities^(a)



Sources: Bank of Japan and Bank calculations.

(a) On-balance sheet holdings only, not including derivatives exposures.

Chart 71:
Japanese banks' sources of net income^(a)



Sources: Bank of Japan and Bank calculations.

(a) Financial years, to end-March of the following calendar year.

(b) Annualised interim results, for the six months to end-September of each year, for the five largest internationally active banks.

Japanese banks reported a reduction in NPLs³⁵ from 8.4% of total loans at end-March 2002 to 7.4% at end-March 2003, with increased charge-offs more than offsetting a reduced flow of new NPLs. For the six months to end-September, Japan's major banks further reduced their average reported NPL/loan ratio to 6.6%. They have dealt with delinquent borrowers mainly using in-house NPL restructuring units, but the government-sponsored Industrial Revitalisation Corporation of Japan³⁶ has also announced eight corporate work-out cases involving a range of banks and industries. Foreign, mainly US, financial institutions and specialist investment funds have also become increasingly involved in the market for Japanese distressed assets.

Progress in recognising and disposing of NPLs, following the adoption of the Financial Services Agency's 'Programme for Financial Revival' in October 2002, has been reflected in some narrowing of the gap between official NPL numbers and analysts' estimates (which typically focus on borrowers' debt-servicing capability or on land collateral values). Some observers note that previous special loans inspections have reviewed only the major borrowers, and not yet the (perhaps weaker) SME borrowers. Also, Resona's new management reported a ¥1.77 trillion interim loss, much of it due to stricter loan classification. Resona is widely regarded as having had poorer asset quality than other major banks, and its new management has an incentive to be cautious in its loan classifications, making it difficult to make inferences about banking system NPLs more widely.

Japanese bank profits have for some years been consumed by NPL credit costs (Chart 71). However, Japan's major banks all announced higher profits for the six months to end-September, with combined net income of ¥921 billion, compared to a net loss of ¥16 billion a year earlier. This improvement was driven by rising equity prices and falling credit costs. Operating revenues barely increased, reflecting the banks' failure to improve lending margins.

The aggregate published Tier 1 capital ratios for the major banks increased from 5.4% at end-March to 6% at end-September. Questions remain about the quality of Tier 1 capital, which at end-March was more than fully accounted for by hybrid Tier 1 instruments, public funds, and deferred tax assets (DTAs), although the share of DTAs in Tier 1 capital fell from 55% at end-March to 43% at end-September. The exceptionally low financial strength ratings for Japan's banks (see Chart 25 in Section 1.1) highlight that their long-term credit ratings are still underpinned by expectations of government support being forthcoming if necessary.

35: NPLs measured on the Financial Reconstruction Law basis, reported by Japan's Financial Services Agency in August.

36: The IRCJ was established in April to facilitate out-of-court corporate work-out cases, by buying claims from minority creditors at 'market value' and helping the borrower and its sponsor to structure a recovery plan.

1.5 Emerging market economies

Near-term risks to UK financial stability from emerging market economies (EMEs) appear unusually low. At present, the external environment facing EMEs is benign, with world growth strengthening and financing costs still at historically low levels. Private capital inflows to EMEs have picked up quite sharply, particularly debt flows. Sovereign borrowers have used some of these flows to improve their debt structures. But some represent net new borrowing which will add, in some EMEs, to already uncomfortably high levels of debt and heavy ongoing external financing needs.³⁷ With capital market conditions unlikely to remain as benign as at present indefinitely, these economies need to strengthen their resilience to future shocks through fiscal restraint and continued structural reform. Creditors too need to assess risks in lending carefully, something that has not always been the case in previous episodes of accelerating inflows.

Capital market developments

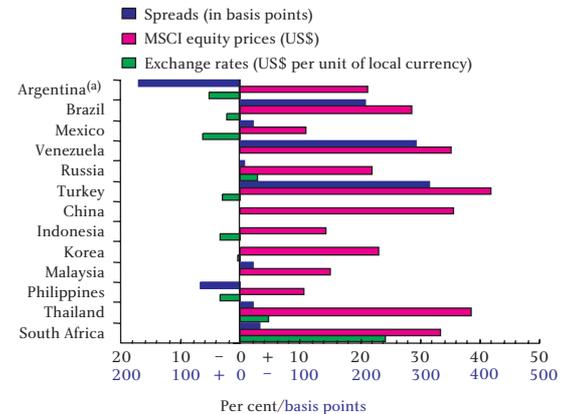
Since the June *Review* the average spread of EME sovereign bond yields over US Treasuries has fallen to around 450 basis points. This has offset much of the recent rise in US long-term interest rates, leaving financing costs for EMEs at historically low levels. Spreads have fallen particularly sharply in some highly indebted EMEs such as Brazil (-209 basis points), Turkey (-316 basis points) and Venezuela (-292 basis points) (Chart 72). Equity markets have also rallied markedly, with the MSCI index of EME equities rising by 26%, more than many developed economy markets (Section 1.1). Most EME exchange rates have been quite stable against the US dollar over the past six months, despite the wider volatility in currency markets discussed in Section 1.1. But a number have depreciated on an effective basis, including those of several Asian EMEs.

EME fund-raising from external markets has picked up, with particularly heavy issuance in bond markets: in the year to date EMEs have raised around half of their total market finance from bond issues, compared with an average of 35% over the previous five years. Data for syndicated loans suggest recourse to bank financing has been relatively subdued. Share issuance has picked up in recent months with the recovery in EME equity markets, although direct equity investment is likely to remain a larger source of finance (Chart 73). For 2003 as a whole, the Institute of International Finance forecasts that aggregate net private inflows to EMEs will rise by a third from last year's ten-year low. But levels of inflows are forecast to remain well below the unsustainable levels seen in the mid 1990s, largely because of lower net lending by commercial banks (Chart 73).

37: The high level of EME public debt is discussed in Chapter 3 of the [September 2003 IMF World Economic Outlook](#). Techniques for evaluating EME debt sustainability are discussed in *Assessing sovereign debt under uncertainty*, in this *Review*.

Chart 72:
EME asset price changes since June 2003

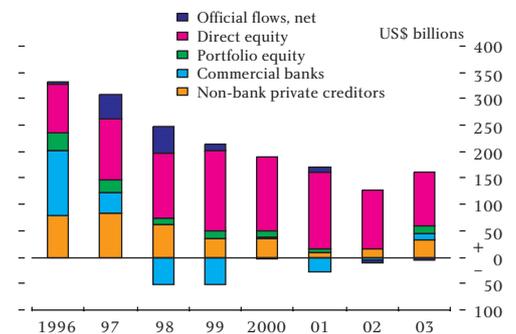
Review



Sources: Bloomberg, JP Morgan Chase & Co and Bank calculations.

(a) Percentage change in total return rather than change in spread is plotted for Argentina.

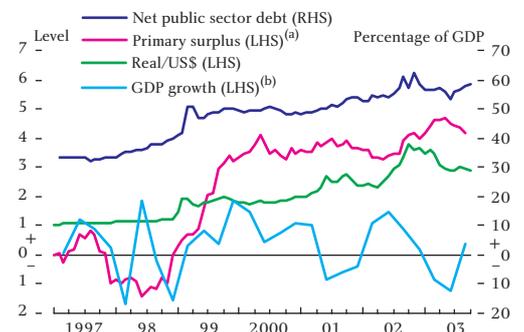
Chart 73:
EMEs' net external financing^(a)



Source: IIF.

(a) Includes 2003 forecasts.

Chart 74:
Brazil: fiscal indicators, the nominal exchange rate and GDP growth

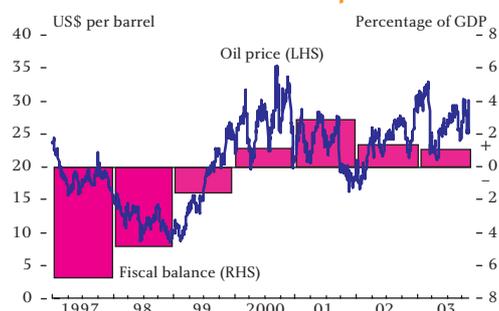


Sources: Banco Central do Brasil, Bloomberg and Bank calculations.

(a) Twelve-month rolling sum, as a percentage of GDP.

(b) Percentage change on a quarter earlier.

Chart 75:
Russia: fiscal balance and oil prices^{(a)(b)}

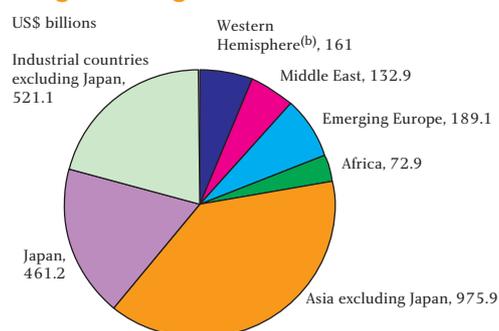


Sources: Bloomberg and IIF reports.

(a) Central government fiscal balance and northwest Europe Urals oil price.

(b) IIF report projections used for 2003 fiscal data.

Chart 76:
Foreign exchange reserves at end-2002^(a)

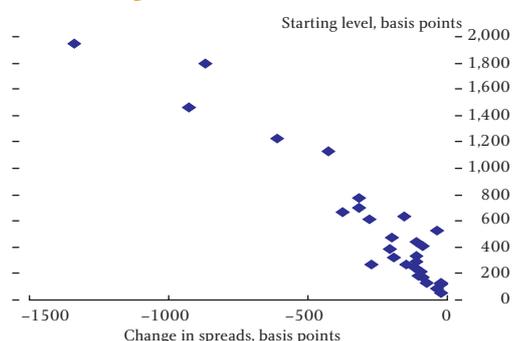


Sources: IMF and Bank calculations.

(a) Chart shows total reserves minus gold.

(b) Includes southern and central America and the Caribbean.

Chart 77:
Change in sovereign bond spreads since start of 2003^(a)



Sources: JP Morgan Chase & Co and Bank calculations.

(a) Excludes Argentina where spreads fell by 351 basis points to 5,991 basis points, Cote d'Ivoire where spreads fell by 284 basis points to 2,911 basis points and Dominican Republic where spreads increased by 489 basis points to 988 basis points.

Against that background, many sovereign borrowers met 2003 financing targets early and some have raised additional funds. Moreover, Brazil, Turkey and Mexico were among several sovereigns that have used gross issuance to improve their overall debt structure, for example, by retiring expensive debt such as Brady bonds, or by reducing shares of floating-rate debt. These actions should help reduce sovereign sensitivity to any future market tightening. **Box 5** reviews debt structures and recent debt management operations in selected EMEs.

The EME capital market rally

The rally in EME markets likely reflects a combination of factors, some more durable than others.

Fundamentals have improved in several EMEs. In Brazil, for example, the authorities have made progress towards reform of the social security system and bankruptcy law. Tight fiscal and monetary control as part of its IMF programme (which may be extended by about one year from its scheduled expiry date of end-2003) have stabilised the debt-to-GDP ratio at just under 60%, although sustainability will also require a durable return to positive growth (Chart 74). The Turkish authorities have introduced bankruptcy and social security reforms. Growth has remained robust at around 6% year-on-year, despite a tight policy stance with a primary surplus of around 5% of GNP and high real interest rates, at around 15%. Continued market access and potential US bilateral finance should help Turkey meet its significant financing needs in the near-term. But, as in Brazil, debt sustainability remains highly sensitive to short-term interest rates and the exchange rate, given the structure of Turkey's debt (as discussed in **Box 5**).

Elsewhere, Russia has used oil revenues to reduce sovereign external debt from 63% of GDP in 1998 to 39% in 2003. Also, it has established a stabilisation fund that will be used to reduce the sensitivity of its fiscal position to fluctuations in oil prices (Chart 75). In Asia, several EMEs have continued to accumulate foreign exchange reserves. Total reserves in Asia, excluding Japan, account for around 40% of global reserves, providing a substantial cushion against possible future lack of access to global financial markets (Chart 76).

Market contacts suggest that the rally in EME capital markets may also reflect a structural shift in the investor base for EME assets, with increased participation by unleveraged investors seeking long-term returns and risk diversification by holding EME debt.

There may also be other, less durable, influences on investor sentiment. One is that high-yielding EME assets may be particularly attractive to investors at this stage of the global economic cycle, with rising growth, low inflation and low interest

Box 5: The structure of emerging market government debt

The sustainability of a sovereign's debt depends not only on the size of debt, but also its structure. For any given level of debt, a sovereign's default risk may be higher if a large proportion is at short maturities, or is linked to asset prices. Short maturities imply that the sovereign faces high roll-over risk. Similarly, if most of the debt is linked to the exchange rate or floating interest rates, a sharp domestic currency depreciation or interest rate rise could rapidly make the debt unsustainable.

'Safer' forms of borrowing – such as long-maturity fixed-rate debt – reduce a borrower's vulnerability to a temporary shock, but are generally more expensive since they transfer various risks to lenders. But the risk premium that EME borrowers have to pay on 'safer' debt is likely to have fallen during this year: financing conditions for EMEs have improved, as evidenced by the significant falls in EME sovereign bond spreads.

Table A:
Changing composition of domestic debt^(a) in selected EMEs, 2002–03^(b)

	Year	Fixed (Per cent)	Floating (Per cent)	Inflation indexed (Per cent)	Exchange rate linked (Per cent)
Brazil	2002	2.2	46.2	14.6	37.0
	2003	9.0	50.0	14.6	26.4
Turkey	2002	25.1	42.8	0.0	32.1
	2003	35.3	41.3	0.0	23.3
Mexico	2002	49.9	38.5	11.7	0.0
	2003	52.6	38.7	8.7	0.0
Poland	2002	89.7	8.2	0.0	2.1
	2003	92.8	6.8	0.0	0.5
Hungary	2002	53.8	46.2	0.0	0.0
	2003	60.5	39.5	0.0	0.0

Sources: Central Bank of Brazil, Turkish Treasury, Finance Ministries of Mexico, Hungary, and Poland, and Bank calculations.

(a) Federal domestic securities (including foreign currency swaps) for Brazil, central government domestic debt for Turkey, domestic federal government securities for Mexico, marketable domestic government securities for Poland, and domestic government paper for Hungary.

(b) The 2002 figures are as of December for all countries, and 2003 figures are as of August for Hungary; September for Brazil, Mexico and Poland; and October for Turkey.

Have EME sovereigns taken advantage of recent favourable financing conditions to improve their debt structure? Evidence from selected EMEs suggests that some countries have improved the profile of their

domestic debt. Table A shows that Brazil, Turkey, Mexico, Poland and Hungary have increased the share of fixed-rate debt in total domestic debt this year. Encouragingly, both Brazil and Turkey have also reduced the share of domestic debt linked to the exchange rate, in part because of a valuation effect resulting from the appreciation of their exchange rates, but also due to net redemptions of foreign-currency debt. But despite this progress, both Brazil and Turkey still hold substantial amounts of domestic debt linked to the exchange rate and floating interest rates, rendering them vulnerable to changes in investor sentiment.

Countries have also sought to lengthen debt maturity. Mexico recently placed its first 20-year fixed-rate bond in its domestic market. Both Brazil and Turkey have increased the average maturity of new domestic borrowing this year. But the maturity of total domestic debt remains short in all these countries at less than 3 years, leaving them significantly exposed to interest rate risk.

A number of EMEs have also improved the profile of their external debt. For instance, four EMEs have exchanged expensive Brady bonds for cheaper Eurobonds this year. Of these four countries, Poland, Venezuela, and Brazil have exchanged either floating-rate or sinking-fund-type bonds for fixed-rate debt.¹ An exception to this is Mexico, which retired its last remaining Brady bonds by exchanging fixed-rate Brady bond debt for fixed-rate Eurobonds. The impact of Brady bond restructuring on debt maturity is mixed: Venezuela has extended its debt maturity, while Mexico and Poland swapped maturity 'like for like', with Mexico and Brazil even shortening maturities in part of their exchanges.

Overall, several countries have made progress towards improving their debt structure in the benign environment of 2003. But some EMEs still remain heavily exposed to asset price fluctuations and roll-over risk. These EMEs need to continue efforts to reduce these vulnerabilities in their debt structure to increase their resilience to future shocks.

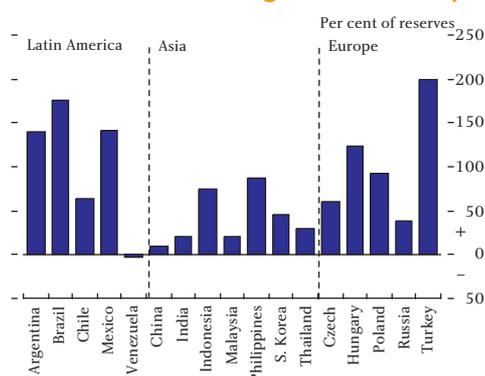
1: The issuer of sinking-fund-type bonds pays back a portion of the bond principal at each coupon payment date.

Table 6:
Forthcoming elections in selected EMEs

Country	Election	Date
Russia	President	Mar. 2004
Indonesia	Parliament	Apr. 2004
Korea	Parliament	Apr. 2004
Turkey	Local elections	Mar. 2004
Philippines	Parliament, President, Senate	May 2004
India	Parliament	Oct. 2004
Brazil	Local elections	Oct. 2004

Sources: Electionworld.org, www.al.sp.gov.br/index6.htm, www.economist.com/countries and Reuters factiva.

Chart 78:
Gross external financing burden in 2004^{(a)(b)}

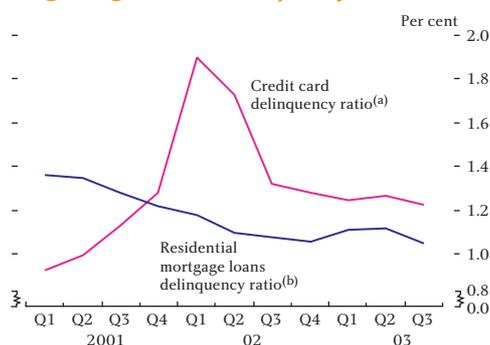


Sources: IIF reports and Bank calculations.

(a) Defined as forecasted short term debt, plus amortisation, plus current account deficit, expressed as a percentage of gross reserves (excluding gold).

(b) The timelines of forecasts for EMEs varies as each is derived from data listed in that country's most recently available IIF report.

Chart 79:
Hong Kong retail credit quality



Source: Hong Kong Monetary Authority.

(a) The total amount of receivables overdue for more than 90 days as a percentage of total receivables is used to calculate the quarterly delinquency ratio.

(b) Measured as a ratio of total amount of loans overdue more than three months to total outstanding loans.

rates. The June 2003 *Review* noted that the rally in EME markets might, at least in part, reflect this 'search for yield'. This hypothesis is consistent with falls in bond spreads in 2003 being greatest in EMEs where spreads were highest initially, and reports from market contacts of increased appetite for higher-risk corporate and local currency exposure (Chart 77).

EME vulnerabilities to tighter financing conditions

It is hard to determine whether this rally will be sustained. Rating agencies have upgraded several EME sovereigns in recent months, including Russia which was raised to investment grade by Moody's. Although that upgrade was somewhat controversial in the markets, the general trend suggests that rating agencies view at least some part of the rally as durable. However, past experience suggests that conditions may not remain as benign indefinitely. Several triggers might lead to a fall in demand for EME assets.

Factors internal to EMEs could cause market volatility. In Russia, where private bond issuance has been particularly strong this year, recent concern about the legal environment has led to volatility in equity prices, although they remain about 50% higher than at the start of the year. Investor uncertainty about structural reform progress and policy direction could rise also in EMEs nearing the end of political cycles in 2004 (Table 6).

Developments in the external environment could also affect sentiment towards EMEs. A rapid pickup in global demand and increasing pressures on capacity utilisation could result in higher real interest rates. That might tighten liquidity conditions for EMEs as capital flows towards investment opportunities in developed economies.

Which EMEs would be vulnerable to a fall in demand for EME assets? Substantial borrowing so far this year suggests that a temporary weakening in market sentiment towards EMEs might have only a limited impact. But several EMEs remain vulnerable to a more prolonged tightening in financing conditions. For example, Brazil and Turkey have substantial financing needs in 2004 relative to official foreign exchange reserves (Chart 78). Argentina's contractual financing requirements are also high, although a substantial share of its external debt is not being serviced pending completion of debt restructuring negotiations. Several EU accession countries also have large financing requirements, reflecting current account deficits of over 4% of GDP. Hungary, in particular, has experienced market volatility this year, reflecting twin current account and fiscal deficits. But strengthening external demand, including in major export markets in western Europe, may help reduce these imbalances.

Rising financing costs against a backdrop of rapid global growth might be less problematic for those EMEs with large export sectors. Asian EMEs might be net beneficiaries. In Hong Kong,

for example, strong external demand, particularly from mainland China, and low domestic interest rates, together with effective exchange rate depreciation, appear to be encouraging a recovery from the SARS-related weakening in growth earlier this year. Annual GDP growth picked up to 4% in 2003 Q3 from a fall of 0.5% year-on-year in the previous quarter.

UK-owned banks have exposures of around US\$130 billion in Hong Kong, their second largest foreign exposure. Faster growth should lower credit risk on this lending, particularly if it leads to a recovery in the property sector, which accounts for about 50% of total bank loans in Hong Kong. The 65% fall in property prices over the past five years has led to a rise in mortgages in negative equity. But the overdue mortgage loan ratio remains low at 1.1% in September (Chart 79). And credit card delinquencies, which have led to losses for UK banks operating in Hong Kong in recent years, have fallen from a peak of 1.9% in early-2002 to 1.2% of total credit-card receivables in 2003 Q3.

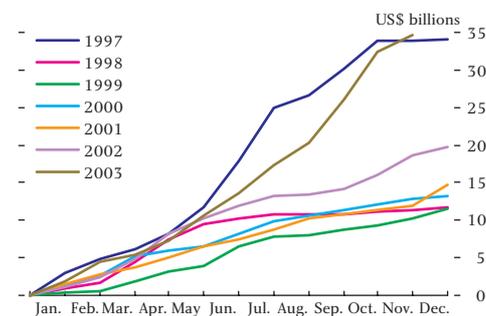
Medium-term financial stability challenges in EMEs

Even if benign external conditions persist, financial stability concerns might arise from rapid credit growth in EMEs, financed by either external or domestic capital.

At present, aggregate external capital flows to EMEs remain low relative to the boom period before the Asia crisis (Chart 73). However, some components within the total are growing strongly. Gross private sector bond issuance this year has been the highest on record, with particularly heavy issuance by Russia and Taiwan (Chart 80). Market contacts also report substantial flows into EME mutual funds and signs of increased involvement by hedge funds. Past experience suggests that periods of rapid inflows, if sustained, can be associated with inadequate assessment of risk and a build-up of future imbalances. In this respect, the fall in dispersion of bond spreads over the past year raises some concerns about investor discrimination among EME assets (Chart 81). Moreover, it is important that strong capital inflows do not detract from the need for EMEs to pursue structural reform.

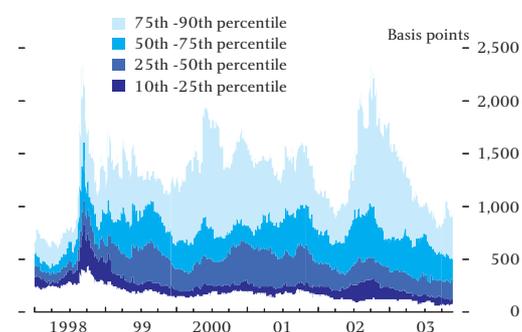
Several EMEs already have rapid domestic credit growth, posing near-term financial stability challenges. China's lending growth at over 20% is arguably of greatest interest for UK financial stability given the potential for instability in China to affect global demand and prospects for Hong Kong. Bank credit levels are already relatively high, raising concerns about overheating in the economy (Chart 82). The Chinese authorities have tightened reserve requirements and prudential controls over recent months to restrain lending. That should help limit the risk of these new loans adding to the existing stock of non-performing loans (officially around 20% of GDP in the four state-owned banks), further boosting contingent liabilities of the fiscal authorities and raising concerns about debt sustainability.

Chart 80:
Cumulative private sector EME bond issuance



Sources: Dealogic and Bank calculations.

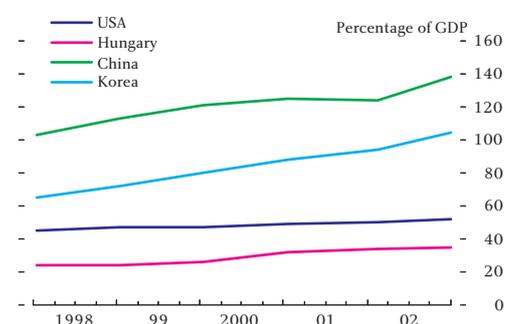
Chart 81:
EME sovereign US\$ bond spreads: distribution over time^(a)



Sources: JP Morgan Chase & Co and Bank calculations.

(a) Percentiles calculated by ranking EME country components of the EMBI Global index.

Chart 82:
Resident banking institutions' claims on private sector relative to GDP in selected countries



Sources: IMF and Bank calculations.

2 The UK environment

2.1 The macroeconomic background

Growth in the UK has been more stable than in the USA or euro area in recent years and has picked up to around trend this year, broadly in line with the May central projection of the Bank's Monetary Policy Committee (MPC). Data on financial balances have been substantially revised, but the broad picture remains one of persistent current account deficits since 1999. The domestic counterpart was initially a private sector deficit, but more recently a widening public sector deficit has emerged (Chart 83). There has been a marked shift from deficit to surplus in the corporate sector since 2001, as companies have sought to strengthen balance sheets by reducing investment and dividend payments. This has more than offset a move into deficit by the household sector, reflecting buoyant household consumption and borrowing. But the latest data showed a narrowing of the private sector surplus in Q2, alongside some recovery in companies' spending and continued resilience in household spending and borrowing.

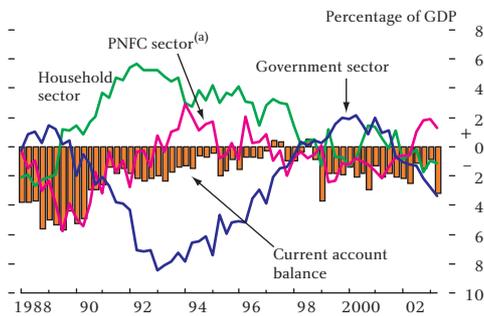
The November central projection of the MPC, on the assumption that the official interest rate remains at 3.75%, was for UK growth over the next two years to be marginally above trend (Chart 84). The MPC does not formulate projections for the financial positions of the UK corporate and household sectors. However, the outlook can be assessed using a method described in the December 2001 *Review*.³⁸ The MPC's November central projection was consistent with a continued recovery of corporate profitability, which would permit further reductions in capital gearing; income gearing and liquidations would be likely to remain low. On these assumptions, the household debt-to-income ratio would be likely to continue to rise, accompanied by broadly stable capital gearing and a moderate pickup in income gearing.

International imbalances continue to pose a risk to the outlook. The effect of any substantial change in global capital flows on the UK's external balance sheet would partly depend on the extent of any associated change in the sterling exchange rate. Despite persistent current account deficits, the UK had returned to a net external asset position of 2% of GDP by 2003 Q2, having had net external liabilities of more than 15% of GDP in early 1999 (Chart 85). The adverse effect on the UK's net external assets of persistent borrowing from abroad has been offset by revaluations of its stock of net external assets,³⁹ in the past few years due largely to the fall in sterling.

38: See Benito, A, Whitley, J D and Young, G (2001) 'Analysing Corporate and Household Sector Balance Sheets', *December 2001 Financial Stability Review*. The model has been developed further to incorporate adjustment by companies in response to changes in their balance sheets: see Bunn, P and Young, G (2003) 'Balance sheet adjustment by UK companies', *Bank of England Quarterly Bulletin (Autumn)*.

39: See Westwood, R and Young, J (2002), 'The external balance sheet of the United Kingdom: recent developments', *Quarterly Bulletin (Winter)*.

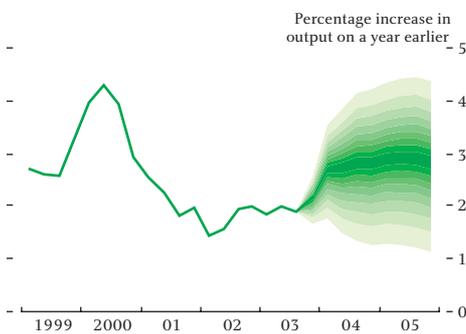
Chart 83:
Sectoral financial balances



Source: ONS.

(a) Private non-financial companies.

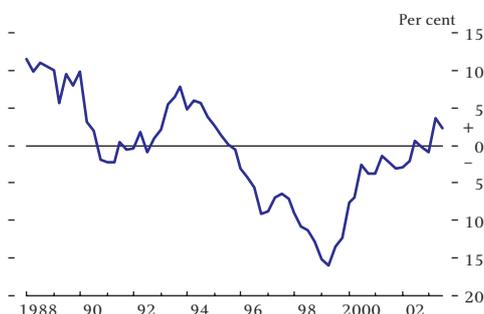
Chart 84:
November Inflation Report GDP projection based on constant nominal interest rates at 3.75%



Source: Bank of England.

The fan chart depicts the probability of various outcomes for GDP growth in the future. The darkest band includes the central (single most likely) projection. See also the footnote to Chart 1 in the *Nov. 2003 Inflation Report*.

Chart 85:
UK net external assets as a percentage of GDP^(a)



Source: ONS.

(a) GDP is annualised.

2.2 The household sector

Income, saving and the financial position

The broad picture for the household sector remains one of slackening growth in post-tax incomes, a declining saving ratio and a widening financial deficit (Chart 86), despite upward revisions to estimated household income and the saving ratio. Higher National Insurance contributions and increased Council Tax payments have tended to reduce post-tax incomes this year. But income growth remains positive, and unemployment has continued to be stable and low.

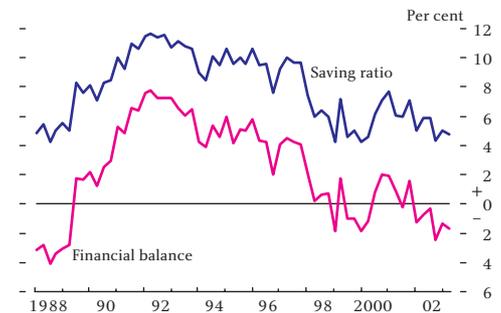
Rising indebtedness

The shift in the household sector's financial position, from the surpluses of the 1990s to the more recent deficits, means borrowing has risen relative to financial asset accumulation. This mainly reflects the growth since 1996 in borrowing secured on property (Chart 87). The strength of mortgage borrowing has persisted despite the signs noted in the June *Review* of a weakening of housing market activity. Forward-looking indicators, such as loan approvals and net reservations, have since picked up. And although annual house price inflation has slowed since the June *Review*, three-monthly rates of house price increase have risen slightly.

Rapidly increasing house values may have priced some first-time buyers (FTBs) out of the market. Others have managed to remain in the market by taking out larger loans: the proportion of FTBs with loan-to-income ratios in excess of three has risen substantially in recent years, especially in Greater London and the South East (Chart 88). That may partly reflect the transition to a low interest rate environment, which has reduced the initial debt-servicing costs of a mortgage, and so raised demand – particularly from cash-constrained FTBs. Higher loan-to-income ratios will have increased their vulnerability to a rise in interest rates or a fall in their incomes. But the share of FTBs with loan-to-value ratios of over 90% has fallen back in recent years, suggesting that FTBs are in a better position to weather any fall in house prices.

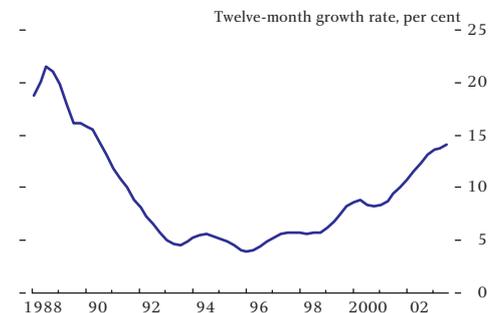
Some 40% of gross mortgage advances are still accounted for by remortgaging, probably reflecting in part the refinancing of existing mortgages at lower discounted rates. Remortgaging also provides one way in which households can extract housing equity.⁴⁰ Mortgage equity withdrawal has remained high and only a little below the peaks of the late 1980s as a share of post-tax income (Chart 89). It could well have risen further in 2003 Q3, given the recent robust lending data. But strong equity withdrawal has not raised the household sector's mortgage debt

Chart 86:
Household financial balance and saving as a percentage of post-tax income^(a)



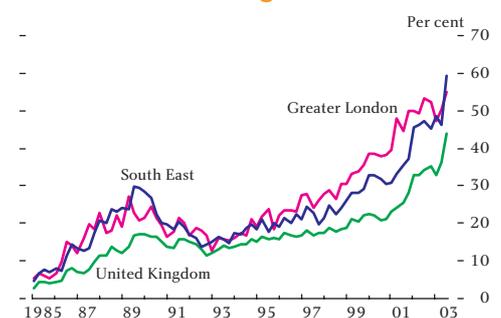
Sources: ONS and Bank of England.
(a) Data are seasonally adjusted and quarterly.

Chart 87:
Secured borrowing by individuals



Source: Bank of England.

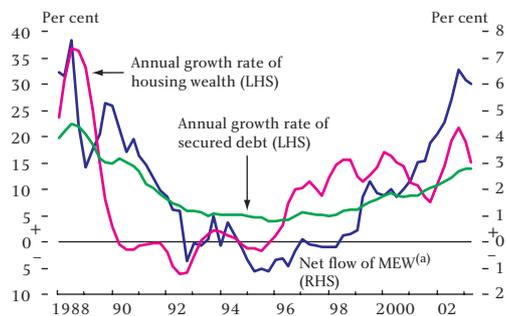
Chart 88:
Percentage of first-time buyers with loan-to-income ratios greater than three^(a)



Sources: Council of Mortgage Lenders and Bank calculations.
(a) The Council of Mortgage Lenders changed the method used for validating loan-to-income ratios from June 2003 onwards. This has led to an increase in the estimated percentage of first-time buyers with loan-to-income ratios greater than three from that date.

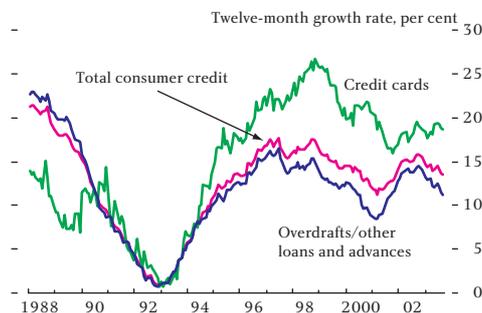
40: See the box on pages 8–9 of the November 2003 *Inflation Report* for the various ways of withdrawing and injecting housing equity.

Chart 89:
Mortgage equity withdrawal and components of net housing equity



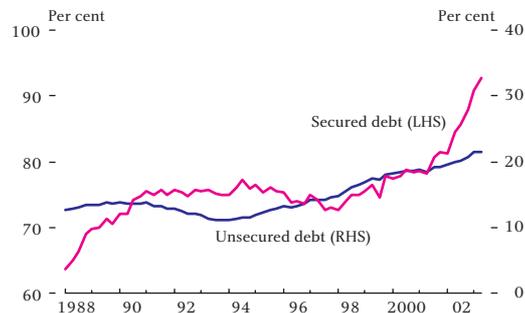
Sources: ONS and Bank of England.
 (a) As a percentage of post-tax income.

Chart 90:
Borrowing by individuals: breakdown of consumer credit^(a)



Source: Bank of England.
 (a) Data are seasonally adjusted.

Chart 91:
Consumer secured and unsecured debt as a percentage of post-tax income^{(a)(b)(c)(d)}



Sources: ONS and Bank of England.
 (a) Data are quarterly.
 (b) Debt data are not seasonally adjusted.
 (c) Post-tax income is annualised.
 (d) Consumers are defined as the household sector excluding sole proprietors, partnerships and non-profit making institutions serving households.

relative to its housing assets: since 1996, the rise in gross housing wealth has generally outpaced that of secured indebtedness (Chart 89), so net housing equity has grown substantially.

Unsecured borrowing growth has also remained buoyant over the past year, although it has eased back from the peak in autumn 2002 (Chart 90). Borrowing on credit cards has grown particularly rapidly and now accounts for around 30% of the total stock of unsecured consumer debt. Other unsecured borrowing, including overdrafts and personal loans, has also continued to increase strongly. But the British Household Panel Survey (BHPS)⁴¹ suggests that a relatively large proportion of households do not have any debt at all⁴² (43% in 2000, the last year for which these data are available). More recent information on the share of people holding unsecured debt (Box 6) suggests that participation in the unsecured debt market has not changed significantly since 2000. It also indicates that most of the increase in unsecured borrowing since 2000 reflects greater borrowing by those with higher incomes.

Balance sheet indicators

Continued rapid debt accumulation, together with the slowdown in household income growth, has led to a further rise in the overall household sector debt-to-income ratio, which reached a record 129% of annualised post-tax income in 2003 Q2. The longer-term increase in the secured debt-to-income ratio partly reflects demographic factors such as the spread of home ownership, although these factors cannot explain all of the recent sharp rise in this ratio⁴³ (Chart 91). The unsecured debt-to-income ratio also rose to a new high in Q2, around double its level ten years ago. Again, longer-term factors, such as a widening of access to personal credit, help to explain the increase.

Despite the record debt-to-income ratio, overall household sector capital gearing fell a little in 2003 Q2, as did the ratio of unsecured debt to financial assets (Chart 92). This reflects the further rise in housing wealth and a modest increase in financial wealth as equity prices have risen. Neither measure of capital gearing is currently substantially above its long-term average.

The increase in aggregate debt raises households' vulnerability to any unexpected fall in incomes or rise in interest rates. In the event of any such shocks, households' ability to meet debt repayments readily from their pool of assets has fallen in recent

41: For more information on the BHPS, see Cox, P, Whitley, J D and Brierley, P G (2002) 'Financial pressures in the UK household sector: evidence from the British Household Panel Survey', *Bank of England Quarterly Bulletin (Winter)*.

42: Surveys such as the BHPS generally exclude as debt the proportion of credit card balances paid off in full each month.

43: See Hamilton, R (2003) 'Trends in households' aggregate secured debt', *Bank of England Quarterly Bulletin (Autumn)*.

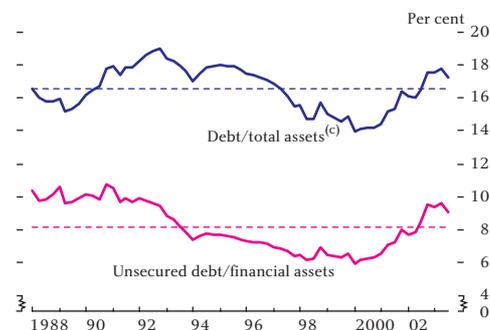
years, as household liabilities have risen in relation to liquid financial assets. The standard indicator of households' ability to service debt is their income gearing – the ratio of debt interest payments to income. This has remained stable since the end of 2001 (Chart 93). A broader measure of the total debt servicing cost that also includes regular repayments of mortgage principal has risen a little but remains below its long-term average. Other things being equal, the accumulation of debt in recent years will have increased the sensitivity of income gearing to interest rate rises, but the effect of any future change in interest rates will also depend on the shares of the mortgage stock accounted for by fixed and floating-rate borrowing. The latest data, for July, suggest that fixed-rate mortgages account for just under a third of the total mortgage stock⁴⁴, although the share of new fixed-rate borrowing has fallen back in recent months, as rates charged on fixed-rate mortgages have risen alongside swap rates.

Indicators of stress

Although the numbers remain small as a proportion of the population, personal insolvencies have risen by a further 18% over the past year (Chart 94). The rise in recent years reflects an increase in bankruptcies both of the employed and particularly the unemployed (bankruptcies of the self-employed have fallen). Over the same period, the proportion of credit card accounts in arrears has risen, although this has fallen back over the past year, as have arrears on other types of unsecured debt. And mortgage arrears as a share of the total mortgage stock have fallen to near-record lows (Chart Q in the Overview section). In the absence of a sharp pickup in income gearing or unemployment, or a marked fall in house prices, overall arrears are likely to remain low.

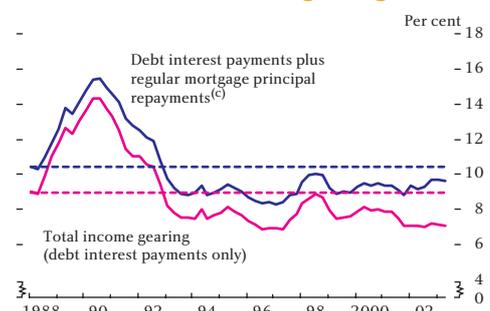
As noted in Box 6, a recent survey commissioned by the Bank suggests that the proportion of households that consider their unsecured debt repayments to be a burden has remained relatively flat in recent years. But earlier surveys also indicate a connection between problems in repaying unsecured and mortgage debt. Some 36% of households reporting in the 2000 BHPS that their unsecured debt repayment commitments were a heavy burden also reported problems in meeting mortgage commitments, compared with only 4% of those not reporting problems in meeting unsecured debt repayments. Those households facing difficulty in financing both their unsecured and secured debt are likely to be particularly vulnerable to adverse economic events or changes in individual financial circumstances.

Chart 92:
Household sector capital gearing^{(a)(b)}



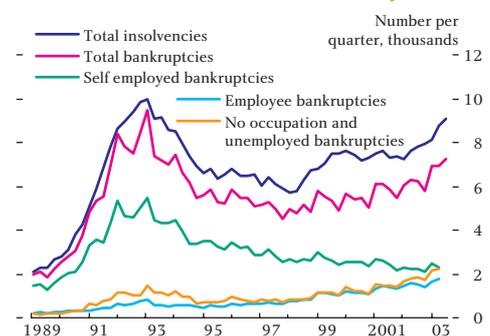
Sources: ONS and Bank of England.
(a) Dashed lines indicate averages of series from 1988 Q1 to 2003 Q2.
(b) Data are not seasonally adjusted.
(c) Financial wealth plus housing wealth.

Chart 93:
Household sector income gearing^{(a)(b)}



Sources: ONS and Bank of England.
(a) Payments as a percentage of post-tax income.
(b) Dashed lines indicate averages for the series over the period from 1988 Q1 to 2003 Q2.
(c) See page 82 of the Jun. 2002 *Review* for details of how this series is constructed.

Chart 94:
Personal insolvencies and bankruptcies^{(a)(b)(c)}



Source: DTI.
(a) Data are for England and Wales. Total insolvencies are seasonally adjusted; bankruptcy data are not seasonally adjusted.
(b) Total insolvencies include bankruptcy orders and individual voluntary arrangements.
(c) Figures for 2003 Q3 are provisional.

44: Based on data from CACI Ltd.

Box 6: Unsecured debt

Unsecured borrowing by households has risen rapidly in recent years. The risks arising from this build-up of debt are likely to be greater if debt is concentrated among more vulnerable households. There are no regular up-to-date surveys on the distribution of debt; the latest public information is from the 2000 wave of the British Household Panel Survey (BHPS).¹ To supplement this, the Bank commissioned a special survey from NMG Research, who in October asked a representative sample of 1,950 adults about their unsecured debt. Further details will be published in the *Winter 2003 Bank of England Quarterly Bulletin*.

Some 34% of the respondents have unsecured debt, similar to rates derived from the BHPS for 2000. The average debt reported for debtors was £3,516, a little higher than the 2000 BHPS figure of around £3,200.² Both surveys indicate that the likelihood of having debt and the level of debt are higher for 25–44 year olds than for other age groups, and are positively correlated with income. Comparing the two surveys, it seems that average debt has risen since 2000 only for debtors in the highest income group (defined here as income of £17,500 and above per annum).

The risks associated with unsecured debt depend on the type of lending. Table A shows that, taken together, average debt for the low and middle income groups is highest in personal loans and hire purchase agreements (excluding student loans). Lenders have better control over the supply of such loans than over credit card lending. However, average debt outstanding on credit cards is also relatively high for low income debtors, and differs only slightly across income groups. Yet only 6% of individuals in the lowest income group have debt outstanding on a credit card, whereas 22% of the middle and 32% of the highest income group do so.²

According to the NMG survey, 10% of debtors report their unsecured debts to be a heavy burden, 22% somewhat of a burden and the majority not a problem, consistent with the results of other recent surveys.³ The

share of individuals reporting unsecured debt of £5,000 or more is relatively low, at 6%, and concentrated among individuals with higher incomes. However, of debtors of £5,000 or more, 17% reported their debt to be a heavy burden and an additional 25% somewhat of a burden.

The share of households reporting debt to be a burden seems little changed in recent years. In the BHPS surveys from 1995 to 2001, around 10% reported their debts to be a heavy burden and 29% somewhat of a burden, similar to the NMG survey. The rapid growth of unsecured debt in recent years has not, therefore, as yet led to any overall increase in the degree of financial distress reported by households. But the survey does point to a small group of heavily indebted individuals who continue to face substantial problems in servicing their debt.

Table A:
Average amount borrowed by individual debtors, and participation rates, by household income and credit instrument^{(a)(b)}

Instrument	Annual household income:			
	Less than £9,500	£9,500- £17,499	£17,500 and more	All ^(c)
HP agreement	1,525 (5)	1,978 (6)	2,743 (11)	2,468 (5)
Personal loan	1,959 (10)	3,479 (16)	5,231 (27)	4,388 (13)
Overdraft	359 (5)	715 (9)	855 (16)	718 (7)
Credit card	1,580 (6)	1,037 (22)	1,952 (32)	1,445 (15)
Catalogue/mail order	335 (9)	345 (13)	249 (9)	302 (8)
Student loan	5,967 (3)	4,044 (2)	5,196 (3)	6,343 (3)
DSS social fund	286 (7)	160 (4)	200 (0)	233 (2)
Any other loans	320 (2)	519 (4)	4,528 (2)	1,422 (2)
Any unsecured debt	1,936 (31)	2,398 (45)	4,991 (54)	3,516 (34)
Per cent of respondents with debt of £5,000 or more:	3	5	18	6

Sources: NMG and Bank calculations.

(a) Average amounts borrowed by those using each instrument are in £ and participation rates in percentages of debtors (in parentheses).

(b) 36% of respondents reporting their income are in the lowest income group, 28% in the middle and 36% in the highest. Those shares are more concentrated among low-income households than in the population as a whole. Income is before any deductions.

(c) Includes those who did not report their incomes.

1: See Cox, P, Whitley, J and Brierley, P (2002) 'Financial pressures in the UK household sector: evidence from the BHPS', *Bank of England Quarterly Bulletin*, Vol. 42, No. 4, pages 410–419.

2: There is a substantial gap between the aggregate amount of unsecured debt reported in survey responses and that published in official statistics. Some of the difference is due to the fact that household surveys exclude credit card and other bills fully paid off in the current month; these are included in the national accounts.

3: See, for example, Edwards, S (2003) 'In too deep. CAB clients' experience of debt', Citizens Advice Bureau.

2.3 The corporate sector

Profitability

Corporate profitability has strengthened somewhat, alongside faster economic growth at home and abroad. Gross trading profits of non-oil private non-financial companies (PNFCs) rose by 4.6% in the year to 2003 Q2 (excluding the alignment adjustment⁴⁵). The gross operating surplus of PNFCs has picked up a little in relation to GDP, after several years of falls (Chart 95). Company accounts data indicate that operating profit margins have stabilised for quoted companies that have reported results for financial years ending in 2003.⁴⁶ And Consensus forecasts for company earnings in 2004 have risen since the start of the year (Chart 96).

Capital gearing and balance sheet adjustment

If sustained, higher profits and equity valuations may assist companies restructuring their balance sheets. The need for such adjustment arises from the substantial rise in corporate sector capital gearing since the mid-1990s (Chart 97), reflecting the financing of the earlier M&A boom and heavy borrowing by the telecoms and commercial property sectors. Recent Bank research suggests that capital gearing remains well above the level that would be expected in the long run given the tax advantages of debt relative to equity finance.⁴⁷

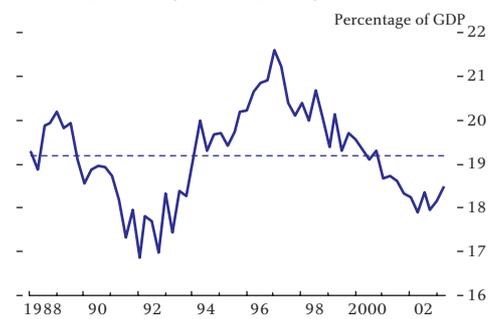
Previous *Reviews* have discussed how those companies with excessive gearing have sought to repair their balance sheets, for example through dividend cutbacks, reductions in capital expenditure and refinancing of debt. In aggregate this has helped stabilise – but not lower substantially – capital gearing (on the replacement cost definition) over the past two years. Gearing relative to the capital stock at current market values has remained at historically high levels. This evidence might suggest that the process of balance sheet adjustment has further to run. But data since the *June Review* suggest that there has been little further adjustment through dividend reductions and expenditure cutbacks. Indeed, PNFCs' total dividend payments rose sharply in 2003 H1, albeit from a low level in 2002 H2, and gross fixed capital formation rose by over 5% in 2003 Q2 (Chart 98), although business investment fell back again in Q3. But increased profitability has allowed the corporate sector to remain in financial surplus, consistent with continued but slower adjustment. The improvement in macroeconomic and market conditions this year may also have led some companies to believe that the risks associated with high gearing have fallen or

45: This alignment adjustment reconciles the income and output measures of GDP.

46: Some 469 quoted companies have so far reported results for financial years ending in 2003, just below 40% of the total sample.

47: See Bunn, P and Young, G (2003) 'Balance sheet adjustment by UK companies', *Bank of England Quarterly Bulletin* (Autumn).

Chart 95:
PNFCs' gross operating surplus^{(a)(b)}

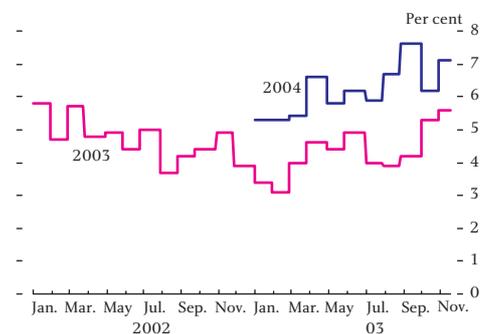


Source: ONS.

(a) Data are quarterly and seasonally adjusted.

(b) Dashed line indicates average of series from 1988.

Chart 96:
Consensus profit expectations for 2003 and 2004^{(a)(b)(c)}



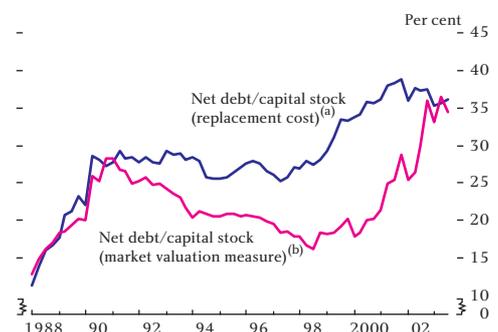
Source: Consensus Economics Inc.

(a) Defined as company trading profits.

(b) Average percentage changes for the year shown relative to a year earlier.

(c) Horizontal axis refers to the month in which the survey of forecasters is undertaken.

Chart 97:
PNFCs' capital gearing

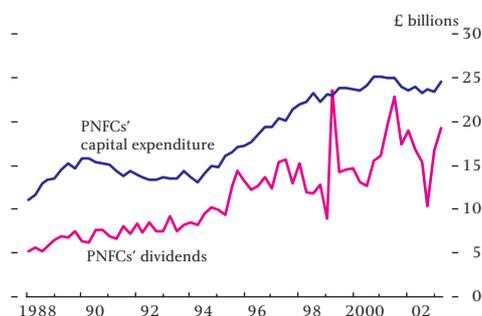


Sources: ONS and Bank of England.

(a) PNFCs' net debt divided by the total value of capital at replacement cost.

(b) PNFCs' net debt divided by the market value of UK-resident assets.

Chart 98:
PNFCs' dividends and capital expenditure^(a)



Source: ONS.

(a) Data are seasonally adjusted and quarterly.

Table 7:
Characteristics of firms in 2002 by dividend payer status^{(a)(b)}

	Dividend payers in 2002	Former dividend payers ^(c)
Number of firms	709	200
Median operating profit margin	7.4	-2.7
Percentage of firms making a loss	7.2	60.5
Median capital gearing at market value	16.1	33.3
Median capital gearing at replacement cost	14.6	15.5
Median number of employees	1,388	271

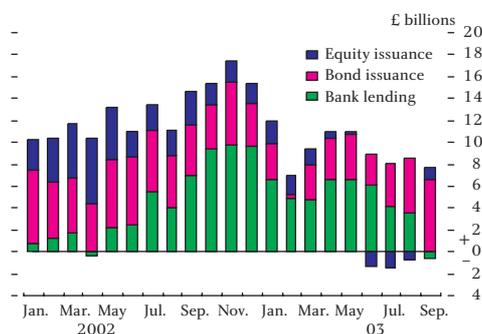
Source: Thomson Financial Datastream.

(a) Based on a sample of 1,253 quoted PNFCs. This includes 344 firms that have never paid dividends, which are not reported in the table.

(b) Data are percentages, except for number of firms and employees.

(c) Firms that did not pay a dividend in 2002 but had paid a dividend at some stage previously.

Chart 99:
Components of external finance for UK PNFCs^{(a)(b)(c)}



Source: Bank of England.

(a) Data are seasonally adjusted three-month rolling totals.

(b) Bank lending data exclude changes in MFIs' holdings of securities and also exclude the effects of securitisations.

(c) Figures exclude borrowing by PNFCs from foreign MFIs.

that gearing may in future be restrained through increased profitability or equity issuance.

Aggregate trends may conceal important variations across companies. The large increases in dividend payments and rise in capital spending in 2003 Q2 are likely to have been concentrated among stronger cash-rich large companies, the profitability of which may have benefited most from the pickup in GDP growth. Company accounts data indicate that companies that paid dividends in 2002 were much more profitable and less highly geared than companies that did not pay dividends in 2002, but had previously paid dividends (Table 7). But the latest data suggest that capital gearing (at replacement cost) of the most indebted decile of quoted companies that have published accounts for year-ends in 2003 has continued to rise. For these companies, at least, adjustment may be protracted.

The extent of corporate adjustment is also likely to depend on the size of deficits on companies' defined-benefit pension schemes, as they seek to reduce those deficits over time through increased employer contributions to those schemes. The aggregate deficit of FTSE-100 companies has fallen back somewhat to an estimated £57 billion (5.7% of their aggregate market capitalisation) at 31 October 2003⁴⁸, compared with £83 billion (10% of market capitalisation) at 31 January 2003. This reduction reflects the recovery in equity prices and the rise in bond yields. Nonetheless, pensions deficits remain a source of financial pressure for some companies.

Adjustment may be assisted if improving profitability allows the corporate sector to reduce its dependence on debt finance. The flow of PNFCs' total external finance has been lower so far this year than in 2002 H2 (Chart 99). Bond issuance has picked up somewhat since the turn of the year. But the flow of PNFCs' borrowing from UK-resident banks has fallen considerably in recent months and companies in some sectors, notably manufacturing, have continued to repay bank debt. Discussions with companies suggest that access to finance has improved. But access to bond market finance has become easier relative to bank finance, with corporate bond spreads narrowing further (Section 1.1) and by rather more than bank loan spreads. That has led a number of companies to refinance their bank debt at longer maturities through increased bond issuance.

Income gearing and debt sustainability

Despite the weak overall profitability and the debt accumulation of recent years, low and falling interest rates over this period have helped to keep corporate income gearing moderate

⁴⁸ For the sake of comparability, this estimate includes six companies who were no longer in the FTSE-100 as of 31 October 2003. It also does not include nine FTSE-100 companies who do not have significant defined-benefit pension schemes or for whom the relevant data were not available.

(Chart 100). The nascent recovery in profitability so far this year has reduced corporate income gearing further (Chart 101). Median income gearing has also fallen, according to the accounts of profit-making quoted companies that have published results for year-ends in 2003 (Chart 102). But income gearing has remained high for the most vulnerable firms – those in the highest income gearing decile – although it stands well below levels in the recessions of the early 1990s and early 1980s (Chart 102). The pickup in interest rates across the yield curve could signal upward pressure on the debt servicing burdens of these firms. And, other things being equal, the sensitivity of firms' income gearing to interest rate rises will have been raised by corporate debt accumulation over recent years. As with households, the effect of any future changes in interest rates will also depend on the shares of fixed and floating-rate debt.

In aggregate, however, corporate sector interest cover and liquidity remain strong, which helps to explain why the overall rate of insolvency for companies has been so low in recent years (Chart 103). Indeed, the rate fell below 1% in the first half of 2003, for the first time in 15 years, and fell further to a record low of 0.83% in Q3. Although balance sheet adjustment by larger firms in sectors such as telecoms may have put substantial pressure on smaller suppliers and customers, this does not yet appear to have led to any substantial rise in business failures. Bank research suggests that probabilities of failure (derived from company accounts data) are generally lower for larger companies⁴⁹, partly reflecting their higher profitability and better liquidity on average, but also perhaps their more diversified income streams and sources of finance. But discussions with both corporate recovery bankers and major providers of small business finance suggest that small business failures have been lower than expected over the past year, perhaps partly because activity has held up better than envisaged.

The short-term outlook for company failures overall remains relatively benign. Although receiverships rose in Q3, in contrast to the trend over the past decade, they were still lower than a year earlier, as were administrations and company voluntary arrangements. Market indicators of corporate prospects have also moved favourably (Section 1.1): equity prices have risen by some 6% since the June Review, and corporate bond spreads have fallen across most sectors and ratings (Chart 104). This suggests that market participants have become more optimistic about the outlook for the corporate sector, although the greater reduction in spreads at lower ratings is also consistent with investors continuing the 'search for yield' discussed in the June Review.

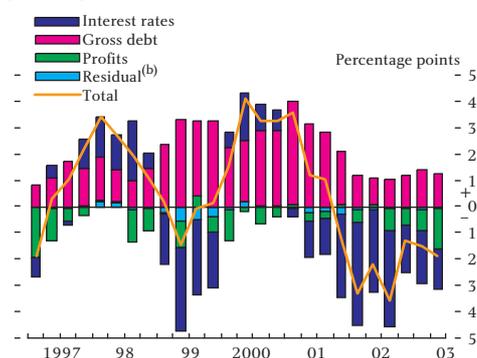
Chart 100:
PNFCs' income gearing^(a)



Sources: ONS and Bank calculations.

(a) As measured by interest payments as a share of gross operating surplus.

Chart 101:
Contributions to annual changes in income gearing for UK PNFCs^(a)

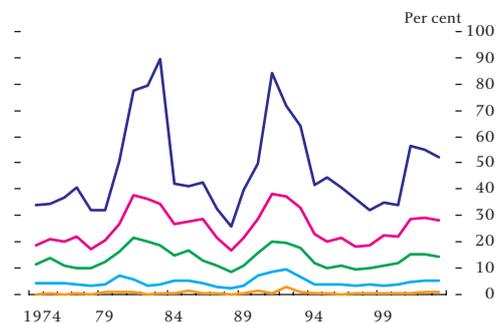


Sources: ONS and Bank calculations.

(a) Income gearing is defined as interest payments divided by pre-tax profits (gross operating surplus).

(b) A residual arising from the calculation of contributions.

Chart 102:
Income gearing of profitable firms with 2003 accounts^{(a)(b)}



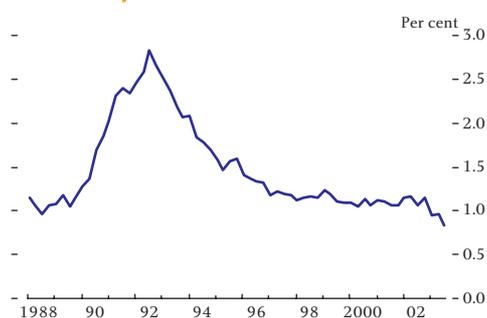
Sources: Thomson Financial Datastream and Bank calculations.

(a) Beginning at the highest line, the 90th, 75th, 50th, 25th and 10th percentiles of income gearing are shown.

(b) Based on a sample of 469 quoted PNFCs in 2003; the sample diminishes for earlier years depending on the existence of those companies at that time.

49: See Bunn, P (2003) 'Company accounts-based modelling of business failures', in the current Review. In this approach, size is measured by the number of employees.

Chart 103:
Rate of corporate insolvencies^{(a)(b)}

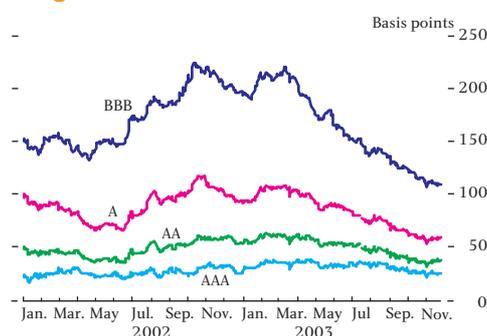


Sources: DTI and Bank calculations.

(a) In England and Wales.

(b) Calculated as the annualised number of insolvencies in the quarter divided by the number of active registered companies in the last month in that quarter.

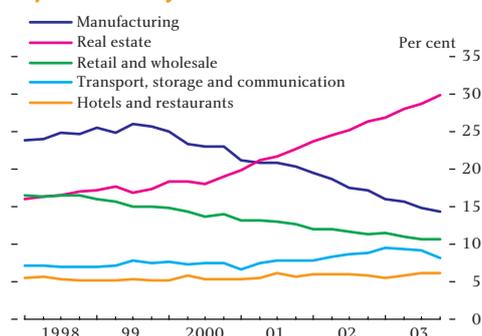
Chart 104
Sterling corporate asset swap spreads, by rating^(a)



Source: Merrill Lynch.

(a) Asset swap spread is defined as the option-adjusted spread over London Inter-Bank Offered Rate of a matched floating rate bond.

Chart 105:
UK-resident bank lending to non-financial corporations by sector^(a)



Source: Bank of England.

(a) Percentage share of total stock of non-financial corporate sector borrowing from UK-resident banks. Includes borrowings in all currencies.

Models of corporate default probability based on financial market prices have become more optimistic since the June Review. A Bank model of default probabilities, based on market valuations⁵⁰, shows a sharp decline in expected default probabilities, reflecting the recovery in equity prices. In contrast, the accounts-based model suggests a small rise in default probabilities. Both models have over-predicted the actual liquidations rate in recent years, especially in the past 18 months. As noted in the June Review, lower-than-predicted liquidations may have reflected the greater incidence of successful restructurings of companies that have defaulted on their debt, most notably in the power and telecoms sectors.

The commercial property sector

Borrowing by real estate companies has risen rapidly over the past five years, almost doubling as a share of the stock of non-financial corporate borrowing from UK-resident banks to close to 30% (Chart 105). But borrowing growth has eased since June, rising by 3.2% in Q3, compared with an average quarterly increase of over 5% during the previous year. The slowdown perhaps reflects the rise in the yield curve since mid-June, which will have raised the cost of new bank finance.

According to the latest De Montfort survey⁵¹, a significant share of bank lending in recent years has been directed into retail property, where rental and capital values have continued to rise (Chart 106). The office sector accounts for a similar share of the stock of lending – around 30%. Office rental and capital values have fallen in the past two years (Chart 106), with those falls largely affecting Central London offices. That can be attributed to a weakening in occupier demand in the City office market in particular.

In contrast to the 1980s, investment in this market has largely been in 'bond-type' assets let on long leases to tenants rather than in speculative development, although discussion at the Bank's Property Forum⁵² suggests that investment in medium-term let property has risen recently. The profitability of these investments will hinge on the outlook for office markets in the next few years. But tenant default rates have remained low, reflecting low rates of corporate insolvency and benign debt servicing conditions.

Evidence from the De Montfort survey suggests an estimated 50% of property debt is due to be refinanced in the next five years (Chart 107). If the capital and rental values of a

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

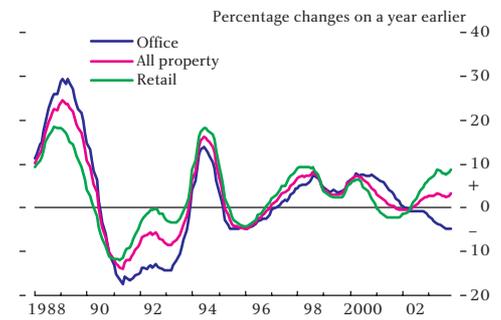
51: See Maxted, W and Porter, T (2003) 'The UK commercial property lending market', De Montfort University, May.

52: For background on the Property Forum, see the [Box on page 72 of the November 1999 Financial Stability Review](#).

property due for refinancing have fallen markedly, the continuation of finance might require an additional injection of equity from the borrower. And if the borrower were unable or unwilling to meet that requirement, banks might make 'forced sales' of property to recover the value of their loans. There has been little evidence so far of distressed sales of properties whose capital values have fallen, in contrast to the early 1990s. And banks would have an incentive to renegotiate to avoid losses, particularly if forced sales risked lowering capital values further. Discussions with lenders suggest that they are prepared to wait and see whether capital values recover in the medium term, as long as interest payments remain secure.

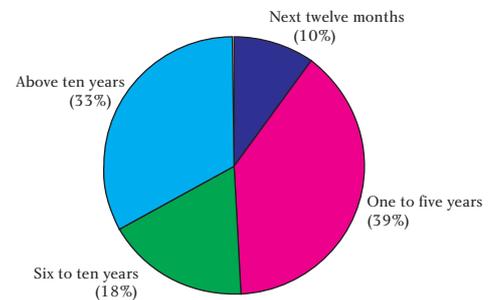
One risk is that the yield curve could move up further. That would increase the costs of refinancing loans and stretch interest cover, particularly for highly leveraged investors – such as some private companies and syndicates of private investors – who have accounted for much of City office investment in recent years. Another risk is a prolonged delay in rental and capital recovery for City offices, perhaps due to a rationalisation of the use of business space by occupiers and increased competition from alternative locations. In that situation, lenders might become more reluctant to maintain loans where loan-to-value covenants have been breached. But the outlook for the commercial property sector overall is also likely to reflect wider economic conditions, which have improved since the June *Review*.

Chart 106:
Commercial property capital values index



Source: Investment Property Databank.

Chart 107:
Proportions of commercial property debt due for repayment as at end 2002



Source: Maxted, W and Porter, T (May 2003) 'The UK commercial property lending market', De Montfort University.

3 The UK financial system

3.1 The UK insurance sector

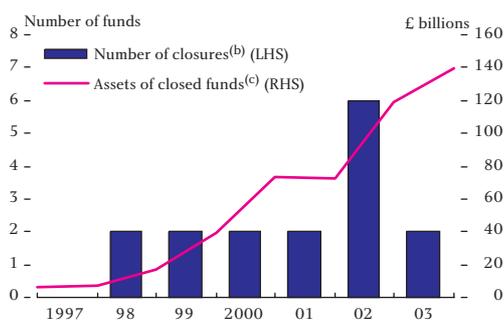
Recent developments

Previous *Reviews* have highlighted UK life insurers' equity exposures and the adjustment in their portfolios away from equities during 2002 and early 2003. At end-2002, equity holdings accounted for about 30% of life insurers' total assets, compared with 49% at end-2000. This shift has reduced life insurers' exposure to equities, while the increase in equity prices in recent months has reduced pressure on their solvency margins.

In shifting away from equities, life insurers increased their holdings of government and corporate bonds, from 34% of total assets at end-2000 to 49% by end-2002, changing the nature of their exposure to market risk. The recent increase in long-dated bond yields ([Section 1.1](#)) has been less marked in the United Kingdom than the United States, and is not likely to have had a significant impact on the measured solvency of UK life insurers.⁵³ It remains to be seen how life insurers' future demand for different types of asset, including bonds and equities, will be affected by reforms to their regulatory regime (set out in this *Review's* 'Strengthening financial infrastructure' article).

Overall, life insurers reported improvements in their investment returns for the first half of 2003, but have also continued with the efforts to rebuild their balance sheets mentioned in the June 2003 *Review*. Some groups have raised additional capital – UK-owned groups have raised £2.5 billion since the beginning of June – largely through issuing subordinated debt. Other groups have chosen instead to scale down some of their activities, selling individual firms or closing funds to new business. For life insurers, the sale of new with-profits policies incurs a relatively high initial cost in terms of the capital that needs to be set aside – known as 'new business strain'.⁵⁴ As a result, some firms with tight solvency margins have chosen to close funds rather than write new with-profits policies. The number of funds closing to new business increased significantly in 2002, but has since fallen back ([Chart 108](#)). Those funds remaining open continue to report lower demand for traditional with-profit products, but some have begun to report improving sales of unit trusts and group pension business (ie pensions sold to groups of people, such as employees of a particular company).

Chart 108:
Closures of UK-resident large with-profits funds^(a)



Sources: FSA and Bank calculations.

(a) Large funds defined as those with with-profits liabilities over £500 million.

(b) Number of closures during year (2003 shows year-to-date).

(c) Cumulative total non-linked assets of all large closed funds (2003 estimate based on end-2002 data).

53: The duration of life insurance firms' liabilities is often longer than that of their assets, and fixed-interest assets are not always held to match fixed-interest liabilities. Hence, when long-dated bond yields increase, the present value of life companies' liabilities can decrease by more than the fall in the value of their assets.

54: The capital that life insurers must set aside when a new policy is sold does not fully take into account the fact that some of the initial expenses of the policy, such as commissions paid to salespeople, will be recuperated through future premiums.

The general insurance sector, although holding fewer financial assets than life insurers, has for many years relied upon investment income to counteract losses incurred on their underwriting activities (Chart 109). Such underwriting losses have been falling recently as firms have concentrated on reducing the ratio of claims and expenses to premium income – known as the ‘combined ratio’ – and as premium rates in some lines of business have risen. Overall, solvency levels in the general sector declined during 2002, but profits have been slightly stronger in 2003, because of relatively high premium income.

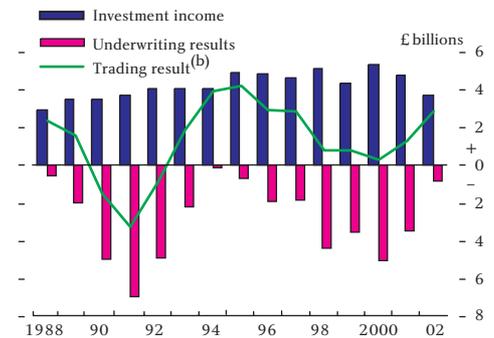
The impact on the large UK-owned banks

The insurance sector has weathered the recent strain without any obvious signs of contagion between insurers, although there has perhaps been some loss of confidence in long-term savings products (Chart 110). The insurance sector may, however, have a wider impact through links with other parts of the financial system – most notably with banks. Links between the banking and insurance sectors include ownership, but also lending and off-balance-sheet exposures – including letters of credit or undrawn facilities.

Direct lending by large UK-owned banks to insurers in the United Kingdom remains low at around 5% of Tier 1 capital. More marked is the ownership channel. Six of the ten largest UK-owned banks own life insurance subsidiaries, and three have general insurance operations. Banks’ involvement in the insurance sector has increased over the past five years, although they make up a relatively small share of the total market (Chart III). Sales of insurance products also affect banks’ income where banks do not own but instead have a distribution agreement with an insurer. Some insurers also own banks, forming an additional link between the sectors.

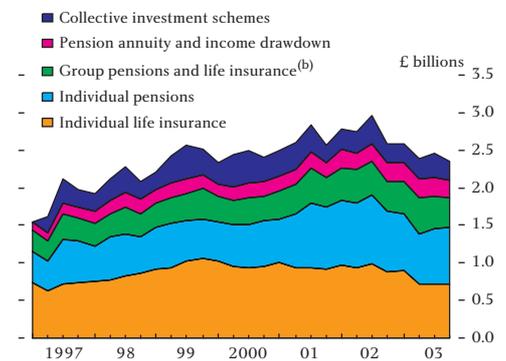
Banking parents have in recent years faced some capital calls from insurance subsidiaries, as discussed in the December 2002 *Review*. More recently, however, many of the large UK-owned banks reported higher income from their insurance – particularly general insurance – operations.

Chart 109:
UK-resident general insurers’ trading results^(a)



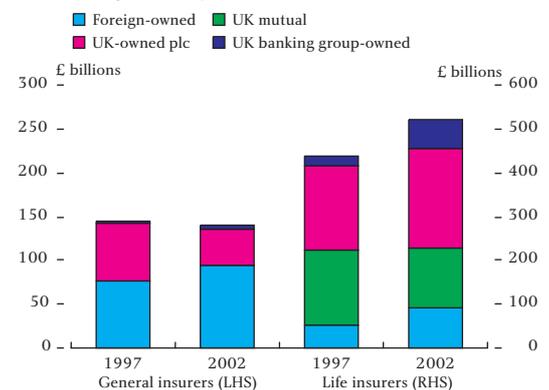
Source: Association of British Insurers.
(a) Worldwide business.
(b) Total income from ordinary activities.

Chart 110:
Life insurers’ UK sales of long-term savings products^(a)



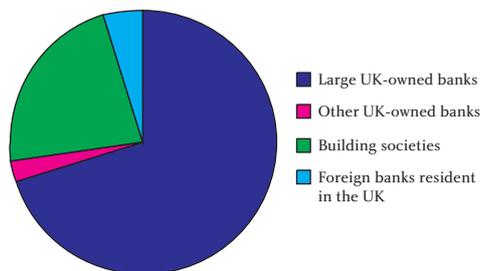
Source: Association of British Insurers.
(a) Annual premium equivalent basis (ie regular premiums plus a tenth of single premiums).
(b) Refers to the sale of policies to groups of people, such as the employees of a company.

Chart 111:
Ownership of large UK insurers^(a)



Sources: Standard & Poor’s and Bank calculations.
(a) Share of total assets held by each type of parent group.

Chart 112:
UK-resident banks' holdings of UK household deposits in June 2003



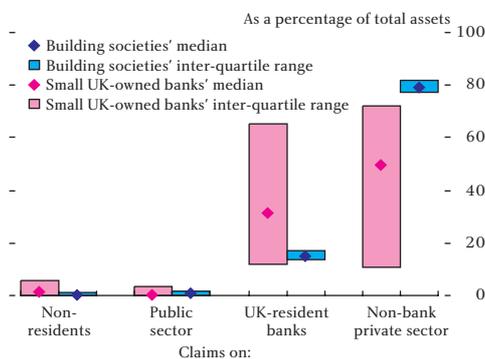
Source: Bank of England.

3.2 The UK banking sector

While there are over 300 banking groups and building societies operating in the United Kingdom, the ten largest UK-owned banking groups⁵⁵ hold the majority of UK households' deposits – some 70% (Chart 112). This Section concentrates on these banks' exposures to the developments in the global and UK environment highlighted in Sections 1 and 2, and their robustness in the event of any future pressures.

Of the other banking groups, over 200 are foreign-owned. For these banks, lending to UK households or firms is typically a small part of their global portfolio. Such banks are, however, active in the UK's wholesale markets – 23 of the top 30 UK interbank borrowers are foreign-owned – and are therefore an important potential route for transmission of overseas shocks to the UK financial system.

Chart 113:
Composition of small UK-owned banks' and building societies' assets, 2003 H1^(a)



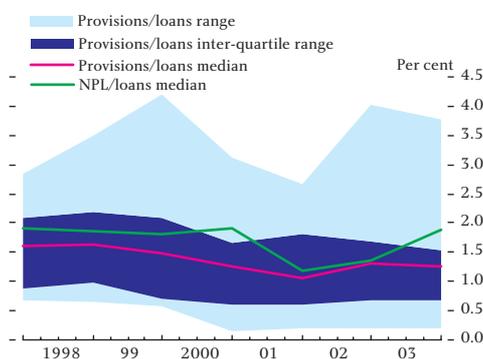
Sources: Bank of England and FSA regulatory returns.

(a) Data cover UK-resident assets only. Data only available for 24 of the larger building societies.

Building societies hold over 20% of household deposits. They are also an important part of the UK mortgage market (some 18% of the stock of lending) and households account for the majority – some 66% – of their assets. Over the past six months, the 65 building societies have reported broadly steady profits, capital and holdings of liquid assets.

In contrast to the early 1990s, the smaller UK-owned banks make up a small share of total lending activity within the United Kingdom. Small banks typically carry relatively larger exposures to the interbank and corporate, rather than the household, market – although exposures vary widely across the sector (Chart 113). Five small banks reported a loss in 2003 H1, while, for the remainder, reported profits and capitalisation were generally stable.

Chart 114:
Large UK-owned banks' non-performing loans and provisions as a proportion of loans



Source: Published accounts.

Large UK-owned banks' exposure to credit risk

Backward-looking indicators suggest that there has been little deterioration in the credit quality of the large UK-owned banks' loan portfolios: non-performing loans remained broadly stable in relation to total lending, as did provisions (Chart 114). Such indicators may, however, underestimate changes in credit quality in the face of rapid loan growth and possible lags in accounting recognition of losses.

Looking forward, the credit quality of banks' portfolios will depend on borrowers' prospects, the scale of banks' exposures, and the value of any collateral or guarantees that the banks hold. UK exposures remain, on average, a majority – some 60% – of

55: The ten largest banking groups are: Abbey National, Alliance & Leicester, Barclays, Bradford & Bingley, HSBC Holdings, HBOS, Lloyds TSB, Northern Rock, RBS Group and Standard Chartered. Throughout this Section, 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 de-mutualised building societies are included from the date that data became available.

the large UK-owned banks' on-balance-sheet assets (Chart 115). Diversification across countries and sectors may reduce the vulnerability of banks' lending to developments affecting particular borrowers' credit prospects, such as those noted in Sections 1 and 2. However, these potential diversification benefits may be limited where there are macroeconomic interdependencies between countries or sectors, or common vulnerabilities to external shocks.

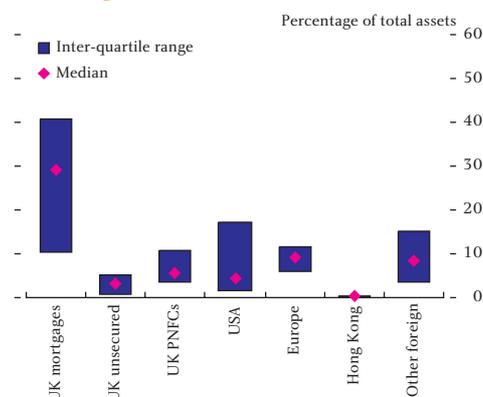
Household exposures

The large UK-owned banks' lending to households – both in the United Kingdom and abroad – is predominantly through mortgages: lending secured on residential property accounts for a large share – some 23% – of the large UK-owned banking sector's assets. UK mortgages are by far the largest share of their mortgage lending, although exposures in the United States and Hong Kong are also material. UK monetary data show that the large UK-owned banks' domestic mortgage lending has grown by some 10% over the past twelve months – above the five-year average of 7%. The growth in their total domestic mortgage exposures (Chart 116) may have been even more marked, because their lending via non-bank mortgage subsidiaries or to non-bank entities engaged in mortgage lending is not included in these data. Non-bank mortgage lenders, of which a number are owned by the large UK-owned banks, account for a growing share of the UK mortgage market (Chart 117).

Arrears on UK mortgages have continued to fall and are at historic lows. And, as outlined in Section 2, in the absence of a sharp pickup in income gearing or unemployment, or a marked fall in house prices, overall arrears are likely to remain low. Even if arrears were to rise, banks hold considerable security against their mortgage lending – the large UK-owned banks estimate that the average loan-to-value ratio (LTV) across their stock of mortgage lending is below 60%. The low LTVs reflect, in part, the impact of cumulative house price increases on collateral values since the loans were granted, notwithstanding withdrawal of equity. New lending is therefore most vulnerable – although the percentage of new loans at high LTVs continues to fall (Chart 118).

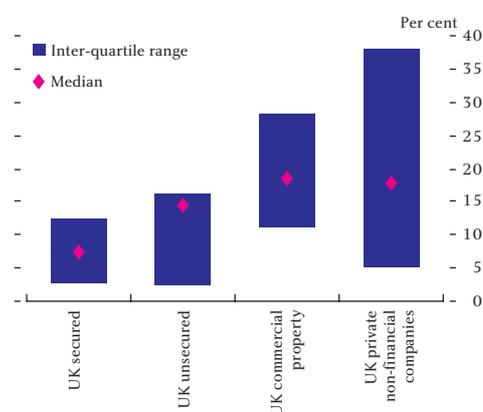
There have, at the margin, been some recent changes in mortgage lending practices. These have differing implications for the vulnerability of lending to macroeconomic changes. First, regulatory data suggest that mortgages sold with both high LTVs (90%+) and high income gearing on the part of borrowers (more than three times) have increased slightly, though remain a small part of the market. Second, there has been continued rapid growth of buy-to-let mortgages – around 15% of all new mortgage lending in the first half of 2003 was for buy-to-let – though it remains a small part of the total stock (Chart 119). Bank contacts have differing views on the vulnerability of these

Chart 115:
Large UK-owned banks' asset composition, June 2003



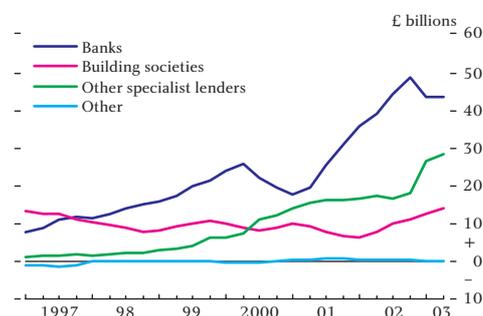
Source: Bank of England.

Chart 116:
Growth of the large UK-owned banks' domestic claims over the past twelve months



Source: Bank of England.

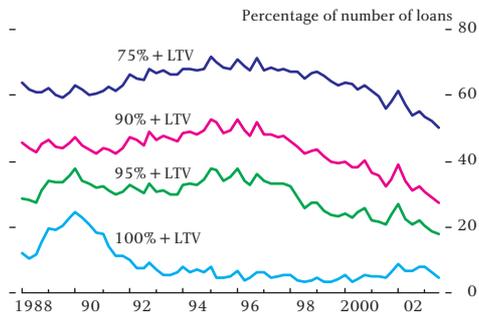
Chart 117:
UK-resident lenders' net residential mortgage lending over the previous twelve months^(a)



Source: Bank of England.

(a) Lending as recorded on the entities' balance sheets will reflect net securitisations and acquisitions between lenders.

Chart 118:
Incidence of higher loan-to-value ratios on new UK retail mortgages^{(a)(b)}

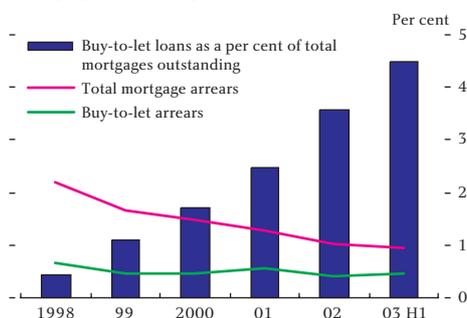


Source: Council of Mortgage Lenders.

(a) By number of loans.

(b) The questionnaire has recently been changed; and data pre-2002 include buy-to-let and are drawn from a 5% sample.

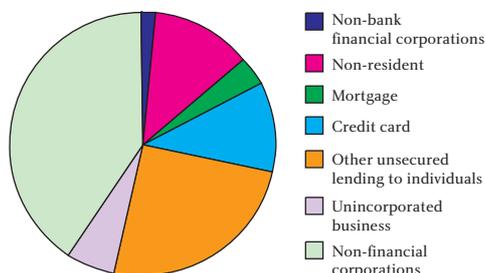
Chart 119:
UK-resident lenders' domestic buy-to-let mortgage lending^(a)



Sources: Council of Mortgage Lenders and Bank of England.

(a) UK-resident lenders are those banks, building societies and other lenders which are members of the CML and which, together, undertake around 98% of all residential mortgage lending in the UK.

Chart 120:
UK-resident banks' write-offs over the past ten years



Source: Bank of England.

exposures. On the one hand, lending is concentrated amongst a smaller number of banks than for traditional mortgages, and the behaviour of borrowers through a business cycle is untested. On the other hand, buy-to-let borrowers may be better able to finance their mortgages than first-time buyers and LTVs are typically lower. Third, sales of fixed-rate mortgages increased over the past twelve months, at their peak accounting for over half of all new mortgages – although this share has fallen in the most recent data. As discussed in [Section 2](#), the make-up of borrowing will affect the vulnerability of borrowers to any future changes in interest rates.

Available market indicators do not signal any emerging concerns: the spreads at which the large UK-owned banks are issuing mortgage-backed securities (MBS) and mortgage bonds are little changed over the past six months, and issuance volumes remain robust. Moreover, Bank contacts do not expect a material deterioration in the quality of their UK household lending portfolios over the coming months.

Unsecured lending to households is a much smaller part than mortgages of the large UK-owned banks' books ([Chart 115](#)), but write-offs have typically been higher, both as a proportion of lending and in absolute amounts ([Chart 120](#)). Such products accordingly typically attract higher prices, but banks must be able to reflect the risks in their pricing properly. Stress tests performed for the IMF in the UK's 2002 financial stability assessment programme, as discussed in the June 2003 *Review*, suggested that the banks' unsecured household lending would probably be more sensitive than their mortgage lending to a macroeconomic deterioration; this is unsurprising given that such lending is uncollateralised. The share of credit card accounts in arrears has increased over the past seven years, largely associated with some increased penetration, but arrears have recently fallen back slightly.

The large UK-owned banks also have overseas unsecured exposures: notably in Germany, Hong Kong and the United States; and HSBC's acquisition of Household in the United States will have changed the composition of their credit card exposures. But these countries have seen some improvements in the quality of household lending portfolios ([Chart 121](#)). Credit card write-offs in Hong Kong, where the large UK-owned banks have over £2.3 billion outstanding, rose sharply in 2002. Bank contacts suggest factors explaining the losses included increased competition amongst lenders and past penetration of lending to higher-risk borrowers. Mortgage lending in Hong Kong has seen less deterioration in credit quality ([Section 1.5, Chart 79](#)) and the credit quality of the large UK-owned banks' mortgage lending exposures in the United States (some £27 billion) is similarly likely to remain satisfactory ([Section 1.2, Chart 42](#)).

Corporate exposures

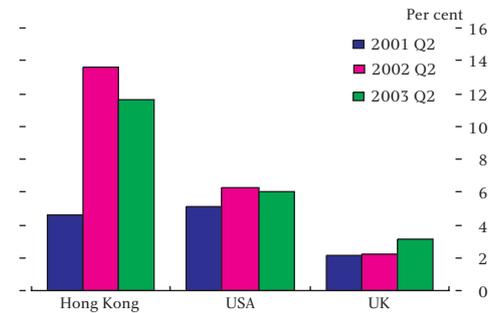
Lending to companies accounts for, on average, around one-third of the large UK-owned banks' total lending to non-bank customers (or some 16% of total on-balance-sheet assets). There are, however, other channels through which banks have exposures to the corporate sector: undrawn facilities provided to companies can be significant; holdings of debt securities on average account for 18% of the large UK-owned banks' assets – of which around one-half is likely to be issued by companies; and the majority of the large UK-owned banks have leasing subsidiaries. Lending by UK leasing entities is equivalent to some 29% of UK-resident bank lending to UK non-financial companies.

In recent years, banks have made provisions against some large global corporate bankruptcies (Section 1.2 chart 35). But over the past six months the large UK-owned banks' corporate portfolios have been reasonably robust: write-offs on UK corporate lending have not increased materially and large-scale-default rates have fallen (Section 1.2). Looking forward, the global improvement in macroeconomic conditions has reduced the credit risk attached to corporate exposures, as discussed in Section 1.1. Indeed, market indicators for companies have generally improved, although spreads remain wide in some sectors. Bank contacts are in general cautiously optimistic about UK corporate prospects going into 2004.

Lending to companies has often led to more volatile losses for banks than on their lending to households. This is in part because the available collateral is not as robust and simple to manage as residential housing (as highlighted in the December 2001 Review); and is also a reflection of the 'lumpiness' of corporate exposures (large exposures⁵⁶ to companies may account for almost half of total corporate lending). One tool that banks use to diversify and spread the credit risk of their corporate lending is syndication. Syndicated lending by the large UK-owned banks grew strongly over the first half of the year – in comparison, US banks reduced their activity. While much syndicated lending is to highly-rated entities, over recent years an increased share has been to lower-rated counterparts (Chart 122).

Previous Reviews have highlighted the scale and rapid growth of the large UK-owned banking sector's lending to the commercial property sector. Lending growth has slowed over the past six months, but remains strong; it has accounted for some 60% of lending to UK companies over the past year (Chart 123). The pace of growth over recent years may present risk management challenges to banks. Lending to the UK commercial property sector is less than Tier 1 capital for the large UK-owned banking sector as a whole, though much of this lending is concentrated

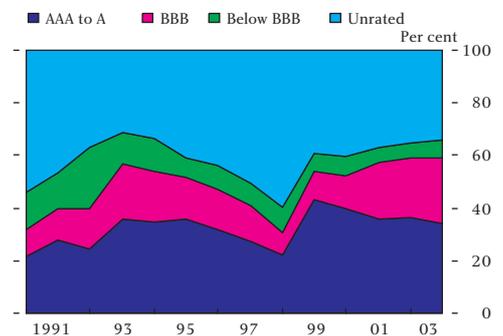
Chart 121:
UK, USA and Hong Kong annualised quarterly credit card write-offs^(a)



Sources: APACS, HKMA and FDIC.

(a) Charge-offs for Hong Kong and USA. 'Write-off' policies may differ in the three data sources.

Chart 122:
Ratings of borrowers at signing of loan agreements with large UK-owned banks^{(a)(b)}

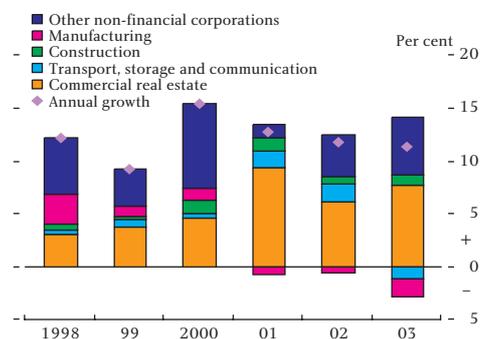


Sources: Dealogic and Bank calculations.

(a) Ratings by Moody's, S&P or Fitch IBCA.

(b) Those loans where UK-owned banks were among the participating banks in a syndicate. Some small subsidiaries may have been excluded and/or double-counted.

Chart 123:
Contributions to annual growth in large UK-owned banks' lending to UK PNFCs^{(a)(b)}



Source: Bank of England.

(a) PNFCs do not include unincorporated businesses, non-profit institutions serving households or public sector business which may be included in some of the component sectors shown.

(b) 2003 data up to end Q3.

⁵⁶: Large exposures are defined in Box 8.

amongst a few banks. Some bank lending to other UK companies is also secured on UK property and so is sensitive to real estate market developments. As discussed in [Section 2](#), credit quality in the commercial property sector remains generally stable; however, the decline in capital values for some subsectors may have eroded LTV cover on such lending. Collateral values for commercial property are both more likely to fall in the event of a shock to the borrowers' credit quality and harder to value than for residential property. In the medium term, borrowers' significant refinancing need offers lenders the opportunity to review loan terms, although the concentration of refinancing in the next few years may constrain banks' ability to manoeuvre.

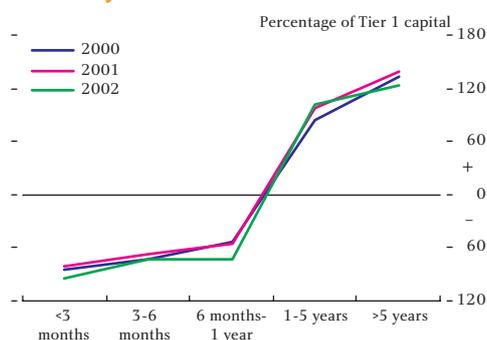
Large UK-owned banks' exposure to market risk

Changes in market prices may affect banks through a variety of channels: their trading book, their banking book, investment of capital by treasury departments, their defined-benefit pension schemes, their direct investments in overseas group companies or their life insurance subsidiaries. Such direct effects are in addition to any effect on the credit quality of banks' lending.

Direct exposures via the trading book, as measured by value at risk (VaR), fell over the first half of the year for most of those large UK-owned banks with trading books. The large UK-owned banks' VaR remains low relative to that of other internationally active banks and primarily comprises exposures to interest rate changes. Rather less detailed data are available on banks' other exposures to market price movements⁵⁷, although planned improvements to international disclosure and accounting standards, such as IAS 39 or Pillar 3 of Basel II, may help. *Ad hoc* disclosure by individual banks suggests that these other exposures can be material – indeed, one UK-owned bank estimated its 'total' VaR was three times that of its 'trading' VaR and similar patterns were noted for international banks, as discussed in [Section 1.1](#).

Exposure in the banking book, in particular, is potentially significant. Maturity transformation by banks results in a mismatch between the maturity of their assets and liabilities. This creates a vulnerability in the banking book to interest rate increases: banks are vulnerable to potential losses, as more liabilities than assets are open to re-pricing over short horizons. But such exposures can be hedged – and many banks hedge them internally via their trading books. Disclosure by the banks, under the FRS13 accounting standard on the degree of any mismatch (Chart 124) suggests that – net of hedging – any losses would be relatively small for the large UK-owned banks unless interest rate changes were large, as discussed in the [December 2002 Review](#). However, the mismatch disclosure

Chart 124:
Large UK-owned banks' aggregate interest sensitivity mismatch^(a)



Sources: Published accounts and Bank calculations.

(a) Figures derived using banks' disclosures under FRS13. Cumulative excess of assets over liabilities open to re-pricing, net of off-balance-sheet items.

⁵⁷: In the UK's financial stability assessment programme, the IMF noted a lack of standardised information on exposures to market risk.

ignores the optionality built into many loan products, which is more difficult to hedge and may generate a vulnerability to interest rate falls. A customer's option to remortgage will, for example, result in pre-payment costs (the banks' fixed costs may not have been fully recouped). Pre-payment risk is likely to be less marked in the UK market than in the United States (see Section 1.2) given that fixed-rate mortgages are less prevalent, are of shorter duration and generally carry early redemption penalties. However, many of the large UK-owned banks are also exposed to developments in the US mortgage market through their holdings of mortgages and MBS.

Large UK-owned banks' robustness to risks

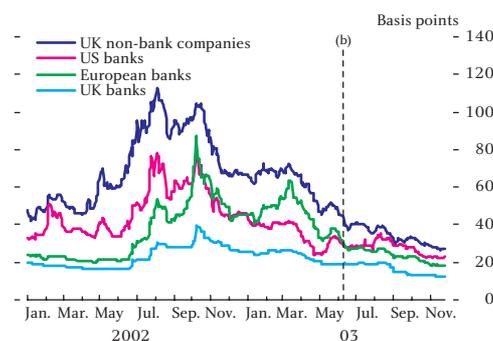
Market indicators remain favourable for the large UK-owned banks – CDS premia have fallen since June and remain low relative both to other UK companies and international banks (Chart 125); and ratings are, on average, high relative to other banking sectors (Section 1.1 Chart 25). Stress tests performed for the IMF in the UK's 2002 financial stability assessment programme also suggested that the large UK-owned banks are likely to be able to withstand credit and market shocks to their books in a stable macroeconomic environment.⁵⁸ The banks' robustness rests on their profits and capital, which are fundamental in determining banks' resilience to shocks; and also their liquidity, as banks must not only be able to meet their obligations but to do so on a timely basis.

Profitability

The profitability of the large UK-owned banking sector, as measured by return on equity (RoE), has been relatively stable since the mid-1990s – with a typical pre-tax RoE of around 20%, notwithstanding losses at one bank in recent years (Chart 126). Return on equity increased for all the large UK-owned banks during the first half of 2003, but this rise largely reflected unusually strong growth of dealing profits: net interest income was flat, as strong asset growth was offset by weak net interest margins. Return on equity can, however, reflect changes in factors other than profits, as discussed in Box 7 – indeed during 2002 RoE was maintained by some increase in leverage. Moreover, RoE is a function of the accounting framework: where reported, the large UK-owned banks' reported RoE is typically lower – although still high – under US than UK accounting principles.

According to survey results⁵⁹, large UK-owned banks expect profit growth to be robust in the short term, reflecting forecasts of continued asset growth. Further ahead, the prospects for growth in net interest income (which remains the largest source of

Chart 125:
Credit default swap premia for large UK-owned banks and other firms^(a)

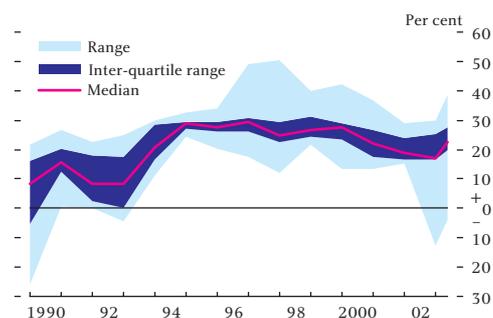


Sources: JP Morgan Chase & Co, CreditTrade and published accounts.

(a) Data are available for seven large UK-owned banks, 33 other FTSE-100 companies, 28 continental European and seven US banks. Individual company and European banks' data are weighted by assets using latest available data.

(b) Jun. 2003 Review.

Chart 126:
Pre-tax return on equity for large UK-owned banks^{(a)(b)}



Sources: BBA, published accounts and Bank calculations.

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

(b) Pre-tax return on equity calculated as pre-tax profit as a proportion of shareholders' funds and minorities.

58: Hoggarth, G and Whitley, J (2003), 'Assessing the strength of UK banks through macroeconomic stress tests', *Bank of England Financial Stability Review*, June.

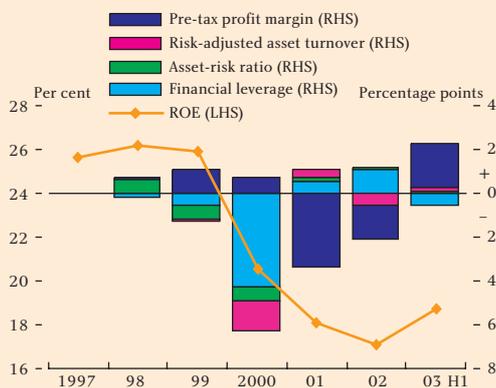
59: For example, Price Waterhouse Coopers CBI Financial Services survey or the Institutional Brokers Estimate System.

Box 7: What drives banks' RoE?

Table A:
RoE decomposition ratios

Ratio	Description and financial stability implications
Pre-tax profit margin	Measures the impact of costs and bad-debts. Effect of rise: Positive .
Risk-adjusted asset turnover	Measures efficiency on a risk adjusted basis. Effect of rise: Positive .
Asset-risk ratio	Measures credit risk appetite. Effect of rise: Negative .
Financial leverage	Measures gearing. Effect of rise: Negative .

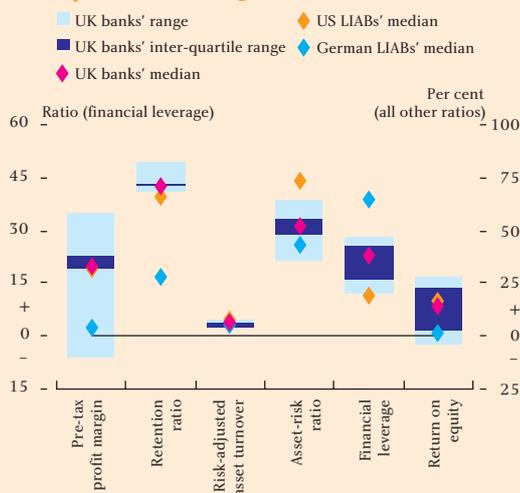
Chart A:
Contributions to changes in large UK-owned banks' aggregate pre-tax RoE^(a)



Sources: Published accounts and Bank calculations.

(a) Bars illustrate the individual contributions of decomposition ratios to the variations in RoE.

Chart B:
International comparison of post-tax RoE decompositions, 2003H1^{(a)(b)}



Sources: Published accounts and Bank calculations.

(a) Risk-adjusted asset turnover and RoE ratios are annualised. LIABs as defined in Section 1.1.

(b) The low median retention ratio among German banks may be a temporary result of the recent difficulties of some large German banks.

Profits represent a bank's first buffer against adverse shocks. Return on equity (RoE), the ratio of profits to the book value of equity, is a widely used measure of banks' profitability. Changes in RoE can, however, reflect changes in factors other than profits, such as leverage. Hence, a rise in RoE does not necessarily imply an improvement of a bank's financial strength. This Box introduces a risk-return framework to assess and compare banks' RoE across time and countries.

Pre-tax RoE can be viewed as the product of four ratios measuring profit margin, efficiency, risk appetite and leverage (Table A).¹ A rise in RoE driven by a higher profit margin or risk-adjusted asset turnover reduces financial fragility, whereas a rise in RoE because of increased financial leverage or a higher asset-risk ratio may indicate a weakening of the bank's financial strength. Likewise, a bank with a RoE similar to that of its peers may be less resilient than them to adverse shocks if its RoE were, for example, the result of higher gearing offsetting a lower profit margin.

Large UK-owned banks' aggregate pre-tax RoE declined in 2000, 2001 and 2002, but the causes of these falls and hence their implications for the banks' financial strength differed (Chart A). In 2000, RoE declined mainly because of a decrease in financial leverage, suggesting lower gearing. In 2001 and 2002, the falls in RoE were largely driven by a reduction in the pre-tax profit margin. In other words, while the decrease in RoE in 2000 – nominally the largest one – did not suggest a weakening of UK-owned banks' financial strength, the falls in 2001 and 2002 did. Banks limited the fall in their RoE in 2002 and in 2001 (but by a lesser extent) by increasing gearing: in effect worsening their capital positions as their profitability declined. But the rise in RoE in the first half of 2003 was driven by a higher profit margin as gearing declined; an improvement from a financial stability perspective.

Similar lessons can be drawn from international comparisons of RoE. To highlight the impact of differing tax regimes on banks' profits, the decomposition has been modified to include the retention ratio (Chart B). In the first half of 2003, the median post-tax RoE of German large internationally active banks (LIABs) was much lower than that of UK-owned banks. And while German banks typically had a lower asset-risk ratio, their gearing was higher and their profit margin was lower. Thus, German banks appeared to be more vulnerable to a deterioration in their operating environment. US LIABs, in contrast, had a similar RoE to UK-owned banks – with a higher asset-risk ratio offset by lower financial leverage.

1: The breakdown of pre-tax RoE in the four ratios, ordered as in the table, is as follows:

$$ROE = \left(\frac{\text{Pre-tax profit}}{\text{Operating income}} \right) \times \left(\frac{\text{Operating income}}{RWA} \right) \times \left(\frac{RWA}{\text{Assets}} \right) \times \left(\frac{\text{Assets}}{\text{Equity}} \right)$$

where RWA stands for risk weighted assets.

income for most banks) may be constrained by a number of factors. In recent years, strong lending growth has more than compensated for declining margins (Chart 127) and, while Bank contacts do not expect any reduction in loan demand in the short term, any slowdown in house price inflation would probably lead to a slowdown in the growth of secured borrowing – albeit with some lag. Pressure on net interest margins may also continue, given the competition in the domestic retail sector, which bank contacts have described as ‘intense’; although a few contacts have suggested that the decline in margins may slow if interest rates increase.

Capitalisation

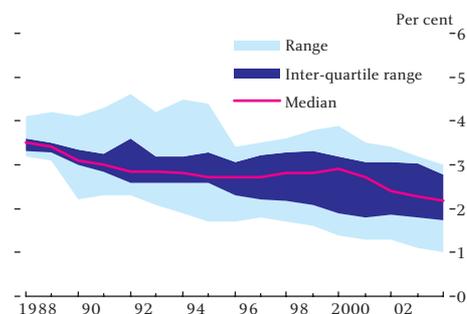
Published Tier 1 capital ratios were little changed for the large UK-owned banks over the past six months, despite strong asset growth. For some banks, this reflected an increased use of non-prime instruments within Tier 1, as discussed in previous *Reviews* (Chart 128). The FSA has recently reviewed its requirements on what qualifies as Tier 1 capital⁶⁰ and this may restrict the use of some non-prime instruments, as discussed in the article on ‘Strengthening financial infrastructure’ in this *Review*. A further subset of Tier 1 is value accrued from changes in the embedded value of investments such as life insurance subsidiaries, as discussed in the December 2002 *Review*. This is a particular issue for the three largest UK bancassurers.

Liquidity

The maturity of a bank’s funding in relation to its lending is an important determinant of its vulnerability to liquidity risk. Holdings of assets that can be used, via sale or repo, to raise funds quickly in the market are a key part of banks’ protection against liquidity risk. The large UK-owned banks’ holdings of liquid assets comfortably exceed the regulatory minima (Chart 129), although it appears there was some slight decrease in holdings of total liquid assets as a proportion of balance sheets over the past six months.

Data to assess the maturity composition of banks’ books are limited. However, there has been a shift towards a greater reliance on short-term wholesale funding – which is likely to be less stable in the event of stress. The use of wholesale funding reflects the continued strength of lending to non-bank customers, which has outpaced growth in customer deposits (Chart 130) and led banks to increase their use of other funding sources. In tapping wholesale markets, they have taken steps to diversify their sources of funding – for example, raising funding abroad, in foreign currencies and via use of securitisation and covered bonds, as discussed in this *Review’s* article on ‘Large UK banks’ funding patterns: recent changes and implications’.

Chart 127:
Large UK-owned banks’ net interest margins^{(a)(b)}

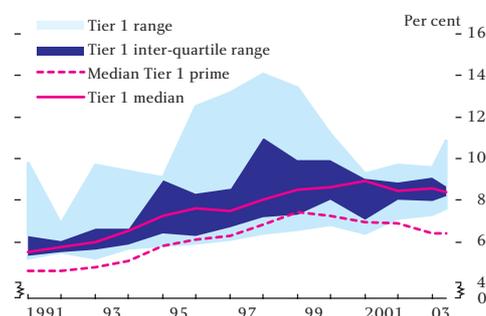


Sources: Published accounts and BBA.

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

(b) Not all banks reported net interest margins for 2003 H1. Data excludes the effect of recent acquisitions.

Chart 128:
Large UK-owned banks’ Tier 1 capital ratios^{(a)(b)}

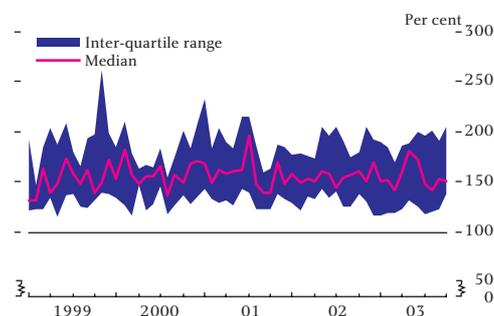


Sources: Published accounts, FSA regulatory returns and Bank calculations.

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

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

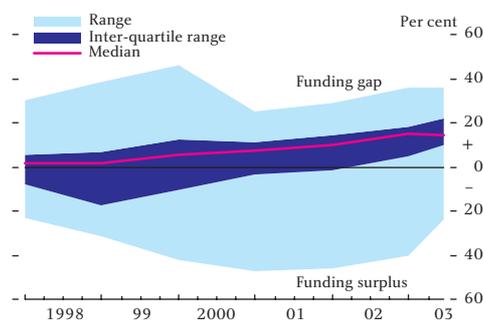
Chart 129:
Large UK-owned banks’ sterling stock liquidity ratios



Source: FSA regulatory returns.

60: www.fsa.gov.uk/pubs/policy/ps155/index.html

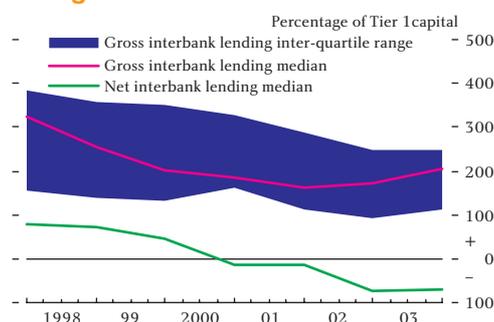
Chart 130:
Large UK-owned banks' customer funding gap as a proportion of customer lending^{(a)(b)}



Source: Published accounts.

- (a) The difference between lending to customers and deposits from them; a positive number represents a funding gap.
- (b) Customer lending and deposits as recorded in banks' published accounts.

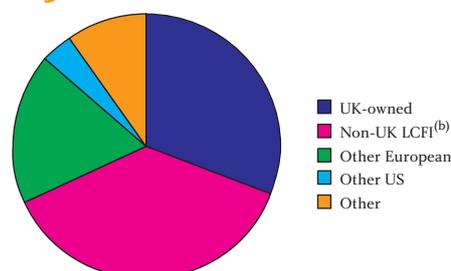
Chart 131:
Large UK-owned banks' gross interbank lending and net reliance on interbank lending^(a)



Sources: Published accounts and Bank calculations.

- (a) Net interbank lending defined as lending to banks minus deposits from banks.

Chart 132:
Largest seven UK-owned banks' 'large exposures' to differing peer groups, June 2003^(a)



Source: FSA regulatory returns.

- (a) Large exposures are defined in Box 8.
- (b) LCFI are defined in Section 1.1.

Such changes are not, however, fully captured in the regulatory measure – the sterling stock liquidity ratio (SSLR) – of the potential calls on the large UK-owned banks' liquidity. For example, their increased use of foreign currency funding would not be reflected in the SSLR, as the SSLR measures only sterling liabilities. In consultation with the Bank, the FSA are considering changes to strengthen the quantitative element of UK liquidity regulation, as described in the 'Strengthening financial infrastructure' article in this *Review*. Qualitative liquidity risk management tools, such as stress testing and contingency funding plans, are also important. New FSA requirements (due to be implemented by end-2004) will require the wider adoption of such policies.⁶¹

Links between financial institutions

As discussed in the *Overview*, published interim results for large complex financial institutions and large internationally active banks have been reassuring. Nevertheless, were a problem to emerge in a bank or banking sector, links between banks could transmit a shock through the system. Such links arise as a result of various activities, including direct lending, derivatives trading, and participation in payment and settlement systems.

Direct and indirect exposures

Direct lending continues to account for a larger share of the large UK-owned banks' exposures to other banks than do derivatives, though this may reflect the greater use of counterparty risk management techniques – such as netting and collateral – for derivatives. Interbank lending grew over the first half of the year, after having fallen for many banks over the past two years. While most of the large UK-owned banks use the interbank market to obtain net funding, all place considerable gross amounts with other banks in the UK and overseas (Chart 131).

Regulatory data offer an insight into how the aggregate direct and indirect interbank exposures are spread across potential counterparties. Banks must report to the FSA their largest 20 interbank exposures to individual counterparties, and any others that exceed 10% of eligible capital. While each bank's interbank exposures appear lumpy ('large' exposures accounting for the majority of interbank lending), as a sector their 'large' exposures are spread across a range of counterparties (Chart 132), although there are some common exposures. The distribution of exposures affects the vulnerability of the system to shocks and Box 8 expands further on the distribution of the largest UK-owned banks' interbank exposures.

61: www.fsa.gov.uk/pubs/cp/fs128.pdf

Box 8: 'Large' exposures between banks

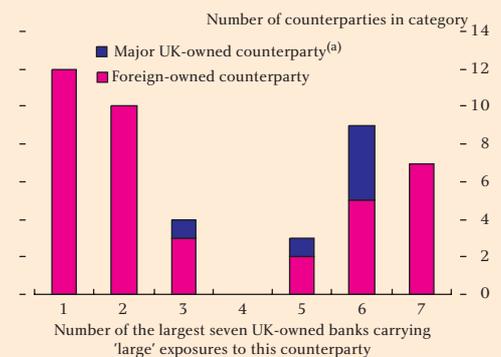
Publicly available data reveal the extent of interbank lending in aggregate, but give no indication of which banks have contractual obligations to one another. Yet in the event of a bank failure, the extent of any spillover will depend *inter alia* on the precise pattern of interbank exposures.¹ Is interbank lending concentrated? And if so, which institutions are the major borrowers? In their regulatory data returns, banks give details of all 'large' exposures to bank and non-bank counterparties. This Box reviews patterns in the 'large' interbank exposures of the seven largest UK-owned banks.²

For regulatory purposes, 'large' exposures are defined as the 20 largest exposures to each broad category of counterparty plus any other exposures that exceed 10% of eligible capital³ – covering both on-balance-sheet claims and off-balance-sheet derivative exposures.⁴ In June 2003, the seven banks had £256 billion of 'large' exposures to banking groups, over twice Tier 1 capital. These 'large' exposures to banks appear to represent the bulk of banks' on-balance-sheet claims on other banks.

A counterparty is most likely to be systemically important if a number of lenders have 'large' exposures to it. At the end of June 2003, the seven largest UK-owned banks had 'large' exposures to 45 different banking groups, most of which are foreign-owned. Of these 45, twelve were exposures for only one of the largest UK-owned banks and a further ten were an exposure for just two of the largest UK-owned banks (Chart A). There were, however, 16 banks that were common exposures to six or more of the seven largest UK-owned banks. Typically, the banks that appear most frequently as 'large' exposures are the large complex financial institutions (LCFIs) (discussed in Section 1.1) and the seven largest UK-owned banks themselves. Foreign-owned LCFIs make up some 37% of the seven largest UK-owned banks' 'large' exposures to banks while UK-owned banks account for a further 31%.

In almost all cases, the seven largest UK-owned banks both carry and are 'large' exposures to one another. At the end of June 2003, the 32 'large' exposures between major UK-owned banks ranged from 2% to 40% of the lenders' eligible capital.

Chart A:
Incidence of common 'large exposure' counterparties, June 2003



Source: FSA regulatory returns.

(a) The seven largest UK-owned banks.

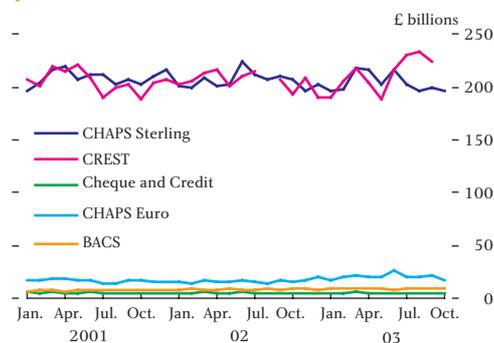
1: Wells, S (2002), 'UK interbank exposures: systemic risk implications', Bank of England *Financial Stability Review*, December.

2: Abbey National, Barclays, HBOS, HSBC Holdings, Lloyds TSB, RBS Group and Standard Chartered.

3: Eligible capital is defined as Tier 1 capital plus Tier 2 capital, less any regulatory deductions.

4: There may in practice, however, be differences in the ways that banks complete the forms.

Chart 133:
Monthly daily average domestic payments
by value



Sources: APACS and CREST.

Chart 134:
Daily volume^(a) and value settled in CLS
(ten-day moving averages)



Source: CLSB 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).

Payment and settlement system exposures

Participation in payment and settlement systems creates a potential credit exposure to other system members and any non-members on whose behalf the bank acts. System design typically mitigates or removes credit risk between system members. Improvements continue here, notably the settlement agreements recently signed by members of the Bankers Automated Clearing Service (BACS) and the Cheque and Credit Company – of which most of the large UK-owned banks are members – that have reduced credit exposures from peak gross amounts of around £35 billion to net amounts of around £2 billion. This and other initiatives to reduce risk in payment and settlement systems are discussed in this *Review's* 'Strengthening financial infrastructure' article.

However, the benefits from such developments accrue primarily to the direct members of the system; material intra-day exposures may remain between system members and any non-members for whom they act. Members are exposed to their customers when they make payments on their behalf before receiving the funding payment from their customer. Data on intra-day exposures are not regularly available but a recent survey conducted by the Bank, provides some evidence (Box 9). It suggests that intra-day exposures arising from the banks' sterling correspondent activities are large, in aggregate and to some individual customers. Similar issues arise in the foreign exchange market. While increasing volumes and values of foreign exchange transactions are now settled through the Continuous Linked Settlement system (CLS) (Chart 134), thereby removing the principal risk between the counterparties in each transaction, potential exposures between settlement members and their third-party customers still need to be managed.

While membership of such systems may present risk management challenges, it nevertheless reduces credit exposures – to the extent that it is used by the market. Take-up of CLS, for example, is still some way from covering the whole foreign exchange market. Only four of the ten largest UK-owned banks have chosen so far to be direct members of CLS, and not one of the remaining six is yet a third-party user. Participation in systems like CLS may not be appropriate for all banks, but where systems are not used or not available, banks must continue to manage the exposures. In the case of foreign exchange settlement risk, this is explored in Box 3 in the following article on 'Strengthening financial infrastructure'.

Box 9: Tiering in UK payment systems

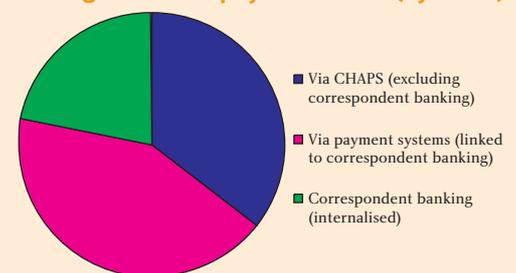
Central banks, in conjunction with the private sector, have done much to reduce the risks within the major payment and settlement systems in recent years. The design of the UK's CHAPS Sterling system, for example, removes the potential for intra-day credit exposures between system members – important given the high value of payments settled daily (around £200 billion). However, system members make payments on behalf of non-members, for example other banks. The 2001 G10 report on 'Consolidation in the Financial Sector'¹ highlighted the increasing importance of large payment banks as part of the infrastructure. Those banks could incur large intra-day or even overnight exposures to their customers (and vice versa). The IMF also noted this issue during its assessment of the UK financial sector in 2002.²

The scale of such exposures is hard to quantify from available data, but the Bank carried out a survey in September 2002 to provide some initial evidence. The results suggest that around £110 billion (50%) of the daily value flowing through CHAPS Sterling is on behalf of non-member banks. As settlement banks typically offer customer banks unsecured intra-day overdrafts, the exposures between direct participants and their customers are likely to be large (albeit controlled via credit limits). These credit risks are typically intra-day, only rarely overnight. Exposures also appear to be relatively concentrated on the banks' largest customers. These findings are unsurprising given that there are only eleven members of CHAPS Sterling (including only six of the largest UK-owned banks) and therefore many banks access the system indirectly.

The correspondent relationship also leads to operational reliance on the settlement bank.³ Indeed, some settlement banks handle values and volumes similar to those in some small overseas payment systems. The banks also settle some payments on their own books – internalising payments where they act for payer and recipient – effectively acting as payment systems in their own right (Chart A). This activity requires strong internal controls and sound legal agreements.

Indirect access is a feature of many other systems; for example, CLS has many third-party members (more than 90 to date). The Bank continues to discuss with banks the risks that arise in tiered payment system arrangements and plans further surveys and analysis in this area.

Chart A:
Sterling interbank payment flows (by value)



Source: Bank of England.

1: www.bis.org/publ/gteno5.pdf

2: www.imf.org/external/pubs/ft/scr/2003/cro346.pdf

3: James, K (2003), 'A statistical overview of CHAPS Sterling', *Bank of England Financial Stability Review*, June.

Strengthening

financial infrastructure

The continued stability of the financial system relies on safe and efficient infrastructure. Suitable arrangements for the regulation of financial institutions, combined with sound and transparent market practices, reduce both the likelihood and severity of episodes of financial instability. A strong emphasis on risk management within payment and settlement systems limits the possibility of these systems acting as conduits through which financial distress is transmitted between institutions or markets. And well-designed international financial architecture reduces the risk of contagion across national borders. Nonetheless, it is important for financial authorities to have available the appropriate tools to manage any crisis that does occur. This article describes the steps taken since the June *Review* – by central banks, other public authorities and the private sector – to enhance further financial infrastructure. Recent activities in respect of the Bank of England’s oversight of payment systems are summarised in the annex.

OVER THE PAST SIX MONTHS, significant progress has been made on a number of initiatives aimed at improving financial infrastructure. Financial authorities have focused on strengthening the ability of individual institutions – through quantitative requirements on their liquidity positions – and the financial system as a whole to withstand unexpected shocks. This has included a study on the need for new or amended statutory powers to deal with the threat of major operational disruption to the UK financial system.

The possibility for financial institutions to incur risk exposures through their participation in payment and settlement systems is highlighted in section 3.2 of *The financial stability conjuncture and outlook* article in this *Review*. Recent developments, notably the integration of eligible debt securities into CREST and settlement agreements in BACS and the Cheque & Credit Clearings, have contributed to a reduction in some of these risks. In addition, private sector efforts to enhance the efficiency of the post-trade clearing and settlement process – for example through the proposed merger between the London Clearing House (LCH) and Clearnet – have continued.

Law and financial regulation

Possible changes to UK liquidity regulation

The liquidity of the banking sector is a key concern for regulators and central banks, given their roles in

relation to the preservation of financial stability and the provision of liquidity to the banking system. There are, however, no international quantitative standards for liquidity risk, although best-practice guidelines for aspects of banks’ qualitative liquidity risk management have been agreed.¹ The different national approaches to liquidity regulation are described in Box 1.

On 30 October 2003, the FSA released a discussion paper (DP24)² setting out ideas for changes to the UK’s *quantitative* liquidity requirements. The ideas are intended to unify the various existing liquidity requirements and address some weaknesses in these regimes. The ideas supplement changes to FSA requirements regarding banks’ *qualitative* liquidity risk management, which are due to be implemented before the end of 2004, and highlight in particular the need for stress testing and contingency funding plans.³

Currently, the FSA requires institutions to maintain adequate liquidity, determined on the basis of either a maturity mismatch or a stock approach. The mismatch approach assesses an institution’s liquidity by assigning inflows (assets) and outflows (liabilities) to different time bands, according to their maturity, and measuring the gap between them. Mismatch guidelines are set for the cumulative periods up to eight days and

1: The Basel Committee on Banking Supervision, ‘Sound Practices for Managing Liquidity in Banking Organisations’, February 2000.

2: www.fsa.gov.uk/pubs/discussion/dp24.pdf

3: Financial Services Authority Policy Statement, ‘Integrated prudential sourcebook: Near-final text on prudential risks systems and controls’, October 2003.

Box 1: Prudential regulation of banks' liquidity: the international context

While there are international guidelines on *qualitative* aspects of regulation of banks' liquidity (in February 2000 the Basel Committee on Banking Supervision published 'Sound Practices for Managing Liquidity in Banking Organisations', setting out broad qualitative guidelines for liquidity risk management), different countries have adopted a variety of approaches to *quantitative* liquidity requirements. In the light of suggested changes to UK liquidity regulation, this box reviews approaches taken overseas.¹

Most countries apply a mixture of quantitative and qualitative approaches to liquidity regulation (Figure A). This typically involves setting some form of liquidity ratio as a minimum requirement (or at least a measure to be monitored by supervisors), complemented by broader systems and controls related to management of liquidity risk.

Figure A:
National approaches to liquidity regulation

Type of approach		
Quantitative only	Mix	Qualitative only
Germany	France	Spain
	Singapore	
	USA	
	Italy	
	Hong Kong	
	Netherlands	
	Japan	
	Australia	
	UK	

Sources: Regulators and central banks; Groupe de Contact.

Where there is a quantitative requirement, national approaches vary. But there is an important basic common objective with respect to the expectations of supervisors – the requirements must ensure a bank has adequate liquidity at all times. In achieving this, there is a primary distinction between maturity mismatch analysis and 'stock' approaches, although, as illustrated by Figure B, this too can be seen as a continuum to a certain extent.

Maturity mismatch analysis involves the classification of expected inflows and outflows of funds into time-bands according to their residual maturity

(contractual or effective/behavioural), with the relationship between the two subject to minimum requirements within particular (groups of) time-bands.

Figure B:
National regulatory regimes^(a)

Type of regime		
Stock requirement	Mix	Mismatch only
UK (SSLR)	Germany	UK (MM)
Hong Kong	Netherlands	Italy
Australia		USA
Singapore		France

Sources: Regulators and central banks; Groupe de Contact.

(a) The current UK sterling stock liquidity requirement (SSLR) and maturity mismatch (MM) regimes are included separately.

A stock approach prescribes a minimum level of cash or high quality 'liquid' or 'marketable' assets in relation to the stock of deposits and other liabilities – sometimes for a restricted range of firms. The range of the assets allowed (the numerator) and the range of liabilities they have to cover (the denominator) determine the extent to which the regime 'bites'; some regimes (Netherlands, Germany) that have a ratio of this kind produce a similar result to mismatch approaches when they include a range of contractual inflows as well as 'marketable' assets. As Figure B illustrates, there is no uniformity of approach, and some countries employ elements of both.

Some regimes (Australia, Singapore, and the 'advanced' approach suggested in the FSA's recent Discussion Paper) also include a degree of internal estimation of likely liquidity stress impacts and scenario analysis. However, these approaches generally have a floor limiting the extent to which banks can set their own stress factors (less conservative than those set by the regulator) within the framework.

In addition, there is considerable variation in the scope of national regimes – that is, whether the regime is applied on a consolidated (group) or

1: Over the past three years, Australia, Germany, Singapore and, most recently (July 2003), the Netherlands have all introduced new quantitative rules for liquidity regulation.

unconsolidated (solo) basis. The current UK SSLR and new Netherlands regimes apply on a consolidated basis, but in Germany, Japan and France the focus is on the unconsolidated deposit-taking entity (this is also the default arrangement suggested in the FSA Discussion Paper). Italy and Hong Kong examine both. However, overseas subsidiaries are sometimes included only if the liquid funds they hold are transferable on demand (eg where there are no legal restrictions).

A closely related issue is the treatment of incoming foreign branches. Within the EU (under the Second Banking Coordination Directive), supervision of the liquidity of branches is the only aspect of prudential supervision for which the host supervisor has *de jure* responsibility. But both outside and inside the EU,

and given the increasing number of internationally active banks employing global liquidity management policies, some supervisors (UK, Netherlands, Australia, Hong Kong) rely *de facto* on assessment by the home supervisor.²

A further area of variation is in the range of currencies included in the assessment. The existing UK SSLR stands out in that it covers only the domestic currency, whereas it is more common for major financial centres (Germany, France, Hong Kong, Netherlands, FSA Discussion Paper) to include all currencies, usually on an aggregate basis. In addition to ensuring all currencies are covered in aggregate, some countries also explicitly monitor liquidity risk exposures between individual currencies.³

2: This approach is generally employed only where the bank concerned operates a global liquidity management policy and the regulatory regime of the home supervisor is deemed to be 'equivalent'.

3: Further discussion of UK banks' cross-currency liquidity risk is provided in [Speight, G and Parkinson, S, 'Large UK-owned banks' funding patterns: recent changes and implications' in this Review.](#)

up to one month. The sterling stock liquidity requirement (SSLR) approach, which applies mainly to UK-incorporated retail banks, has the objective of ensuring banks maintain a stock of high quality 'liquid' assets which can be monetised quickly in order to cover outflows in the event of liquidity stress.

There are, however, a number of areas in which the current arrangements could be improved. The SSLR measures liquidity requirements only on a single currency basis and over a one-week-ahead time horizon. The mismatch approach, for its part, does not address the behavioural and stressed adjustments of inflows and outflows in a consistent and comprehensive manner. The International Monetary Fund (IMF) identified some of these concerns in its recent Financial System Stability Assessment (FSSA) of the UK.

Recognising these shortcomings, the suggested changes to the current quantitative requirements have the following key underlying design principles. The measurement should cover *all currencies* – this is of particular importance given the global operations of many UK banks. It should look at both the near term

and the *medium term* (one month), to ensure that any emerging problems are identified. The measurement should also include a *wider range* of potential calls on a bank's liquidity – derivatives and contingent obligations are to be incorporated. Furthermore, the FSA intends to attempt calibration of the requirements to correspond to a firm-specific liquidity stress,⁴ and to apply weightings and haircuts to inflows and outflows that are consistent with this.

The FSA's new ideas are intended to unify the four existing requirements – the SSLR, the mismatch requirement, the building societies requirement and the investment firms requirement. However, additional comfort is desirable regarding the liquidity position of those banks that act as conduits of liquidity to the remainder of the financial system. The FSA and the Bank of England – as provider of liquidity to the system – are discussing with banks an additional high-quality liquid assets requirement for this purpose. The requirement would be designed to ensure that the banks concerned⁵ hold a core of high-quality liquid assets⁶ within their general marketable assets pool.

4: Stress equivalent to a two-notch ratings downgrade.

5: Based on membership of the CHAPS Sterling payment system.

6: For example, those assets eligible for Bank of England open market operations.

A further subset of new calls included in the FSA's ideas reflects the liquidity needs arising from banks' involvement in payment systems. This element is also of particular interest to the Bank of England given its role, as banker to the banking system, in the operation and oversight of payment systems. The Bank is working closely with the FSA and settlement banks on the design of such a requirement. An important aim is to ensure that incentives to settle payments through the payments system (and thus liquidity conditions in the system as a whole) are not adversely affected.

Completing the new Basel Accord

The June 2003 *Review* reported recent progress on the new Basel Accord (Basel II) and gave an overview of the objectives and three 'pillar' structure of the new Accord.⁷ Following its most recent meeting in October 2003, the Basel Committee on Banking Supervision (BCBS) issued a press release stating that members were committed to work promptly to resolve the outstanding issues by mid-2004. The implementation date remains unaltered at 31 December 2006.

In the EU, preparatory work for a new Risk-based Capital Directive (CAD 3) to implement Basel II continues – the European Commission's third consultation on the new Directive closed on 22 October 2003. The US authorities' domestic consultation also finished, on 3 November 2003.

Domestically, the FSA published a consultation paper (CP189)⁸ in July 2003 outlining proposals for implementing the Pillar one internal ratings-based approaches to credit risk. HM Treasury issued a consultation document on the transposition of Basel II into EU legislation on 3 December 2003.⁹

Prudential regulation of UK life insurers

In August 2003, the FSA published a consultation paper (CP195)¹⁰ setting out a new regulatory regime for UK life insurers. The new approach will be broadly similar to the three-pillar design of the new Basel regime for banks.

The change is motivated by FSA concerns that the degree of prudence in existing regulatory requirements is opaque and employs 'margins on margins', ie regulatory solvency margins are added on top of existing prudent margins in insurers' estimates of their liabilities. The new regime is intended to increase the transparency of UK regulatory requirements, and firms' economic solvency, while still conforming to EU directives. The new regulations are also intended to reduce the possibility that solvency requirements lead to management decisions that are to the potential detriment of the firm or its policyholders (by allowing estimates of liabilities to be more sensitive to assumed future management actions, such as cutting bonus rates as asset prices fall).

The life insurance equivalent of the 'pillar one' requirement for banks will be known as the capital resource requirement. With-profits funds with liabilities over £500 million, which account for half of all with-profits funds and 95% of with-profit fund liabilities, will be required to calculate their 'pillar one' capital requirement using a 'twin peaks' approach.¹¹ These firms must have sufficient capital to cover the higher of a 'regulatory' peak and a 'realistic' peak. The regulatory peak is intended to ensure that firms have sufficient capital to cover their contractual obligations (ie the guaranteed sum assured and any annual bonuses already announced). The realistic peak is intended to ensure that firms can cover their 'realistic' liabilities (ie 'policyholders' reasonable expectations' of future bonuses).

The proposals for calculating the 'pillar one' capital requirement are similar to those discussed in previous FSA consultation papers and the letter to life insurance firms' Chief Executive Officers sent in March 2003, but with a new risk capital margin (RCM) to be added to the realistic peak. The RCM will include reserves to cover equity price, interest rate and property price risk (the risks included in the resilience requirement for the regulatory peak), plus reserves for credit risk and persistency risk. The FSA will commission work to calibrate the scenarios to be used in the RCM; the eventual impact of these

7: For details of the new Accord, see Jackson, P (2002), 'Bank capital: Basel II developments', *Financial Stability Review*, December.

8: www.fsa.gov.uk/pubs/cp/cp189.pdf

9: www.hm-treasury.gov.uk/media//98DD3/cad3condoco3.pdf

10: www.fsa.gov.uk/pubs/cp/cp195.pdf

11: With-profits funds with liabilities of less than £500 million will calculate their 'pillar one' capital requirement under the current regulatory rules. They will be allowed to opt into the new regime but will not subsequently be able to opt out.

additional reserves on life insurers' relative demand for the underlying assets will depend upon the relative capital reserves required.

'Pillar two' of the insurance regime will be based on individual capital assessments by life insurers, in consultation with the FSA. All firms (including those with with-profits funds of less than £500 million) will self-assess their capital needs for the full range of their business, drawing up an individual capital assessment (ICA). The assessment of 'pillar one' and 'pillar two' capital will be quite similar for firms required to report their 'realistic' balance sheet, but 'pillar two' will also aim to take into account all risks to which the firm is exposed: this includes risks set out in the resilience requirements, plus other risks, such as operational risk. The FSA will study each firm's ICA and, where necessary, give 'individual capital guidance', which would increase the level of 'pillar two' capital the firm must hold.

To encourage market discipline ('pillar three' of the insurance regime), life insurers' realistic balance sheets will be reported in their annual regulatory returns alongside their regulatory balance sheet, and will therefore be publicly disclosed. But insurers' ICAs and any related FSA guidance will not be made public.

Alongside the introduction of the three-pillar regime, the consultation paper also proposes changes to the definition of capital for insurers. The changes will harmonise the definition for banks and insurers wherever possible, applying the terms 'Tier 1' and 'Tier 2' (currently used to categorise banks' capital) to life insurers' capital.¹²

The new regime, to be implemented in late 2004, is part of a wider FSA review of UK insurance regulations, including a consultation paper (CP207) on 'treating policyholders fairly' published in November 2003.¹³ Reviews of insurance regulation are also being conducted by some other countries (eg the Netherlands) and form part of broader international efforts to establish an appropriate solvency regime for insurers. These include a fundamental review of insurers' capital requirements in the EU (known as Solvency II), and work by the International

Accounting Standards Board on a standard for insurance contracts.

FSA Consultation Paper on financial groups

The FSA has released a consultation paper (CP204)¹⁴ setting out proposals to implement the EU Financial Groups Directive (FGD). The Directive requires, from 2005, additional prudential supervision of those groups which straddle the insurance and combined banking/investment sectors. To date, the firms that constitute these groups have been subject to sectoral group requirements, but the capital of some mixed groups as a whole has not been assessed.

Effective consolidated supervision of groups is an important element in maintaining financial stability, as it assesses the risks to a firm (for example, a bank) that arise as a result of its membership of a wider group. This is increasingly important given the emergence of large conglomerates which provide a wide range of financial services. The Directive also requires the identification of a supervisory 'co-ordinator' for each group, with defined roles and responsibilities for group supervision.

As consolidated supervision of commercial banking groups has been in place for some time, the FSA proposals are not expected to make significant changes to their existing supervision regime. The proposals do however close some gaps in relation to investment banking groups and global insurance groups. Areas of significant change are as follows:

- The FGD requires in principle that consolidated supervision be carried out for the whole of financial groups that are active in the EU, on a worldwide basis. This is only required, however, if it is determined that worldwide consolidated supervision is not already being carried out to 'an equivalent standard' for the group concerned by its home state, where this is a non-European Economic Area (EEA) 'third country'. At present, it is uncertain which countries outside the EEA will qualify as 'equivalent'. Where 'equivalence' is not found, either an EU regulator would endeavour to carry out worldwide consolidated supervision, or other approaches would be used, such as requiring

12: As noted in Box 4, the FSA has also reviewed its policy on the definition of regulatory capital for banks.

13: www.fsa.gov.uk/pubs/cp/cp207.pdf

14: www.fsa.gov.uk/pubs/cp/cp204.pdf

an EU-based holding company to be established and/or attempting to ring-fence EU firms from the rest of the group.

- For insurance groups, the group capital adequacy regime under the Insurance Groups Directive, which presently requires the regulator to determine appropriate action if the group solvency ratio is not met, will become a 'hard' test. This change will be implemented in stages – during 2004 for life firms and later for non-life firms.¹⁵
- For insurance groups with banking and investment subsidiaries, following FGD implementation the capital requirement of a subsidiary will be deducted from group capital. Currently, insurance companies can include the market or net asset value of investments in banking subsidiaries in calculating their own regulatory capital, even though the capital might be needed to meet the requirement of the subsidiary – in future, such firms will not be 'double-gearred' in this way.

Supervision of US investment bank holding companies and broker-dealers

The US Securities and Exchange Commission (SEC) has also addressed existing gaps in group-wide supervision by issuing proposals to allow investment banks to be supervised on a consolidated basis.

One proposal suggests a framework for the supervision of Supervised Investment Bank Holding Companies (SIBHCs), allowed for under the 1999 Gramm-Leach-Bliley Act. This would permit eligible firms (essentially investment bank holding companies without banking operations and with specified minimum capital) to apply, voluntarily, for supervision by the SEC on a group-wide basis. The SEC anticipates that six SIBHCs will apply to be supervised in this way.

Under a second proposal, broker-dealers would be permitted, also on a voluntary basis, to apply for supervision at holding company level. Firms would be eligible to apply for such treatment even if they have a banking business within the group, providing banking is not the group's main business, but would

require a higher level of capital to qualify than would SIBHCs. The twelve firms expected to apply for this alternative treatment would be permitted to use internal models to calculate capital requirements in a manner consistent with the Basel standards. As a consequence, the SEC estimates that these broker-dealers would, on average, realise a reduction in capital charges of approximately 40 per cent.

An expectation of the proposed group-level supervision arrangements is that they will satisfy the 'equivalence' conditions of the EU Financial Groups Directive, discussed above. The SEC has sought comments on the proposals before 4 February 2004.

EU adoption of international accounting standards

The EU International Accounting Standards (IAS) Regulation¹⁶ requires that, from 2005, the consolidated accounts of all listed EU companies should be prepared according to standards issued by the International Accounting Standards Board (IASB). Member States have the option of extending the requirements of this Regulation to unlisted companies and to the production of individual accounts.

The use of modern, harmonised accounting standards across the EU can potentially promote financial stability through its impact on transparency and market discipline. Prior to its use in Europe, each accounting standard has to be endorsed, generally by the EU Accounting Regulatory Committee. On 29 September 2003, the EU completed endorsement of all existing Standards with the exception of those dealing with the recognition, measurement and disclosure of financial instruments (IAS 32 and 39).

The proposed standard for financial instrument measurement (IAS 39) has proved controversial. The standard is complex, articulating a mixed model primarily based on marking financial instruments to market but also including provision for significant categories of instrument to continue to be booked at historic cost. While some welcome the greater emphasis on market prices, others believe that this 'fair-value' approach will create a misleading degree of volatility in published financial results.¹⁷

15: The new approach is complementary to the proposals set out in FSA Consultation Papers 190 and 195 on enhanced capital requirements for insurers (discussed earlier in this article).

16: EU Regulation number 1606/2002.

17: Fair value accounting standards for complex derivative instruments have been considered by the Emerging Issues Task Force (EITF) of the US Financial Accounting Standards Board (issue number 02-3).

There is also a debate concerning the complex 'hedge accounting' rules that are needed to address situations in which an instrument is carried at historic cost but hedged using one measured at fair value. The IASB issued an exposure draft addressing this issue on 21 August.

The IASB's intention is to finalise the standards for financial instruments (other than those in respect of hedge accounting) by the end of 2003, and to issue final standards by spring 2004. It is highly desirable that the timetable for EU adoption of IAS accounting standards is met, and therefore that the IASB and preparers of accounts find a satisfactory means of resolving the remaining issues concerning IAS 39 in a timely fashion. The IASB is also committed to a review of financial instruments accounting from first principles after 2005.

While IAS 39 captures most of the financial instruments held by insurers, the IASB's fifth exposure draft, published on 31 July 2003, specifically addresses insurance assets and liabilities, and represents the first phase of the move to International Financial Reporting Standards (IFRS) for insurers. As with IAS 39, debate continues over certain elements in the fair-value regime that may induce accounting balance sheet volatility between 2005 and 2007, by when the move to IFRSs for insurers will have been completed.

Nevertheless, the transparency achieved by the fair-value principle remains desirable, as does the harmonisation created by international standards. UK insurers' assets are already marked to market and the FSA will enforce its version of full fair-value accounting – a 'realistic' valuation of insurers' liabilities – from 2004.

Market infrastructure

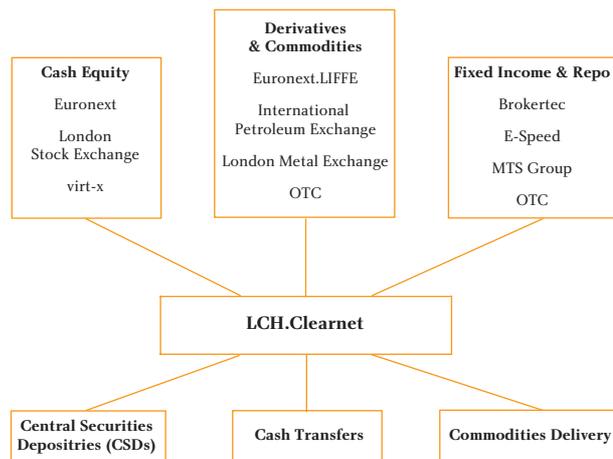
LCH.Clearnet merger announcement

On 27 November 2003, London Clearing House (LCH) shareholders approved the terms of a proposed merger with Clearnet to form 'LCH.Clearnet Group'. Court sanction is required prior to completion of the merger – a hearing is scheduled for December 2003, and provided sanction is given the merger will become effective soon thereafter.

Under the terms of the proposed merger, LCH and Clearnet will become subsidiaries of a new UK holding company, LCH.Clearnet Group Ltd. They will

provide central counterparty (CCP) services for a broad range of exchange-traded and over-the-counter (OTC) instruments, in the UK, Belgium, France, the Netherlands and Portugal, as illustrated in Figure 1.

Figure 1:
Major markets to be served by LCH.Clearnet Group



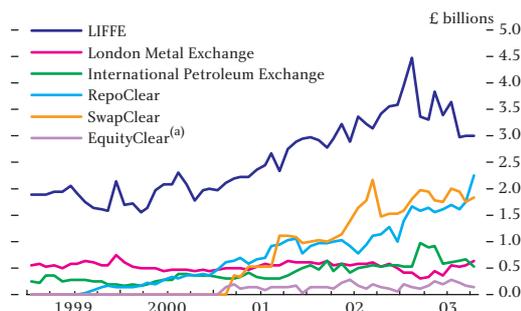
There are three stages to the merger proposal: in the first phase (lasting two years), LCH and Clearnet will harmonise operating procedures; the second phase involves the development (by 2006) of a common technical platform for each business stream; and in the final phase it is intended to give members the choice to clear all their positions in any of the markets served by the Group through either LCH or Clearnet.

The merger has the potential to deliver significant benefits to the members of both clearing houses. A well-designed CCP with appropriate risk management arrangements reduces its members' bilateral exposures (and the likelihood that a default will have knock-on effects) by interposing itself as counterparty in every trade and by multilaterally netting market participants' positions. When complete, the merger will potentially allow for greater netting opportunities, margin reduction through offset of correlated positions, and capital savings. In the shorter term, LCH and Clearnet members will also benefit from internal cost savings brought about by the process of aligning technical and operational arrangements during phases one and two of the merger.

However, in addition to reducing overall counterparty risk, LCH.Clearnet Group will perform a key operational role in the markets that it serves, highlighting the importance of robust arrangements for the control of operational and liquidity risks. In

addition, the credit risks potentially arising are large – at end-October 2003 LCH alone held £8.4 billion in initial margin (Chart 1). It will also be important to ensure legal certainty of cross-border transactions involving the merged entity.

Chart 1:
Initial margin required by LCH for its largest cleared markets at end-month



Source: London Clearing House.

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

From a financial stability perspective, it will be important for the merged entity to identify, monitor and manage risks of all types, and that the incentives for market participants and the LCH.Clearnet management reinforce that risk management. Strong, balanced governance will be essential in achieving this aim, as well as to ensure that management delivers efficient, cost-effective services to its members and the markets it serves, including through the development of innovative new services. In particular, financial authorities will be concerned to ensure that shareholder profit expectations play a small role relative to the risk management of the CCP.

As the merger progresses, central banks and regulators will continue to examine the arrangements for payments and settlement, for custody of assets held by the consolidated CCP, and for any cross-margining arrangements that are introduced between the two subsidiaries.

The regulatory and oversight arrangements for the new group combine continuity at the local level with the need for close co-operation between the relevant authorities. LCH will remain under the supervision of the FSA as a recognised clearing house, and the

French authorities will regulate Clearnet in co-ordination with the relevant regulatory authorities in Belgium, the Netherlands and Portugal. The holding company, LCH.Clearnet Group, will be supervised on a consolidated basis by the French bank regulatory authorities (the Commission Bancaire). Further agreements on co-operation between the UK authorities and the Clearnet supervisors are being prepared to ensure co-ordination and effective communication on matters of common interest.

Dematerialisation of money market instruments

Issuance of eligible debt securities – dematerialised equivalents of money market instruments (MMIs) – into CREST commenced on 15 September 2003. The migration of outstanding MMIs from the Central Moneymarkets Office (CMO) to CREST subsequently took place over four weekends during September and October 2003, and following the successful completion of this process, CMO closed on 16 October 2003.

The newly issued securities are settled in CREST on a delivery-versus-payment basis in central bank money, reducing settlement risk by eliminating the intraday exposures formerly present between settlement banks in CMO.

Dematerialisation of money market instruments and the closure of CMO represent the completion of the last major recommendation of the Securities Settlement Priorities Review carried out by the Bank of England in 1998. Box 2 summarises the steps taken over the past five years to enhance the arrangements for securities settlement in the UK.

Standards for securities clearing and settlement systems in Europe

The European System of Central Banks (ESCB) and the Commission of European Securities Regulators (CESR) have published jointly a consultation on risk management standards for EU securities clearing and settlement systems. The proposed standards are based on the Recommendations for Securities Settlement Systems issued by the Committee on Payment and Settlement System (CPSS) and the International Organisation of Securities Commissioners (IOSCO) in November 2001.¹⁸ Alongside the draft standards, the

18: 'Recommendations for Securities Settlement Systems: A report of the Committee on Payment and Settlement Systems and the Technical Committee of the International Organisation of Securities Commissions', November 2001 (www.bis.org and www.iosco.org).

Box 2: The Securities Settlement Priorities Review: progress since 1998

The integration of dematerialised equivalents of money market instruments (eligible debt securities) into CREST has completed the final outstanding major recommendation of the Bank of England's 1998 Securities Settlement Priorities Review (SSPR).¹ This box recalls the recommendations made in the SSPR and assesses the progress achieved over the past five years.

The SSPR was undertaken once CREST – the then newly-established settlement system for UK corporate securities – achieved full volume in settling those securities. It proposed a series of steps to reduce risk and maximise efficiency in the UK's securities settlement infrastructure, following an earlier initiative to reduce risk in payment systems.² The six major recommendations of the SSPR were as follows:

- CRESTCo should take over responsibility for operating the Central Gilts Office (CGO) and the Central Moneymarkets Office (CMO);
- CGO and CREST should merge;
- full delivery-versus-payment in central bank money should be introduced;
- consideration should be given to removing the gap between settlement in CREST and registration of securities transfers;
- CMO instruments should be dematerialised and settled in CREST; and
- the standard equity settlement cycle should be shortened.

CRESTCo, which operates the CREST system, took over the operation of CGO and CMO from the Bank of England in 1999 (the Bank continued to run the CMO depository for paper money market instruments

on behalf of CRESTCo). Following the necessary legal and technical work, gilts were moved into CREST in July 2000, following which CGO was closed.

In February 2001, the standard settlement cycle for equity trades was reduced from five days to three (in line with international standards), thereby shortening the duration of traders' exposures to counterparty risk (a default would result in the need to replace the trade, potentially at a price disadvantage).³ In the same month, the London Stock Exchange, together with CRESTCo and the London Clearing House, introduced a joint central counterparty (CCP) service for equity trading on the London Stock Exchange's Electronic Trading Service (SETS) system. Central counterparties can reduce risk in anonymous trading systems such as SETS by interposing themselves between buyer and seller, thus standardising the credit risk.⁴ Settlement netting in the CCP was subsequently introduced on 1 July 2002, and has significantly reduced settlement risk; by the end of 2002 the number of cleared trades on SETS that still required settlement had fallen by around 98%.

Real-time delivery-versus-payment (DvP) in sterling and euro central bank money for securities settlement was introduced in CREST in November 2001. To facilitate this, a link was established between the CREST settlement system and the RTGS processor operated by the Bank of England. The introduction of full DvP replaced the previous arrangement of end-of-day settlement of interbank obligations on a multilateral net basis. It thereby eliminated intraday exposures between settlement banks, which, if they had ever crystallised, could have destabilised the UK financial system.⁵ At the same time, the move to Electronic Transfer of Title, whereby CREST became the register of legal title for uncertificated securities, eliminated the previous gap between settlement and registration of gilts and corporate securities trades, improving the delivery leg of DvP.

1: www.bankofengland.co.uk/markets/payments/sspr9809.pdf

2: Set out in the 1989 Ernest Sykes Lecture (reproduced in Bank of England *Quarterly Bulletin*, August 1989).

3: Page 99 of the June 2001 *Review*.

4: For a more detailed description of the role of central counterparties, see Hills, R, Rule, D, Parkinson, S, and Young, C (1999), 'Central counterparty clearing houses and financial stability', *Financial Stability Review*, June.

5: Page 118 of the December 2001 *Review*.

During September and October 2003, following the necessary legal and technical changes, traditional paper-based money market instruments were replaced by fully dematerialised equivalents in CREST.

All of these improvements to the UK securities settlement infrastructure required intensive preparatory work by the market as a whole. In addition, the active co-operation of HM Treasury was needed in preparing the necessary amendments to the legislative structure for CREST, now set out in the Uncertificated Securities Regulations 2001 (which were amended in June 2003 to introduce eligible debt securities).

In addition to the six major recommendations, the SSPR also advocated the introduction of links between CREST and securities settlement systems in other countries. In September 2002, CREST merged with Euroclear, the Brussels-based international central securities depository (which already owned national central securities depositories in Belgium, France and the Netherlands), thus providing members

with access to a wider range of overseas securities. Improvements to settlement facilities in CREST for unit trusts and open-ended investment companies were also suggested – work continues in this area. Other initiatives include consideration of how to improve payment arrangements for US dollar settlement in CREST.

The substantial achievements of the past five years are not, however, an end to the process. The value and volume of securities traded and needing settlement continues to grow, particularly cross-border. New technology, along with harmonisation of law, regulation and market practice, offers the possibility of added efficiency gains and further reductions in risk. The most recent initiatives in this area include the agreement of international standards for securities settlement systems⁶, the work of the Giovannini Group, and the Group of Thirty (G30) report on 'Global Clearing and Settlement', which provides an action plan for improving the infrastructure supporting securities markets.⁷

6: For example, the recommendations issued jointly by the Committee on Payment and Settlement Systems (CPSS) and the International Organisation of Securities Commissions (IOSCO) in November 2001.

7: The work of the G30 in the field of clearing and settlement is summarised on page 79 of the [June 2003 Review](#).

ESCB and CESR also published a paper asking whether, and if so, how, the scope of the standards should be extended to encompass major custodian banks and other significant securities clearing and settlement service providers. The consultation period for both documents ended in October 2003 and market responses are now under review – a revised version of the standards will be produced early in 2004.

Once finalised, the ESCB-CESR standards will be used by regulators and overseers (including the Bank of England) to ensure that EU clearing and settlement systems are both safe and efficient. To facilitate this, an assessment methodology will be developed jointly by the ESCB and CESR.

Range of currencies settled by CLS expanded

During September 2003, one year after commencing live operations, the Continuous Linked Settlement (CLS) system added four new currencies – those of Denmark, Norway, Sweden and Singapore – to its

original list of seven eligible currencies. Further currencies are expected to be introduced into CLS over the next two years.

Previous *Reviews* have highlighted the reduction in risk brought about by CLS.¹⁹ By settling foreign exchange (FX) transactions on a payment-versus-payment basis, CLS eliminates a major component of FX settlement risk, namely the principal risk that arises from the possibility that a market participant pays out the currency it sold but fails to receive the currency it purchased. The contribution of CLS to reducing FX settlement risk, and the areas in which risk may remain, are discussed further in Box 3.

The introduction of the four new currencies has led to an increase of over 4,000 (around 5%) in the average number of sides settled by CLS each day (each FX trade consists of two sides – one in each currency). As illustrated by Chart 2, with the exception of a seasonal decline during July and

19: See, for example, pages 82–85 of the [December 2002 Review](#).

August 2003, CLS volumes and values have grown strongly since the system was launched in September 2002 – the daily value of sides settled now frequently exceeds US\$1 trillion.

Chart 2:
Daily volume^(a) and value settled in CLS (ten-day moving averages)



Source: CLSB 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).

Market practices

Revision to the UK Combined Code on corporate governance

In July 2003, the Financial Reporting Council (FRC) approved a revised Combined Code on corporate governance.²⁰ The new Code is based on the recommendations of the reviews led by Derek Higgs on the role of non-executive directors and by Sir Robert Smith on guidance for audit committees, both of which reported in January 2003.

Under FSA rules, listed companies are required to explain how they apply the principles of the Combined Code, and to confirm whether they comply with its provisions or to explain why they do not. The Code also applies to institutional investors in their role as shareholders. In this context, the overall objective of the revised Code is to safeguard investor confidence in UK capital markets, by enhancing the governance standards of listed UK companies, and the reliability and independence of reported financial information.

The revised Code entered into effect on 1 November 2003. New features include revised definitions of the roles of the board, the chairman and the non-executive directors. Larger listed

companies are now expected to have half of their board composed of independent non-executive directors, and clear criteria by which to define independence are provided.

In addition, the revised Code provides a strengthened role for the audit committee in order to monitor the integrity of the company's financial reporting and to reinforce the independence of the external auditor.

Insolvency provisions of the UK Enterprise Act

Provisions contained in the UK Enterprise Act 2002 regarding corporate and personal insolvency came into force on 15 September 2003. The new provisions are designed to simplify existing insolvency procedures and affect administrative receivership, administration, company voluntary arrangements ('CVAs') and individual voluntary arrangements ('IVAs') relating to personal bankruptcy. The main features are:

- abolition of the Crown's preference;
- new ways of appointing an administrator out of court;
- circumscribing administrative receivership, such that a floating charge holder cannot petition the court to appoint a receiver (floating charges provided prior to 15 September 2003 are 'grandfathered');
- requiring (new) floating-rate charge holders to set aside a proportion of proceeds (up to a maximum of £600,000) for unsecured creditors;
- making the administration procedure quicker and limited to one year (with limited extensions); and
- allowing administrators to make distributions to all creditors.

While strengthening somewhat the position of debtors (particularly in relation to IVAs), and intending to promote more of a culture of corporate rescue than receivership, the changes do not go as far as US Chapter 11 bankruptcy arrangements, with creditors retaining a key role.

²⁰ The revised Code is available on the FRC website, www.frc.org.uk

Box 3: CLS and the continuing need to reduce foreign exchange settlement risk

In the 1996 'Allsopp Report'¹, G10 central banks drew attention to serious deficiencies in the way many banks measured and managed the exposures they incurred in settling foreign exchange (FX) transactions. Exposures on transactions where parties paid out the currency they had sold before receiving the currency they had bought exceeded (in some cases) the capital of the banks involved and remained outstanding for several days.

This so-called 'principal risk' raised concerns for the safety of individual banks, and also – owing to the potential for payment difficulties in one firm to cause a chain of payment failures in other institutions – for the stability of the international financial system. The G10 central banks thus set out a strategy to reduce FX settlement risk. This required action by:

- (i) individual banks to control their FX settlement exposures;
- (ii) private sector industry groups to provide risk-reducing multi-currency settlement services; and
- (iii) central banks to induce rapid private sector progress.

The successful launch in September 2002 of the Continued Linked Settlement (CLS) system, which eliminates principal risk between settlement members by settling FX transactions on a payment-versus-payment basis, represents a landmark in private sector progress on the second strand of the G10 central banks' strategy. CLS has provided a means for individual banks, participating either as 'settlement members' or as 'third-party users', to reduce their FX settlement exposures. The growth of CLS since its launch, in terms of the value and volume of transactions settled, the number of currencies included and the number of institutions using CLS is a welcome sign that a practical and effective means of reducing settlement risk has been found. At the end of November 2003, 55 members and 100 third-party users were settling most of their eligible transactions through CLS.

But probably significantly less than half of total FX settlement is currently effected through CLS.²

Many transactions are still settled outside CLS, raising questions about the potential exposure of counterparties in these transactions to settlement risk, and whether the counterparties concerned have taken, or could take, steps to reduce that exposure.

Transferring settlement of FX business into CLS is one way of reducing principal risk but may not be appropriate for all banks, for example because of their low FX volumes or the group of currencies in which they trade regularly. For those banks that do not participate in CLS, settlement risks can still be managed and contained by ensuring that exposures are measured and monitored, that counterparty limits are administered, and that appropriate management controls are in place. Collateral arrangements and legally sound netting arrangements are other important tools. The Basel Committee on Banking Supervision has published guidance on principles and methods for reducing FX settlement risk.³

For those banks that participate in CLS as third parties, and for the settlement members that take on these third-party customers, the exposures that may arise between the settlement member and third party need to be monitored and controlled. A settlement member takes on a credit exposure if it pays out currency due to the third party before it receives currency due from the third party. Third parties can take on exposures to settlement members in a similar manner. Moreover, where a settlement bank succeeds in attracting a large number of third-party customers, many institutions may become dependent on that bank's operational resilience and successful liquidity management. The issues surrounding exposures that may arise from a tiered participation structure – highlighted in Box 9 in the preceding article – should also be considered by CLS users.

There is significant scope for some market participants to reduce FX settlement risk further, and supervisors and central banks will continue to take a close interest in identifying where risk remains inadequately controlled.

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: Accurate figures are not available – CLS provides data on its daily settled values, but comparable up-to-date figures for the market as a whole do not exist. Estimates using data drawn from the BIS April 2001 triennial survey of FX market activity find that between one quarter and one third of the value of total transactions is currently being settled through CLS. Central banks plan carefully to examine the results of the 2004 BIS survey in conjunction with CLS data.

3: Basel Committee on Banking Supervision, 'Supervisory Guidance for Managing Settlement Risk in Foreign Exchange Transactions', September 2000.

International financial architecture

End of the IMF contingent credit lines facility

On 26 November 2003, the IMF Executive Board decided to allow the IMF's contingent credit lines (CCL) facility to expire on its scheduled sunset date of 30 November 2003.

Created in 1999 as part of the IMF's efforts to strengthen crisis prevention, the CCL facility offered IMF member countries with strong economic policies a precautionary line of defense against balance of payments problems that might arise from financial contagion. However, many countries fear that seeking IMF assistance is viewed by the markets as a sign of weakness – hence the facility was never used. In addition, since 1999 a number of emerging market economies have reduced their vulnerability to external shocks through reserve accumulation, the adoption of flexible exchange rates, and other reforms.

The IMF does, however, intend to continue exploring ways to reduce vulnerabilities and provide precautionary support for countries with strong policies in dealing with external financial developments.

Assessments of offshore financial centres

Over the past three years, the IMF has carried out assessments of the supervisory and regulatory regimes of 40 offshore financial centres (OFCs). The assessment programme has had a significant effect in improving supervisory standards – many centres have strengthened their laws, regulations and supervisory arrangements to meet international standards, either ahead of their IMF assessment or as a result of it.

The IMF Executive Board recently agreed that monitoring of OFCs should become a standard component of the work of the Fund.²¹ This will include regular monitoring of OFCs' supervisory and regulatory systems, and ways to improve the transparency of OFCs' supervisory systems and activities. Other key elements include enhancing technical assistance and collaboration with standard setters and supervisors to strengthen standards and exchanges of information.

21: www.imf.org/external/np/sec/pn/2003/pn03138.htm

22: www.financialsectorcontinuity.gov.uk

23: www.bankofengland.co.uk/publications/taskforce/main.htm

Crisis management

Update on business continuity planning initiatives

The tripartite Standing Committee on Financial Stability's sub-group on resilience and contingency planning co-ordinates the work of the UK financial authorities – the Bank of England, HM Treasury and the FSA – and other bodies in this area. The primary responsibility for contingency arrangements lies with the private sector, but the authorities aim to encourage the sharing of information and facilitate work to address overlaps and gaps.

Current initiatives are focused on six areas: clarifying the role of the financial authorities; safeguarding communications during a crisis; encouraging market co-ordination in business continuity planning; promoting individual firms' resilience; and ensuring the resilience of telecoms and physical infrastructure. The future work of the financial sector authorities in this field will be adapted to encompass the recommendations of the Task Force on Major Operational Disruption in the Financial System, discussed below.

The financial authorities would expect to perform a central co-ordination and communication role in the event of operational disruption affecting the financial system. New mechanisms have been put in place to ensure the authorities could maintain communication with market infrastructures and participants. This is in addition to the tripartite website,²² which would be one of the main means of communication in the event of major operational disruption. The website provides an overview of the main organisations involved in this work within the financial sector, their responsibilities and activities, and gives a brief summary of the key issues currently being addressed.

Task Force on Major Operational Disruption in the Financial System

In June 2003, HM Treasury announced the establishment of a Task Force, chaired by Sir Andrew Large, Deputy Governor of the Bank of England, to examine the need for new statutory powers to help deal with major operational disruption in the financial services sector. The Task Force published its final report on 3 December 2003.²³

The Task Force reviewed the measures already in existence to minimise the impact of major operational disruption. In particular, it sought to identify the extent to which relevant provisions in private sector contracts and in the rules of market infrastructures represented best practice and were actually implemented.

The Task Force found that there were a wide range of defensive measures and risk management provisions available to mitigate the consequences of major operational disruption. It concluded that such mechanisms generally allow contracting parties to address and manage risks appropriately; this conclusion is in line with the outcome of similar reviews in the USA.

In relation to key market infrastructures – payment systems, exchanges, clearing and settlement systems and financial infrastructure service providers – the Task Force found that they generally appeared to have well-developed plans for business continuity, with a range of powers within their rules to deal with major operational disruption.

Against this background, the Task Force examined the need for a range of powers:

- powers to suspend financial obligations;
- powers of direction over financial markets;
- powers to prohibit financial transactions;
- powers to declare a bank holiday;
- emergency powers under the Civil Contingencies Bill; and
- powers to waive statutory requirements during a crisis.

The Task Force concluded, on balance, that no new statutory powers are needed. It acknowledged the importance of the existing focus on contractual methods of dealing with emergencies, on market infrastructure rules, and on creating an environment where there is a coordinated approach to contingency planning. This approach was seen as being well suited to the particularly international and interconnected nature of UK financial markets.

The Task Force took account of work that has already been undertaken to address business continuity issues, but concluded there was a need for further improvements. In particular, the Task Force put forward eight recommendations to help further improve the resilience of UK financial markets:

- market participants and the financial authorities should continue to place a high priority on business continuity planning;
- market participants and their trade associations should work to ensure that private contracts are reviewed to take account of major operational disruption;
- market infrastructures should ensure that they have specific rather than general powers to deal with major operational disruption;
- the UK financial authorities should continue to contribute to international efforts to develop recognised good business continuity practice for systemically important market infrastructures;
- participants in significant markets should consider whether there would be benefits from further defining the principles on which to base claims arising from the delayed performance of contracts following major operational disruption;
- the financial authorities should aim to clarify further, and publicise, their respective roles in the event of major operational disruption;
- the financial authorities should consider with market participants the need for a high-level committee to help ensure co-ordination across financial markets in the event of major operational disruption; and
- the UK financial authorities should continue to promote international co-operation and co-ordination in developing responses to major operational disruption.

For each recommendation, the Task Force suggested how it could be implemented. It also proposed that the Tripartite Standing Committee on Financial Stability should monitor progress in meeting the recommendations, and publish a progress report in October 2004 and annually thereafter.

Box 4: Other developments in the financial infrastructure

Initiative	Significance	Progress
Review of the definition of regulatory capital for UK banks.	The FSA has reviewed its policy on what constitutes Tier 1 'core' regulatory capital.	Responding to comments on an earlier consultation paper, ¹ the FSA has stated that it no longer proposes to treat capital-instruments economically equivalent to non-cumulative preference shares as eligible for Tier 1. The FSA has also clarified the border between core and non-core ('innovative') Tier 1 capital.
FSA regulatory reporting requirements.	Reform and harmonisation of the different reporting frameworks across industry sectors aims to support the risk-based approach the FSA takes in meeting its statutory objectives and to reduce the regulatory burden on firms.	Consultation papers ² on the overall approach (including mandatory electronic reporting), specific reporting requirements for mortgage, general insurance and investment firms, and insurance firms' publicly available data, were published in September 2003.
Reform of UK audit and accountancy regulation.	Proposed measures are designed to enhance confidence in auditor independence and the quality of audits, reduce conflicts of interest and enhance transparency of reporting.	The UK government's legislative programme for 2003/4 includes the Companies Bill, which will amend the statutory framework for supervision of the accounting and auditing professions (including an extension of the authorities' information gathering powers).
UK pensions legislation.	Government action plan (published in June 2003), proposes a number of measures, including the establishment of a pensions protection fund, to enhance the security of pensions provision.	Legislative proposals announced in November 2003.
Regulatory reform proposals for US government-sponsored enterprises (GSEs).	Proposal to create a new Office of Housing Finance Supervision within the US Treasury should, if enacted, lead to strengthened oversight arrangements for Freddie Mac and Fannie Mae. Market perceptions of an implicit government guarantee for the GSEs could, however, be reinforced.	US Administration proposals put forward in September 2003 are expected to be enacted in 2004.
US accounting standards for consolidation of the assets and liabilities of variable interest entities.	New Financial Interpretation Number (FIN) 46 is designed to tighten the rules regarding the consolidation of variable interest entities (VIEs), such as asset-based commercial paper conduits, in the accounts of a bank or other institution holding a controlling financial interest in the vehicle.	On 31 October 2003, the US Financial Accounting Standards Board issued a proposed Interpretation of FIN 46 ³ , which should help to avoid inconsistent interpretation by reporting institutions. Implementation of the standard has been delayed by six months and will be effective for financial statements related to periods ending after 15 December 2003. ⁴

1: www.fsa.gov.uk/pubs/policy/ps155.pdf

2: FSA Consultation Papers 197, 198 and 202 (www.fsa.gov.uk/pubs/cp/index-2003.html).

3: www.fasb.org/draft/ed_prop_interp_vie.pdf

4: Some US financial institutions have already elected to consolidate variable interest entities in their accounts.

Initiative	Significance	Progress
Principles-based accounting in the USA.	A principles-based approach to accounting should encourage firms to base decisions more exclusively on economic risk and rewards, with the substance, rather than the form, of transactions taking priority. A risk of greater complications could arise, however, if a principles-based system were to be imposed on top of existing rule books.	Securities and Exchanges Commission (SEC) staff study ⁵ released on 25 July 2003 recommended the adoption of a principles-based accounting system, although it would take considerable time for such an approach actually to be implemented.
SEC proposals on short selling.	The proposals would, among other things, require short sellers in all US equity securities to locate securities to borrow before selling short ⁶ and impose strict delivery requirements on securities where many sellers have previously failed to deliver.	The SEC's proposed rules ⁷ were announced on 29 October 2003, with a 60-day comment period.
US regulation of hedge funds.	The recommendations would result in strengthened oversight of the US hedge fund industry and address the paucity of publicly available data (by requiring the majority of hedge fund advisors to register and provide information to the SEC). None of the recommendations attempt to limit the use of leverage, short-selling or derivatives, all of which facilitate the ability of hedge funds to enhance market efficiency and liquidity.	SEC staff report ⁸ published on 29 September 2003, which is now being considered by Commissioners, recommended the registration and subsequent regulation of any hedge fund adviser managing the interests of more than 14 individual investors.
Inclusion of collective action clauses (CACs) in international bond issues.	The inclusion of CACs, with features such as majority action clauses in bond contracts, can reduce creditor co-ordination problems and thereby facilitate agreement on a sovereign debt restructuring deal.	In recent months a number of emerging market issuers, including Poland, Turkey and Peru, have included CACs in bonds issued under New York law, continuing the trend established in the first half of 2003. However, some issuers, such as China and the Phillipines, have chosen not to include CACs in their New York law bonds.
Sovereign Debt Code of Good Conduct.	There has been interest in developing a Code to set out best practice for debtor and creditor behaviour on issues related to sovereign debt.	At their October 2003 meeting, G20 Ministers and Central Bank Governors encouraged an 'inclusive' group of issuers and market participants to engage in further discussion.

5: www.sec.gov/news/studies/principlesbasedstand.htm

6: The practice of selling short prior to having arranged to borrow the required securities is commonly known as 'naked' short selling.

7: www.sec.gov/rules/proposed/34-48709.htm

8: www.sec.gov/news/studies/hedgefunds0903.pdf

Annex: Oversight of payment systems

The Bank of England oversees payment systems used in the UK as part of its responsibilities for the stability of the financial system as a whole.²⁴ This annex describes key developments since the June 2003 *Review*.

CHAPS

CHAPS Sterling and CHAPS Euro – the UK’s main high value payment systems settling transactions with a total value averaging over £300 billion daily – have been judged by the IMF to be of a ‘very high standard internationally’²⁵ in terms of compliance with the BIS Core Principles used to assess safety and efficiency in systemically important payment systems.²⁶ CHAPS has nevertheless taken further steps to ensure continued full compliance with these Principles.

The need for legal robustness of the rules and procedures of systemically important systems is one of the Core Principles. If payments are not irrevocable and legally final, potentially large credit risks can arise. CHAPS has initiated work to confirm that settlement members that are branches of overseas-incorporated institutions have the power and authority to commit themselves to abide by the scheme rules and that their home country legal systems would not interfere with their ability to fulfil their obligations.

The Bank of England operates the Real-Time Gross Settlement (RTGS) processor that enables credit exposures between CHAPS members to be avoided by settling payments individually and in real time. RTGS ‘by-pass’ arrangements to allow CHAPS Sterling to continue to operate should RTGS be unavailable have also been agreed and tested. If by-pass mode were invoked (it has not been to date), CHAPS Sterling would revert to end-of-day multilateral net settlement. Payments activity could continue but, as a consequence, the credit risks associated with deferred settlement would be reintroduced. Since the

June 2003 *Review*, the last of the commercial bank members of CHAPS previously without the technology to apply net debit caps, and thus limit the credit risk they would bring to the deferred net settlement, have implemented the necessary system upgrades.

A further step to ensure the timely completion of daily settlement in by-pass mode would be to reach *ex-ante* agreement on procedures to provide liquidity funding in the event that an individual member in a net debit position experienced difficulties funding its obligation. CHAPS has undertaken to investigate such arrangements once similar work involving BACS and the Cheque and Credit Clearing (C&CC) Company, discussed in Box 5, has reached its conclusion.

CREST

The FSA has responsibility for regulation of CREST, the UK’s main securities settlement system, but the Bank of England also takes an interest both because of CREST’s prominent role in the UK financial system, and particularly the embedded payment mechanism used for settling the cash leg of transactions. That payment mechanism settles around £200 billion daily, which is clearly of systemic proportions. Moreover, the system has a close interdependency with CHAPS – liquidity transfers between the two systems are essential to the smooth functioning of both. The benefits of the recent dematerialisation of money market instruments and the migration of these instruments into CREST are described earlier in this article.

Euroclear Group continues to consult the market on the design of the ‘single settlement engine’ which (from 2006) will provide a common platform for all transactions in the merged group of which CREST is now a part. The Bank, as provider of liquidity for settlement in CREST, is in close contact with Euroclear and other interested central banks regarding the design of future settlement arrangements.

24: The objectives and focus of the Bank’s payment systems oversight is set out in ‘Oversight of Payment Systems’, Bank of England, November 2000 (www.bankofengland.co.uk/fsr/ops.pdf). The Bank has a statutory duty as designating authority for UK payment systems under the EU Settlement Finality Directive (SFD) 1998 and the associated UK implementing regulations – the Financial Markets and Insolvency (Settlement Finality) Regulations 1999. Designation under the SFD protects the rules of payment systems against challenge in the event of the insolvency of a participant. This can increase legal certainty about the status of obligations, reduce credit risk and minimise disruption to the functioning of payments systems (an analysis of the benefits potentially provided by SFD designation may be found in ‘Improving the legal basis for settlement finality’, Caroline Pitt, *Butterworths Journal of International Banking and Financial Law*, October 2003). CHAPS and CLS have sought and obtained SFD designation from the Bank of England. In addition, CREST and the London Clearing House (LCH) have been designated by the FSA, following consultation with the Bank on the payments aspects. None of the UK’s retail payment systems has yet chosen to seek designation, although retail payment systems have been designated in some other EU Member States.

25: International Monetary Fund, ‘United Kingdom: Financial System Stability Assessment’, February 2003.

26: Bank for International Settlements, ‘Core Principles for Systemically Important Payment Systems’, January 2001.

London Clearing House

The London Clearing House (LCH) is also regulated by the FSA and is another core element of the UK financial system. It acts as a central counterparty (CCP) for a wide range of derivatives and securities transactions, enhancing risk management and efficiency by allowing market participants to replace multiple bilateral exposures with a single net position with LCH. As the legal counterparty to its members, and guarantor of transactions, the integrity of LCH's own risk management is vital to the financial system as a whole. The proposed merger with Clearnet, described earlier in this article, will increase further the importance of sound management of CCP risks.

LCH operates a default fund which provides protection against a member's failure to pay should the margin held to cover that member's position with LCH prove insufficient. The size of the fund is calculated by applying stress tests which assume extreme market price movements based on a combination of challenging historical and theoretical scenarios. The results of stress tests conducted earlier in 2003 prompted LCH to increase the size of its default fund, from £343 million to £583 million, in September 2003.

BACS

BACS processes an average of 16 million direct debits, direct credits and standing orders (with a total value of around £10 billion) each day. Over the past six months there has been significant and beneficial change in BACS in a number of areas, along with substantial progress on other projects due for completion in 2004/05.

The separation of BACS into an infrastructure services company (ISC) and Scheme Company was completed on schedule on 1 December 2003. The separation is intended to enhance the effectiveness, accountability and transparency of BACS governance. It gives the ISC increased scope to consider opportunities to compete for business in other parts of the global payments market, and may give it more freedom to attract new capital to fund innovation. The Scheme Company and its members will also enjoy greater freedom to choose the best-value supplier of infrastructure services, and to define the payment services products they require without being unnecessarily constrained by the ability of one particular supplier to deliver.

Other benefits of the separation process have included the work it has prompted to clarify membership criteria and procedures for dealing with any settlement member that experienced financial difficulties. Members are working on eligibility criteria that would combine fair and open access to the payment system with effective management of the credit and liquidity risks associated with settlement membership. As part of the separation process, members have better defined the processes for managing the exclusion of a member, and decision-making procedures in the event of a member default. In parallel, BACS ISC has been able to devise and implement software upgrades to improve the technical mechanisms to implement an exclusion were this to be required. Further work on both the decision-making process and technical mechanisms for managing exclusion is planned for 2004.

The major infrastructure renewal project 'NewBACS' will deliver useful new functionality and security features. As part of this project, work scheduled for 2004 includes examination of the technical capability to apply debit caps and thereby control credit risk.

The key priority for members of the BACS Scheme Company and the Cheque and Credit Clearing Company (C&CC), however, should be to complete work on the liquidity-funding and loss-sharing agreements that will ensure settlement can complete in the event of a member failing to pay. The risks to which settlement banks are currently exposed and the potential for wider disruption are set out in Box 5. The agreements are central to reducing credit and liquidity risks to individual settlement members, both before and after any changes that may result from the reform of membership criteria.

Continuous Linked Settlement (CLS)

The Bank of England takes part in the co-operative oversight of CLS, the international foreign-exchange settlement system. The increase in the total value and volume of transactions settled in CLS (now regularly over US\$1 trillion per day), in the number of participants in the system and in the number of currencies being settled in CLS, is described earlier in this article. But much foreign exchange settlement continues to take place outside CLS, raising questions about the potentially large risks that some institutions may be running unnecessarily. Foreign exchange settlement risk and how it can be reduced is explored further in Box 3.

Box 5: Banks' exposure to settlement risk in BACS and Cheque and Credit Clearings

Settlement members of BACS and the Cheque and Credit Clearings (C&CC) currently accept uncapped credit risk against the other settlement members in these payment systems. Although the values likely to be at risk have been reduced substantially as a result of the settlement agreements signed in June 2003, there is no certainty that these systems can settle in the unlikely (but not impossible) event that one of the settlement members were to fail, or suffer a temporary shortage of liquidity – there are no agreed procedures for determining either who would bear any loss or whose funds would be used to enable settlement to complete. Unless agreement on who would pay any shortfall is reached, no settlement member in a credit position would receive any part of the pay-outs expected at that settlement. Payments to customers could be disrupted, and BACS and C&CC might be obliged to suspend all payment processing.¹

To address these weaknesses, the settlement members are working collectively, in a project facilitated by the Association for Payment Clearing Services (APACS), and encouraged by the Bank of England, to reduce the credit risks to which they are exposed, and to prevent potential disruption to the system as a whole. The first stage of this project was accomplished in June 2003 with the entry into force of formal *settlement agreements* (see below and previous *Reviews*), but there remains an urgent need to put in place a *liquidity-funding* and *loss-sharing* agreement to seek to ensure that settlement could complete in the event of a failure to pay by a settlement member. The target is for the agreement to be signed within the next few months.

BACS and C&CC are both 'deferred multilateral net settlement' systems. In such systems, all payments submitted during an input period are netted to produce for each member a single obligation to, or claim on, the system as a whole. Legally robust multilateral netting can reduce credit exposures to individual members more effectively than bilateral netting because it offsets what would otherwise be some members' bilateral net credit positions *vis-à-vis* a particular member against others' bilateral net debit positions *vis-à-vis* that member.

But a potential drawback of multilateral netting is the uncertainty concerning which members would bear any losses in the event of a default by a member in a net debit position. Without *ex ante* agreed procedures for funding a defaulter's position, no member in a net credit position would be able to receive any funds from the affected settlement, even if all other net debtors had paid. The settlement pay-outs delayed would almost always be larger than the exposure to the defaulting member. In BACS, for example, the Bank of England, as a member of the system, made an average daily settlement pay-in of almost £1 billion in October 2003, whereas the sum of pay-ins by other members averaged around £0.3 billion. But if any of the smaller net debtors failed to pay in, none of the creditors could collect any of the funds due from the affected settlement – amounts due from, and paid by, the Bank of England would also be blocked.

The settlement agreements, which provide a legally robust framework for multilateral netting, came into force at the end of June 2003. They have helped to ensure that credit exposures are reduced to net amounts, which have historically peaked at around £2 billion to the largest member across both systems over the three-day settlement cycle, from actual peak gross exposures that have exceeded £35 billion. But these agreements do not ensure that any settlement takes place in the event of a default and put no limit on the potential size of the net debit position a failing member can accumulate.

The proposed liquidity-funding and loss-sharing agreement is intended to reduce credit exposures by introducing a collateral pool, to which each member will contribute according to the pattern of net debit positions or some other measure of the risk they bring to the system. It will entail a significant element of 'defaulter pays', as the failed member's collateral would be liquidated first to cover a default. The agreement will also aim to ensure sufficient funds are available to allow settlement to complete promptly in all but the most extreme circumstances, so that banks expecting funds would receive them when expected.

1: Surviving members could voluntarily provide liquidity to enable settlement to complete, but this could result in the loss of all or part of these funds. A surviving member may be able to reverse entries already made on accounts in its books – although this will depend on its agreements with its customers, which differ between members and are distinct from and independent of the member's obligations at an interbank level. Nevertheless, any such action could affect standing orders, direct debits and direct credits (including around 90% of UK salary payments) processed by BACS, along with paper cheques and credits in the C&CC. BACS and the C&CC Company respectively handled gross payments worth £9.8 billion and £5.0 billion daily in October 2003.

These measures to control risk and enable settlement to complete in the event of a default would be further strengthened by the planned introduction of debit caps in BACS (which are not practicable with existing technology but should be in 'NewBACS'). These caps could be set to align maximum net debit positions with the amounts likely to be covered by the liquidity-funding and loss-sharing agreement.

Arrangements to address settlement risk in deferred net settlement systems are not new. A collateral pool and debit/credit caps are already used in the Euro 1 pan-European system. Banks have also agreed liquidity provisions and loss-sharing agreements – albeit in different circumstances from BACS and C&CC – in CLS. BACS and C&CC now need to adopt similarly sound practices.

SWIFT

SWIFT (Society for Worldwide Interbank Financial Telecommunication) is not a payment system but provides secure messaging between financial institutions. It is used by approximately 7,500 financial institutions in 200 countries. Many payment systems also use the SWIFT network for their messaging. SWIFT is in the process of 'migrating' its main messaging service from an ageing 'X.25' network to a newly constructed 'Internet Protocol' (IP) network. The target is to migrate all users by end-2004. Managing the transition without disruption of service presents challenges to both SWIFT and its users, but good progress has been made over the past six months. In addition, the move to a more widely known technology has necessitated heightened awareness of the technical security risks.

Other payment schemes

LINK – which clears around six million transactions conducted through the UK's ATM (Automated Teller Machine) network per day – is currently working to strengthen its governance arrangements by separating the decision-making of its 'scheme' and 'infrastructure' functions. It has sought to strengthen governance through the appointment of an independent non-executive chairman, and plans to review arrangements for decision-making on scheme-related issues.

In addition to LINK, the Bank of England has oversight contacts with Switch, MasterCard and Visa. A welcome development in the payment card industry is the progress on the 'Chip and PIN' initiative to provide more effective security features on credit and debit card transactions. This is a co-operative

industry solution backed by UK banks and building societies, the card schemes, the Association for Payment Clearing Services (APACS) and the British Retail Consortium. The national roll-out – involving the upgrading of point-of-sale terminals and the re-issuance of payment cards with Chip and PIN capability – will be gathering pace in 2004 and is expected to complete in 2005. This will result in an increasing proportion of retail transactions being verified with a PIN (Personal Identification Number) rather than with a signature.

Business continuity in payment systems

As part of wider efforts to enhance the resilience of market infrastructure in the event of major operational disruption, business continuity has been a key theme of oversight discussions with payment systems. Contingency and resilience are a core business concern for payment systems, and large amounts of money and time are being invested in these areas.

In a few cases, work to address some remaining identified points of possible weaknesses is planned but not yet complete. One or two systems recognise the need to define more clearly their decision-making procedures in the event of disruption. The Bank of England will continue to discuss progress in these areas with overseen payment systems in 2004. Key payment systems and their members have taken part in cross-industry exercises to test the co-ordination of responses to major disruption. Payment system representatives were also closely involved in the work of the Task Force on Major Operational Disruption in the Financial System (discussed earlier in this article) and supported its conclusions.



Transparency

and financial stability¹

Prasanna Gai, Australian National University and Hyun Song Shin, London School of Economics

Improved information about macroeconomic fundamentals, the balance sheets of firms and financial institutions, and the conduct of policy has been central to recent efforts to improve financial stability. Strides have been made in recent years to improve the quantity and quality of data provision under the IMF's *Special Data Dissemination Standard* (SDDS). Pillar III of the proposed Basel II Accord relies on disclosures by banks to exert market discipline through the price mechanism. Codes and standards on monetary, fiscal and financial policy seek to establish best-practice guidelines to clarify the objectives, role and process of policy. And countries have sought to publicise the extent of their disclosures through *Reports on Observance of Standards and Codes* (ROSCs) in an attempt to make a virtue of their 'transparency about transparency'.

THE NOTION OF TRANSPARENCY is broad-ranging. It encompasses notions of accountability and political legitimacy of decision makers, as well as the legal and accounting infrastructure in which economic decisions are made. But from the operational perspective of a central bank, transparency can be regarded more narrowly in terms of the disclosure of information to a wider audience. Intuitively, the release of a greater volume of more precise information in a more timely manner seems beneficial because it reduces asymmetric information and uncertainty in financial markets. Information about the financial stability framework and public evaluation of national balance sheets against yardsticks on international codes and standards offers investors an opportunity to assess risk better and arrive at more informed decisions. Moreover, greater clarity about financial stability policy potentially simplifies the task of monetary and fiscal policy by establishing clear lines of responsibility and objectives. In an environment of greater trust, communication by the central bank allows for greater flexibility to act.²

In this article we explore some of the consequences of greater transparency for financial stability. We highlight issues of incentives, co-ordination, and the interaction between the two, which play out in different ways depending on the nature of the disclosure. In particular, the ramifications of

transparency for financial stability hinge on answers to the following questions:

- *Who* is disclosing? Is it the central bank or other public authorities, or is it a private sector player or regulated entity?
- *When* is the disclosure? Is the disclosure one of general intent and/or in pursuit of the setting up of general channels of communication, or is the disclosure made after learning some specific features of the world, and hence discretionary?
- What is the *format* of the disclosure? Is the disclosure public in the sense of becoming common knowledge among all interested parties, or is it less than public, perhaps in the form of confidential bilateral communications between a private sector firm and the central bank?

Ex-ante central bank communication

We first consider the creation of general channels of communication by central banks, government agencies and other public bodies that take place before any specific information on distress or problems with the financial system are known. To the extent that the channels of communication are established before any specific features of the world are known, we regard such actions as being *ex-ante* communication. The task is to set up a framework

1: We are grateful to Andy Haldane, Stephen Millard, Roger Clews, Nigel Jenkinson and Alex Bowen for their comments on earlier drafts.

2: Svensson (2002) offers a similar argument.

for disclosure that is embodied in particular institutions.

Concrete examples of such *ex-ante* communication include the Bank of England's Monetary Policy Committee minutes, *Inflation Report* and *Financial Stability Review*, all published regularly; testimony in front of the Treasury Select Committee of the House of Commons and public speeches by Bank officials. Such communications establish a conspicuous platform from which the central bank's assessments of the economic and financial outlook can be conveyed in reasonable detail to transmit key messages to the public and the financial markets. The very open nature of these communications serves two critical purposes. First, they make the actions of the central bank very sensitive to reputation, thereby fostering credibility in the policy framework. And second, they provide a coherent institutional structure for ensuring common knowledge of the central bank's analysis and intentions.

The academic literature on monetary policy considers both issues in detail. The fact that there is always some information relevant for policymaking that, as Vickers (1998) notes, is simply incapable of being put in the public domain means that outside observers can never be completely certain what a central bank's actions will be, given public information and the central bank's avowed objective. Effective policy-making always requires some degree of discretionary behaviour. In principle, that means that, if a central bank's true objective were to differ for some reason from its avowed intentions, it could exploit the scope for discretionary behaviour to pursue its private goal without being caught out straight away. But any immediate benefits of doing so must be set against the future reputational costs of compromising the remit. In practice, it is not clear why a central bank would have any objective other than its avowed one, but observers might nevertheless not be convinced of that. Improvements to *ex-ante* channels of communication allow the public to gauge the intentions and goals of the central bank better and, in so doing, increase the reputational costs to the policy-maker of pursuing an objective that differs from the stated one³. In the UK, publication of inflation 'fan charts' together with details of the discussions of MPC members within the Inflation

Report and MPC minutes, serves as a benchmark against which the intentions of the central bank can be openly scrutinised.

Policy-makers' behaviour in promoting financial stability is the focus of this article. Viewed from a financial stability perspective, *ex-ante* transparency may play an even more critical role as a check on the actions of the central bank. The temptation for policy-makers in this instance is to deny a willingness to provide a financial safety net *ex ante*, but to intervene to bail out financial institutions *ex post*. Greater transparency about the goals and intentions of financial stability makes the potential loss of reputational capital very large, however. Unlike monetary policy, where policy-maker reputations are built and lost slowly, financial crises are low probability extreme events where the costs – both real and reputational – are upfront, large and immediate. Furthermore, since the central bank is often unsure about the systemic risks of a bank failure or a sharp fall in asset prices, it risks damaging its reputation by acting when intervention is unjustified, or by failing to act in what turns out to be a systemic crisis.

The format of the central bank's communication is critical to its ability to convey its intentions. Publications such as the *Financial Stability Review*, the *Inflation Report* and the MPC minutes seek to provide a clear informational platform from which the contents can be projected as a coherent whole to its audience. The aim is to achieve common knowledge of its main propositions. Not only does each individual in the audience understand the contents, but each individual can be reasonably confident that the audience as a whole has grasped the main propositions. This communication strategy contrasts with an alternative communication strategy that relies more heavily on speeches and testimonies of policy-makers made at different times. Although a collection of speeches taken together may convey a coherent message, the fragmented nature of the communication leaves open the possibility that some market observers fail to capture the intended picture with its emphases and qualifications. More importantly, even those market participants who have understood the full picture may be uncertain whether everyone has grasped it.

3: Faust and Svensson (2001) exemplify models that take this view. See Chortareas et al (2001) for a concise review of the literature on monetary policy transparency. Geraats (2002) also surveys models of transparency in the Barro-Gordon Class.

An analogy from the everyday use of email is useful to illustrate the difference between the two strategies. Compare two instances. In the first, an email message is sent to a group of recipients in which the list of recipients is suppressed. In the second, the same message is sent to the same group of recipients, but the list of recipients is clearly displayed on the message. In both instances, all the recipients will be aware of the contents in the body of the email. However, common knowledge is achieved only in the second scenario.

A fragmented communication strategy is akin to an email message in which the list of recipients is partially obscured. The recipient of such a message cannot be sure whether everyone has received the same message. Even if the proportion of market participants who miss the full picture is small, the overall consequences can be much larger, since even those market participants who have understood the full picture may harbour doubts as to the extent of slippage in addressing the full audience. Overall, there is the possibility that the market outcome may be driven by the lowest common denominator – ie the less than fully informed parties – and not by fully informed agents. This is because market participants typically find it difficult to co-ordinate their actions, and the reactions of less than fully informed agents may affect the actions of better-informed agents.⁴

Ex-post discretionary disclosure

A central bank can sometimes have an informational advantage over other market participants. Its role as the lender of last resort, and the trust that private sector players place in the motives of the central bank, often mean that the central bank is in receipt of sensitive information about financial entities that is not widely shared in the market. The central bank is thus in a powerful position. By having a policy of disclosing information⁵ about the financial conditions of an individual entity, it can discourage financial institutions from engaging in excessively risky activities. To what extent should the central bank play the role of a whistle-blower willing to disclose the true state of financial balance sheets?

The existence of a distressed party influences the market dynamics in important ways, and the presumption that more information is better does not always hold. Common knowledge of financial distress can generate opportunities for speculative gains by exploiting and further aggravating the balance sheet of the distressed party. This is because of the greater scope for co-ordination that arises from the common knowledge of distress, and from the predictability of the actions of the distressed party. To a large extent, a successful speculative attack is the resolution of a co-ordination problem between a group of interested parties whose actions tend to be mutually reinforcing.

The Thai financial crisis of July 1997 is a concrete example where the central bank was, itself, the distressed party. In the period leading to the abandonment of the baht's peg to the dollar on 2 July, the Thai authorities' figures for foreign reserve holdings were exaggerated by the inclusion of dollar holdings needed to settle forward and swap positions in dollars put in place to shore up the peg. However, once IMF assistance was requested late in July, one of the conditions that the IMF imposed on Thailand for the IMF package was that the Thai authorities should clarify the true extent of the foreign reserve losses. The Thai package was announced on 20 August, and the announcement was accompanied by the revelation that some US\$23 billion of the Thai dollar reserves were already tied up with the forthcoming settlement of swap and forward contracts. The Thai baht duly crashed, exacerbating the financial distress. Many commentators, as well as the IMF itself (IMF (1999)), have identified this episode as an avoidable mistake.

The issue in Thailand was whether it was wise to issue a highly public announcement on the deteriorating fundamentals of a distressed party in the market. Public announcements, by their nature, serve a co-ordination role among disparate market participants. To the extent that a currency attack is the resolution of a co-ordination problem among disparate speculators and domestic hedgers, any opportunity to enhance this co-ordination would be detrimental – at least to the Thai authorities.

4: Morris and Shin (2002), Amato et al (2002) and Allen et al (2003) study the role played by common knowledge of the central bank's intentions in financial market behaviour. The literature on herding and informational cascades (eg Bannerjee, 1992; Bikchandani et al, 1992) offers related insights. Woodford (2002) discusses how the breakdown of common knowledge gives rise to nominal rigidities that allow monetary policy to have real effects.

5: Any disclosures by the central bank would be subject to legal constraints on the disclosure of information or duties of confidentiality arising through contract when the information was received, or duties implied by general principles of law (principles of banking secrecy). These contracts, principles and laws will clearly influence the central bank's public disclosure policy.

A thought experiment helps push this point further. Think back to September 1998 when the hedge fund Long-Term Capital Management (LTCM) was close to bankruptcy, and the US authorities were considering the various options on how to resolve the crisis. What if the authorities (the New York Fed, in this instance) had taken the same course of action that the IMF had taken with Thailand in 1997? In other words, suppose that the New York Fed had required LTCM to announce its trading positions publicly as a precondition for facilitating the co-ordination of its creditors. There seems little doubt that LTCM's distress, as well as the distress of its creditor banks and counterparties, would have been greatly exacerbated. Common knowledge of the trading positions of LTCM would have identified more clearly than ever the greatest vulnerabilities and served as an effective co-ordinating signal to exploit the weakened position of the distressed parties. In such circumstances an orderly resolution of the crisis would have been more difficult to achieve.

The obvious retort to the claim that public disclosures are detrimental is that if such disclosure requirements had been in place from the beginning, then LTCM would not have overreached itself to the extent that it did, and the Thai authorities would not have attempted to hold the dollar peg by committing reserves in the swap market for so long. Hence, when the public disclosure requirement is in place from the outset, practices that only thrive on asymmetric information will be discouraged, and prevent potential vulnerabilities from appearing in the first place.

Although the argument that disclosure can mitigate the temptation of banks and other financial entities to engage in excessively risky behaviour is a powerful one, it runs the risk of limiting the policy-maker's ability to react flexibly to events. Vickers (1998) argues that optimal monetary policy cannot be absolutely transparent – a degree of discretion in monetary policy is necessary to ensure sensible decision-making in a rapidly changing macroeconomic environment.⁶ And George (1994) emphasises that withholding information about the timing, nature and terms of intervention in financial crises provides the central bank with vital room for manoeuvre:

“...we usually try to keep the fact that we are providing systemic support secret at the time... If people know we are so concerned about systemic fragility that we have judged it necessary to provide support, that could lead to a wider loss of confidence... and we would rapidly find ourselves in the position where we were in practice underwriting all the liabilities of the banking system.”

Thus, the benefits of discretionary disclosure in mitigating the inefficiencies of moral hazard need to be balanced against its efficacy in managing crises. Given the high reputational costs at stake in managing financial crises, a central bank may need to be selective in its *ex-post* discretionary disclosures and engage in policies of ‘constructive ambiguity’. While this places a higher degree of discretion in the hands of a crisis manager, problems of time inconsistency and ‘policy-maker moral hazard’ are likely to be tempered if clear *ex-ante* channels of central bank communication are in place.

Disclosures by private sector players and the informational role of prices

Closely related to the idea that disclosures by the central bank help mitigate excessive risk in the financial system is the notion that market prices have their maximum impact when the public information on which prices are based is as accurate as possible. Pillar III of Basel II advocates reliance on market discipline through market prices, in turn informed by disclosures by banks and other financial institutions. Mitigating information asymmetries by policies that require greater disclosure by market participants may thus be a means of limiting moral hazard in financial markets.

The argument for the preventative effects of greater disclosures by regulated entities is a strong one.⁷ But it is important to keep in mind the mechanism that is envisaged in this argument. When informed parties are required to disclose some of their private information, there is less scope for the informed party to pursue their own socially detrimental goals by hiding behind the cloak of secrecy. Thus transparency is most effective in reducing economic inefficiencies when the information required is directly relevant to the underlying principal-agent problem. The same

6: Jensen (2002) discusses how transparency in monetary policy may constrain flexibility in pursuing a stabilisation policy by encouraging the central bank to focus more on reducing undesirable variability in inflation.

7: There is a burgeoning empirical literature that backs up the force of the argument. Baumann and Nier (2003), for example, find that banks in those jurisdictions that require a greater degree of disclosure tend to take on less risky projects.

goes for the information conveyed by prices. The information conveyed by prices is most useful in those cases where the market prices reveal information that the informed party would like to withhold from the rest of the market. Market discipline through prices serves to level the playing field between informed and uninformed parties.

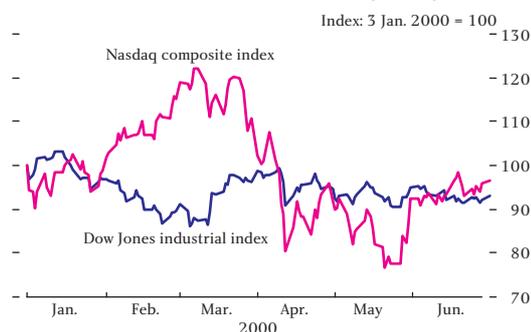
In many contexts, prices serve to aggregate the divergent opinions of a large number of uninformed agents. One might argue that it is nevertheless useful to use the price information that is derived from the interactions of such agents in regulating other, more secretive, agents who want to benefit from their private information. Relying on such price signals is most effective whenever the traders who determine prices have decision horizons that are a close match with the decision horizons of the regulated entities. For instance, suppose that a firm has issued corporate bonds, and that such bonds are held mainly by investors who normally hold those bonds to maturity, but enough bonds are traded in the market to give continuous prices. In such a case, the market price of the bond will reflect the probability of default and the loss, given default. If the firm were to venture into riskier ventures or increase its leverage further, then the disclosures by this firm will be digested by the market and the bond will be priced accordingly. Anticipating this, the firm will think twice before engaging in any risky venture that may weaken its position in the market.

In some other cases, however, the decision horizon of the regulated entity may not coincide with the decision horizon of the dominant market participants whose activities determine prices. For example, short-term movements in equity prices may reflect incentive and agency problems among the major market participants themselves operating in the market, as well as shifts in the fundamentals of the companies being traded. Fund managers whose mandates are written in terms of relative performance measures may feel pressured to deviate from their judgements on fundamental values, given the nature of their compensation contract. The prospect of losing a valued client would further reinforce the tendency to deviate from fundamentals. Indeed, the agency problems go deeper. The trustees who employ fund managers are, themselves, subject to an agency problem *vis-à-vis* the beneficiaries who have appointed them. Trustees may profess the importance of long-term investment goals, but may

feel pressured to dismiss a low-performing fund manager and replace him with an alternative fund manager chasing the latest fashion in the market. Equity markets often experience sharp 'sector reversals', in which once-fashionable sectors of the equity market fall out of favour and are replaced by newly fashionable sectors.

The first few months of 2000 illustrate sector reversals dramatically. In the period running up to the peak of the Nasdaq index on 10 March, stocks in the technology, media and telecoms (TMT) sector rose very rapidly even as the Dow Jones index (composed mainly of conventional, 'old economy' stocks) fell. But the roles were reversed following the peak. The Nasdaq index fell sharply thereafter, often experiencing wild swings, while the previously unfashionable old economy stocks rallied strongly (Chart 1).

Chart 1:
Dow Jones industrial and Nasdaq composite index



Source: Bloomberg.

When market prices are driven by players whose actions are motivated mainly by short-term considerations arising from agency problems that bear little fundamental relationship to the long-run value of the assets that they trade, then prices will lose much of their informational role. There is a 'horizon mismatch' between those (short-term) traders who influence prices and the regulated entities whose long-term decisions on risk one is most interested in. Failing to recognise this horizon mismatch can lead to suboptimal decisions and economic costs.

Take the example of the Merton-style 'structural' models of credit risk used by firms such as KMV (now part of Moody's) in which the volatility of the share price is used to calculate the volatility of the firm's assets as a whole, and thereby calculate the probability of default by setting the probabilistic path

of the firm's assets against the notional value of its liabilities. Such models have been used extensively, and have proved to be successful.

However, on those occasions when the share price is buffeted by short-horizon trading decisions that bear little relationship to the long-run fundamental value of the assets, calculations of default risk that neglect such effects may give misleading results. Many telecom firms issued large amounts of debt in order to finance their extensive investment projects at the peak of the stock market's strength in the late 1990s. Analyses of credit risk that relied on inference from share prices often came up with conclusions on default risk that were more optimistic than assessments implied by the credit ratings of these firms. Moreover, the probability of default intimated by debt prices sometimes deviated from those intimated by equity prices. When market prices give conflicting signals of the underlying fundamentals, the reasons for the discrepancy are worth exploring further.

There is another notable instance of the economic costs arising from the failure of the market to reflect the fundamental values of underlying assets. Many European countries started to auction off licences for the third generation (3G) mobile phones in 2000, beginning with the UK in February/March of 2000. The 3G auction in the UK led to a fiercely contested bidding contest, netting the UK Treasury a *per capita* revenue of 650 euro. Subsequent auctions in other European countries yielded less, sometimes dramatically less (Table 1).

Table 1:
Per capita revenue (euro), and concluding month of auction

Country	Per capita revenue	Clearing month of auction
UK	650	March 2000
Netherlands	170	July 2000
Germany	615	August 2000
Italy	240	October 2000
Austria	100	November 2000
Switzerland	20	December 2000
Belgium	45	March 2001
Greece	45	July 2001
Denmark	95	September 2001

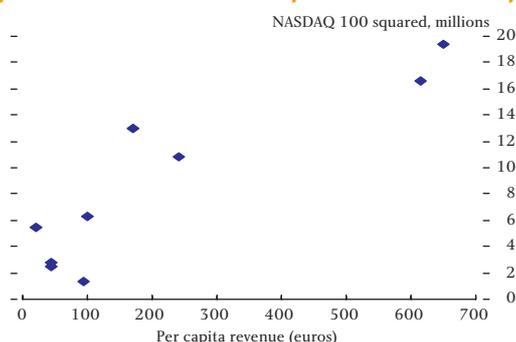
Source: Klemperer (2002).

Authors such as Klemperer (2002) have emphasised the importance of the auction design in explaining the differences in revenues raised. To some extent,

however, the variation in the revenues also reflected the prevailing euphoria and perceived spending power as reflected in the equity index for high-tech stocks at the time of the respective auctions.

Consider the following scatter plot between the *per capita* revenue raised and the squared value of the Nasdaq 100 index at the close of the month in which the auction took place (Chart 2). The squared value of the index is intended as a proxy for the non-linear nature of any euphoria, or the perceived ability to pay, that rely on excess value above some basic threshold. The correlation coefficient has value over 90%.

Chart 2:
Relationship between revenue per capita for 3G mobile phone licences and the square of the Nasdaq 100



Sources: Klemperer (2001) and Bloomberg.

The reasons underlying this relationship are worth exploring further. For a telecoms firm contemplating a bidding strategy in a forthcoming auction, the first question to ask would be how much the licences were worth, and how much funding can be raised to finance the bidding strategy, at what cost. Net present value calculations can be made based on projections of revenue growth and the choice of a suitable discount rate. However, the margin of error in such calculations would be large for projects that pay off such a long time in the future. They are typical 'long duration' projects that are extremely sensitive to the discount rate and growth rate of revenue. However, by embracing the principle that market prices reveal relevant information, clues for the appropriate numerical values for such variables could be obtained from market prices themselves. What better way, then, to infer the value of such licences than by looking at the market price as expressed in the share prices of the high-tech sector itself? Provided that prices were faithful reflections of the underlying values, the logic of the reasoning cannot be faulted. But the key premise that

the price reflected the underlying value may be the weak link in this chain of reasoning.

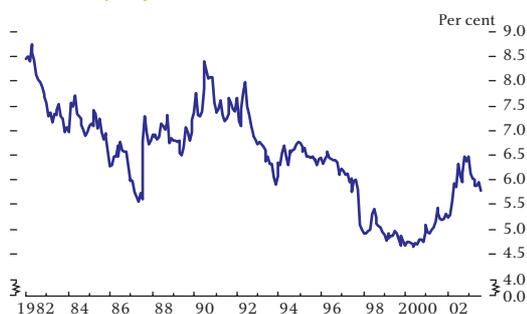
The direction of causation between optimistic projections of revenue from a project and the high market valuation of the project is almost certainly more complex than in the simple account suggested above. Strong projections of revenue may influence market value, as well as the market value itself influencing methods for calculating future revenues. The popularity of course options on valuation in business school finance programmes in the late-1990s reflects the latter.

Additional insights on the consequences of signals generated by market prices for real economic decisions such as investment can be gained by examining an estimate for the cost of equity. At its simplest, the cost of equity can be regarded as the internal rate of return for an equity-funded project – that is, the discount rate that would set the present value of the dividend stream equal to the market price of equity. Following this definition, the cost of equity can be written as

$$\text{cost of equity} = g + \frac{d}{p} (1 + g)$$

where g is the real growth rate of dividends, d is current dividends and p is the share price.⁸ The following chart plots the cost of equity for the UK assuming a real growth rate of dividends of 2.5% – roughly the long-run growth rate of the UK.

Chart 3:
Cost of equity



Sources: Thomson Financial Datastream, Bloomberg and Bank calculations.

The cost of equity fluctuated between 5% and 8% in the last two decades, but dipped below 5% in the late 1990s and 2000. Present value calculations of

long-duration investment projects are sensitive to small changes in the discount rate. The information conveyed by market prices affects the cost of equity, and hence real economic decisions.

The central bank's whistle-blowing role need not be confined to cases where it has received privileged information concerning a distressed party. There may be cases where the dynamics of asset prices may be distorted by short-term incentives or other impediments to the workings of an efficient market, and where private sector agents' incentives do not allow them to correct the misalignments by means of the workings of the market mechanism. Should the central bank blow the whistle in this instance? Finding the right time to blow the whistle can be almost impossible. Blow it too soon, and the central bank is accused of venturing into judgement too quickly when the uncertainties are too large to allow such presumptions. Blow it too late, and the central bank is accused of failing in its duties, and allowing imbalances to develop. However, when market prices give conflicting signals of the underlying fundamentals, such discrepancies may be highlighted by the central bank for consideration and digestion by the market. The design of the central bank's communication strategy is, thus, of critical importance given its authoritative role in marshalling debate.

In the context of banking regulation, Crockett (2001) argues that there are four prerequisites for market discipline to be effective. The market must have sufficient information; the ability to process it; the right incentives to process it; and the mechanism to exercise effective discipline. In the wider context that we have in mind, one could add to this list the condition that the market information must derive from actors whose motivation is closely tied to the underlying problem at hand.

Some concluding remarks

Calls for transparency in economic life are increasingly commonplace. In this paper we have attempted to highlight how greater disclosure influences financial stability through its effects on the incentives of market participants and their ability to co-ordinate their actions in the financial system. Although transparency is a powerful tool for limiting the moral hazard of investors and governments alike,

8: The market price p is construed to be the present value of the dividend stream, so that $p = d(1 + g)/(r + g)$, where r is the cost of equity.

it can be a two-edged sword. The efficacy of communication depends on the institutional framework, the decision horizon and expectations of key players, and the constraints that these can place on policy-maker flexibility. From the viewpoint of the central bank, it suggests that while the platform for the dissemination of information must be coherent and open, disclosures themselves may need to be selective. The benefits of reducing moral hazard *ex ante* need to be weighed against the risks of generating real hazards *ex post*. Our analysis suggests three broad implications for central bank communication related to its financial stability remit:

- First, *ex-ante* communication about the general intention of policy is a powerful tool, which allows the public to scrutinise the actions of the central bank. But this discipline is sensitive to the format of the disclosures. In general, it is not possible to express policy intentions fully and fragmented communication can exacerbate co-ordination

problems in financial markets, resulting in over-reaction to public information.

- Second, the release of specific information (for example, about firms and financial entities), can mitigate moral hazard and promote market discipline. Such discretionary disclosures, however, also risk exacerbating co-ordination failures in asset markets and can have damaging consequences for the real economy. The sensitivity of market expectations suggests that policy-makers may need to be selective about disclosures of this kind.
- Third, disclosure policies aimed at the private sector that rely on the price mechanism to mitigate socially inefficient activities are sensitive to the decision horizons of market participants. In circumstances where the dynamics of asset prices impede the workings of an efficient market, a role for central bank communication in correcting ‘horizon mismatches’ cannot be ruled out.

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Resolution of banking crises:

a review

Glenn Hoggarth, Financial Industry and Regulation Division, Bank of England,
Jack Reidhill¹, US Federal Deposit Insurance Corporation and Peter Sinclair, University of Birmingham

Late last year, the Bank of England's Centre for Central Banking Studies hosted a research workshop for officials from a number of developed and emerging market economies on banking crisis resolution. This article, which draws on the information provided in the workshop, is based on a paper presented at its concluding conference. It describes some of the principles that authorities should and do consider when resolving banking crises, and possible resolution options.² It also assesses the resolution practice in recent systemic banking crises.

OVER THE PAST QUARTER of a century, unlike the preceding 25 years, there have been many large bank failures around the world. Caprio and Klingebiel (2003), for example, document 117 episodes of systemic crises and 51 cases of borderline or non-systemic crises in developed and emerging market countries since the late 1970s.³ Moreover, cross-country estimates suggest that output losses during banking crises have been, on average, large – over 10% of annual GDP⁴ – and that bank lending and profitability have often remained subdued for years afterwards. This article reviews the merits of the various techniques used by authorities when resolving individual or widespread bank failures.⁵

Faced with a banking crisis the authorities clearly need to take some remedial action but they must also consider how their intervention affects the future behaviour of the private sector. One goal of crisis resolution is to reduce the disruption to the payments system and damage to confidence in the financial system as a whole. Authorities could also be concerned with the knock-on effects on the supply of credit to the private sector. The potential systemic threat to the economy of bank failures will vary with the size of bank intermediation in the economy and whether borrowers have other sources of credit.

But actions to deal with these aspects can clearly lead to future moral hazard. If any protection provided to banks in a crisis is greater than they expected, this could increase their risk-taking in the future. In a widespread crisis the authorities are therefore likely to face a trade-off between maintaining financial stability today – through offering protection to failing banks – and jeopardising future financial stability through increasing moral hazard later on, if today's actions make future assistance appear more likely. As Bagehot put it, "any aid to a present bad bank is the surest mode of preventing the establishment of a future good bank".⁶

Governments also wish to limit the fiscal costs of crisis resolution. Although these costs might simply be a transfer of income from current and future taxpayers to bank 'stakeholders', particularly depositors, raising (non-lump sum) taxes can have a large distortionary impact on economic welfare.

The next section considers various measures of reducing the net costs of crisis resolution and of reducing the probability of future crises. Then alternative resolution strategies that can be adopted during a crisis are assessed followed by how these resolution options are affected by the type of crisis.

1: The views expressed are those of the authors and do not necessarily reflect the position of the Federal Deposit Insurance Corporation.

2: The paper was also used as background material for this year's Central Bank Governors' Symposium on 'The role of central banks in preventing and dealing with financial crises'.

3: Systemic is defined here as pertaining to cases where all or most of the capital in the banking system has been exhausted.

4: See for example IMF (1998), Bordo, et al (2001) and Hoggarth and Saporta (2001).

5: See also BIS (2002) on resolving individual banking problems, and Hoelscher and Quintyn (2003) on resolving recent systemic crises.

6: There is an analogy here with lending by the IMF in sovereign crises which may affect the risk-taking incentives of creditors and debtors (see Haldane and Taylor (2003)).

The penultimate section assesses the evidence of how systemic crises have been resolved in practice. The final section draws conclusions.

Measures affecting the costs and benefits of crisis resolution

No two countries are exactly alike in their financial or legal framework. Nor will their methods of safeguarding financial stability be quite the same. Nonetheless, the following elements in a crisis resolution strategy appear to have general application, as ways of limiting the immediate costs to the economy and to the taxpayer while also limiting future moral hazard.

Private sector solutions

Private crisis management solutions are clearly preferable to public sector solutions. They are likely to place existing capital holders in a first loss position, and impose no direct costs on the taxpayer. Where a bank is, or is close to, insolvent, existing shareholders or creditors could be asked by the supervisor to provide the capital shortfall. This has the advantage of attempting to keep the bank alive as a going concern, while levying a charge on those that have most to gain from the bank's survival.

If a failing bank is taken over by another stronger bank this usually has the advantage of penalising incumbent managers and shareholders. The senior managers are likely to be replaced while existing shareholders would lose all, or part, of their investments.

Loss imposition

Should the public sector become involved, moral hazard and the resolution costs can still be limited, by ensuring that bank 'stakeholders' – shareholders, managers, depositors and other creditors – share at least some of the losses.

Following a bank failure, existing *shareholders'* capital is typically written down or wiped out. Equity holders should be aware of the risk that its value could decline, or even disappear in the most adverse conditions.

Managers should, and often do, lose their jobs and suffer reputational damage in the case of bank

failure, if the cause of the problem is poor management rather than bad luck. However, the character of remuneration, in practice, presents the bank's senior management with asymmetric incentives. They stand to gain from the bank's success, for example through profit-linked bonuses. But if the bank fails, what both they, and their shareholders, may lose is limited. To address this moral hazard problem the severity of the penalties on the senior management could be linked in some way to the magnitude of losses. For example, in extreme cases, directors could perhaps become liable to bans on service as directors of any public company, cancellation of severance compensation clauses in their contracts, and fines.

Imposing losses on uninsured *creditors* in the event of bank failure will improve subsequent market discipline and thus help to reduce the likelihood of future crises. It should also lower the fiscal costs of resolving individual bank failures.

The design of deposit protection schemes can also have an impact on behaviour. Moral hazard can be reduced through the adoption of schemes with a limited coverage so that depositors face some risk of losses. These limits may relate to the maximum value insured, the types of depositors included in the scheme or some form of co-insurance.⁷ It may be especially important to impose losses on large depositors, such as other banks or non-bank companies, since they may be better able to monitor banks' behaviour.

Recent studies suggest that the design features of deposit insurance affect financial stability. Demirgüç-Kunt and Detragiache (2000) find, in a sample of 61 countries over the 1980–97 period, that, in the absence of an effective system of prudential regulation and supervision, the likelihood of crises increases with the coverage ratio (the coverage ceiling of the issuance scheme relative to GDP per head), and declines if there is co-insurance. Hoggarth, Jackson and Nier (2003) find that schemes with unlimited coverage or no co-insurance are more likely to be associated with crises than those with limited schemes. Barth, Caprio and Levine (2001) also find that more generous deposit insurance greatly increases the probability of future crises.

7: Co-insurance is an arrangement whereby depositors are only insured for a pre-specified portion of their deposits. For example, in the UK, aside from the first £2,000, which is paid in full, depositors are insured for 90% up to a ceiling of £35,000.

Faced with a *systemic* crisis, however (and in some cases even where explicit schemes have been in place), authorities have often introduced temporary blanket insurance protection for all depositors (and other creditors) to maintain or restore confidence. Since these crises have reflected fundamental insolvency problems, not just insufficient liquidity, the credibility of any guarantee will depend on the government's ability to pay.

While temporary blanket insurance may be appropriate after the event, once a systemic emergency has arisen, a general expectation it would be provided could only make future emergencies more probable. One response to their dilemma is to make the authorities' role in crisis transparent.

Transparency and disclosure

Clarity and transparency over restructuring programmes in general, and not just over the provision of deposit insurance, may speed up the resolution process and reduce both present costs and future risks. The various authorities involved in crisis management – the central bank, regulatory body (where separate) and the Treasury (Ministry of Finance) – should each have well-defined responsibilities in a crisis but also processes in place to co-ordinate policy action. In the UK this has been set out in the Memorandum of Understanding (1997) between the Bank of England, the FSA and HM Treasury.

It is important to have a clear resolution strategy in advance, and there are advantages in disclosing at least the principles of this strategy. Absence of such a strategy could lead to forbearance. It may also transfer losses from shareholders to taxpayers and discourage new private sector recapitalisation. For example, in the mid-1990s Mexican crisis, non-performing loans were purchased by the government at their book value, not at an estimate of their market value. This greatly increased the cost to taxpayers without preventing many bank problems from recurring (De Luna-Martinez (2000)). And in Japan, public disclosure of non-performing loans over the past decade has been piecemeal, with estimates frequently revised upwards. This has undermined the credibility of the disclosed figures and since banks' capital ratios were understated bank restructuring was delayed (Nakaso (2001)).

International evidence shows that governments face strong political pressure to rescue failing banks. Once

a government has provided such support any claim that owners, managers and creditors of banks that fail in future cannot expect to be assisted from public funds is hard to make credible. Although in the long run it may be beneficial for the authorities not to bail out banks, and thus not to encourage excessive risk taking, when a crisis occurs there are economic and political advantages to them from providing support 'on this one occasion'. This time-consistency problem provides a case for clear rules, violations of which are obvious to the private sector and carry some political cost.

Speed of resolution

Delaying bank restructuring while allowing forbearance may permit a continuous flow of credit to the economy and give time to assemble information on a bank's financial position and to devise a well-thought-through strategy. However, if the conditions of financial institutions deteriorate further this may increase the final costs of resolution. There is also a risk that banks will gamble for resurrection – that is, take a big risk that will save the bank if it comes off, and just add to other people's difficulties if it does not. This happened, to an extent, in the Savings & Loans' (S&L) crisis in the United States during the 1980s (FDIC (1997)). Although rapid resolution may result in a bigger short-term fall in output because of the closure of unviable banks and their insolvent corporate borrowers, longer-term performance should improve if as a result a properly functioning banking system is restored earlier.

Case study evidence suggests that prompt intervention reduces the costs of intervention and promotes efficiency (OECD (2002a)). Dziobek and Pazarbasioglu (1997) found, in a sample of 24 systemic crises, that most progress in restoring the banking system's financial strength and its intermediation role – each proxied by six (equally weighted) indicators – occurred for countries that took action within one year of problems emerging.

Where banks are liquidated, it is important that the bankruptcy procedures allow insured depositors and other creditors prompt access to the funds due to them. In practice, court proceedings can sometimes take years to resolve, thus delaying pay-outs to creditors. Further, in a worldwide survey of deposit insurance schemes, Garcia (2000) finds that many funds take months to repay insured depositors.

Choice of resolution strategies

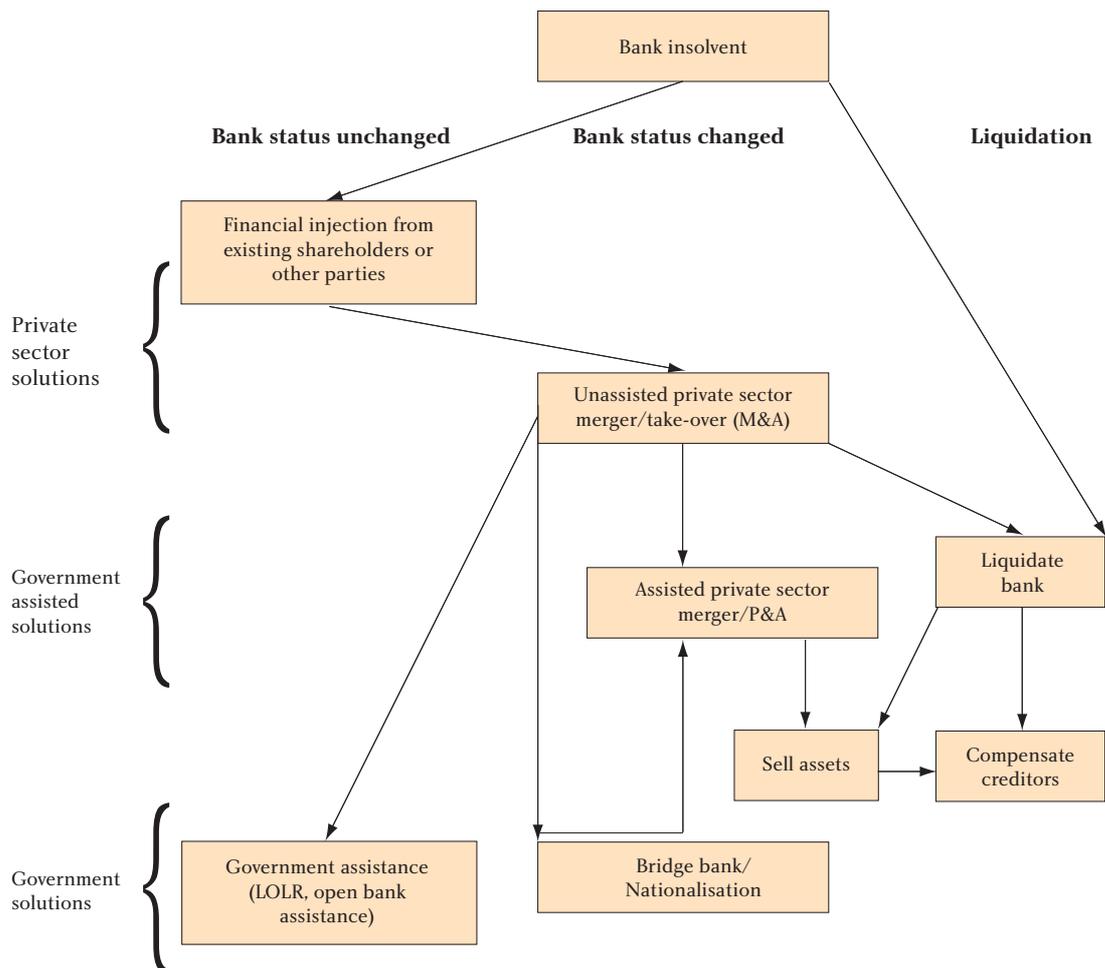
Notwithstanding the above desirable features to minimise the net costs of resolution, in practice the choice of strategy is circumscribed. A clear legal framework can have an important bearing on both the range and effectiveness of the policy options in resolving crises. For example, in some countries the supervisory agency may lack the power to write down capital, force a merger or close an institution; and if it does, may face prosecution by creditors and owners for damages. In other countries the authorities have the full range of options – they can replace managers and the board of directors, close a bank, inject capital and nationalise. Bankruptcy procedures also vary but have a large bearing on resolution. If they are slow, they can seriously delay the resolution process. The political and social context may also influence the options in practice.

There is a range of options for resolving insolvent banks. At one extreme, a bank can be kept open

through an injection of capital. At the other extreme, a bank can be closed with its assets sold and depositors and possibly other creditors paid off. Between these extremes, a bank's licence may be removed but with the bank sold off to another bank, in full or part, to preserve the bank's activities. The extent of involvement of the authorities may also vary. It may be limited to encouraging or organising private sector support, or extended to official financial support, in the limit through government takeover.

When a bank is financially distressed there should be a preference, first, to encourage a private sector solution. If an unassisted private sector solution cannot be found, a decision would next be made about whether to liquidate the bank or provide some form of government assistance (see Diagram 1). In exceptional circumstances, if there were a systemic threat, governments might consider a takeover or guarantee to a failed bank, as an interim measure. These options are reviewed below in turn.

Diagram 1:
Decision tree in crisis resolution



Unassisted resolutions

Bank status unchanged

When a bank supervisor discovers that a bank is at, or close to, the point of insolvency, the first response is to see whether the bank can be rehabilitated without government assistance. There are often several steps here. The bank can be instructed to curtail lending, either in a specific line of business or across the board. A request (demand) for additional capital from existing shareholders or other interested parties is often issued; management changes can be required; and operational changes are almost always undertaken.

Bank status changed – private sector merger

If a capital infusion from existing shareholders or other interested parties is not available, an unassisted merger with another healthy financial institution is usually the next course of action. For an unassisted merger to occur, the extent of losses must be transparent to the prospective acquirer. Therefore, supervisors should examine the troubled bank to determine the size of losses to ensure that the acquiring institution has sufficient capital to absorb potential losses in the failing institution.

A number of factors may affect the likelihood of a private sector merger or takeover. As financial systems have become more competitive, the willingness of a group of banks to organise a rescue to preserve the stability of the industry as a whole may have diminished. So a bank may involve itself in rescuing another bank only if it is demonstrably in its own self-interest to do so. The size of the firm (relative to the financial system as a whole) may also affect the ability to achieve a private sector solution. The failure of a large financial institution may have a large adverse impact on other firms either through direct exposures or the impact on asset prices of unwinding its positions. So some institutions may be 'too big to fail' for the private sector. The rescue of Long-Term Capital Management (LTCM) may be a case in point (see Herring (2002)).⁸ It is also easier to co-ordinate a rescue with fewer counterparties. On the other hand, in a financial system that is already highly concentrated, the authorities may be reluctant to allow further consolidation for competition reasons.

Liquidation

If an unassisted private sector merger is not possible, a decision is often made to liquidate the bank. In a liquidation, the bank is declared insolvent, closed, and depositors paid off. The restructuring authority then liquidates all assets. In most cases uninsured depositors and other creditors are only covered if sufficient funds are available after liquidation. Liquidation exerts a strong financial discipline on the various stakeholders. But when a liquidation occurs it may affect other banks through direct exposures or changes in financial market prices.

Moreover, as discussed earlier, reimbursing depositor and creditor claims, from the sale of the failed bank's assets, can be a long and disruptive process that locks up people's wealth for months or even years and has knock-on effects throughout the economy.

Assisted resolutions

If some form of government intervention is considered, various forms are available.

Bank status unchanged

Lender of last resort (LOLR). Central banks usually only provide emergency liquidity assistance in potentially systemic situations and only for a limited period. Liquidity support to individual institutions can buy time to assess the underlying solvency position and to assess alternative resolution strategies.⁹ Although LOLR is intended for illiquid but fundamentally solvent banks, in practice it may be difficult, in the time available, to distinguish between a liquidity and a solvency problem. Mechanisms should be put in place to ensure that such lending is time-limited and conditional, and that the central bank protects itself from incurring losses, in particular through taking collateral (see George (1994) for the principles underlying the provision of LOLR in the UK).

Open bank assistance occurs when the government provides financial assistance to a distressed bank without taking the bank over or eliminating the current stockholders' position entirely. The assistance can be in the form of the provision of capital or through purchasing non-performing assets from the bank. This allows the operations of the bank to

8: In the case of LTCM 14 of its largest creditors injected \$3.6bn. If LTCM had been allowed to fail this would have automatically triggered the closeout of netting arrangements. The major creditors feared that an unwinding of LTCM's positions might result in a marked decline in asset prices. This, in turn, may have resulted in losses for these counterparties (and others) that held similar positions.

9: Liquidity assistance discussed here refers to lending to individual institutions rather than in the Bagehot sense of lending to the banking system as a whole. For a review of the literature on LOLR see Freixas et al (1999) and Wood (2000).

continue uninterrupted. However, there are potential weaknesses with open bank resolutions. Most important, if the bank's management is left in place, and the existing shareholders' investment protected, this will seriously increase moral hazard. Making government support conditional can reduce this problem, for example, through replacing management, eliminating or downgrading existing shareholders' interests, or mandating an infusion of private sector capital. Open bank assistance has often required repeated capital injections before problems have been solved, resulting in large fiscal costs of resolution.

Bank status changed

Resolution of a bank failure often involves an *assisted merger or acquisition*. The transaction can be completed with another bank or, if permitted by law, another type of institution. A merger provides business continuity for both borrowers and depositors. It can be structured in many different ways, depending on the size and complexity of the distressed bank, the funding constraints of the resolution authority, and the amount of time until failure. Banks can also be split up, with the deposits, branches and assets sold off separately.

Assisted mergers are sometimes accomplished using purchase and assumption transactions (P&A). In an assisted P&A the acquirer *purchases* the assets and *assumes* the liabilities, in whole or part, of the failed bank, with the resolution authority compensating for the difference. Here, existing shareholders lose all of their investments. Uninsured creditors, too, may lose part of their investment if the P&A is only partial.

Bridge banks are a form of *temporary* government ownership. A number of industrialised countries with systemic crises, such as Finland and Sweden, have assumed temporary ownership of troubled large banks, to permit restructuring and subsequent sale to a private institution. Bridge banks offer a holding period so that a final resolution strategy can be effected. While the government can maintain the business operation of the bank, the set time period forces the resolution authority to focus on cleaning

up the bank's balance sheet in preparation for selling it.¹⁰

Outright government ownership (where allowed) has typically occurred when a very large bank fails. The government authorities take over the bank by nationalising it, usually eliminating the stockholders' interest but protecting depositors and other creditors. One problem with outright nationalisation, however, is that government managers do not have the same incentives as private bank managers. In market economies, private sector banks are essential for efficiently allocating credit. Evidence suggests that countries with higher shares of state-owned banks tend, on average, to have a higher share of non-performing loans and higher operating costs (Goldstein and Turner (1996)).¹¹

Estimating the loss in a distressed bank is a key step in a bank resolution. One technique used to determine whether it is better to liquidate a bank or keep it alive with some official assistance, is to estimate the liquidation value of the bank's assets, the total value of the insured liability holders' claims and the related administrative expenses involved. These costs of liquidation can then be compared with the subsidy required to assist in a takeover or a P&A by another bank, to determine the 'least cost' solution. The higher the value of the bank as a going concern relative to its break-up value, the greater the case for providing official support rather than liquidating the bank. But if a large part of the bank's liabilities are uninsured, liquidation might be cheaper, at least from the viewpoint of the deposit insurer.

However, such cost comparisons only consider the *direct* financial costs of different resolution strategies to the deposit insurer. This calculation may understate the cost of liquidation in systemic crises, as it ignores any knock-on effects on the rest of the financial system. On the other hand, the cost of official support to the economy may be understated to the extent that bank restructuring protects the investments of uninsured depositors and other creditors and thus potentially increases moral hazard.¹²

10: To limit moral hazard Mayes, Halme and Liuksila (2001) suggest that the government should impose the same losses on shareholders and uninsured creditors that they would have faced had the bank been immediately liquidated. Such a scheme, however, could still induce contagion. As banks with large deposits at the failed bank may face substantial losses, it may result in a disruption to financial markets and payments system more generally and it could trigger creditor runs at other banks.

11: But causation here could also run in the opposite direction.

12: This risk of moral hazard can be eliminated by forcing uninsured depositors and other creditors to take the same 'haircut' in an assisted sale as they would in a liquidation.

Table 1:
Alternative resolution strategies for failed banks: who bears the losses?

	Shareholders (lose money)	Managers (lose jobs)	Creditors (lose money)	Employees (lose jobs)
Bank status unchanged				
Shareholders' capital injection	No	No	No	No
Government injection ^(a)	Probably, partly	Probably	Possibly, partly	Probably
Bank status changed				
Merger and acquisition ^(b) (M&A)	Probably, partly	Possibly	Possibly, partly	Possibly
Purchase and assumption ^(b) (P&A)	Yes	Possibly	Yes if P&A partial	Possibly
Nationalisation/bridge bank ^(c)	Yes, partly	Probably	Possibly	No
Liquidation	Yes	Yes	Yes, uninsured	Yes

(a) Government injection is usually conditional on changes in senior management; some losses to shareholders and restructuring often results in job losses. It may also be preceded by financial restructuring whereby uninsured creditors accept some losses.

(b) A private sector M&A would typically replace managers if there are large business overlaps between the acquirer and the acquired. A write-down of existing shareholders' capital is likely beforehand and there may be some losses to uninsured creditors. In a P&A, existing shareholders will be wiped out and uninsured creditors will make losses if the acquirer assumes only some of the original banks' liabilities. Mergers often result in the consolidation of bank operations that result in staff reductions.

(c) Nationalisation usually wipes out the stockholders, however there are cases where stockholders are left with a subordinated residual claim.

It is particularly important that the way a current crisis is resolved should not make banks, and their creditors, raise their estimate of the chance of bail-out in future crises. That would make future crises more frequent. Furthermore, the calculation of benefits and costs should allow for the fact that any budgetary costs are financed, sooner or later, from distortionary taxation.

through direct exposures to the failed bank or indirectly through the impact of the failing bank's reaction to the shock, for example, through depressing the price of marketable assets held by other banks. Also, on the liability side, an initial bank failure could trigger a withdrawal of deposits from other banks thought to face problems similar to the failed bank.

Type of shock and resolution technique

The policy options available in a banking crisis are sensitive to the type and size of shock affecting the financial system, in particular whether failures are thought systemic.

If the situation is non-systemic, the focus of the resolution is on the individual failed bank's balance sheet. In this case the failed bank will either be merged with a healthy bank or liquidated. In a systemic situation, however, the immediate aim of the authorities is usually to restore financial stability of the system as a whole, restore public confidence and avoid bank runs. Here guarantees are likely to be given to liability holders at the failed bank(s), and perhaps to the financial system as a whole to avoid or reduce panic. So the aim is first to stabilise the liabilities of the banking system, before restructuring the assets of the failing banks.

Systemic crises can be analysed on two dimensions:

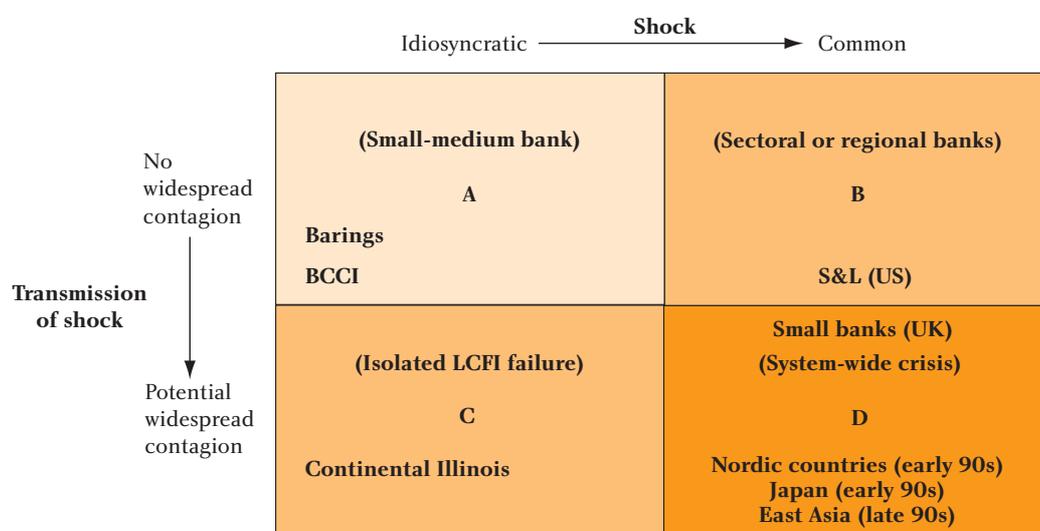
(i) the breadth of the shock that hits the financial system (for example, is the impact of the initial shock confined to one or two banks only or does it affect many banks?); and (ii) the extent to which the initial bank failure(s) then affects the rest of the financial system. Such contagion or spillover effects could reduce the value of other banks' assets

A stylised representation of these two dimensions is shown in Diagram 2.

Quadrant A consists of an idiosyncratic shock to one bank where the contagion effects for the system are thought to be small, such as the failure of a small or medium-sized bank because of management failure or fraud (eg Barings). Quadrant B shows where there are common shocks hitting a number of banks, but where the spillover effects are likely to be small. This would apply when a group of banks have limited interlinkages with the rest of the financial system, such as a specific shock to a region (New England in the early 1990s) or sector (the US savings and loans crisis in the 1980s). Quadrant C shows where the shock is specific but the linkages are thought to be strong. This would normally involve a so-called large complex financial institution (LCFI). Quadrant D depicts a situation where several banks suffer a common shock that could affect the whole system. There is of course a continuum between these polar cases. If the region or sector is large enough then B and D would merge, as would C and D if one bank dominated the financial system.

If an idiosyncratic shock causes the failure of a small or medium-sized bank – quadrant A – the policy response itself, or the bank's reaction to the policy

Diagram 2:
Types of shocks to the financial system



action, should have a minimal direct short-term impact on the rest of the financial system. Its borrowers, for example, should be able to switch to other lenders. Other similar banks thought to be weak would lose deposits but there would be a flight to *quality* within the financial system rather than a reduction in the aggregate deposits of the system. The picture changes if one very large bank fails (quadrant C), or a number of banks fail at the same time (quadrant D). If the LCFI failure is due to a purely specific factor, such as fraud, the systemic threat will depend on the size and type of direct linkages that the failed bank has with the rest of the financial system. But a more general shock could threaten unconnected banks.

In case C – the failure of one large bank – the focus is to maintain the activities of the problem bank or, failing this, to unwind it in an orderly fashion, so as to limit the impact on other financial institutions and markets.¹³

In case D – a system-wide crisis – the key immediate aim of authorities is usually to stabilise the financial system as a whole (at minimum fiscal and moral hazard cost) and only then to focus on restructuring the failed banks. Most recent systemic crises have typically been caused by an adverse macroeconomic shock weakening the whole financial system, rather than resulting from the impact of contagion following the failure of just one individual bank (see Borio (2003)).

This has restricted the available policy options. In a systemic crisis, no well-capitalised domestic private

banks may be found to buy the failed banks, leaving takeovers by foreign banks or the government as the only option. In recent systemic crises, some countries have relaxed rules on foreign entry to allow takeovers by foreign banks – such as in Finland and Mexico – while others have relied more on government ownership. For example, following the banking crisis in Norway, and more recently in South Korea, the government became owner of more than half of the banking system.

It may also be more difficult to penalise some stakeholders. In principle, existing shareholders' capital can, and should, still be written down during system-wide crises. However, evaluating the underlying value of impaired assets may be harder than during normal market conditions. Estimates of cash flows, interest rates and underlying business conditions will be uncertain, as will the value of collateral. This may lead to an understatement of losses, thus imposing costs on taxpayers rather than on existing shareholders. Such understatement occurred recently in Mexico and Indonesia.

With a non-systemic bank failure, the existing safety net will apply, so only insured depositors will be protected and access to central bank finance is on normal terms. But in extensive crises, imposing losses on uninsured depositors or other creditors could exacerbate the liquidity crisis. Often the central bank provides emergency liquidity and the government may provide a temporary blanket government guarantee

13: In the United States, for example, the FDIC would probably set up a bridge bank immediately following the failure of a (deposit-taking) LCFI (see Bovenzi (2002)).

to depositors and other creditors to maintain confidence. Liquidations have rarely been used immediately in system-wide crises because of the enhanced risk of bank runs. However, in highly dollarised banking systems, LOLR is limited by the level of international reserves and offering guarantees to holders of foreign currency deposits may not be credible. More generally, the credibility of a blanket guarantee may be undermined if the government has a large debt burden.¹⁴

Often a system-wide banking crisis is accompanied by a currency crisis. This may increase banking system losses if banks, or their customers, have large net foreign currency exposures. If the government assumes banks' bad debts, the currency crisis could deepen further, opening up a vicious circle that appears to have characterised many of the difficulties recently faced in the east Asian crisis. In a currency crisis the authorities may respond by *increasing* interest rates to defend the exchange rate, rather than by *reducing* rates to help alleviate pressure on the banking system.

Evidence on crisis resolution

Short-run impact

Based on responses to a questionnaire, the OECD (2002a) recently compared the techniques and practices used in member countries faced with large bank failures. In addressing problems, the central bank or government agency typically intervened soon after the onset of the crisis to supply liquidity. In most cases this helped to avert a panic by liability holders. Most governments protected depositors, in whole or part, up to the statutory minimum. Liquidations were used only occasionally and typically only for smaller institutions or where only a small part of the banking system was impaired. When large commercial banks have been in trouble, problems have usually been resolved through mergers and some mix of government capital injection and increased government control. Existing shareholders' capital has been written down.¹⁵ In most countries, government ownership only lasts for a short period until a private buyer is found. But after some episodes, such as in Norway, banks remained nationalised for years.

In most systemic banking crises during the 1990s, the central bank has provided liquidity support to problem banks, to offset withdrawals by depositors and other creditors. Central banks have often made losses on this lending for the banks that turned out to be insolvent. Blanket guarantees to depositors and other creditors have also been provided, albeit sometimes temporarily. Confidence in the banking system has usually revived quickly. However, in the more recent Argentinian crisis (2001–2002) a blanket guarantee to liability holders was not given. Such guarantees would not have been credible given that the source of the crisis was the unsustainability of the fiscal position. Instead, to prevent bank runs, a temporary deposit freeze was imposed.

In a study of the recent crises in east Asia, Lindgren et al (1999) found that the announcement of temporary blanket guarantees to all depositors and other creditors succeeded in stopping runs by domestic depositors although not in securing rollover of foreign liabilities. De Luna-Martinez (2000) found no cases of depositor bank runs during the Korean and Mexican crises once blanket guarantees were provided to depositors and other creditors, and central bank liquidity was provided for a short period.

So blanket guarantees, usually provided in systemic crises, could have stopped banking system runs. But an alternative view is that broad guarantees were not needed, and depositors would in any case have simply shifted from banks seen as weak to strong ones. At first blush, the recent Indonesian situation appears to provide evidence for the first interpretation. It was only after its central bank shifted from a limited to a full guarantee that liquidity runs were stemmed.¹⁶ However, Goldstein (2000) argues that a limited deposit insurance scheme could have avoided a bank run had the public been convinced at the time that all, not just a few, of the system's insolvent banks were being closed. More generally, Demirgüç-Kunt, Detragiache and Gupta (2000) found, in a sample of 36 developed and emerging country banking crises, that at the outset of crises, deposits in the banking system *as a whole* did not decline.

14: See Hoelscher and Quintyn (2003) for a discussion of resolution policies in economies with highly dollarised banking systems and large government debt burdens.

15: In some countries, shareholders have been left with nominal amounts because of legal restrictions on full write-downs or to avoid costly legal challenges by existing shareholders.

16: According to Lindgren et al (1999) the run occurred because depositors thought they would only receive limited protection (up to the equivalent of US\$2,000) as was announced for the first round of 16 banks that were initially liquidated in November 1997.

Table 2:
Liquidity support, depositor guarantees, fiscal costs and the output losses of banking resolution in thirty-three systemic banking crises 1977–2002^(a)

	Number of crises	Length of crisis (years), average	Non-performing loans (per cent of total loans), ^(b) average	Bank credit/annual GDP (per cent), ^(c) average	GNP per head (US\$ 000s, PPP basis) at the start of the crisis, average	Cumulative fiscal costs of banking resolution (per cent of GDP), ^(d) average	Output losses 1 ^(e) (per cent of GDP), median	Output losses 2 ^(e) (per cent of GDP), median
All countries	33	4.3	26.7	44.2	6.6	15.0	7.1	23.1
LOLR (open ended)^(f)								
– Yes	21	4.8	31.1	47.1	6.7	17.3	13.9	37.0
– No	12	3.4	19.3	39.1	6.4	10.9	3.8	9.1
Blanket deposit guarantee^(f)								
– Yes	22	4.3	29.3	47.8	7.9	16.6	9.8	28.7
– No	11	4.3	17.3	37.0	4.0	11.8	5.0	15.7
Banking crisis alone	10	4.6	23.7	44.9	7.3	7.8	2.4	15.7
Banking and currency crisis^(g)	23	4.2	28.2	43.9	6.3	17.4	11.6	32.2
of which:								
– with LOLR	16	4.5	32.9	45.1	5.9	18.9	17.0	43.9
– without LOLR	7	3.4	17.5	41.3	7.3	14.1	4.8	13.2
of which:								
– with blanket deposit guarantee	16	3.9	29.7	46.9	7.5	19.4	17.0	37.2
– without blanket deposit guarantee	7	4.9	19.5	37.1	3.6	12.8	4.8	24.7

Sources: Caprio and Klingebiel (2003), Hoelscher and Quintyn (2003), Hoggarth and Saporta (2001), Honohan and Klingebiel (2003), OECD (2002), IMF, World Bank and Bank calculations.

(a) A systemic crisis is defined as when all, or nearly all, the capital in the banking system is eroded. The crises are Finland (1991–93), Japan (1992–), Norway (1988–92), South Korea (1997–2000), Spain (1977–85), Sweden (1991), Argentina (1980–82), Argentina (1995), Brazil (1994–96), Bulgaria (1996–97), Chile (1981–83), Colombia (1982–87), Côte d'Ivoire (1998–91), Czech Republic (1989–91), Ecuador (1996–2001), Ghana (1982–89), Hungary (1991–95), Indonesia (1997–), Malaysia (1997–2000), Mexico (1994–95), Paraguay (1995–99), Philippines (1981–87), Philippines (1998–2000), Poland (1992–95), Senegal (1988–91), Slovenia (1992–94), Sri Lanka (1989–93), Thailand (1983–87), Thailand (1997–2000), Turkey (1982–85), Turkey (2000–), Uruguay (1981–84), Venezuela (1994–95).

(b) Estimated at peak. Data available for 19 countries only. Comparisons should be treated with caution since measures are dependent on country specific definition of non-performing loans and often non-performing loans are under-recorded.

(c) At the beginning of the crisis. Credit to the private sector from deposit money banks (IFS code 22d) as a share of annual nominal GDP (IFS code 99b).

(d) Bank recapitalisation, government payouts to liability holders and public sector purchases of non-performing loans.

(e) Output losses 1 is the cumulative deviation in the *growth* of output during the crisis period from its pre-crisis ten-year trend. Crisis ends when GDP growth returns to pre-crisis trend or if not occurred estimated up until 2002. Output losses 2 is the cumulative deviation in the *level* of output during the crisis from its ten-year pre-crisis trend. Crisis end based on qualitative judgement of country experts, see Hoggarth and Saporta (2001). Data exclude Côte d'Ivoire. Because of data limitations, a three-year and six-year pre-crisis trend was used for Czech Republic and Slovenia respectively.

(f) Open-ended LOLR is where central bank liquidity support is given for more than one year that is greater than the aggregate capital of the banking system. Blanket government guarantee is either explicit or where state banks account for 75% or more of banking system assets.

(g) A currency crisis is defined, as in Frankel and Rose (1996), as a nominal depreciation in the domestic currency (against the US dollar) of 25% combined with a 10% increase in the rate of depreciation in any year of the banking crisis period. The latter condition is designed to exclude from currency crises high inflation countries with large trend rates of depreciation.

Direct cross-country evidence on official support suggests that open-ended liquidity support and blanket guarantees have been associated with higher fiscal costs of crisis resolution (Table 2).¹⁷ However, this does not necessarily imply causation. Fiscal costs are likely to be higher, the larger the adverse shock to the banking system. But in the face of such a potential systemic threat it is more likely that the authorities would also provide liquidity support and guarantees to liability holders. Yet fiscal costs still

appear higher after allowing for quantifiable proxies for the size of the shock to the banking system. Honohan and Klingebiel (2003) find that, after controlling for other factors that are likely to impact on resolution costs in a sample of 40 developed country and emerging market crises, open-ended liquidity support and blanket guarantees increase the direct fiscal costs of crisis resolution.¹⁸

17: Open-ended liquidity support is defined as liquidity support provided for more than twelve months which is greater than the aggregate capital of the financial system. Blanket guarantees are either explicit government guarantees or implicit ones proxied by where state banks account for more than 75% of the banking system's assets. Source: Honohan and Klingebiel (2003).

18: Fiscal costs reflect the various direct types of expenditure involved in rehabilitating the financial system, including liquidity support, purchases of non-performing loans, bank recapitalisation and payments made to depositors and other creditors, either implicitly or explicitly through government-backed deposit insurance schemes. These estimates may not be strictly comparable across countries. They also exclude, for example, any widening in bank spreads faced by depositors and borrowers and more generally any impact on inflation and output.

But any fiscal outlays arising from widening the safety net need to be weighed against the *potential* benefits to the economy as a whole from avoiding more widespread bank failures. For example, in the United States banking crisis in the early 1930s, the absence of depositor guarantees and liquidity support kept the fiscal costs low, but the adverse consequences to the broader economy were severe with output falling by some 30% from peak to trough.

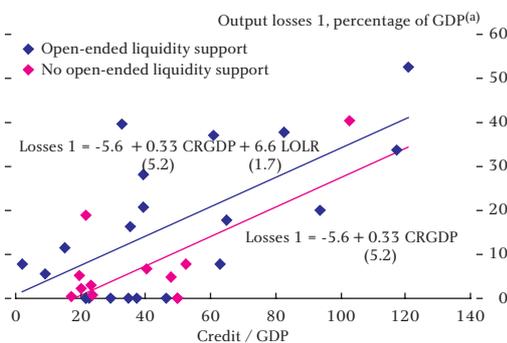
Charts 1 and 2 suggest that controlling for the importance of bank intermediation in the economy (measured by bank credit/GDP), open-ended liquidity support is associated with larger declines in output during a banking crisis.¹⁹ This still appears true after allowing for other factors that may affect output losses such as whether a currency crisis also occurs (Table 3 equation 1). But there is no evidence, either

positive or negative, of association between deposit guarantees and the output losses of crises (Table 3 equation 2 and Charts 3 and 4).

Bordo et al (2001) also found, in a sample of 29 countries over the 1973–97 period, that banking crises were associated with much bigger output losses when open-ended liquidity support was provided (but blanket depositor guarantees had no effect either positive or negative). They argue that the provision of open-ended liquidity support may testify to some countries' reluctance to allow banks to fail. Support was in some cases given to insolvent banks, not just those that were fundamentally sound but illiquid. This may have increased moral hazard, enabled some banks to gamble for resurrection, and facilitated continuing financing for loss-making borrowers.

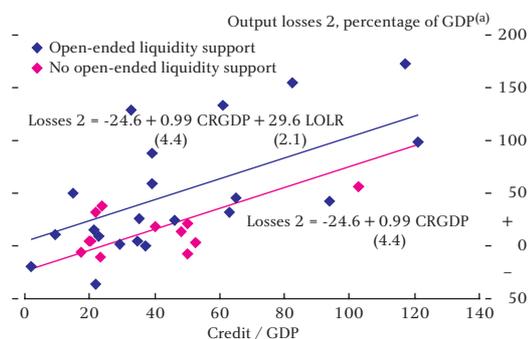
Types of official intervention and output losses during recent systemic banking crises 1977–2002

Chart 1:
Output losses 1 and credit/GDP: liquidity support



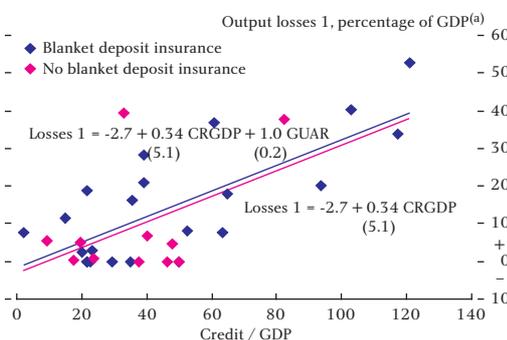
Sources: IMF, Honohan and Klingebiel (2003) and Bank calculations.
(a) t-statistics in parentheses.

Chart 2:
Output losses 2 and credit/GDP: liquidity support



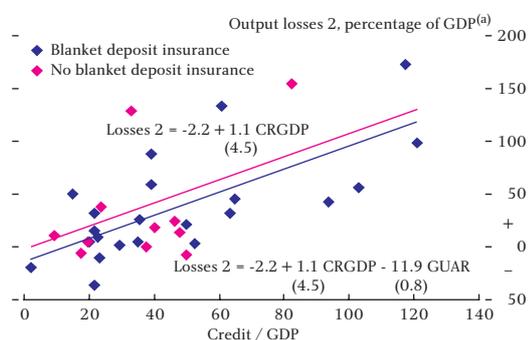
Sources: IMF, Honohan and Klingebiel (2003) and Bank calculations.
(a) t-statistics in parentheses.

Chart 3:
Output losses 1 and credit/GDP: blanket deposit insurance



Sources: IMF, Honohan and Klingebiel (2003) and Bank calculations.
(a) t-statistics in parentheses.

Chart 4:
Output losses 2 and credit/GDP: blanket deposit insurance



Sources: IMF, Honohan and Klingebiel (2003) and Bank calculations.
(a) t-statistics in parentheses.

19: Output losses are measured as either the sum of growth rates (output losses 1) or output levels (output losses 2) during the banking crisis from the pre-crisis ten-year trend. For a discussion of the issues in measuring the output costs of banking crises see Hoggarth and Saporta (2001).

Table 3:
Impact of liquidity support and government guarantees on output losses

1. YLOSSES1^(a)

	A. Liquidity support (LOLR) (1)		B. Blanket guarantee (GUAR) (2)	
LOLR ^(b)	4.50	(1.2)		
GUAR ^(c)			0.70	(0.2)
CRGDP ^(d)	0.34	(5.6)	0.35	(5.6)
CUR ^(e)	9.40	(2.3)	10.50	(2.6)
R ²	0.56		0.54	
DW	2.00		1.90	
Number of observations	32		32	

2. YLOSSES2^(a)

	A. Liquidity support (LOLR) (1)		B. Blanket guarantee (GUAR) (2)	
LOLR ^(b)	28.20	(1.9)		
GUAR ^(c)			-12.40	(0.8)
CRGDP ^(d)	0.99	(4.3)	1.10	(4.5)
R ²	0.42		0.36	
DW	2.70		2.40	
Number of observations	32		32	

Sources: Honohan and Klingebiel (2003), IMF and Bank calculations.
t-statistics in parentheses.

- (a) YLOSSES1: Cumulative deviation in the growth of output during the crisis period from its ten-year pre-crisis trend.
(b) LOLR: 1 where liquidity support provided for more than twelve months that is greater than the aggregate capital of the banking system, 0 otherwise.
(c) GUAR: 1 where explicit government guarantee or implicit 1 (where state banks account for 75% or more of banking system assets), 0 otherwise.
(d) CRGDP: Bank credit to the private sector/annual GDP (%) at the outset of the crisis.
(e) CUR: 1 where currency crisis, 0 otherwise. Currency crisis is a nominal depreciation (against the US dollar) of 25% combined with a 10% increase in the rate of depreciation in any year of the banking crisis period.
(f) YLOSSES2: Cumulative deviation in the level of output during the crisis period from its ten year pre-crisis trend.

Longer-run impact

Have crisis resolution strategies been effective in getting banks to reintermediate again, and to return to profitability after a crisis? In a sample of 24 systemic banking crises, Dziobek and Pazarbasioglu (1997) found that resolution measures were more successful in improving the banking system's balance sheet (stock) positions than their profit (flow) performance. An injection of equity or swapping bonds for bad loans (financial restructuring) can improve balance sheets, but improving profitability is harder, as it needs policies that include restructuring the financial and operating position of bank borrowers.

Demirgüç-Kunt, Detragiache and Gupta (2000) also find that real bank credit fell markedly in the first three years after crisis, despite some recovery in real output, as banks switched their portfolio into other assets. This highlights the difficulty of getting banks to intermedate again in the aftermath of a crisis, partly reflecting the persistence of low borrower credit worthiness and lack of good collateral.²⁰ Some banks may also have switched their portfolio into more liquid and safer assets. In many cases, liquidity was needed to stem runs by foreign depositors, while government bonds helped banks with depleted capital to meet their minimum required capital ratios since these carried a lower regulatory risk weight than loans. In Indonesia, for example, at end-2002 loans still accounted for less than 30% of total banking system assets, while government recapitalisation bonds represented 45% of assets.

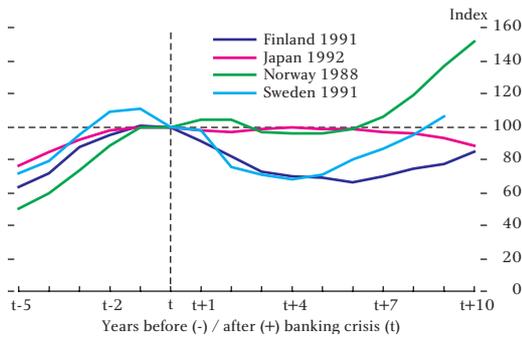
Caution is needed in interpreting credit data during crises.²¹ Nonetheless, in the aftermath of the most recent systemic crises, bank lending remained depressed for years (Charts 5–8). At the end of 2002, for example, real bank lending in Finland and Mexico was still 10% and 55% respectively below pre-crisis levels. Mexico's lack of creditor rights, and weak bankruptcy laws, have deterred its banks from lending. Interestingly, lending held up most in Norway and South Korea – two countries that initially used nationalisation as a resolution method. In most banking crises, profits, too, have remained negative for years (Charts 9–10).

20: There is a difficult identification problem of knowing the extent to which the decline in the amount of credit and its share of total assets reflects either (i) a desire for banks to reduce lending, (ii) a constraint, such as insufficient capital, on the ability of banks to lend, or (iii) a fall in loan demand by banks' customers.

21: One problem in interpretation is that credit data include write-offs of bad loans.

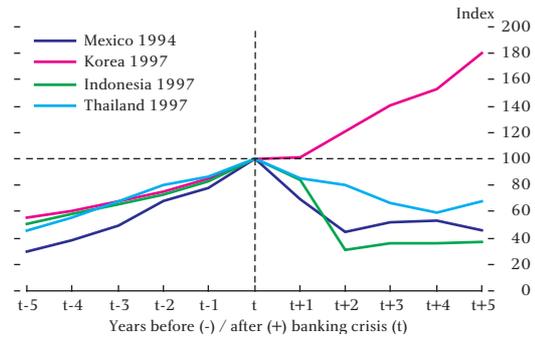
Banking intermediation and profitability after recent selected banking crises

Chart 5:
Developed countries: early 1990s
real bank credit (t = 100)



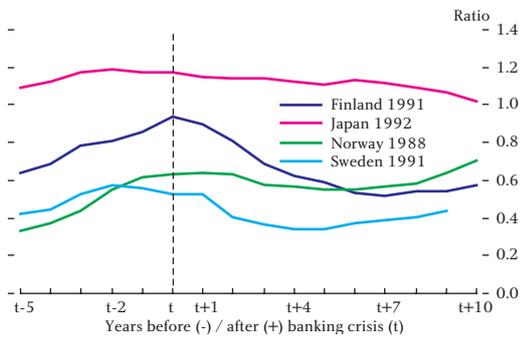
Sources: IMF and Thomson Financial Datastream.

Chart 6:
Emerging market countries: mid- to late-1990s
real bank credit (t = 100)



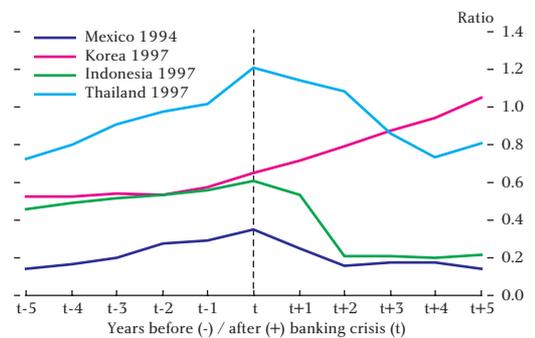
Sources: IMF and Thomson Financial Datastream.

Chart 7:
Developed countries: early 1990s
bank credit/GDP ratio



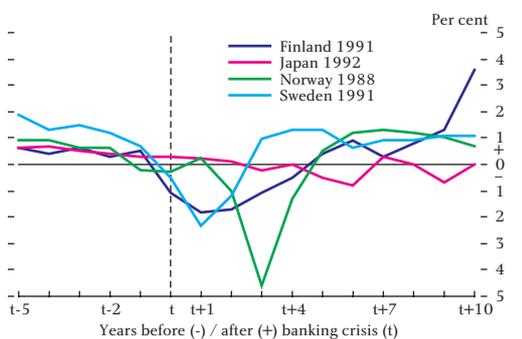
Sources: IMF and Thomson Financial Datastream.

Chart 8:
Emerging market countries: mid- to late-1990s
bank credit/GDP ratio



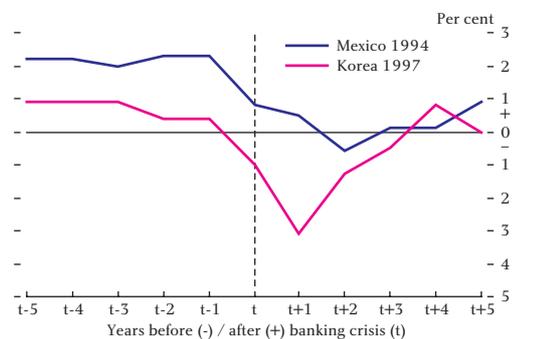
Sources: IMF and Thomson Financial Datastream.

Chart 9:
Developed countries: early 1990s
commercial banks' profits before tax – percentage of total assets



Sources: OECD and Drees and Pazarbasioglu (1998).

Chart 10:
Emerging market countries: mid- to late-1990s
commercial banks' profits before tax – percentage of total assets



Source: OECD.

Conclusion

As evidence from the Great Depression shows, banking crises can have a dramatic adverse impact on the economy, in the absence of intervention.²² But keeping the fiscal costs low, and avoiding moral hazard in the future, are also prime factors in determining the appropriate scale and character of intervention.

With individual bank failures, the authorities usually first seek a private sector solution. Any losses are first passed to existing shareholders, managers and, in some cases, uninsured creditors; and not to taxpayers. Restructuring policies are transparent with only viable institutions kept open while unviable ones are liquidated.

In system-wide crises, however, policy options are more limited. Finding a domestic private sector solution is hard. So there has been more reliance on foreign takeovers and government intervention. *Temporary* government assistance is often preferred to liquidation, to avoid selling bank assets at 'fire sale' prices. Also, because of concerns of widespread liquidity runs, blanket guarantees are usually given early to all bank creditors.

In most recent systemic crises the central bank or government agency has intervened early to provide liquidity to failing banks and blanket guarantees to depositors. In nearly all cases investor panics have been quelled but at a cost to the budget and from greater moral hazard in the future. It seems that open-ended liquidity support has prolonged banking crises, thus increasing, not reducing, the output costs to the economy. Restructuring has usually occurred through mergers, often government assisted, and some government injections of capital or increase in control. Shareholders have usually lost their capital and senior managers their jobs, but creditors, including uninsured ones, have rarely made losses. Liquidations have been used only occasionally, and typically for smaller institutions.

In recent systemic crises, resolution measures have been more successful in improving banks' balance sheet positions than in restoring their profits or credit to the private sector. In many cases, bank lending remained subdued for years after a banking crisis. However banking crises are handled, the adverse effects on the economy are likely to be large. This indicates that ensuring that the financial system is robust in the face of even substantial shocks should be a key objective of financial stability policy.

22: See, for example, Friedman and Schwartz (1963).

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Large complex financial institutions: common influences on asset price behaviour?

Ian W Marsh and Ibrahim Stevens, G10 Financial Surveillance Division, and Christian Hawkesby, Financial Industry and Regulation Division, Bank of England¹

In recent years, mergers, acquisitions and organic growth have resulted in the development of some large complex globally active financial groups, which, in an international financial centre such as London, deserve monitoring from a financial stability perspective. This article analyses the degree of co-movement in the asset prices of a selected group of large complex financial institutions (LCFIs), and assesses the extent to which LCFIs' asset prices are driven by common factors. A relatively high degree of commonality is found between asset price developments of most LCFIs, although there are still noticeable divisions between sub-groups of LCFIs, both according to geography and primary business-line.

SOME OF THE LARGEST and most complex financial groups have come to transcend national boundaries and traditionally defined business-lines. As a result, their overall health may no longer depend so much on their 'home' market. This consolidation of financial sectors and development of large complex financial institutions was documented in the G10's Report on Consolidation in the Financial Sector (Ferguson Report, 2001).

Global financial consolidation is especially relevant for the Bank of England, because London's role as an international financial centre means that most LCFIs have significant operations in London's financial markets. For the UK, it suggests that monitoring of national banking systems should be supplemented with analysis of developments among these large globally active LCFIs. Given their wide-ranging activities, surveillance of LCFIs also provides a unique window on international financial market developments.

This article seeks to determine the extent to which LCFIs are influenced by common factors. Knowledge of these common factors is important for the assessment of risks to financial stability emanating from LCFIs. Borio (2003), for example, suggests that, when compared with institution-specific factors,

systemic risks arising through 'common exposures to macroeconomic risk factors across institutions' carry the 'more significant and longer-lasting real costs' to the financial system.

An obvious way to investigate the commonality of exposures across LCFIs is to examine published accounts. However, the opacity of some corporate accounts, the ability of institutions to shift exposures off-balance-sheet, and different accounting regimes combine to make this a difficult exercise. For example, as highlighted in the IMF's Financial System Stability Assessment of the UK, few UK financial institutions currently report reconciliations of their financial accounts prepared in UK standards, to international or US Generally Accepted Accounting Principles (GAAP).

This article takes a complementary approach and examines the asset price behaviour of LCFIs on the assumption that sophisticated market participants are able to see through the veil of accounting (and possibly incorporate information not published in corporate accounts) when pricing assets. In particular, correlation matrices are computed for equity returns and changes in credit default swap (CDS) premia. Several techniques are used to summarise the

¹ The authors would like to thank Stephen Collins, Mardi Dungey, Andrew Gracie, Rosario Mantegna and Salvatore Micciche for comments and advice, and Sheila Scott for research assistance.

essential features of these two correlation matrices, many of which simply provide graphical or numerical summaries of a subset of the correlations.

To the extent that equity prices reflect (discounted) future income streams, a high correlation between equity returns of LCFIs may indicate exposures to common return factors. Similarly, if CDS premia are taken as indicative of the risk of the institutions, similar behaviour of CDS premia may suggest exposure to common risk factors. The analysis of common factors influencing LCFIs' asset prices encompasses both perceptions of direct exposures between LCFIs and exposures to similar external factors.

Defining large complex financial institutions

When defining a group of LCFIs, the size of a financial institution's balance sheet may not necessarily be a good indicator of its contribution to systemic risk. A retail bank, for example, could be very large, but strictly regulated, subject to deposit insurance, and not very interconnected with the rest of the financial system.

Interconnections between financial institutions, through both similar exposures to external factors and exposures to each other, tend to be more evident

where the institutions are engaged in financial market activities. As a result, significant participation in financial market activities is perhaps a better criterion for identifying a group of LCFIs.

Furthermore, to be an LCFI, the financial institution would be expected to be involved in a diverse range of financial activities in a diverse range of geographical areas – that is, to be complex as well as large.

The approach taken here is to choose a small number of admittedly arbitrary criteria that are reasonably simple, but easily verifiable, and that provide a relatively intuitive list of LCFIs.²

To join the group of LCFIs studied, a financial institution must feature in at least two of the following six league tables:³

- ten largest equity bookrunners world-wide
- ten largest bond bookrunners world-wide
- ten largest syndicated loans bookrunners world-wide
- ten largest interest rate derivatives outstanding world-wide

Table 1:
Selected large complex financial institutions: league table rankings

Name	Country	Equities	Bonds	Syndicated loans	Interest rate derivatives	Foreign exchange	Custody assets	Number of categories ^(a)
Citigroup	United States	5	1	2	4	1	4	6
Deutsche Bank	Germany	9	4	4	2	3	5	6
Credit Suisse	Switzerland	6	6	8	–	4	–	4
JP Morgan Chase	United States	–	5	1	1	–	3	4
Barclays	United Kingdom	–	10	5	8	6	–	4
Goldman Sachs	United States	2	9	–	6	–	–	3
HSBC	United Kingdom	–	–	10	–	2	9	3
Société Générale	France	8	–	–	9	–	10	3
Bank of America	United States	–	–	3	3	8	–	3
Lehman Brothers	United States	7	8	–	–	–	–	2
Merrill Lynch	United States	1	3	–	–	–	–	2
Morgan Stanley	United States	4	2	–	–	–	–	2
UBS	Switzerland	3	7	–	–	–	–	2
ABN Amro	Netherlands	–	–	–	–	7	6	2
BNP Paribas	France	–	–	–	5	–	7	2

Sources: FX Week, Globalcustody.net, Thomson Financial Datastream and Swapsmonitor.

(a) This is the total number of categories for which an LCFI receives a top ten ranking. Citigroup for example receives a ranking for all categories and therefore has a total of six ranking points.

2: It should be emphasised that exclusion from this set of LCFIs does not imply that other financial institutions are systemically unimportant or unworthy of monitoring. The task is merely to identify a manageable number of institutions amenable to statistical analysis.

3: Based on data available in October 2001.

- ten highest FX revenues
- ten largest holders of custody assets world-wide.

Table 1 summarises the final list of fifteen financial institutions that form the group of LCFIs used subsequently, giving their ranking within each category and the number of criteria that they meet in the final column.

Since the choice of league tables was to some extent dictated by availability, the inclusion of certain institutions in the final group is open to debate.⁴ However, most major US and European institutions are present (although the exclusion of all Japanese banks may be thought controversial), and, for the purposes of this article, marginal changes in the list do not alter the conclusions reached.

LCFI asset prices

Equity prices

Equity prices denominated in US dollars for the LCFI group are taken from Datastream for the period 30 May 1994 to 6 October 2003. There are observations for fourteen of the LCFIs.⁵ The start date for the sample was determined by the listing date for Lehman Brothers. Weekly equity returns are calculated as percentage changes using Monday closing prices.

Credit default swap premia

In order to focus on the risks impinging on the LCFIs, asset prices that are more directly related to the price of credit risk exposure to each LCFI are also considered. Data on mid-market CDS premia were taken from CreditTrade and JP Morgan Securities. They have a constant maturity of five years and are available for thirteen LCFIs.⁶ Unfortunately, since the CDS market is a relatively new one, they are only available since January 2001. Weekly changes in CDS premia, in basis points, are calculated using Monday prices.

In subsequent sections empirical techniques are applied that summarise the key features of these LCFIs' equity returns and CDS premia changes. First, a number of methods are used to investigate the essential features of the correlations of these returns, imposing no assumptions on what is driving the correlations. Results from this analysis are then used to build a factor model of LCFI asset prices, to investigate the extent to which LCFIs' asset prices are driven by common factors.⁷

Correlation and network analysis

Correlation matrices

Table 2 summarises the correlations between LCFIs based on equity returns (above the leading diagonal) and CDS premia changes (below the leading diagonal). Red and orange shading denote very high (>0.6) and high (0.5–0.6) correlations respectively, while tan and cream shading denote low (0.4–0.5) and very low (<0.4) correlations.

The preponderance of red shading in the top-left quadrant implies generally high correlations between US LCFIs using both equity and CDS data. The mixture of shading in the bottom-right quadrant implies that the European LCFIs are typically less highly correlated with each other, but that hot (and cold) spots occur. The predominantly tan or cream off-diagonal quadrants show that European LCFIs are not normally highly correlated with US institutions using either equity or CDS data. As a comparison, equity return correlations for a control group of non-financial companies matched to the LCFI group by market capitalisation and country were also computed. These correlations are on average much lower than those between LCFIs.⁸

Cluster analysis

Cluster analysis attempts to determine the natural grouping of observations and is best viewed as an exploratory data analysis technique. It is applied here

4: If the criteria are taken as given, the group of LCFIs is reasonably robust over time. Taking league tables from one year later, Société Générale and Lehman Brothers fall out of the group and State Street joins.

5: Goldman Sachs is omitted since it only went public in May 1999, making the period of analysis relatively short.

6: HSBC and Credit Suisse are excluded on the grounds that their CDS premia were not sufficiently liquid for the entire period of analysis.

7: We assume that correlations between LCFIs are stable. De Nicoló and Kwast (2002) also present evidence that measured equity return correlations among a group of US large and complex financial institutions were unstable, particularly in 1996. However, under the assumption of multivariate normal returns, correlations measured in high volatility periods can appear higher than those measured in low volatility periods even when the true underlying correlation is constant. Ongoing research by the present authors investigates the effect of time-varying correlations, since some of the LCFIs examined here have experienced substantial development, including mergers and acquisitions, within our sample periods.

8: It proved impossible to construct a control group using CDS premia because of the relatively small number of non-financial companies for which this market is sufficiently liquid.

Table 2:
Correlation heatmap

	Citi group	Bank of America	Merrill Lynch	Lehman Brothers	JP Morgan Chase	Morgan Stanley	Goldman Sachs	HSBC	Barclays	Credit Suisse	UBS	Deutsche Bank	Société Générale	BNP Paribas	ABN Amro
Citigroup	–	0.67	0.75	0.68	0.73	0.75		0.45	0.38	0.47	0.40	0.47	0.41	0.37	0.45
Bank of America	0.74	–	0.60	0.59	0.68	0.60		0.42	0.31	0.43	0.38	0.39	0.36	0.34	0.40
Merrill Lynch	0.56	0.49	–	0.78	0.68	0.82		0.44	0.32	0.48	0.42	0.46	0.40	0.37	0.43
Lehman Brothers	0.60	0.60	0.62	–	0.65	0.80		0.45	0.34	0.48	0.44	0.45	0.42	0.41	0.39
JP Morgan Chase	0.66	0.68	0.64	0.63	–	0.71		0.41	0.32	0.46	0.38	0.47	0.41	0.38	0.41
Morgan Stanley	0.63	0.63	0.74	0.71	0.72	–		0.48	0.33	0.48	0.42	0.46	0.41	0.41	0.44
Goldman Sachs	0.70	0.70	0.73	0.71	0.72	0.82	–								
HSBC								–	0.53	0.44	0.40	0.41	0.48	0.44	0.48
Barclays	0.30	0.21	0.20	0.11	0.27	0.28	0.30		–	0.49	0.42	0.38	0.46	0.45	0.47
Credit Suisse										–	0.71	0.56	0.55	0.54	0.62
UBS	0.30	0.25	0.33	0.21	0.30	0.23	0.28		0.51		–	0.54	0.53	0.51	0.58
Deutsche Bank	0.51	0.34	0.25	0.24	0.37	0.28	0.36		0.45		0.37	–	0.58	0.53	0.57
Société Générale	0.33	0.37	0.14	0.09	0.27	0.29	0.26		0.33		0.42	0.52	–	0.79	0.54
BNP Paribas	0.31	0.29	0.22	0.11	0.26	0.32	0.29		0.35		0.37	0.58	0.77	–	0.53
ABN Amro	0.41	0.25	0.36	0.30	0.36	0.37	0.44		0.56		0.54	0.65	0.41	0.46	–

Greater than 0.6

Between 0.5 and 0.6

Between 0.4 and 0.5

Less than 0.4

Sources: Thomson Financial Datastream and Bank calculations.

to determine groups of LCFIs whose equity prices or CDS premia behave in similar ways. These companies can then be considered to be similar institutions whose equity returns or CDS premia changes are probably driven by common factors. The number and nature of these common factors are discussed in a later section.

Though many types of cluster analysis exist, this paper uses one of the most popular – agglomerative hierarchical cluster analysis.⁹ This approach combines LCFIs into groups of similar institutions. The algorithm initially views each observation (LCFI) as a separate group (giving N groups each of size 1). The closest two groups in terms of the Euclidean distance¹⁰ are then combined (giving $N-2$ groups of 1, and one group of 2). This process continues until all observations are combined into one group (of N LCFIs).

The clustering results of the equity returns of the fourteen LCFIs are shown in Figure 1, known as a dendrogram. Two major clusters are apparent, since

the LCFIs cleanly divide into US and European groups. Within these regional groups, sub-groups can also be identified. The North American bloc consists of two sub-groups: (i) the three large banking groups (Citigroup, JP Morgan Chase and Bank of America), and (ii) the three brokerage houses (Merrill Lynch, Morgan Stanley and Lehman Brothers). The European bloc contains sub-groups made up largely of national clusters. Thus the Swiss banks join together, as do the two British banks and the two French banks. The six continental banks form a single cluster before the UK banks are added. The first LCFIs to join (the two French banks) do so a long way from the bottom of the dendrogram, indicating relatively high levels of idiosyncrasies (a reflection of the substantially less than perfect correlations in Table 2).¹¹

The clustering of LCFIs according to changes in CDS premia is similar (Figure 2). Again, the European LCFIs are grouped together first along regional/national boundaries and then to form a large group, while the US banks broadly group as for

9: Further technical details of the algorithm used can be found in Hawkesby, Marsh and Stevens (2003).

10: Euclidean distance is a mathematical measurement of the distance between two points measured on a straight line.

11: Note that the left-right ordering of the LCFIs conveys no information.

Figure 1:
Dendrogram of equity returns

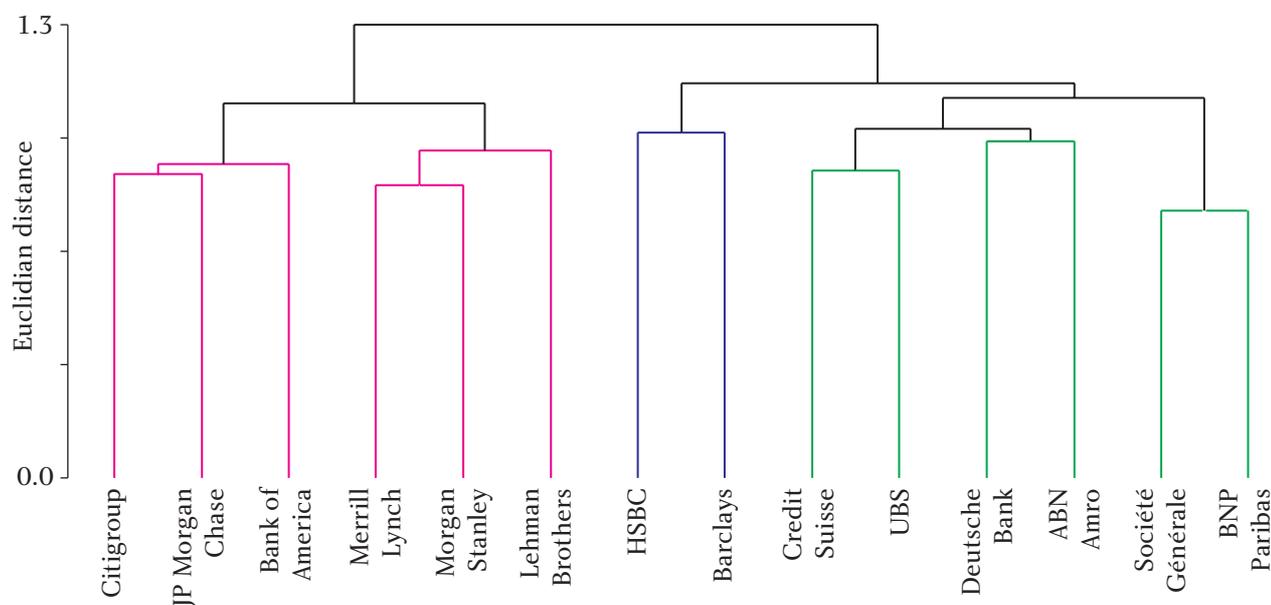
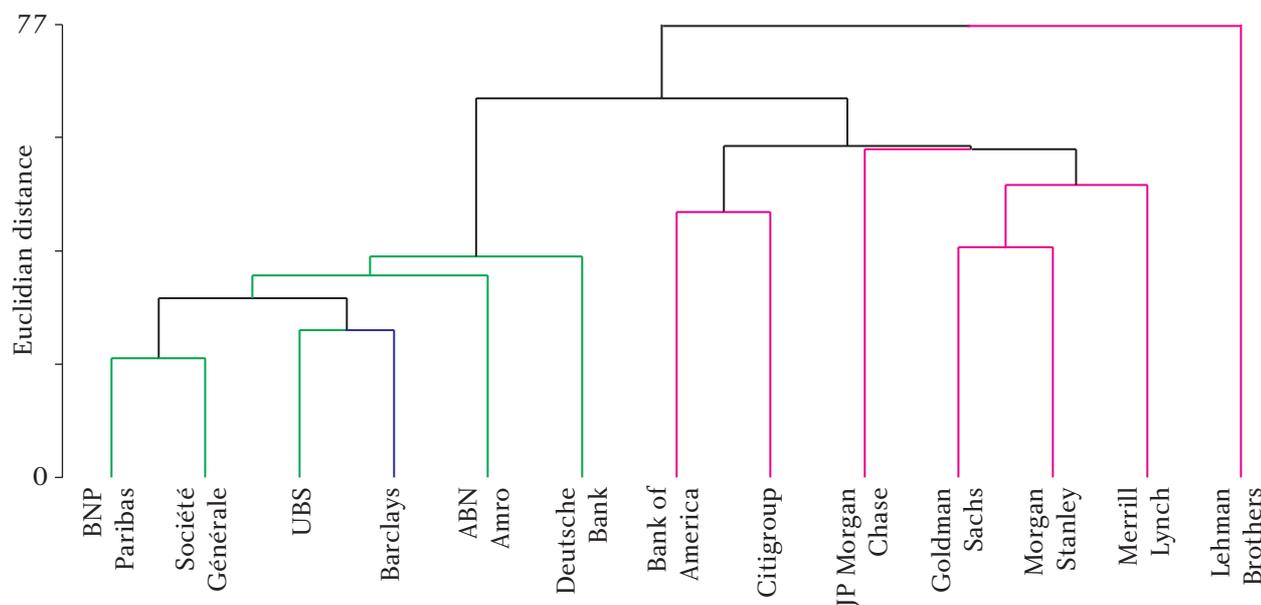


Figure 2:
Dendrogram of changes in CDS premia



equity returns.¹² There are two exceptions. First, JP Morgan Chase now clusters with the brokerage houses rather than the banks.¹³ Second, Lehman Brothers forms an outlier, only joining the rest of the LCFIs when the European and US groups have combined. Compared to other brokerage houses,

Lehman Brothers is significantly smaller by total revenue and its business is much more concentrated in fixed-income markets.

Cluster analysis is not an exact science and robustness testing is important. One consideration is

12: The early clustering of the European LCFIs near the bottom of the dendrogram may seem counterintuitive given that Table 2 shows the correlation between European LCFI CDS premia changes to be lower than that of US LCFIs. The quick clustering reflects the noticeably lower variance in European CDS premia changes, which is in turn caused by the lower level of European CDS premia (see below for further discussion).

13: JP Morgan Chase clusters with the money centre banks even if equity returns are examined over the period corresponding to the CDS data, suggesting that the shift in cluster is related to the asset rather than the period examined.

that the correlations and clusters calculated from equity returns may merely be picking up the fact that the LCFIs are all highly correlated with world or local market indices rather than with each other. The partitioning of LCFI clusters along national lines may then be driven by equity market segmentation rather than by nationally separated risk-return characteristics. To strip out the world and local market effects, and hence to concentrate on the extra correlation caused by being an LCFI, the data is first purged by performing the following regression:

$$r_t = \alpha + \beta W_t + \delta L_t + r_t^* \quad (1)$$

where the dependent variable, r , is the equity return for the LCFI at time t , W represents the return on the world equity index and L represents the return on the relevant local equity index. Cluster analysis is then performed on the residuals of the regression, r^* , which are free from world and local market effects.

The resulting dendrogram (Figure 3) shares many of the same sub-groups (eg the French banks join quickly, as do the three large US banks), but importantly the figure suggests that the three US brokerage houses are different from all of the

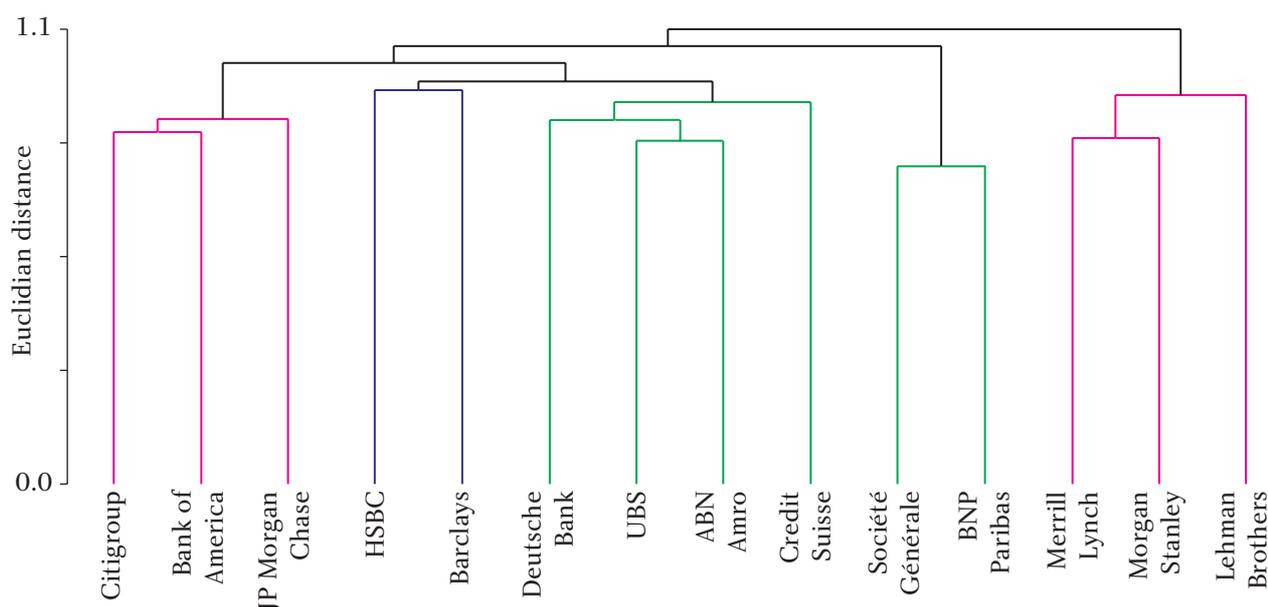
banking-oriented LCFIs once market effects are removed. The US banks cluster with a large group of European banks, then the two French banks, before finally clustering with the three US brokerage houses.^{14,15} Sectoral segmentation is then an important dimension to the degree of heterogeneity of the LCFI group in addition to geographical splits.

Minimum spanning trees

The dendrograms suggest which LCFIs are similar to other LCFIs, and which groups of LCFIs are similar to other groups of LCFIs. But not all institutions are equally important. Some are closely related to many others, possibly spread across several groups. These LCFIs are important nodes in a network. A minimum spanning tree (MST) can be used to identify both these important institutions and the more peripheral LCFIs. More importantly, it can identify the most important link between groups.

The MST is an open-chain graph with a set of $N-1$ links between the N LCFIs. From an ordered list of all bivariate correlations between LCFIs, the MST is constructed by linking pairs of LCFIs with the highest correlations, while leaving out those connections which would lead to closed loops. Mantegna and Stanley (2000) provide a full

Figure 3:
Dendrogram of residual equity returns



14: Unfortunately, there was not a reliable world or country index for CDS premia for the period of analysis, making a similar exercise for CDS price changes impossible.

15: As a second robustness test, we perform an equity returns-based cluster analysis for a control group of non-financial companies matched to the LCFIs by market capitalisation and nationality. This is only intended to be indicative, since this control group is split across several sectors, but crucially it does not show the characteristic US-European split seen for the LCFIs, indicating that this is an important feature to be explained.

explanation of the computation of an MST in the context of financial data.

The MST is attractive because it provides a unique arrangement of LCFIs that selects the most relevant connections of each of them. It reduces the $N(N-1)/2$ correlation coefficients into $N-1$ links. This, of course, raises the key question of whether essential information is lost in the reduction. Onnela, Chakraborti, Kaski, Kertesz and Kanto (2003) find that summary statistics of the MST are highly correlated with summary statistics of the whole correlation matrix (eg the mean correlation coefficient), suggesting that the lost information is not hugely important. Further, Mantegna (1999) and Onnela et al (2003) show that an MST can provide a reasonable economic taxonomy of US equities, since branches of the tree can be clearly identified as business sectors.

The MST based on equity returns is given in Figure 4. The length of the lines connecting nodes is inversely proportional to the correlation coefficient, such that short lines represent LCFIs that are highly correlated while longer lines suggest less correlation. The MST reveals a similar pattern to the dendrograms above – the links between US LCFIs are typically high, as are some national links between European institutions. Morgan Stanley–HSBC is the strongest, if

non-intuitive, link between the US and European networks. However, this is a relatively weak link with a correlation of just 0.48. To place this in context, the lowest correlation between any two US LCFIs is 0.59 (Lehman Brothers–Bank of America). This suggests that every US LCFI is much more highly related to every other US LCFI than any non-US LCFI. The links between European LCFIs are much weaker, leading to a more dispersed MST. An MST computed using equity returns purged of world and local market effects (not reported) also displays relatively high correlations among US LCFIs, with the European institutions more dispersed and again separated along national lines.

Figure 5, based on changes in CDS premia, provides a very similar picture despite the different assets, time periods and samples of LCFIs analysed. The US brokerage houses cluster strongly in both, the large US banks are closely related in both, and, although the equity-based links are not strong, the French banks cluster with Deutsche Bank in both. Above all, the LCFIs again form US and European groups, with a relatively weak link between Deutsche Bank and Citigroup joining them. That these companies link the two halves of the CDS-based MST is intuitive, as these are the only two LCFIs to rank in the top ten in each of the six LCFI criteria (Table 1). Nevertheless, only one of the 21 CDS-based correlations between

Figure 4:
Minimum spanning tree of equity returns

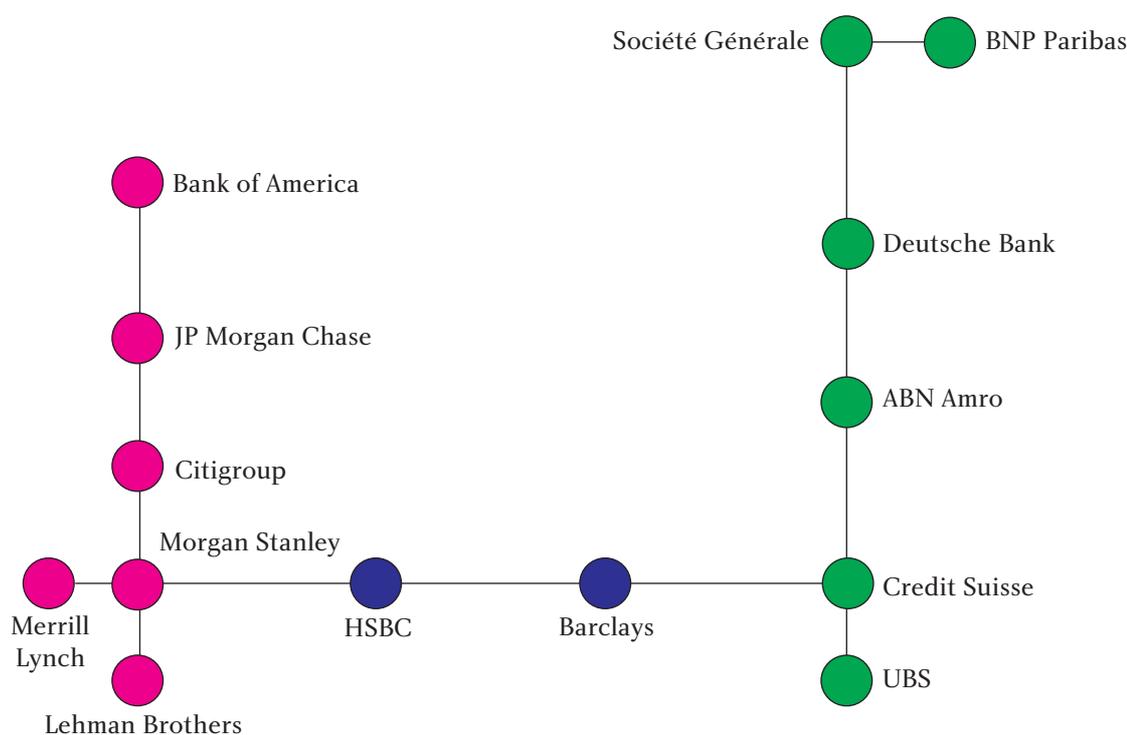
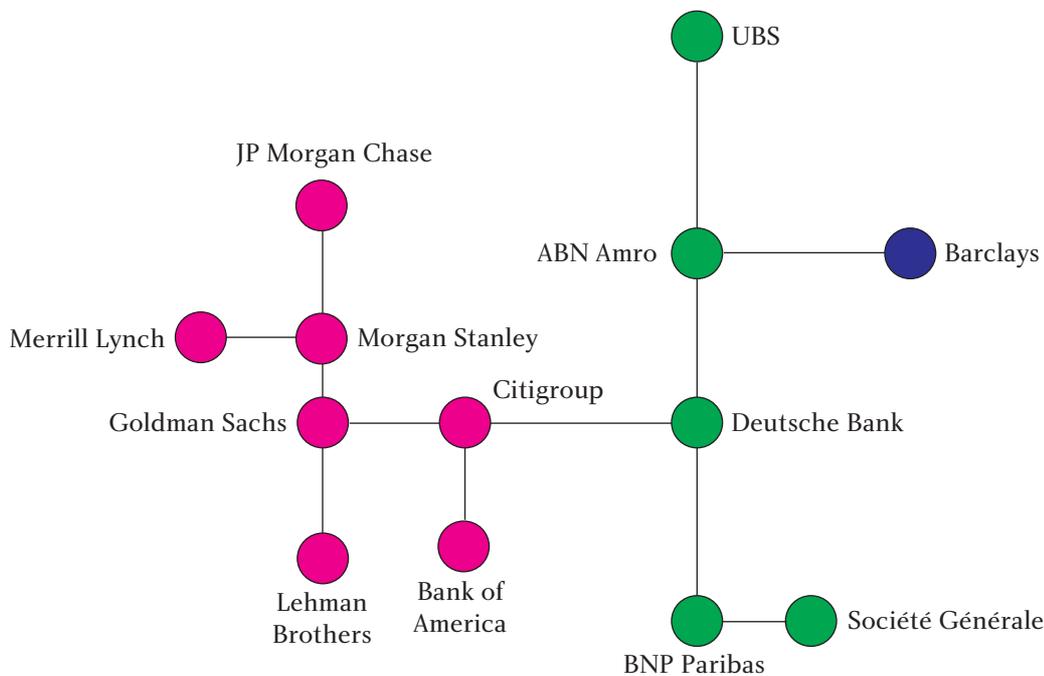


Figure 5:
Minimum spanning tree of changes in CDS premia



US companies is lower than the Citigroup–Deutsche Bank link that joins the US and European LCFIs.¹⁶

These relatively low correlations between the US and European branches of the MSTs, using both asset prices, suggest that the US and European groups face some different risk and return exposures. Nevertheless, even the weakest links are strong in an absolute sense, suggesting that, while there are some differences between the two groups, they still share significant common driving factors.

Factor modelling

In this section, results from the previous sections are used as a guide in building factor models for equity returns and changes in CDS premia. The goal is to be able to understand what proportions of the variation in LCFI equity returns and changes in CDS premia can be explained by factors common to all LCFIs, by regional- and sector-specific factors and by idiosyncratic factors unique to each LCFI.¹⁷

A factor model of equity returns

The structure of the factor model developed in this section draws on King, Sentana and Wadhvani (1994),

Dungey (1999) and Dungey, Fry, Gonzalez-Hermosillo and Martin (2003). The equity returns of each LCFI are presumed to evolve in response to movements in a number of observed and unobserved factors. Local and world equity returns are included as observed factors, following the form of equation (1). Previous sections have suggested structure in the residuals of this equation and so the following unobserved factors are included:

- a factor common to the entire set of LCFIs, denoted by C ,
- factors common to US and European regional groupings, R_{US} and R_{EUR} ,
- factors common to sectoral groupings (banks and brokerage houses), S_{BK} and S_{BR} respectively, and
- factors assumed to be related only to individual LCFIs, f_i .

The factors can be viewed as proxies for the variation in observable macroeconomic variables that explain the variation in LCFI equity returns.¹⁸

16: The Bank of America – Merrill Lynch correlation is just 0.49.

17: These common, regional, and sectoral factors encompass market perceptions of both exposures to similar external factors and direct counterparty exposures that are common across groups of LCFIs. Where direct counterparty links are very institution-specific, they become idiosyncratic factors.

18: Although the tests for the effects of macro factors on the return-generating process for LCFIs suggests that only the world and local equity indices have reasonable explanatory power, it is possible that movements in world and local equity indices capture the variation in a large number of economic variables.

The equity return for LCFI i at time t is expressed as

$$r_{it} = \underbrace{\alpha_i + \beta_i W_t + \delta_i L_{it}}_{\text{observed factors}} + \underbrace{\lambda_i C_t + \gamma_i R_{jt} + \theta_i S_{kt} + \phi_i f_{it}}_{\text{unobserved factors}} \quad (2)$$

$i = 1, \dots, n$ $j = \text{US, EUR}$ $k = \text{BK, BR}$

The unobserved factors are each specified as stationary and independent disturbance processes. The time-invariant loadings on these factors vary across LCFIs and are given by the parameters β_i , δ_i , λ_i , γ_i , θ_i and ϕ_i .

The model is estimated in two stages. First, the LCFI equity returns are regressed on the two observed factors and a constant. The R^2 of each regression gives the proportion of equity returns variance explained by these two observed factors. The residuals of these regressions are then used in the second stage unobserved factor model:

$$\begin{bmatrix} r_{1t}^* \\ r_{2t}^* \\ \vdots \\ r_{nt}^* \end{bmatrix} = \begin{bmatrix} \lambda_1 & I_1 \gamma_{US1} & (1-I_1) \gamma_{EUR1} & J_1 \theta_{BK1} & K_1 \theta_{BR1} & \phi_1 & 0 & \dots & 0 \\ \lambda_2 & I_2 \gamma_{US2} & (1-I_2) \gamma_{EUR2} & J_2 \theta_{BK2} & K_2 \theta_{BR2} & 0 & \phi_2 & \dots & 0 \\ \vdots & \vdots \\ \lambda_n & I_n \gamma_{USn} & (1-I_n) \gamma_{EURn} & J_n \theta_{BKn} & K_n \theta_{BRn} & 0 & 0 & \dots & \phi_n \end{bmatrix} \begin{bmatrix} C \\ R_{US} \\ R_{EUR} \\ S_{BK} \\ S_{BR} \\ f_1 \\ f_2 \\ \vdots \\ f_n \end{bmatrix} \quad (3)$$

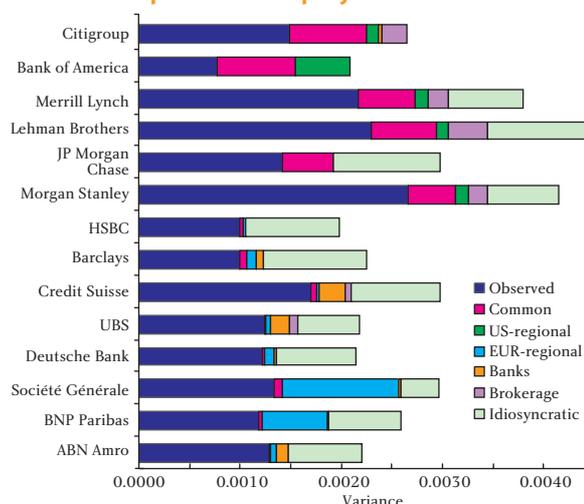
I_i denotes an indicator variable for each LCFI that takes the value unity if that LCFI is US-based and zero otherwise. Similarly, J_i and K_i are indicator variables that are unity if that LCFI is bank or broker, respectively, and zero otherwise. The LCFIs in the sample include pure brokerage houses, global banks, LCFIs that include both types of operation and more peripheral banks. A 'bank' factor is included for Citigroup, Bank of America, JP Morgan Chase and all the European LCFIs, and a 'broker' factor for Citigroup, Merrill Lynch, Lehman Brothers, JP Morgan Chase, Morgan Stanley, Credit Suisse, UBS and Deutsche Bank.

The model in this stage is estimated by the generalised method of moments technique. For each

LCFI, the proportion of the variance of returns attributable to a factor is computed as the ratio of the squared loading on that factor to the total variance.¹⁹

These decompositions are presented graphically in Chart 1. The combined observed factor explains between 37% and 64% of equity returns variance and is the most significant single factor on average. The common unobserved factor is important for each US LCFI but is small for the European institutions. The regional factor is important for most of the US LCFIs, and particularly for Bank of America. The observed world and US equity market plus unobserved common and US regional factors explain, on average, 78% of the equity returns volatility of US LCFIs. This suggests that US LCFIs are very highly exposed to similar macro factors and constitute a relatively uniform group of institutions.

Chart 1:
Factor decomposition of equity returns



Sources: Thomson Financial Datastream and Bank calculations.

This is much less true of the European LCFIs, for which unobserved common effects are very small, and the European regional factor is only important for the two French banks. This reinforces the previous results suggesting comparatively high heterogeneity among the European institutions.

The bank factor is only economically important for the two Swiss banks, while the broker factor appears marginally important for the pure brokers and Citigroup (but not JP Morgan Chase). Sectoral factors do not appear to influence the equity returns of most

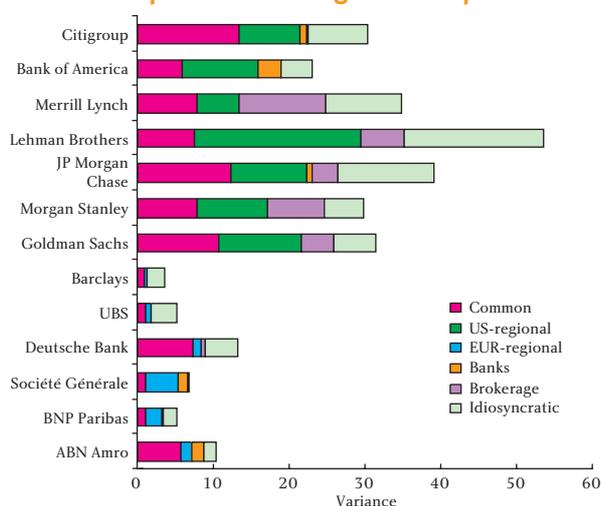
19: Further details are given in Hawkesby, Marsh and Stevens (2003).

LCFIs significantly despite the separation of bank-oriented LCFIs and brokers in Figure 3.

Unobserved factor model of CDS premia

Since there is not yet a reliable world or even country index of CDS premia, it is not possible to extract the effect of the observed world and country factors when looking at changes in CDS premia. However, a similar exercise – using simply unobserved common, regional, sectoral and idiosyncratic factors to decompose the variance of changes in CDS premia – yields the results described in Chart 2.²⁰

Chart 2:
Factor decomposition of changes in CDS premia



Sources: Thomson Financial Datastream and Bank calculations.

The first point to note is the marked asymmetry in the variance of US and European LCFI CDS premia. The cost of credit default protection on European LCFIs is substantially less than for US financials.²¹ Since the variance in the change in the CDS premia is computed (and not the percentage change), the European LCFIs also have substantially lower variance. A second feature is that Lehman Brothers has by far the highest CDS variance (and the highest equity variance), and was the outlier LCFI in the cluster analysis.

The common factor is important for most of the US LCFIs and both Deutsche Bank and ABN Amro.

The appropriate regional factor is economically significant for all US LCFIs and, again, the two French banks. A large proportion of the variation in CDS premia for the majority of the LCFIs can be explained by common global and regional factors. The two outliers here are Barclays and UBS, where idiosyncratic factors are dominant. However, these banks also have the smallest variation in CDS premia.

The broker factor is very important for Merrill Lynch, Lehman Brothers, Morgan Stanley and Goldman Sachs, but is essentially zero for Citigroup (in contrast to the equity results) and is relatively low for JP Morgan Chase. The pure US brokers appear to have been exposed to a significant common risk factor that is more obvious from the CDS premia than equity prices. The bank factor is important for Société Générale, ABN Amro and Bank of America but is close to zero for the other LCFIs.

Idiosyncratic contributions average 30% across the LCFI panel for the factor model of CDS premia, compared to 25% for equity prices.²²

Conclusions

Over the past fifteen years, some of the largest and most complex financial institutions have come to transcend national boundaries. As a result, they have become an important channel in their own right for the cross-border transmission of financial market developments, especially in an international financial centre such as London. Given their size and diverse activities, LCFIs also provide a window on international financial markets.

This article uses the correlation of LCFIs' asset prices as an indication of links between LCFIs, through both perceptions of direct counterparty links between LCFIs and exposures to similar external factors. A relatively high degree of commonality between asset price developments of most LCFIs is found, especially when compared with the commonality between a control group of size/country-matched non-financial companies. However, the results also highlight that the LCFIs cannot be viewed as a homogeneous group. Despite the emergence of these globally focused

20: In the absence of a world CDS index, we expect the same information to be captured by the unobserved common factor.

21: This may be because the protection afforded European banks by national governments is perceived to be greater or simply because of the segmentation of this relatively new market. Blanco, Brennan and Marsh (2003) and the references therein discuss this market in more detail.

22: For equities, 67% of bilateral correlations of extracted idiosyncratic factors are uncorrelated across LCFIs. Most significant correlations tend to be between US LCFIs, potentially suggesting some large institution-specific direct counterparty exposures. See Hawkesby, Marsh and Stevens (2003).

LCFIs, there are still noticeable divisions between sub-groups of LCFIs, according to both geography and whether the LCFI is primarily a bank or a brokerage.

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Large UK-owned banks' funding patterns:

recent changes and implications

George Speight, Sterling Markets Division and Sarah Parkinson, Financial Industry and Regulation Division, Bank of England

The large UK-owned banks have raised increasing amounts of funding from wholesale markets over recent years, as their customer lending has grown more rapidly than their customer deposits. This article reviews the changing, and increasingly diversified, funding strategies of the large UK-owned banks and highlights some issues relevant to the design of bank liquidity regulation.

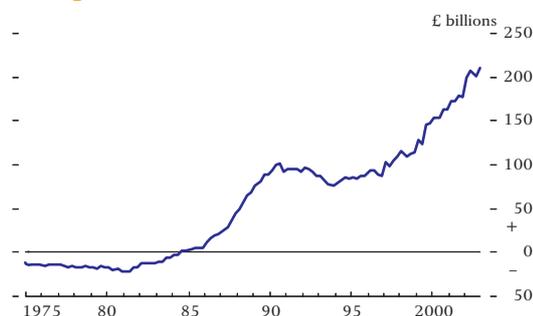
RECENTLY, THE UK CORPORATE and particularly household sectors have borrowed heavily from banks and building societies, as they did in the late 1980s. And as then, deposits from these sectors have increased more slowly (Chart 1). The large UK-owned banks have accounted for much of the recent increase in borrowing. And they have increasingly funded this growth in their assets in the wholesale markets, extending beyond just the short-term sterling markets.

This article reviews this pattern of funding, placing the strategies the banks have adopted in the context of structural factors such as the incentives created by the current Sterling Stock Liquidity Regime (SSLR) for liquidity regulation of large UK-owned banks.

The gap between the large UK-owned banks' 'customer' lending and deposits

Between December 1998 and June 2003, the large UK-owned banks' total worldwide 'customer' lending increased by around £600 billion compared with customer deposit growth of around £400 billion, lending increasing from 52% of total assets to 55% and deposits falling from 54% to 48%.¹ Similarly, in the late 1980s banks' and building societies' UK customer loans as a proportion of total assets also increased sharply, by 9 percentage points.² Customer deposits also increased as a proportion of total assets, but by only 4 percentage points.

Chart 1:
UK-resident banks' and building societies' net sterling lending^(a) to UK households and non-financial companies



Source: Bank of England.

(a) Difference between households' and PNFCs' M4 lending and M4.

This change in customer business since December 1998 was more pronounced for some banks than others, primarily reflecting their more rapid loan growth (Chart 2). Much of the growth was accounted for by the banks' UK operations, reflecting the demand for credit among UK households and companies: loans to UK customers increased by £270 billion, £110 billion more than the rise in UK customer deposits (Box 1, Chart A). This mismatch might have been larger had the banks not removed a significant amount of loans from their balance sheets during this period through securitisation, principally issuance of mortgage-backed securities.³

1: As reported in the banks' published accounts.

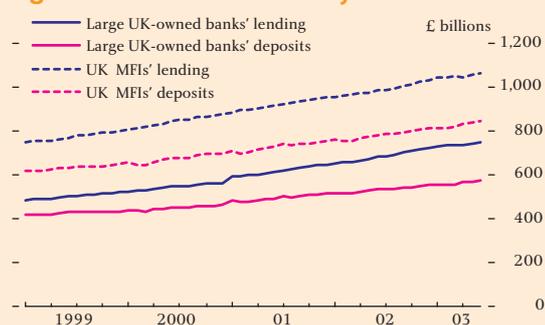
2: Sterling loans as a proportion of total assets for UK-resident banks and building societies.

3: The impact of securitisation on the mismatch between UK customer loans and deposits is difficult to quantify, as it is possible that some of the loans that have been securitised would not have been made were it not possible to securitise them.

Box 1: Data sources for analysing trends in the large UK-owned banks' balance sheets, and definitions of terms

The large UK-owned banks are for these purposes defined as Abbey National Group, Alliance and Leicester Group, Barclays Group, Bradford and Bingley plc, HBOS Group, HSBC Group, Lloyds TSB Group, Northern Rock plc and Royal Bank of Scotland Group. These banks account for the majority of the deposits from and lending to households and companies in the United Kingdom (Chart A).¹

Chart A:
Lending to and deposits from UK customers by the large UK-owned banks^(a) and by all UK MFIs^(b)



Source: Bank of England.

(a) UK-resident entities.

(b) Monetary and financial institutions.

Primary data sources used in this article are: the banks' published accounts and Financial Services Authority regulatory returns, which in each case cover the banks' worldwide operations on a consolidated basis; and the banks' balance-sheet returns to the Bank of England, covering their UK operations only.² Data on banks' UK operations are an important complement to the consolidated analysis given that

funding may not be entirely fungible within worldwide groups, particularly in times of stress.

Contacts at the large UK-owned banks explain that changes in their liability mix and increased use of 'wholesale funding' largely reflect the rapid recent growth in their 'customer' business, in particular the strength of customer lending. To investigate these patterns in the data, it is necessary to make some assumptions in order to define 'customer' and 'wholesale' business.

Banks' published accounts identify 'customer' loans and deposits, but these items are not replicated in the banking returns (for the banks' UK operations). When using these data, we define UK 'customer' business as UK households' and private non-financial corporations' (PNFCs) deposits with banks and their credit from banks.³ This will tend to underestimate 'customer' loans and deposits, as it excludes non-bank ('other') financial corporations (OFCs), some of the deposits and loans of which will be more in the nature of customer than wholesale market business. It also excludes the public sector.

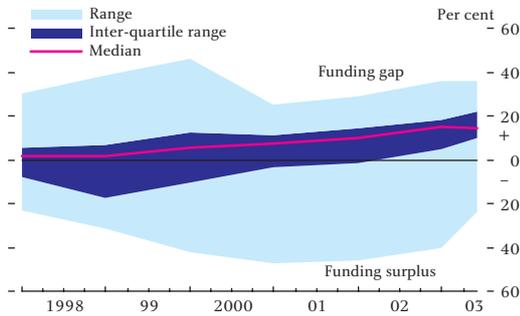
Apart from customer deposits, banks' liabilities comprise various elements which can be broadly categorised as 'wholesale' liabilities, including deposits from banks and near-banks, money market debt securities, longer-term debt securities including medium-term notes (MTNs) and subordinated debt, and shareholders' funds.

1: See also Section 3.2 of this Review.

2: That is, the operations of their UK-resident banking entities. For more detail on the sources of data, see Gracie, A and Logan, A, 2002 UK bank exposures: data sources and financial stability analysis, *Financial Stability Review*, June.

3: 'Deposits' are defined as 'money holdings', that is, M4, and its foreign currency equivalent. As well as deposits, this includes holdings of short-term bank securities (of up to five years original maturity) and any reverse repos with the banking sector. But both are very small for households and PNFCs. Similarly, 'loans' are defined as M4 lending and its foreign currency equivalent, so including repos – which are very small – and banks' holdings of securities issued by PNFCs, as well as loans.

Chart 2:
Large UK-owned banks' customer funding gap as a proportion of customer lending^(a)



Source: Published accounts.

(a) The difference between customer loans and customer deposits, as a proportion of customer loans; a positive number represents a funding gap.

In principle, the increase in the net lending of the large UK-owned banks to UK households and PNFCs could have been met by increased net borrowing from other UK residents, including OFCs and the public sector, as well as the rest of the UK banking sector. However, in practice UK residents in aggregate were large net borrowers both from the large UK-owned banks and from the banking sector as a whole. Thus, a significant proportion of the additional wholesale funding of the large UK-owned banks was from overseas⁴, as in the late 1980s. However, in the late 1980s the banking sector's borrowing from overseas appears to have been mostly in sterling, plus a small amount in foreign currency bond and equity markets, whereas since 1998 the banks have borrowed more in foreign currency money markets, as described below.

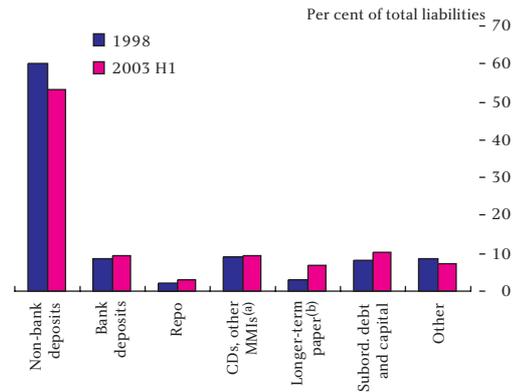
Developments in the large UK-owned banks' wholesale funding

The large UK-owned banks have met their increased customer funding need since 1998 – around £200 billion on a worldwide basis – using a variety of sources and maturities.

An important component of their funding has been longer-term instruments, from MTNs through to equity, both in sterling and in other currencies (Chart 3). Securitisation has also become increasingly significant and is now an integral part of some banks' business models. The large UK-owned banks securitised some £60 billion of sterling loans in total

over the period, primarily mortgage loans (Chart 4), thus removing them from their balance sheets and from our definition of funding need.

Chart 3:
Stylised liabilities of large UK-owned banks

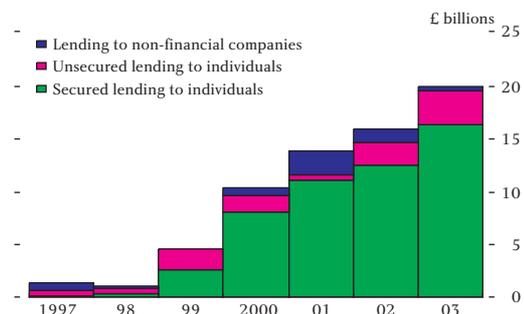


Source: FSA regulatory returns.

(a) MMIs are money market instruments.

(b) The increase in this item in part reflects recent acquisitions.

Chart 4:
Securitisations (annual flows), by nature of underlying loan^{(a)(b)}



Source: Bank of England.

(a) Securitisations by UK-resident banks, may include some loan transfers.

(b) 2003 shows Jan.–Sep. only.

But the banks also raised a significant amount of additional funding in short-term money-market instruments, both in sterling and in foreign currencies.

Sterling money market

Between December 1998 and June 2003, the large UK-owned banks significantly increased their net borrowing via sterling domestic interbank deposits, certificates of deposit (CDs) and repo. Indeed, as a group, they were small net lenders in these markets at the end of 1998 but net borrowers by June 2003⁵

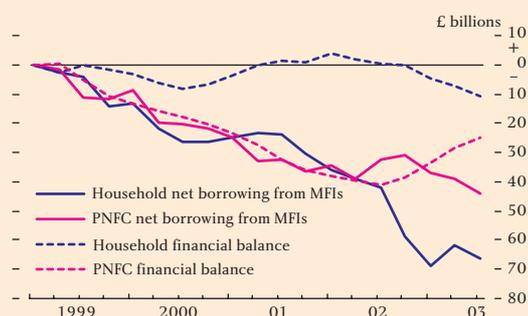
4: Box 2 contains more details on the links between UK household and corporate financial balances and the balance sheets of the UK banking sector and the large UK-owned banks since 1998.

5: Not all of the large UK-owned banks were net borrowers in these markets as of June 2003, reflecting the differences in their funding requirements.

Box 2: Sectoral financial balances and the banking sector's balance sheet

UK residents were large net borrowers from the UK banking sector between the end of 1998 and mid-2003, but their aggregate *financial deficit* was much smaller, reflecting net purchases of other financial assets, primarily by households¹ (Chart A). Among these purchases may have been some of the longer-term liabilities of the UK banking sector, which have also risen (included in row 4 of Table A).² But any such purchases fell far short of funding the banking sector's net lending to UK residents. Banks bridged the gap by borrowing from *non-residents*, taking more deposits from and issuing more short-term debt securities to them than they extended credit (row 3 in Table A), and issuing longer-term liabilities to them (included in row 4).³

Chart A:
UK households' and private non-financial corporations' cumulative financial deficits and net borrowing^(a) from UK MFIs



Sources: Bank of England and ONS.

(a) Net borrowing shown as negative. It is the increase in the sectors' money holdings with MFIs net of the increase in their liabilities to MFIs (not adjusted to add back securitisations).

Households' net purchases of financial assets other than domestic deposits can also include flows into deposits with overseas banks. UK households have significant deposits with banks in the Channel Islands and the Isle of Man, which in turn lend larger sums to banks in the United Kingdom (around £25 billion and £110 billion respectively, as of June 2003). In a sense, these deposits are simply being 'recycled'. But the deposits of UK households – and indeed of all the

Table A:
Stylised balance sheet of UK monetary and financial institutions (consolidated basis), by counterparts^(a)

£ billion	Dec. 1998			Jun. 2003		
	Assets	Liabilities	Net	Assets	Liabilities	Net
UK non-bank private sector	1,024	884	-140	1,565	1,238	-327
UK public sector	42	19	-23	41	26	-15
Rest of world	1,149	1,124	-25	1,743	1,804	61
Other assets and liabilities^(b)	76	264	188	85	366	281
Total (excluding inter-MFI business)^(c)	2,291	2,291	n.a.	3,434	3,434	n.a.

Source: Bank of England.

(a) Data are as in Table B2.1 in Bank of England, Monetary and Financial Statistics.

(b) Assets include bonds (of over five years' original maturity) and equity of other UK MFIs; liabilities include bonds of the same maturity and equity issued. The statistics do not allocate these liabilities to counterparties, though with respect to liabilities to the rest of the world, further information is available in the ONS Pink book.

(c) Total assets do not include MFIs' claims on other MFIs and similarly for liabilities, these data being for the consolidated MFI sector.

Table B:
Stylised balance sheet of UK-owned banks' UK operations, by counterparts^(a)

£ billion	Dec. 1998			Jun. 2003		
	Assets	Liabilities	Net	Assets	Liabilities	Net
UK non-bank private sector	641	559	-82	1,046	788	-258
UK public sector	18	9	-9	13	11	-2
UK MFIs^(b)	222	203	-19	359	371	12
Rest of world	196	211	15	410	491	82
Other assets and liabilities^(c)	57	153	95	126	292	166
Total	1,134	1,134	n.a.	1,954	1,954	n.a.

Source: Bank of England.

(a) This table estimates the share of UK-owned banks in the MFIs' balance sheet shown in Table A. It contains a number of approximations, including placing items in suspense and transmission in 'other' assets and liabilities.

(b) Not adjusted for intra-group transfers (see footnote seven).

(c) Assets include bonds (of over five years' original maturity) and equity of other UK MFIs, liabilities include bonds of the same maturity and equity issued. The statistics do not allocate these liabilities to counterparties.

non-bank UK domestic sectors – with banks in the Channel Islands and Isle of Man did not increase by very much between December 1998 and June 2003,

1: Burnett, M and Manning, M 2003, Financial stability and the United Kingdom's external balance sheet, *Bank of England Quarterly Bulletin*, Winter discusses some of these financing issues in more detail.

2: UK residents' holdings of these longer-term instruments are not included in the concept of 'net borrowing' as used here (as they are not part of 'broad money').

3: Reflecting these flows, the banking sector recorded a cumulative net inflow on the UK's financial account of around £115 billion over the period. This offset the cumulative financial deficit of the UK economy, and hence its cumulative current and capital account deficits (around £80 billion), together with the domestic sectors' cumulative net purchases of overseas financial assets (around £45 billion). (Measurement difficulties mean that these figures are approximations, the 'errors and omissions' item identically balancing them.)

so that this 'recycling' story does not significantly affect the picture of the UK banking sector as a growing net lender to UK residents over the period, and in particular to UK households.

Reflecting their core role in intermediating financial flows in the UK economy, the large UK-owned banks'

net funding has followed a broadly similar pattern to that for the whole banking sector, as for example with the key role played by borrowing from non-residents (Table B).⁴ Indeed, raising additional wholesale funding from overseas has been a major theme in the liability management of the large UK-owned banks.

4: In Table B, the large UK-owned banks are proxied by all UK-owned banks. As of June 2003, the large UK-owned banks accounted for 96% of all UK-owned banks' liabilities.

(Table 1). In the late 1980s there was a broadly similar development, as the UK high-street banks moved from being net lenders into the sterling money market to being roughly flat.

The large UK-owned banks also currently transfer a significant amount of sterling to their UK operations from their overseas offices, although the scale of this activity has been broadly unchanged since 1998. However, they significantly increased their net sterling deposits from *other* non-resident banks.⁶ A significant part of this sterling borrowing from overseas banks, both their own offices and other banks, was from the

Channel Islands and the Isle of Man, and part of this in turn represents the recycling of UK private sector sterling deposits (Box 2). Banks and building societies had also borrowed large amounts in sterling from overseas to fund their customer lending during the late 1980s, and in fact in relative terms this source of additional funding was then more important.

CDs constitute an important part of the large UK-owned banks' funding in the sterling money market.⁷ As term liabilities, CDs are an attractive form of funding from the point of view of the banks' liquidity management, including meeting their

Table 1:
Large UK-owned banks' position in the sterling money market

£ billion	Assets		Liabilities		Net position		Change in net position	
	Dec. 1998	Jun. 2003	Dec. 1998	Jun. 2003	Dec. 1998	Jun. 2003		
Loans to UK banks and building societies ^(a)	109	207	Deposits from UK banks and buildings societies	104	213	-5	6	11
Certificates of deposit of UK banks	38	43	Certificates of deposit issued	50	64	12	21	9
Reverse repos	31	35	Repos	21	42	-10	9	19
Total	178	283	Total	175	319	-3	36	39
Loans to and reverse repos with non-resident banks	16	16	Deposits and repos with non-resident banks	42	73	26	57	31
of which:			of which:					
with non-resident own offices	1	3	with non-resident own offices	26	22	25	19	-6
with non-resident CMI ^(b) s	0	1	with non-resident CMI ^(b) s	1	8	1	7	6
with other non-resident banks	15	12	with other non-resident banks	15	43	0	31	31
Memo item:			Memo item:					
reverse repos with non-residents ^(c)	1	5	repos with non-residents ^(d)	0	7	-1	2	3

Source: Bank of England.

(a) Not adjusted for intra-group exposures. 'Loans' include banks' holdings of building society certificates of deposit.

(b) Central Monetary Institutions.

(c) Included in 'reverse repos' above.

(d) Included in 'repos' above.

6: Net sterling deposits from other non-resident banks, excluding central monetary institutions, increased to around £30 billion by June 2003 (Table 1). This figure covers both unsecured deposits and repos, but the repo element is small.

7: The figures for banks' domestic interbank loans and deposits shown in Table 1 are very large, but these are significantly higher – possibly by a factor of as much as three – than inter-banking group loans and deposits, which are perhaps more relevant. This reflects the inclusion of transfers of funds between institutions in the same banking group in the recorded statistics. But this affects loans and deposits equally, leaving the net position unchanged.

regulatory liquidity requirements. The large UK-owned banks are subject to the SSLR, under which they must hold high-quality liquid assets to cover their sterling net wholesale outflows (plus a portion of their retail deposits) over the following five working days. As such, the large UK-owned banks need to hold liquid assets against only a small proportion of their outstanding CDs, which typically have original maturities of between one and twelve months.

Some of the *demand* for bank CDs comes from the banking sector itself. Indeed, one such source of demand is generated by the SSLR. While the SSLR may not always be a binding constraint on the stock of total assets banks hold for liquidity reasons (banks tend to hold more liquid assets than the SSLR requires), it does impose conditions on the quality of these assets. Within certain limits⁸, the large UK-owned banks can count CD holdings as part of their regulatory liquid assets, the remainder consisting of assets eligible for use in the Bank of England's open market operations (OMOs).⁹ As CDs are typically higher-yielding than these eligible assets, the banks tend to use the maximum permitted amount of CDs, or not much less, to meet their requirements under the SSLR. Recently, such holdings have accounted for in the order of half of the large UK-owned banks' total holdings of CDs.

Another reason why the large UK-owned banks and other institutions hold CDs is for use as collateral against which to borrow gilts from insurance companies or pension funds in the stock lending market. Borrowed gilts may in turn be lent to obtain liquidity via the gilt repo market or the Bank of England's sterling money market operations. Box 3 explains the links between the CD, gilt repo and stock lending markets, and how developments in the regulatory sterling stock liquidity regime and the design of the Bank's operations may have influenced changes in the large UK-owned banks' activities in these markets.

Foreign currency funding

The large UK-owned banks have also sought additional wholesale funding in foreign currencies through

money markets, and through issuance of MTNs and other longer-term instruments. Contacts at the banks say that they have often been able to raise sterling funds at lower cost in foreign currency (on a currency-swapped basis) than in sterling markets directly, and that these foreign currency markets give them access to greater liquidity. Issuance of foreign currency money-market instruments – primarily CDs, CP and interbank deposits – has been concentrated in US dollars, reflecting the depth of those markets and the attractiveness to US money-market investors of diversifying their credit risk by lending to highly-rated overseas banks. Indeed, several large UK-owned banks have opened US offices to improve their access to US investors.¹⁰ The large UK-owned banks have also sought funding in euro, but often at longer maturities.

Banks and building societies also tapped foreign currency markets at longer maturities in the late 1980s to help fund their customer lending. But in contrast to more recently, they did not at that time tap foreign currency money markets to any great extent.

Between December 1998 and June 2003, the large UK-owned banks' UK operations in aggregate increased their net funding in foreign currency CDs and CP by around £40 billion and their net foreign currency deposits from overseas banks (excluding central monetary institutions and their own overseas offices) by £25 billion. A further £15 billion came from the banks' overseas offices, in part reflecting money-market issuance out of those offices. This funding has made a significant contribution towards accommodating the growth in the banks' net customer lending (of some £200 billion on a worldwide basis). Together with the additional sterling money-market issuance, it helps explain the increase in the proportion of bank deposits and other money-market liabilities in the large UK-owned banks' total liabilities (Chart 3).

Reflecting their increased recourse to foreign currency wholesale markets to fund sterling lending, the large UK-owned banks' UK operations in aggregate have changed from having broadly matched sterling assets and liabilities to having a surplus of sterling assets

8: In calculating how many eligible assets they must hold, banks can use CDs to offset up to half of their net wholesale outflows. For more details see: Chaplin, G, Emblow, A and Michael, I 2000, *Banking system liquidity*, *Financial Stability Review*, December.

9: These are gilts, Treasury bills, eligible bills and, since 1999, eligible euro-denominated securities issued by European Economic Area (EEA) governments and major international institutions that are eligible for use in the European System of Central Banks' monetary policy operations.

10: For example, US money market mutual funds face restrictions on holdings of paper issued outside the United States.

Box 3: CDs, gilt repo and stock lending

UK institutional investors own the majority of gilts, and many lend some of their holdings into the gilt repo and stock lending markets. Most have remained reluctant to *repo* them, apparently because they prefer not to have to manage the resulting cash balances. Rather they lend them in the stock lending market against the collateral of other securities and are paid a fee. CDs are often used as collateral. Since the development of the gilt repo market in the mid-1990s, one trading strategy has been for intermediaries to borrow gilts from institutional investors, using CDs as collateral, and to repo out these gilts. This raises cash to pay for the CDs.¹ As at end-May 2003, some £60 billion of gilts were lent out in the stock lending market.

A few of the large UK-owned banks are active in the stock lending market, accounting for a significant part of total gilts borrowed during the first half of 2003 (much more than in late 1998). When a bank uses CDs to collateralise stock borrowing of gilts and in turn repos out these gilts, it records its CD holdings on the asset side of its balance sheet and its gilt repos on the liabilities side. So this business shows up in Table 1, although it is neutral in terms of funding: the gilt repo liabilities fund the CD assets so that the bank raises no net funding. Adjusting the June 2003 figures in Table 1 to take account of this, reveals that the large UK-owned banks are much bigger net *borrowers* in the CD market than Table 1 suggests, consistent with their large wholesale funding requirement. And they are also revealed as net borrowers of securities (*lenders* of cash) in the repo market, with a surplus of repoed-in over repoed-out securities.

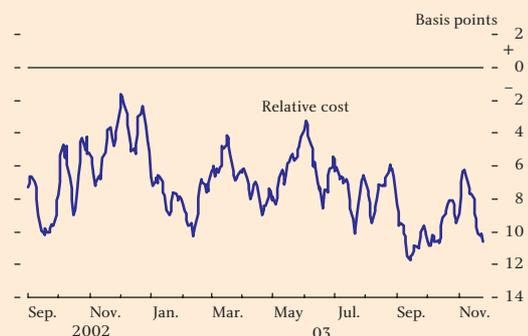
¹: The intermediaries earn a return from the spread between the CD rate (which they earn) and the gilt repo rate (which they pay), minus a fee paid to the owner of the gilts. They may also structure the term of their CD assets and their gilt repo funding to take a view on short-term interest rates.

over liabilities of almost £40 billion at June 2003. But the banks differ in the extent to which sterling assets exceed sterling liabilities; Chart 5 indicates this dispersion at the level of consolidated groups.

In so far as the banks use foreign currency money market liabilities to meet their sterling obligations,

This surplus of repoed-in securities, particularly gilts, contributes towards the large UK-owned banks' total holdings of liquid assets, helping them to meet their SSLR requirements. But, since 1998, the share of gilts in their stock of liquid assets has been steadily decreasing with a fall in their *outright* holdings of gilts. This has reflected in turn a progressive switch towards holding high quality euro-denominated collateral – broadly speaking, euro-denominated securities of governments in the EEA. The Bank of England began to accept such collateral in its operations in 1999, with a corresponding widening of securities eligible as stock liquidity. Eligible euro collateral has typically been cheaper than gilts for banks to hold (Chart A).

Chart A:
Cost of holding eligible euro-denominated collateral relative to gilts^{(a)(b)}



Sources: Bloomberg and Bank calculations.

(a) Relative cost calculated as difference between one-month BBA repo and Libor fixing spread and one-month European Banking Federation repo and euribor spread.

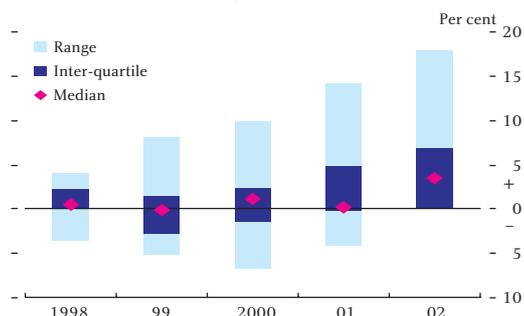
(b) Lower values indicate a lower cost of repoing euro-denominated securities relative to gilts.

they sell the foreign currency to buy sterling in the spot foreign exchange (fx) market, typically with a simultaneous forward purchase of the foreign currency for sterling to hedge their currency risk (an 'fx swap').¹¹ The depth of the fx swap market – in particular, the sterling-dollar fx swap market – is thus important for them. Overseas banks, large companies,

¹¹: Where banks issue longer-maturity foreign currency debt, they may also convert the proceeds to sterling using the fx swap market, requiring them to roll over the swaps periodically. Alternatively, they might enter into longer-term currency swaps, including basis swaps, in which floating-rate sterling payments are exchanged for floating-rate payments in the foreign currency. See also 'Markets and operations', Bank of England Quarterly Bulletin, Autumn 2003, pages 267–268.

institutional investors and central banks provide significant flows, and foreign exchange dealers may also take the other sides of trades on their own books.¹² Contacts suggest that one way they do this is to borrow sterling at short maturities and sell this into fx swaps, hedging the resulting interest rate position with derivatives.

Chart 5:
Large UK banks' excess of foreign currency liabilities over assets, as a proportion of total liabilities^(a)



Source: Published accounts.
 (a) On a consolidated basis.

Nonetheless, contacts at the large UK-owned banks and elsewhere have reported that the sterling-dollar fx swap market can have periods of lower liquidity, such that the swap into sterling is not attractive. In such circumstances, contacts have suggested that banks might still choose to issue in the liquid dollar money market and sell their dollars in the spot market, but they may delay carrying out the forward leg, running an fx position in the interim.

The increased use of foreign currency funding raises the issue of *cross-currency liquidity* risk, that is, the risk arising from banks' reliance on continued liquidity in fx markets, including under strain, to meet their obligations in one currency with funds in another. Further, to the extent that banks hedge foreign currency liabilities – in particular longer-term liabilities such as MTNs – with swaps of shorter maturities, they have to roll over the swaps and, in doing so, are exposed to the cash flow implications of movements in the spot foreign exchange rate, and in relative interest rates.

Conclusions

This article has described recent patterns in the wholesale funding of large UK-owned banks. Coincident with an increase in their wholesale funding need to meet the net growth in their customer lending, these banks have sought to diversify across different markets, maturities and currencies. For some banks, however, the use of short-term funding via money markets has increased. Other things being equal, this would increase exposure to liquidity risk, although it is difficult to assess this without a fuller picture of their other assets and liabilities. The current review of UK liquidity regulation, discussed in this *Review's* 'Strengthening financial infrastructure' article, is important in this respect.

The analysis also highlights two specific issues relating to the SSLR. The first is the impact of the SSLR both on the demand for and supply of sterling CDs issued by banks. Banks can reduce their required holdings of liquid assets under the SSLR by issuing term CDs in order to extend the maturity of their liabilities. But they can also, within limits, use CDs issued by other banks to meet their regulatory liquidity requirements under the SSLR. A larger CD market has given banks greater flexibility in their wholesale funding during a period when the UK banking sector has been in good financial health. But there are questions about whether, in times of stress, these unsecured interbank exposures could be a channel of contagion.

The second issue highlighted is the increased use of foreign currency funding by the large UK-owned banks. While banks themselves may have adequate controls for managing their foreign currency liquidity, the current SSLR only covers banks' sterling liabilities. This highlights the need for an all-currency approach to regulatory liquidity monitoring and control, and the current proposals for changes to the arrangements for UK bank liquidity regulation include this important change.

12: The April 2001 BIS survey recorded daily average turnover of over US\$30 billion (nominal outstandings) in fx swaps with a sterling leg with maturities of between eight days and one year, the relevant maturities for hedging most money market issuance.

Company-accounts-based modelling of business failures

Philip Bunn, Domestic Finance Division, Bank of England¹

Default by companies on their debt poses a risk to financial stability. To monitor the threat it is important to identify the companies with significant amounts of debt that have the highest probabilities of failing and consequently defaulting. This article discusses a company-accounts-based approach to modelling corporate failure with the aim of highlighting such companies. It finds that information on profitability, interest cover, capital gearing, liquidity, company size, industry, whether a company is a subsidiary and overall economic conditions can all help to explain which companies fail. This paper also illustrates how firm-level probabilities of failure from the model can be used to construct aggregate measures of financial risk and to monitor the distribution underlying those aggregate estimates.

CORPORATE FAILURE POSES a threat to financial stability if firms that fail default on their debt. Recent work has aimed to supplement the Bank's existing qualitative assessments of the risks arising from company failure with a more quantitative approach. This article describes the work undertaken as part of that programme using company accounts information to model business failures. It complements the recent *Review* articles by Vlieghe (2001) on the aggregate corporate liquidations rate and Tudela and Young (2003) on the Merton approach to predicting default by individual companies.

The size of the risk to financial stability from an individual company depends on both the probability that the firm will fail and on the amount of debt at risk of default if it does fail.² For surveillance purposes, it is important that we are able to identify and monitor the firms that present the largest risk. We use firm-level company accounts data and a proxy for macroeconomic conditions to model the probability of failure for each individual firm. We can then multiply this probability by the firm's debt to generate an estimate of debt at risk of default for each firm. We also derive an aggregate measure of debt at risk, and use the firm-level dimension of the data to analyse the distribution of this measure.

Economic background

There is a wide literature on the determinants of firm failure at both the aggregate and firm level. Vlieghe (2001) describes recent work in the Bank on the determinants of aggregate corporate liquidations and discusses the relevant literature. The general conclusions are that debt to GDP (gross domestic product), deviations of GDP from trend, interest rates and real wages can all help to explain the corporate liquidations rate.

The literature using company-level information to explain which firms fail dates back to Beaver (1966) and Altman (1968). Early work used financial ratios derived from company accounts data and discriminant analysis techniques. Recent work, such as that by Geroski and Gregg (1997) and Lennox (1999), has used a logit/probit approach. There is no consensus across the literature about exactly which variables from company accounts data can best predict company failure, but most studies include at least some measure of profitability, capital gearing and liquidity. The literature suggests that the macroeconomic environment is also an important explanatory variable. But many studies use a sample period that is too short to allow the incorporation of these macroeconomic effects into the model, and the papers that do only focus on public quoted companies.

1: This article is based on a recently published Bank of England working paper written jointly with Vicky Redwood, who was formerly a member of the Domestic Finance Division at the Bank of England and who now works for Capital Economics.

2: The size of the risk to financial stability also depends on whether the individual company failure is symptomatic of a more widespread corporate sector problem or whether it is likely to lead to contagion which could trigger further defaults. The article does not address this dimension of assessing systemic risk.

An alternative to using company accounts data to predict company failure is a model based on up-to-date market information. Recent work in the Bank to develop an in-house Merton model is described in Tudela and Young (2003). Whether a firm defaults or not is determined by the market value of that firm's assets in conjunction with its liability structure. When the value of its assets falls below a certain threshold, the firm is considered to be in default.

The approach taken at the Bank in surveillance work is to use a range of models. Tudela and Young (2003) find that probabilities of default from their Merton model have more predictive power than those from a simple company-accounts-type model. But, there are reasons why supplementing the Merton model with a company-accounts-based approach may be appropriate. First, the Merton model is dependent on equity price data and can therefore only be applied to quoted companies, which account for approximately 1,500 of the 1.6 million registered companies in the UK. It is important that we have a model that can also be applied to private companies. Second, although the Merton model provides a good ordinal ranking of companies on the basis of their probability of going into receivership, there is evidence that the implied probabilities of default may be limited as a cardinal indicator of risk. The company-accounts-based approach may yield more accurate cardinal probabilities of failure, because the estimation of the model takes into account the proportion of companies that failed in the past. Third, it is difficult to explain the reasons why a probability is at a particular level in the Merton model because the information is subsumed in share prices. This is easier in a company-accounts-based model, and the approach also permits an assessment of the effect of changes in profits, gearing, and so forth on probabilities of failure.

Data

The data used are company-accounts data for UK registered non-financial companies taken from the Bureau van Dijk FAME database. Public and private companies with complete accounts are included in

our dataset, which covers eleven years from 1991 to 2001. We do not model firms with fewer than 100 employees because accounts are generally incomplete for smaller firms. A year is classified as a financial year, running from 1 April to 31 March the following calendar year. We define a firm as failed in a particular year if its company status (according to FAME) is in receivership, liquidation or dissolved, and its last reported accounts were in the previous year. This definition includes voluntary liquidation and dissolution where there may be no risk of default, but we are unable to distinguish between voluntary and compulsory failures. Table 1 summarises the data.³

Table 1:
Sample summary

Year of survival/failure	Number of surviving firms	Number of failed firms	Percentage of firms who failed	Total number of firms
1991	3,885	183	4.50	4,068
1992	6,408	205	3.10	6,613
1993	8,715	171	1.92	8,886
1994	9,189	148	1.59	9,337
1995	9,397	135	1.42	9,532
1996	10,233	122	1.18	10,355
1997	10,806	150	1.37	10,956
1998	11,180	206	1.81	11,386
1999	11,334	193	1.67	11,527
2000	11,316	223	1.93	11,539
2001	11,291	197	1.71	11,488
Average per year	9,432	176	1.83	9,608
Total	103,754	1,933	1.83	105,687

Sources: Bureau van Dijk and Bank calculations.

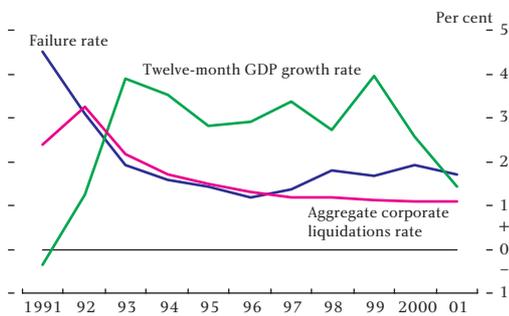
Chart 1 plots the annual failure rate along with the annual GDP growth rate.⁴ The pattern of company failures looks broadly to fit the pattern of the economic cycle.⁵ Chart 1 also shows that the profile of our failure rate roughly follows that of the corporate liquidations rate, although there are significant differences in the definition of the two series. First, corporate liquidations includes all incorporated companies of any size, whereas our definition of failure includes only firms with 100 or more employees. Second, only liquidations are included in the aggregate liquidations rate measure, whereas we also define a firm that enters receivership as failing.

3: The number of observations increases in the later years because of increases in the number of firms with over 100 employees and more comprehensive recording of accounts by FAME. Less than 1,000 of the companies in any year are quoted.

4: The measure of GDP used is GDP at constant market prices. We define the twelve-month GDP growth as the percentage growth rate from Q1 to Q1, therefore measuring the growth over Q2, Q3, Q4, and Q1.

5: Whilst our sample does not cover a full economic cycle, it contains enough for us to be able to identify some trends.

Chart 1:
Failure rate and macroeconomic variables



Sources: Bureau van Dijk, ONS, DTI and Bank calculations.

Methodology and variable specification

We use a probit approach to model the probability of a company failing.⁶ The company accounts information we use to identify which companies are most at risk can be divided into four main groups: profitability, financial ratios, firm characteristics and macroeconomic variables.

Economic theory suggests that the probability of firm failure should be negatively related to profitability. In our model we include the profit margin as a set of three separate dummy variables taking the value of one if a firm has a negative profit margin before earnings and taxation, a profit margin between 0% and 3%, or a profit margin between 3% and 6%.⁷ The reference group is firms with a profit margin of greater than or equal to 6%. The motivation for this non-linear approach is that a 2 percentage point fall in profits which reduces a firm's profit margin from 1% to -1% may have a larger marginal effect on that firm's probability of failure than a similar fall in the profit margin from 7% to 5%; that is, negative profits are likely to matter more.

The financial ratios in our model are interest cover, the debt-to-assets ratio and the current ratio.⁸ We expect that the debt-to-assets ratio will be positively

related to the probability of failure, and interest cover and the current ratio will be negatively related. We also include an interaction term, which takes the value of one for a firm if its profit margin is negative and if its debt-to-assets ratio is in excess of 0.35. This broadly represents firms that are both loss making and have above average capital gearing. It should allow us to evaluate whether the combination of negative profitability and high capital gearing raises the probability of failure by more than the effect of the two factors taken individually.

The firm characteristics we include in the model are company size, industry type and whether a firm is a subsidiary. The number of employees is included to test the hypothesis that small firms are more at risk of failure than large firms. We use six industry dummies based on 1992 SIC codes. The reference group for the industry dummies is manufacturing, primary industries, and utilities.⁹ A subsidiary dummy is included in the model to account for the possibility that a subsidiary can be bailed out by its holding company, which should reduce the probability of failure. We also include an interaction term that equals one if a firm is a subsidiary and makes a loss to assess if the marginal effect of making a loss is smaller for subsidiaries because of the possibility that a subsidiary can be rescued by its holding company.

Work on aggregate liquidations has found that the business cycle is an important determinant of bankruptcies; we therefore include the annual growth rate of GDP as a proxy for macroeconomic conditions.¹⁰ To an extent, changes in macroeconomic conditions should be reflected in the company accounts data, but we include GDP growth to assess whether there is an additional effect over and above this.

Empirical results

Our preferred probit model for estimating the probability of failure and the corresponding marginal

6: A probit model uses the maximum likelihood methodology and the characteristics of firms that have survived and failed to efficiently determine the optimal weight of each explanatory variable in an index of likelihood of failure, which is then mapped into a probability between 0 and 1 using the standard normal transformation. This approach is supported by Lennox (1999), who compares discriminant analysis with the logit/probit approach and concludes that well specified logit and probit models can identify failing companies more accurately than discriminant analysis.

7: As suggested by Geroski and Gregg (1997).

8: Interest cover is defined as profit before interest and taxation over interest payments. Values of interest cover in excess of the 90th percentile in each sample year are recoded to that value, since increases in interest cover above a certain level are unlikely to have any impact on the probability of failure, and firms with low interest payments can have very high interest cover. Negative values of interest cover (which all result from negative profitability) are recoded to zero. The debt-to-assets ratio is defined as the sum of short-term debt, overdrafts and long-term debt all over total assets. The current ratio is measured as current assets over current liabilities.

9: Primary industries and utilities are amalgamated with manufacturing, because these sectors are relatively small and there are not enough failures in our data in those industries to warrant including separate industry dummies.

10: Vlieghe (2001) discusses the aggregate liquidations literature.

effects are reported in Table 2. Company accounts data are taken from the year preceding the year of survival or failure, since firms that fail are unlikely to have contemporaneous data. There is further discussion of the econometric specification in Bunn and Redwood (2003).

Table 2:
Preferred equation for estimating the probability of failure^(a)

Variable	Coefficient	t-ratio	Marginal effect ^(b)
Profit margin <0	0.68	16.10	2.95
Profit margin >=0 & <0.03	0.22	6.94	0.64
Profit margin >=0.03 & <0.06	0.15	4.42	0.40
Interest cover	-0.01	-5.42	-0.03
Debt-to-assets ratio	0.16	4.99	0.39
Profit margin <0 & debt-to-assets ratio >0.35	0.11	2.52	0.29
Current ratio	-0.23	-9.37	-0.57
Ln (number of employees)	-0.13	-11.40	-0.32
Subsidiary	-0.57	-20.53	-1.73
Profit margin <0 & subsidiary	-0.37	-7.82	-0.66
Industry dummy: construction	0.14	3.39	0.38
Industry dummy: wholesale and retail	-0.11	-3.52	-0.25
Industry dummy: hotels and restaurants	-0.31	-5.15	-0.55
Industry dummy: transport, storage and communication	-0.12	-2.47	-0.26
Industry dummy: real estate, renting and business activities	0.00	0.03	0.00
Industry dummy: other services	-0.23	-5.17	-0.46
Twelve-month GDP growth rate	-0.07	-7.61	-0.17
Constant	-0.89	-10.99	-

Sources: Bureau van Dijk and Bank calculations.

(a) The standard errors are adjusted to allow for clustering by each individual company. This adjustment is made because the sample is pooled, which violates the assumption that each observation is independently drawn.

(b) The marginal effects show the change in the probability of failure (on a scale of 0 to 100) from a one unit increase in each variable (change from 0 to 1 for dummy variables), with all other variables evaluated at the sample means. For example, a 0.1 percentage point increase in the debt to assets ratio, from 0.3 to 0.4, will increase the probability of failure by 0.04 percentage points, all other things being equal.

All of the coefficients on the variables in our preferred model (other than that on one industry dummy) are statistically significantly different from zero at the 5% significance level; most are significant at the 1% level. The coefficients associated with the profit dummies are all significantly different from each other at the 5% level. The marginal effects on the profit dummies are all relative to a profit margin of greater than, or equal to, 6%. For example, the probability of failure for a firm that makes a loss will be 2.95 percentage points higher than that for a firm with identical characteristics except that its profit margin is in excess of 6%. By far the largest marginal

effect of the profit dummies is associated with making a loss, the second largest with a 0% to 3% profit margin, and the smallest with a 3% to 6% profit margin, which is in line with our hypothesis that making a loss matters more.

The coefficients imply that an increase in interest cover reduces the probability of failure, whilst increases in capital gearing (the debt-to-assets ratio) raise it, holding other factors constant. When low profitability and high gearing occur together this leads to a higher predicted probability of failure than if the two effects occurred in isolation. Higher liquidity (as measured by the current ratio) is found to reduce the likelihood of failure. Small firms are more likely to fail than large ones after controlling for all other factors. Subsidiary companies have a lower probability of failure, and the size of this effect is larger if that firm also makes a loss. These results suggest that if a subsidiary is in trouble it is less likely to fail, all else being equal, because of the possibility that its holding company will bail it out.

The coefficients on the various service sector industry dummies are jointly significantly different from zero, although they are not all individually significant. This implies that companies in the service sector are less likely to fail than those in manufacturing, primary industries and utilities, all other factors held constant. Construction firms have a higher probability of failure relative to the reference group of manufacturing, primary industries and utilities.

The coefficient associated with the twelve-month growth rate of GDP is negative and significantly different from zero. The significance of GDP growth implies there is a common factor related to macroeconomic conditions that influences the probability of company failure in addition to individual firm-level characteristics. The results could be explained by interactions between companies or by a change in the behaviour of banks. In times of recession, banks may be less willing to lend and quicker to close companies down. There are two possible reasons for this. First, in a recession, banks may be under pressure to improve their own balance sheets, which would involve closing down the highest risks more rapidly. Second, the likelihood of a company in trouble turning itself around is lower and the subsequent recovery time longer in a recession, also providing an incentive for banks to withdraw lines.

Analysis of the predicted probabilities of failure from our preferred model shows that the distribution is highly skewed. There are a large number of firms with low probabilities of failure and a few firms with high probabilities. To illustrate this, the mean probability of failure for the whole sample is 1.8%, and the median is 0.8%. The mean probability of failure for firms that failed is about three and a half times the corresponding probability for surviving firms, and this difference is statistically significant.

Applications to financial stability

The previous section described how company accounts data and information on macroeconomic conditions can be used to derive estimates of the probability of failure for each firm. We now show how those probabilities can be used to assess risks to financial stability arising from the UK corporate sector. To do this we need to identify the companies with significant amounts of debt that have the highest probabilities of failing. We use the concept of 'debt at risk' introduced by Benito, Whitley and Young (2001). Firm-level debt at risk (DAR_i) is the product of the predicted probability of failure for a firm (pp_i) and its total debt (D_i), (equation (1)).

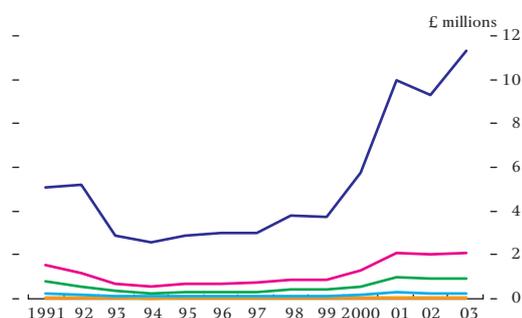
$$DAR_i = pp_i * D_i \quad (1)$$

Firm-level debt at risk is a crude measure of the expected loss on loans to each firm, reflecting both the probability of failure and the expected loss in the event of default. Our measure of debt at risk assumes a 100% loss rate, and is therefore not a measure of loss given default. It is an upper bound to the expected losses because in practice, a proportion of each loan to a failed company is likely to be recovered and banks make provisions for impaired loans. Debt at risk is not just a measure of financial stability risks to the UK banking sector because some of the outstanding debt of UK companies is also owed to foreign banks and corporate bondholders.

The individual companies that pose the biggest risk to financial stability are those in the upper tail of the distribution of debt at risk, which is shown in Chart 2.¹¹ Chart 2 shows that the distribution of debt at risk is highly skewed, with a large number of firms

having low levels of debt at risk and a small number having high levels. The implication of this skewed distribution is that, to assess risks at an aggregate level, we should particularly focus on the individual firms with the very highest levels of debt at risk. The further widening of the distribution since 1999 suggests that monitoring the highest-risk firms has now become even more important for assessing financial stability risks. The firms with the highest debt at risk are predominantly very large companies with considerable debt in absolute terms and a probability of failure that is (in many cases) above average.

Chart 2:
Distribution of debt at risk^{(a)(b)}



Sources: Bureau van Dijk and Bank calculations.

(a) At 2000 prices, deflated using GDP deflator.

(b) 99th, 95th, 90th, 75th, 50th, 25th and 10th percentiles shown.

Our estimates of firm-level debt at risk can be used to construct aggregate measures of financial risk as well as to identify the individual firms that pose the biggest risk to financial stability. We now describe how those aggregates can be calculated and demonstrate how they can be used.¹² At the aggregate level, an upper bound on the expected losses from loans to UK companies can be approximated by the sum of all the individual firm-level estimates of debt at risk. We define this as our aggregate micro-based measure of debt at risk (DAR_{MICRO} , equation (2)).

$$DAR_{MICRO} = \sum_{i=1}^n pp_i D_i \quad (2)$$

The aggregate level of debt at risk can also be approximated using a macro-based measure which

11: Charts 2–5 use the predicted probabilities on a 0 to 1 scale, and also include estimates of debt at risk for 2002 and 2003 using data that were not used in estimating our preferred model. The estimates for 2002 are based on 11,127 sets of accounts; the corresponding figure for 2003 is lower at 6,606 because of delays in reporting of accounts and delays incorporating reported accounts into the FAME database.

12: This was also done in Benito, Whitley and Young (2001) but they only used data for around 1,000 public quoted companies in any particular year, whereas the current study focuses on up to 12,000 public and private companies per year.

involves multiplying the unweighted mean predicted probability of failure (\overline{pp}) by the total amount of debt held by all firms (DAR_{MACRO} , equation (3)). This is equivalent to assuming that the probabilities of failure are the same for all companies in the micro-based measure, or that debt is evenly distributed amongst firms.

$$DAR_{MACRO} = \overline{pp} \sum_{i=1}^n D_i \quad (3)$$

Owing to the different number of firms in each year it does not make sense to look at absolute aggregate debt at risk for surveillance purposes. We therefore scale the debt at risk estimates by total debt and by the number of firms. Whichever scaling factor is used, the ratio of these two aggregate measures can be used to assess whether or not debt is concentrated among the firms with the highest probabilities of failure. We define this ratio as an index of debt at risk concentration (I , equation (4)). If this index is greater than one, the implication is that debt at risk is concentrated among the highest-risk firms. This would clearly pose more of a risk to financial stability than if the index were less than one. Any increases in the index would represent an increase in these risks.

$$I = \frac{\sum_{i=1}^n pp_i D_i}{\overline{pp} \sum_{i=1}^n D_i} = \frac{DAR_{MICRO}}{DAR_{MACRO}} \quad (4)$$

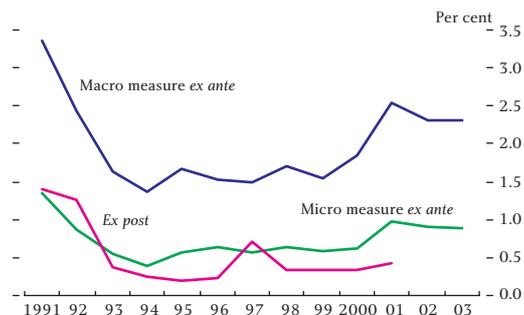
The two measures of debt at risk described so far are both *ex-ante* measures. It is also possible to measure debt at risk *ex post* ($DAR_{EX-POST}$) by summing the debt of all failed companies (equation (5), where D_i^F is the debt of firm i if firm i failed). We can use this *ex-post* measure to assess the predictive power of our *ex-ante* measures of debt at risk.

$$DAR_{EX-POST} = \sum_{i=1}^n D_i^F \quad (5)$$

Chart 3 shows these measures of aggregate debt at risk scaled as a percentage of total debt, and Chart 4 shows the index of concentration of debt at risk.

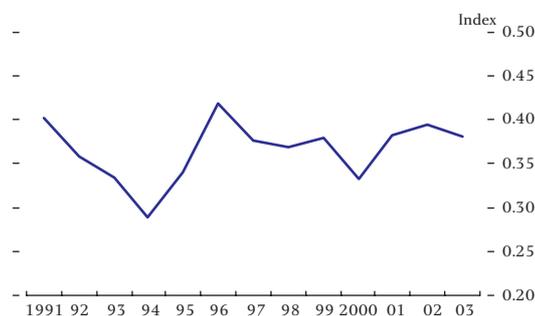
There are two key comparisons to be made here. The first involves comparing the two *ex-ante* measures, the second contrasts the two *ex-ante* measures with the *ex-post* measure.

Chart 3:
Debt at risk as a percentage of total debt



Sources: Bureau van Dijk and Bank calculations.

Chart 4:
Index of concentration of debt at risk



Sources: Bureau van Dijk and Bank calculations.

The first comparison shows that the micro-based estimate of debt at risk *ex ante* is always less than the *ex-ante* macro measure. Hence the index of concentration of debt at risk is less than one, averaging 0.36 over the sample period. This implies that the assumption of an even distribution of debt between firms does not hold, and that the macro-based measure overstates the risks to financial stability. Debt is concentrated amongst firms with relatively low probabilities of failure. The firms with the very highest probabilities of failure are generally small and therefore do not hold a large amount of debt in absolute terms.¹³ This result contrasts with the finding of Benito, Whitley and Young (2001), who apply estimates of the effects of profitability and gearing on the probability of failure from Geroski and Gregg (1997) to a set of quoted companies and

13: This does not mean that their debt-to-assets ratio – one of the explanatory factors in determining predicted probabilities of failure – cannot be high.

perform a similar analysis.¹⁴ They find that the *ex-ante* micro measure exceeds the *ex-ante* macro measure throughout the 1990s. This reflects the use of a different model and different data. If we apply the parameters used by Benito, Whitley and Young (2001) to our data, we find that the micro measure of *ex-ante* debt at risk is in general just above the macro measure. We look at public and private companies, whereas Benito, Whitley and Young (2001) only used data on public companies. The inclusion of large numbers of smaller private companies in our data helps to change the results.

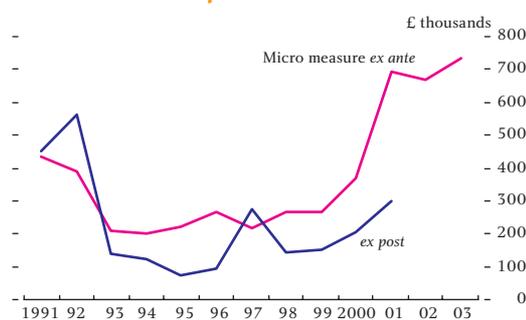
The fact that the index of concentration of debt at risk is well below unity implies that the use of firm-level data is important. However, the relative stability in this index suggests the concentration of debt amongst high-risk firms has not changed substantially over the sample period, and therefore changes in the macro measure can still provide a reasonable estimate of changes in the micro measure.

The second comparison from Chart 3 is between the *ex-ante* measures of debt at risk and the *ex-post* measure. It is clear from the chart that, as a percentage of total debt, our *ex-ante* micro measure comfortably outperforms the *ex-ante* macro-based measure in terms of predicting debt at risk *ex post*. The micro-based measure under-predicts *ex-post* debt at risk during the early 1990s recession, but it has generally over-predicted since then, whereas the macro-based measure consistently over-predicts. All of these measures of debt at risk were at their peak in 1991. They have been relatively stable since 1993. However, there has been a moderate increase in our *ex-ante* measures since 2001, which can be explained by increases in the predicted probabilities of failure, arising predominantly from the deterioration in corporate profitability and the slowdown in GDP growth over this period. The increase in the predicted probabilities has not been reflected in a rise in the corporate liquidations rate since 2001. Liquidations have been lower than expected, which may reflect the greater incidence of successful restructurings of companies that have defaulted on their debt.

From a risk assessment perspective it is perhaps more relevant to use a measure of debt at risk that additionally takes into account what is happening to debt levels. Scaling aggregate debt at risk by the

number of firms in the data in each year is one way to do this. The real mean level of debt per firm was relatively stable until the late 1990s, since when it has grown significantly. This is consistent with the generalised increase in corporate sector capital gearing to rates above those of the early 1990s. It implies that, although debt at risk as a proportion of total debt has been relatively stable since 1993, the absolute level of debt at risk has grown rapidly since the late 1990s. Chart 5 illustrates this, indicating that real mean *ex-ante* debt at risk per firm has increased significantly since 1999, exceeding the 1991 level in 2001 and remaining above it in 2002 and 2003. It shows that the rise in corporate indebtedness in recent years has increased the risk to financial stability from company failure, and it suggests that the average debt at risk per firm needs to be closely monitored in the future. As before, the *ex-ante* micro-based measure under-predicts *ex-post* debt at risk in the early 1990s but has generally over-predicted since then.

Chart 5:
Mean debt at risk per firm^(a)



Sources: Bureau van Dijk and Bank calculations.
(a) At 2000 prices, deflated using GDP deflator.

Conclusion

We have constructed a model in which the probability of failure for individual firms is determined by company accounts information (on profitability, interest cover, capital gearing, and liquidity, other firm characteristics such as company size, industry, and whether a firm is a subsidiary) and overall macroeconomic conditions. The motivation for this is to be able to identify for surveillance purposes which companies with significant debts have the highest probabilities of failing and potentially defaulting. The company-accounts-based approach is used at the Bank for this purpose alongside the Merton approach based on market information.

¹⁴ These estimates are derived from a model estimated for firms with over 500 employees between 1991 and 1993.

We apply the predicted probabilities of failure from our model to monitoring risks to financial stability by calculating debt at risk of default, which takes into account both the probability of a firm failing and the amount of debt that they have. We find that debt at risk is particularly concentrated among a very small number of firms. We should monitor these firms closely in order to assess the aggregate risks. Although debt at risk is concentrated among a few firms, these are generally not the companies with the highest predicted probabilities of failure, which instead tend to be small.

Summing firm-level debt at risk generates an aggregate measure of debt at risk. This micro-based measure of financial risk performs better in predicting default than a macro-based approach that does not

fully exploit the firm-level dimension of the data. Aggregate debt at risk as a proportion of total debt was at its highest in the early 1990s, and it has been relatively stable since 1993. There has been a modest increase since 2001 because of increases in the predicted probabilities of failure, but this has not been reflected in a rise in corporate liquidations, possibly because of more successful restructurings. But since 1999 the average level of debt held by firms has been rising. As a consequence, mean *ex-ante* debt at risk per firm has increased, and in 2001 it exceeded the 1991 peak in real terms, suggesting that the growth of corporate indebtedness has increased the risks to financial stability from company failure. This increased vulnerability at the firm level needs to be monitored closely, notwithstanding the relative stability of debt at risk as a proportion of total corporate sector debt.

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Assessing sovereign debt

under uncertainty

Gianluigi Ferrucci and Adrian Penalver, International Finance Division, Bank of England

Traditional techniques to assess whether a country's stock of public debt is sustainable fail to illustrate adequately the uncertainty about the future state of the economy. This article proposes a new approach that attempts to address this issue. The method is similar in spirit to that used to generate the so-called inflation forecast 'fan charts' published in the Bank of England *Inflation Report*. It illustrates the probabilistic nature of debt dynamics by assuming that the shocks to key inputs for debt sustainability come from joint distributions and persist through time. The model may be used to measure the probability of certain debt outcomes and to assess several interrelated questions on debt sustainability. In particular, it could prove useful when assessing the viability of IMF programmes, especially in the context of exceptional access to IMF funds.

EMERGING MARKET DEBT CRISES have been a significant feature of the international financial system in the last two decades. Since lending to emerging markets is risky, we should expect some financial crises. But there is a consensus that the number of financial crises has been excessive and considerable effort has been expended in recent years on proposals to reduce their incidence.

There is no single identifiable cause of all international debt crises in developing countries. In some cases, borrowing countries are likely to be able to pay eventually but have debt repayments falling due which they cannot roll over. A financial crisis can result if the debtor cannot borrow to meet its near-term commitments.

Generally speaking, though, creditors are less willing to roll over loans when there is an expectation that the debtor will be unable to repay in the future. This expectation can arise because of the types of policies the government is running. For example, a government weakening its tax base is less likely to be able to secure funds to make future repayments. Or a country using foreign exchange reserves to defend a fixed exchange rate may be using up resources otherwise available to repay creditors. Moreover, the sustainability of a set of policies depends on macroeconomic conditions. Other things being equal, a country growing regularly at 5% a year can sustain a higher level of debt than one growing at 2% a year.

An assessment of whether a debtor can repay is a common feature of any debt contract. But a key distinction between corporate and sovereign debt is that sovereigns are not subject to a higher legal authority that can transfer assets from the debtor to creditors in the event that the debtor does not repay.

It is difficult for a sovereign to be considered insolvent in the sense that the value of its debts exceeds its assets, because most of a sovereign's assets pertain to its future tax-raising powers. Therefore, a more limited criterion of debt sustainability is typically applied to sovereign borrowers. Can the debtor continue to run the same policies without the debt burden rising indefinitely? Any answer to this question can only be conditional on the assumed future path of the economy. But this is obviously uncertain, so an assessment of sustainability is inherently probabilistic.

Whether or not a sovereign's debt position is sustainable has important international public policy implications. If it is highly probable that a sovereign's debt position is sustainable, the provision of short-term liquidity by the International Monetary Fund (IMF) can help mitigate the output losses otherwise associated with illiquidity problems.

IMF financial support if the sovereign's position is unsustainable, however, can potentially be counterproductive. If no politically feasible policy adjustment, even with the full co-operation of creditors, can make the debtor's position sustainable,

then the only viable solution is to write down the face value of the debt. IMF financial support in these circumstances can only delay a restructuring. Such delay can make the eventual restructuring even larger.

These considerations are reflected in the IMF's recently created exceptional access framework. One of the criteria to qualify for large-scale IMF financial support is that 'a rigorous and systematic analysis indicates that there is a high probability that debt will remain sustainable'.¹ Therefore, it is very important that IMF staff and major IMF shareholders have appropriate tools to perform sustainability analysis on a probabilistic basis. The IMF has done some work on this which will be discussed below. The purpose of this article is to set out a method used by Bank of England staff, in conjunction with other indicators, to analyse sovereign debt sustainability.

Concepts

A simple formula describes the evolution of the public debt stock over time:

$$D_t = (1 + i_t)D_{t-1} - PS_t \quad (1)$$

where D_t is the stock of public debt maturing at the end of period t , i_t is the one-period nominal interest rate and PS_t is the primary budget surplus (revenue, including seignorage, less non-interest expenses) during period t . Equation (1) assumes that all public debt is denominated in domestic currency and that the whole stock of debt is rolled over at the end of each period. To account for the scale of the economy and the impact of inflation, we can divide equation (1) by nominal GDP (Y_t) and define $d_t = D_t / Y_t$, $ps_t = PS_t / Y_t$, r_t as the *ex-post* real interest rate and g_t as the real GDP growth rate. Equation (1) can then be rewritten as:

$$d_t = \frac{1 + r_t}{1 + g_t} d_{t-1} - ps_t \approx (1 + r_t - g_t) d_{t-1} - ps_t.$$

Repeated substitution of this equation into itself gives an evolution of the path of debt conditional on assumptions about ps_t , r_t and g_t . The debt-to-GDP ratio is generally considered 'sustainable' if the derived path does not increase indefinitely over time. This is not to say that a country cannot have a rising debt-to-GDP ratio over a finite period.

If it is assumed that all variables stay constant, then for the debt path not to be explosive requires that the initial debt stock is subject to the following constraint:

$$d_0 \leq ps / (r - g).$$

This inequality gives powerful insights into the sustainability of a sovereign's debt. A sovereign that is able to run a larger primary surplus can have a higher initial debt stock while maintaining long-term sustainability, *ceteris paribus*, than one that cannot. A country that is growing fast can run a lower primary surplus for a given debt stock and interest rate than one that is growing more slowly. For example, an economy with an average primary surplus of 1% of GDP, a real interest rate of 8% and a real growth rate of 4%, has a sustainable debt-to-GDP limit of around 25%. An economy with an average primary surplus of 2% of GDP, real interest rate of 3% and a growth rate of 1.5%, has a sustainable debt-to-GDP limit of around 133%.

These relationships suggest that for given growth and interest rate paths, any initial level of debt is sustainable, provided the sovereign is willing to run a large enough primary surplus. The theoretical literature on sovereign debt (starting with Eaton and Gersowitz 1981) emphasises that debt repayment can be viewed as a strategic choice, in which the sovereign weighs up the political and economic costs of raising the requisite primary surplus against the political and economic costs of non-repayment, including the loss of capital market access. Implicitly, therefore, there is a limit on the size of the primary surplus that a debtor is willing to run.

The evolution of actual debt stocks is usually more complex than implied by these simple equations. Sovereigns issue foreign currency debt as well as domestic currency debt and the debt stock has multiple maturities. These complexities can, however, easily be subsumed within the framework. For example, the evolution of the path of debt of a sovereign with multiple duration instruments is described by:

$$\sum_1^J D_{t,t+j} = \sum_1^K \sum_1^J i_{t-k,t+j} D_{t-k,t+j-1} + \sum_1^K D_{t-k,t} - PS_t,$$

1: 'IMF Concludes Discussion on Access Policy in the Context of Capital Account Crises; and Review of Access Policies in the Credit Tranches and the Extended Fund Facility', Public Information Notice No. 03/37, March 21, 2003.

where the first subscript refers to the date of issuance and the second to the date of maturity. Similarly, the evolution of the path of debt for a sovereign issuing in foreign currency is described by:

$$\sum_0^F D_t^f E_t^f = \sum_0^F (1 + i_t^f) D_{t-1}^f E_t^f - PS_t$$

where E_t^f is the nominal bilateral exchange rate with currency f . The example we discuss is a two-currency, one-period duration model, where the debt stock evolves according to:

$$d_t \equiv d_t^d + d_t^f = \frac{1 + r_t}{1 + g_t} d_{t-1}^d + \frac{(1 + r_t^f)(1 + q_t)}{1 + g_t} d_{t-1}^f - ps_t \quad (2)$$

where the total debt-to-GDP ratio (d_t) is the sum of domestic (d_t^d) and foreign-currency (d_t^f) denominated securities and depends on the real cost of borrowing in domestic (r_t) and foreign (r_t^f) currency, the real GDP growth rate (g_t), the real rate of currency depreciation (q_t), and the primary surplus-to-GDP ratio (ps_t).²

Assessing sustainability – IMF approach

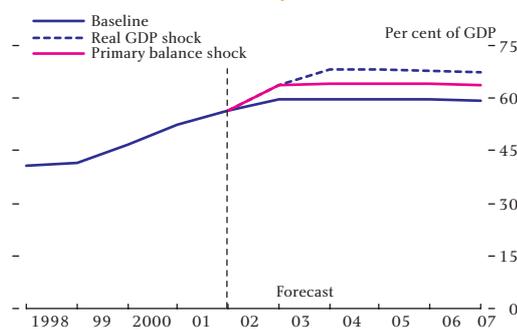
The recursive method set out above to assess debt sustainability is a common approach and is used by a number of private sector organisations and the IMF. The starting point for the IMF's assessment of a member's debt sustainability is a medium-term projection of the country's macro economy which defines expected paths for growth, interest rates, the exchange rate and the primary surplus prepared by Fund staff.³ For countries with IMF programmes, these paths can be more optimistic than the recent historical experience might suggest, because one intention of IMF programmes is to create a structural break in performance. Assuming the authorities' policy programme is implemented in full, these projections enable IMF staff to estimate a path of a country's debt-to-GDP ratio. This could be a very different path from a forecast based on partial implementation of the programme. The IMF

acknowledges that these baseline paths should be subject to sensitivity tests to judge the robustness of the projections to different assumptions.⁴ The IMF's tests fall into two categories.

The first set of tests uses different scenarios for the path of the economy, including applying historical averages and market forecasts of the key variables instead of IMF staff projections, a no-policy-change assumption on fiscal policy and a country-specific shock. The second set of tests assesses the impact on the baseline scenario of temporary adverse shocks to particular macroeconomic variables. These shocks are calibrated according to the standard deviation of the variables.

Chart 1 illustrates the IMF's analysis of public sector debt sustainability for St Lucia.⁵ The baseline scenario assumes that the government achieves a primary surplus from 2004 onwards. The debt-to-GDP ratio rises in 2003 but gradually falls over the remainder of the projection period. The sensitivities of this path to the assumptions of the baseline are illustrated by the impact of several shocks. The real GDP shock assumes St Lucia's economy grows at its historical average minus two standard deviations in 2003 and 2004. The primary balance shock assumes that the primary surplus is the historical average minus two standard deviations in 2003 and 2004. Since these paths both assume fiscal consolidation over the remainder of the projection period, these shocks only have a one-off effect on the level of the debt burden and not on its direction at the end.

Chart 1:
Public debt sustainability for St Lucia



Source: IMF.

2: A similar analysis can be conducted for a country's external position using the trade surplus instead of the fiscal surplus.

3: This was originally set out in *Assessing Sustainability*, published by the IMF in May 2002.

4: These sensitivity tests were standardised in *Assessing Sustainability* and updated in *Sustainability Assessments – Review of Application and Methodological Refinements*, published by the IMF in June 2003.

5: *St Lucia Debt Sustainability Analysis*, IMF Country Report 03/139, January 2003. St Lucia is not a programme country.

There are several dimensions along which the IMF's standard tests are limited.

First, presenting a discrete path may give undue prominence to point estimates. The future is inherently uncertain and an important aspect when assessing the riskiness of debt dynamics is the scope of this uncertainty. The IMF approach recognises uncertainty but illustrates this with alternative discrete scenarios. Assessing the uncertainty surrounding future debt outcomes can be improved by adopting an explicit probabilistic approach.

Second, shocks based on historical standard deviations for individual variables are partial and may not adequately recognise the impact of interrelated shocks. In other words, economies are usually hit by primitive shocks (to the terms of trade, natural disasters, financial market uncertainty etc) which affect the main macroeconomic variables simultaneously but to different degrees. For example, rarely are countries hit by a growth shock alone. To form a proper probabilistic assessment of these risks to debt dynamics, one needs to consider the joint impact of these shocks.

Third, temporary shocks do not adequately reflect historical dynamic relationships. Fundamental shocks, such as those mentioned above, can persist through time. This persistence can result in an initial shock having much wider effects over time.

Finally, the IMF's baseline path is conditional on full implementation of announced government policies. In the cases of countries with IMF programmes, this includes adherence to programme conditionality. Since members generally do not implement IMF conditions in full, the IMF's baseline path is more optimistic than a median forecast might be.⁶

An alternative approach

Conceptual

An alternative approach to debt sustainability analysis (DSA) is to construct explicit probability distributions for the evolution of the debt stock over time. This can be achieved by assuming specific probability distribution functions for the key DSA inputs, calibrated from their historical means and variances. These probability distributions can be used to generate a large number of outcomes for each of the inputs at each date, which can then be run through a standard debt dynamic equation to obtain the implied probability density for the debt-to-GDP ratio. The implied debt paths depend importantly on the assumptions made about the distribution of DSA parameters, their means, variances and covariances.

One way to account for the potential correlation of different shocks and the serial correlation of individual shocks over time is to assume that DSA parameters follow an underlying vector autoregressive (VAR) process.⁷ Subject to data availability, a VAR system can be estimated for the key DSA variables. Conditional on starting values, we can then produce a 'central projection' forecast for each of the DSA variables over a given forecast period. Uncertainty around this central projection can be calibrated using the estimated covariance matrix of residuals from the VAR.⁸ The distribution of possible future paths of debt-to-GDP, conditional on assumptions about any non-modelled components, can then be calculated by running the distribution of DSA variables through equation (2).⁹

The outcome of this simulation process is an implied distribution of the debt-to-GDP ratio. This can be used to calculate probabilities of particular outcomes, such as $prob(d_t > d_{t+n})$ – the probability of the debt stock falling below its starting point after n years. Confidence intervals and other density statistics (median, mean, variance etc) can also be calculated.¹⁰ Uncertainty around the model predictions can be

6: Evidence in the Fund paper Sustainability Assessments on IMF forecasts since 1995 "suggests that, at a five year horizon, the external debt ratio is under-predicted by about 3.3% of GDP. [...] For upper middle income countries the bias is 4.2% of GDP, while for those with Fund supported programmes, it amounts to more than 7% of GDP" (page 11).

7: In a VAR process each variable is a function of lags of itself and all the other variables in the system. VARs are a common way of allowing historical data to 'speak for themselves' rather than imposing a theoretical structure.

8: We assume that shocks are normally distributed.

9: There may also be some DSA variables that cannot be included in the estimated VAR and their future path must be assumed. The implied forecast distribution is conditioned on these assumptions.

10: The form of this distribution is not normal (despite the underlying relevant parameters being jointly normally distributed) because the debt-to-GDP ratio is a non-linear function of these variables.

illustrated graphically using ‘fan charts’ similar to those used in the Bank of England *Inflation Report* for inflation forecasts. These summarise the calculated probability density function of debt over time using a set of prediction intervals covering deciles of the distribution, with lighter shades for the outer bands.

Empirical

This section presents an empirical application of the VAR method to an illustrative emerging market economy (EME). The VAR includes four variables: the domestic interest rate (r), the foreign interest rate (r^f), the change in the real exchange rate (q) and the real growth rate of GDP (g). This four-equation VAR is estimated using quarterly data over the period 1994 Q1 to 2002 Q4.

The VAR output is used to form projections for the DSA variables as follows. First, random draws of the VAR error terms ε_{1t} , ε_{2t} , ε_{3t} , and ε_{4t} are taken from a joint normal distribution with mean equal to zero and covariance matrix equal to the estimated covariance of the VAR residuals. These error terms are contemporaneously correlated and identification depends on the assumed ordering of the equations in the VAR (see Annex). The order chosen is r_t , r_t^f , q_t , and g_t . Reversing the order as a robustness check yields broadly similar results.

These random draws are then combined with the estimated parameters of the VAR to get values of r_{t+1} , r_{t+1}^f , q_{t+1} , and g_{t+1} using as starting condition the steady-state value of the VAR. This is equal to the historical means of the series, provided that the sample is sufficiently large. Then another set of random draws is made and the simulation repeated recursively to produce a sequence of linked macroeconomic fundamentals. This sequence is then repeated 1,000 times for the purpose of producing a probability distribution.

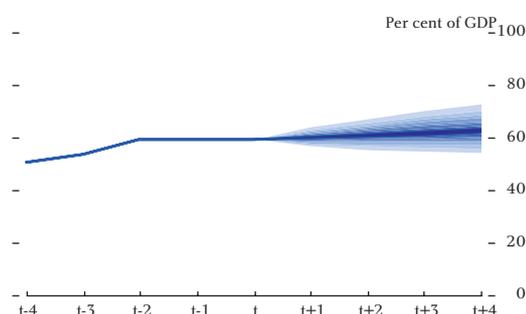
One issue is how frequently to update the debt profile. Since the VAR is estimated on a quarterly basis, it is possible to produce quarterly forecasts for the underlying DSA variables. This would be equivalent to assuming that a country has to roll over all its debt every quarter. Since this seems an extreme assumption, the debt equation (2) is updated at

calendar year-end. This fits most naturally with annual estimates of debt-to-GDP.

For the purpose of the simulation, it is assumed that the starting stock of public debt is 60% of GDP, 55% of which is denominated in foreign currency and 45% in local currency. It is assumed that this proportion is maintained unchanged throughout the analysis.

Finally, and importantly, it is assumed that the primary surplus is fixed at 1% of GDP. The assumption of exogenous fiscal policy is consistent with practices in the Bank of England *Inflation Report*, where projections are conditional on the assumption of no change in monetary policy.¹¹ The probability distribution under the assumption of exogenous fiscal policy is illustrated in Chart 2.

Chart 2:
Fan chart from VAR



Source: Bank of England.

Applications

Several interrelated questions on debt sustainability can be examined using this probabilistic framework.

Conditional on the distribution of the DSA parameters, the *ex-ante* probability that the debt burden at the end of the period will be no higher than the initial level can be calculated. For example, in the case of Chart 2, debt at the start of the period is 60% of GDP. By the end of the fourth year the probability of the debt-to-GDP ratio being less than 60% is around 30%.

The distribution can also be used to calculate the change in the primary surplus required to achieve a given probability that the debt-to-GDP ratio will be

11: Unchanged fiscal policy is not what one would actually expect to happen in reality, because governments do react to news. Moreover, fiscal policy might not be exogenous. A change in fiscal policy may affect GDP growth directly through government spending, disposable income or taxation. It may feed back on borrowing costs and through this channel on growth again. It may have an impact on inflation and the exchange rate. These effects might be modelled explicitly by endogenising fiscal policy by adding a ‘primary surplus’ equation in the VAR.

below a particular threshold at the end of the period. For example, a primary surplus of 2.5% of GDP is required to achieve a 75% probability that the debt-to-GDP ratio is less than 60% by the end of the fourth year.

The method can also be used to ask what starting level of debt is consistent with a given probability of stable debt dynamics, for a given primary surplus. This is relevant in the context of restructuring negotiations. For example, if the country in Chart 2 can be expected to run a primary surplus of 2% of GDP for the next four years, the maximum initial debt stock is 54% of GDP for debt to be sustainable at the 60% confidence interval.

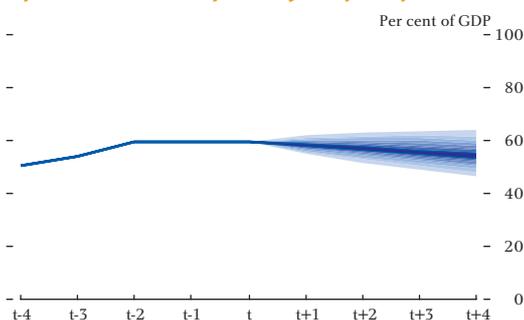
Another possible application is to experiment with different 'rules' for fiscal policy that would need to be implemented to secure a sustainable debt path, in the event of additional shocks.

Stress-testing the fan charts

This probabilistic framework allows us to assess links between debt sustainability and structural features of the economy. Some comparative static exercises illustrate.

Chart 3 presents the effect of increasing the primary surplus to 3% of GDP over the forecast horizon, compared with 1% assumed in Chart 2. The median path of the debt-to-GDP ratio falls, and the width of the confidence interval also narrows, albeit not significantly in this case.

Chart 3:
Impact of different primary surplus paths

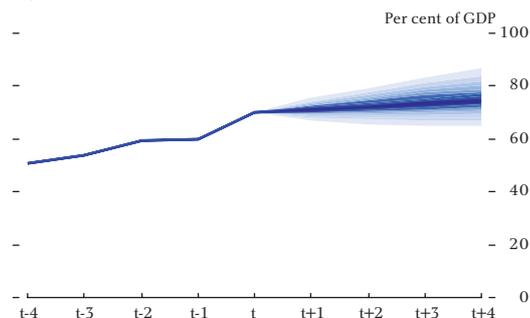


Source: Bank of England.

Chart 4 assumes an initial debt stock of 70% of GDP at time t , compared with 60% in Chart 2. It shows

that the central projection becomes steeper and that the forecasts become more volatile. This is because an unchanged volatility of the DSA parameters is now applied to a higher debt stock.

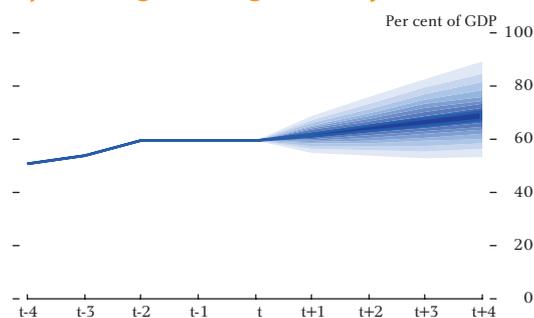
Chart 4:
Impact of higher initial debt stock



Source: Bank of England.

The currency composition of the debt stock also affects debt outcomes. Chart 5 illustrates the fan chart for an economy with the same size of debt as in Chart 2, but under the assumption that the whole stock of public debt is foreign-currency denominated. Because the exchange rate is highly volatile and the example contains a trend devaluation, debt rises more quickly and uncertainty increases. In many EMEs the proportion of public debt denominated in foreign currency is high, suggesting more vulnerable debt dynamics.¹²

Chart 5:
Impact of higher foreign currency debt



Source: Bank of England.

Caveats and extensions

The VAR approach is flexible and can be adapted to country circumstances. For example, one could include changes in the terms of trade, oil prices or the growth rate of major trading partners as

12: This is sometimes known in the literature as the 'original sin' of foreign debt (Eichengreen and Hausmann (1999)).

explanatory variables. However, VAR analysis also comes with several ‘health warnings’.

First, the scope and accuracy of VARs is limited by the availability of data in many countries. This may occur because data have only been collected for a short period of time and/or with low frequency, or because historical data may be misleading in the event of structural breaks – for instance, changing from a planned to a market economy, or a fixed to floating exchange rate, or coming out of a period of hyperinflation. Indeed, creating a structural break is often an intention of IMF programmes. For similar reasons, it is necessary to be careful when selecting the time period from which we estimate the coefficients. These data limitations restrict the number of countries for which this approach can be applied.¹³

Small samples can also create problems if they contain very large shocks. If these shocks are not genuinely representative, then the covariance matrix will be biased. On the other hand, treating very large shocks as outliers risks underestimating the future probability of similar large shocks.

Second, VARs are non-structural. They model every endogenous variable in the system as a function of the lagged values of all other endogenous variables, without using economic theory to posit a relationship between them. This may lead to over-parameterisation – many of these variables might be properly excluded from the model. However, given the focus on analysing the dynamic impact of random disturbances on a system of interrelated time series, rather than identifying the parameters driving the expected path of the relationships in the model, this is not especially problematic.

Third, an important assumption in this analysis is the duration of debt. The duration of debt assumed in the debt equation determines the speed with which shocks to interest rates and exchange rates are locked in. Since the VAR system is stationary, the assumption about the duration of debt does not affect the assessment of long-run sustainability, because all shocks are eventually reflected in the level of debt. But longer duration debt provides a time buffer to put in place policy adjustment when debt

dynamics are worsening. A complete analysis of debt dynamics would take into account the average duration of a country’s debt. Average duration of debt is generally shorter for EMEs than industrial countries.

Conclusions

This paper presents a method of analysing public sector debt sustainability on a probabilistic basis. This method calculates the distribution of future paths of the debt-to-GDP ratio by running the forecasts of the DSA inputs, generated from a VAR, through a standard debt-accumulation equation. The model provides explicit quantitative distributions for the evolution of the debt stock over time. These can be used to measure the probability of certain debt outcomes and to assess several interrelated questions about debt sustainability.

This probabilistic approach can be useful when assessing the viability of IMF programmes, especially when granting exceptional access to IMF money. It cannot substitute for the judgement required to assess whether a borrowing government is able to achieve a specified level of fiscal primary surpluses. But it can provide empirical evidence to support these judgements.

The VAR-based model offers an improvement over the standard techniques commonly used to assess debt sustainability. Notably, it models explicitly the interrelationship between shocks. It also considers the persistence of shocks over time – the likelihood that a bad outcome in one period is followed by bad outcomes in the future. These are both important components of the risks surrounding the debt burden of a country, in particular EMEs.

Technical annex

To illustrate the analytics of the stochastic simulations, we rewrite the dynamic equation of the debt-to-GDP ratio (2) as:

$$d_t = f(d_{t-1}, x_t, ps_t) \quad (\text{A.1})$$

where the vector of DSA variables is defined:

$$x_t = (r_t, r_t^f, q_t, g_t).$$

13: In small samples there can also be a difference between the steady-state values of the VAR and the historical averages over the sample period. Both are only estimates of the true means of the variables, although they should converge to the true statistic in a large enough sample.

The lags in the relationships in this VAR are assumed to be of length p so that the VAR can be written:

$$x_t = C + B_1 x_{t-1} + B_2 x_{t-2} + \dots + B_p x_{t-p} + \varepsilon_t \quad (\text{A.2})$$

where C is a vector of intercept terms, B_i ($i = 1, 2, \dots, p$) are matrices of slope coefficients, and ε_t is a vector of independently identically distributed error terms:

$$\varepsilon_t \sim N(0, \Omega).$$

By assumption, these error terms may be contemporaneously correlated with each other (the off-diagonal elements of the covariance matrix Ω may be different from zero), but are uncorrelated with their own lagged values and with the right-hand side variables (x_{t-i}).

Conditional on data availability, we can estimate the system (A.2) using historical data. Since only lagged values of the endogenous variables appear on the right-hand side of the VAR, there is no issue of simultaneity and the system can be estimated appropriately using ordinary least squares (OLS). The assumption that the disturbances are not serially correlated, required for OLS estimation, is not restrictive because we could absorb any error term serial correlation by adding more lagged values of x_t . The lag structure that offers the best fit may be identified using some information criterion (eg the Akaike or Schwarz criteria).

Suppose that the estimated VAR(p) is:

$$x_t = \hat{C} + \hat{B}_1 x_{t-1} + \hat{B}_2 x_{t-2} + \dots + \hat{B}_p x_{t-p} + \hat{\varepsilon}_t \quad (\text{A.3})$$

where:

\hat{C} is the vector of estimated intercept terms; \hat{B}_i ($i = 1, 2, \dots, p$) are the matrices of estimated slope coefficients; and

$\hat{\varepsilon}_t = x_t - \hat{C} - \hat{B}_1 x_{t-1} - \hat{B}_2 x_{t-2} - \dots - \hat{B}_p x_{t-p}$ are the estimated residuals, with estimated covariance matrix:

$$\hat{\Omega} = \hat{\varepsilon} \hat{\varepsilon}', \text{ where: } \hat{\varepsilon} = (\hat{\varepsilon}_T, \hat{\varepsilon}_{T-1}, \dots, \hat{\varepsilon}_0).$$

Simulations for each variable can be made using the estimated coefficients in (A.3) multiplied by lagged values of x_t (the *initial condition*) plus draws of the error terms in each period. To reflect the underlying properties of the data, the draws have to be consistent with the estimated distribution of the error terms. A correlation matrix is needed for this. But some or all of the off-diagonal elements of the covariance matrix Ω may be non-zero because they are contemporaneously correlated. There are an infinite number of possible correlation matrices for the error terms consistent with the covariance matrix derived from the estimated equation. A common way to identify a unique correlation matrix is to assume an order for the errors, so that one error term is not affected by any others in the current period; the second is only affected by the first, and so on. Formally, this is known as a Cholesky decomposition.¹⁴

Suppose that the initial condition is given by:¹⁵

$$\bar{x} = (\bar{x}_{T-1}, \bar{x}_{T-2}, \dots, \bar{x}_{T-p}),$$

and suppose that the forecast horizon is k periods. Using the Cholesky decomposition of the covariance matrix, a random error vector for k periods can be generated:

$$\varepsilon_{T+1}, \varepsilon_{T+2}, \dots, \varepsilon_{T+k}$$

from the distribution:

$$\varepsilon_t \sim N(0, \hat{\Omega} = \hat{\varepsilon} \hat{\varepsilon}').$$

The estimated VAR can then be combined with the initial condition and the random draws of the error term to get recursive forecasts of x_t over the next k periods:

14: The Cholesky decomposition is a widespread method of identifying VARs. Although not the case here, changing the order of the equations can change significantly the responses to shocks.

15: We use as initial condition the VAR steady state. This has the benefit that the impulse response functions only capture the reaction to shocks and are unaffected by the initial position of the system. By definition, the steady state is the fixed point x^* that satisfies the condition:

$$x^* = \hat{C} + \hat{B}_1 x^* + \hat{B}_2 x^* + \dots + \hat{B}_p x^*.$$

It is given by:

$$x^* = (I - \hat{B}_1 - \hat{B}_2 - \dots - \hat{B}_p)^{-1} \hat{C}.$$

$$x_{T+i} = \hat{C} + \hat{B}_1 x_{T+i-1} + \hat{B}_2 x_{T+i-2} + \dots + \hat{B}_p x_{T+i-p} + \varepsilon_{T+i}, \quad (i = 1, 2, \dots, k).$$

These forecasts incorporate persistence through the lagged values of the dependent variable. Volatility is captured through the historical variance of the regression residuals (the diagonal elements of the estimated variance matrix). Cross-correlation among variables is measured by the off-diagonal elements of the covariance matrix of residuals.

By repeating the simulation for a large number of draws of the stochastic error term (say 1,000), the implied distributions of the DSA vector x_t over the forecast period can be estimated. These forecasts of x_t can then be plugged in equation (A.1) to generate the simulated evolution path of the debt-to-GDP ratio over the forecast horizon. In each simulation, debt evolves according to the random draws of x_t , given the starting position of the public debt stock (d_{t-1}) and the assumed forecast path of any non-modelled components.

The sustainability condition in this stochastic environment differs from that in the deterministic case (Blanchard and Weil 2001). In particular, taking into account volatility, strict sustainability requires

that the distribution of the debt-to-GDP (d_t) ratio satisfies:

$$\lim_{t \rightarrow \infty} E(d_t) = 0, \text{ and } \lim_{t \rightarrow \infty} \sigma^2(d_t) < \infty.$$

The first condition is the natural extension of the deterministic sustainability condition to a stochastic world – namely that the expectation of d_t is asymptotically zero. This is a necessary condition for sustainability. However, if the debt-to-GDP ratio is stochastic, this condition is no longer sufficient, as we also require that d_t is sustainable in all states. If the variance of d_t is not finite, its distribution will exceed any finite limit with probability one if $E(d_t)$ rises over time, and with positive probability if $E(d_t)$ tends to zero. Thus, with strictly positive probability, debt will be unsustainable even if $E(d_t)$ goes to zero. This explains why a finite variance is required. However, strict sustainability may not always be respected in empirical applications, given the difficulties of making forecasts over an infinite horizon. Instead, we may require a weaker definition of sustainability, namely that there is a reasonably high probability (say 75%) that the debt-to-GDP ratio at the end of the forecast horizon (normally four years) is not higher than that at the beginning of the horizon.

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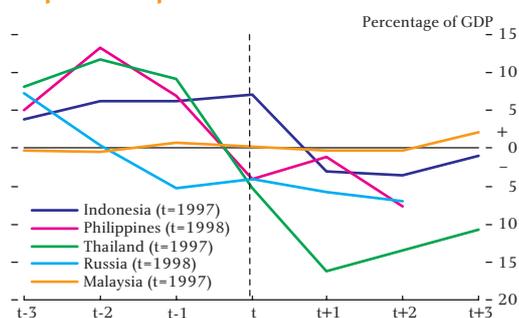
The catalytic effect of IMF lending: a critical review

Catherine Hovaguimian, International Finance Division, Bank of England

Given the scale of capital flight in recent capital account crises, IMF (International Monetary Fund) lending packages have reached record sizes. The IMF hoped that these large programmes would catalyse private capital flows by restoring confidence and attracting renewed investment, but recent theoretical analysis suggests that this catalytic effect is fragile and will only work in limited circumstances. Empirical evidence bears this out: in most cases the expected turn-around in capital flows has failed to materialise. There is merit, therefore, in further consideration of alternative responses to capital account crises, including payments standstills and roll-overs.

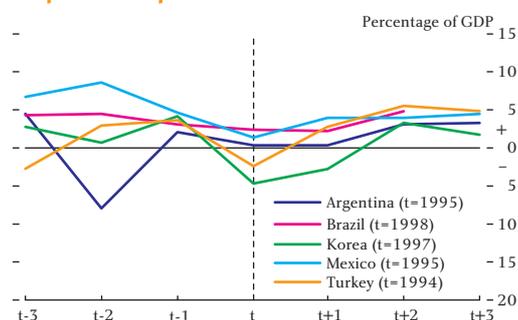
THE CAPITAL ACCOUNT CRISES that affected a number of emerging market economies (EMEs) in the 1990s were characterised by dramatic reversals of capital flows (Charts 1 and 2¹). For example, in 1997 in Thailand net private capital *outflows* were equivalent to 5.3% of GDP, compared with *inflows* of 11.8% and 9.2% of GDP in the previous two years.² The scale of capital flight posed a challenge for the official sector in formulating the appropriate policy response. Relying on domestic adjustment alone to re-establish balance of payments equilibrium would have required a severe drop in output. Equally, there were concerns about the desirability and feasibility of the IMF undertaking an international lender of last resort (LOLR) operation by providing liquidity on a sufficient scale to meet capital outflows.

Chart 1:
Net private capital flows



Source: Data from Table A5.1 in Appendix V of Ghosh et al (2002, p. 82–84).

Chart 2:
Net private capital flows



Source: Data taken from Table A5.1 in Appendix V of Ghosh et al (2002, p. 82–84).

As an alternative, the IMF often adopted an intermediate response to capital account crises, seeking to act as a *partial* LOLR. This offered the prospect of mitigating domestic adjustment without requiring as large an official intervention. The IMF provided large-scale liquidity support on the condition that countries adhered to specific policy programmes. The objective was to restore market confidence, thus prompting an end to capital outflows and possibly stimulating renewed private sector capital inflows. This was the so-called ‘catalytic effect’ of IMF lending on private capital flows, on which this approach to crisis resolution relied.

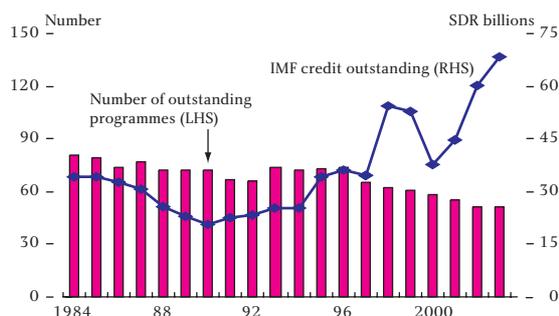
Even acting as a partial LOLR, the scale of IMF lending in responding to these crises has been very large. For example, last year’s programme for Brazil

1: Country examples have been divided into those where capital flows remained depressed relative to pre-crisis levels for some time (Chart 1) and those where they recovered more quickly (Chart 2). Both show the severity of the initial drops in capital flows, scaled by GDP.

2: See Table A5.1 in Appendix V of Ghosh et al. (2002, page 83).

provided a record US\$30 billion of IMF financial assistance in a bid to restore market confidence. Reflecting this, IMF credit outstanding has been rising over recent years, even though the number of country programmes has fallen (Chart 3).

Chart 3:
IMF credit outstanding^(a)



Source: IMF.

(a) Purchases from the General Resource Account, as at end August each year.

Against this background, it is not surprising that the concept of catalytic IMF financing was attractive to policy-makers. Towards the end of the 1990s, policy statements often made reference to the role of catalytic IMF finance in crisis resolution. For example, the G7 communiqué from the Annual Meetings in October 1998 stated: “we reiterated our support for the central role of the IMF in enhancing crisis prevention, including ... providing catalytic financial assistance as needed in support of appropriate policies and to combat contagion.” And the International Monetary and Financial Committee (IMFC) communiqué from the Annual Meetings in September 2000 stated that: “It [the Committee] welcomes the progress on developing a framework for involving private creditors in the resolution of crises... In some cases, the combination of catalytic official financing and policy adjustment should allow the country to regain full market access quickly.”

In practice, however, the catalytic effect of IMF lending appears to have fallen short of IMF programme

expectations. This article reviews theoretical arguments and empirical evidence to try and explain why. Perhaps in response, in recent years policy-makers have placed less emphasis on the catalytic effect.³

Theory

Defining the catalytic effect

For a country facing a capital account crisis, a combination of domestic policy adjustment (typically through the current account), private capital inflows and official sector lending can all help meet a country’s external financing needs, but *ex ante* the mix of these three financing sources is uncertain and interdependent. The authorities and market participants are unsure about each others’ plans, and are continually reassessing their own plans based on their expectations of others’ actions.

Private sector investors adjust their investment plans based on their assessment of economic prospects. These will depend critically on domestic policies and IMF financial assistance. In principle, an IMF programme should have an impact on domestic policy through conditionality as well as providing lending. In this context, the catalytic effect can be thought of as the change in planned net private capital flows induced by both components of the IMF programme.⁴ Since our focus is on capital account crises, the catalytic effect is defined as operating over a fairly narrow time-frame.⁵ In addition, this discussion is restricted to how the catalytic effect might work in cases where countries are experiencing liquidity pressures, and does not cover cases where there are clear solvency problems.⁶

It is useful to distinguish between two channels when assessing the catalytic effect of an IMF programme. The *lending channel* refers to the direct impact of IMF lending on private sector capital flows, as a result of the alleviation of liquidity pressures. The *policy channel* is defined as the indirect impact of IMF conditionality on private sector capital flows. The next two sections explore the theoretical explanations for, and limitations of, the lending and policy channels.

3: The catalytic effect has not been explicitly referred to in recent IMFC or G7 communiqués. The most recent reference in such statements was in the IMFC communiqué of April 2001.

4: We can express this as: catalytic effect = $E_{t-1} (PSI_{t|IMF=0}) - E_{t-1} (PSI_{t|IMF \neq 0})$, where the expectations are those of private sector investors (PSI), based on their information set. Under our definition the catalytic effect measures the change in *ex-ante* private sector investments plans with an IMF programme (IMF≠0) and without (IMF=0).

5: Of course, the IMF may also have an impact on economic prospects and private investment over a longer time-horizon. In the 1980s the term ‘catalytic effect’ emphasised the role of IMF lending in the context of structural reform programmes, but the meaning shifted in the 1990s toward a short-term crisis management tool (Cottarelli and Giannini, (2002)).

6: In practice liquidity and solvency crises are difficult to distinguish and are often interdependent. However, the impact of IMF lending could vary across cases. For example, in situations of default or where debt sustainability is the key problem, positive private sector responses to IMF programmes might reflect expectations of a bailout (moral hazard). This would differ from the renewal of market confidence that forms the basis for the catalytic effect as defined here.

Lending channel

Capital account crises in EMEs share many characteristics with domestic banking crises. Co-ordination problems among creditors may generate roll-over or liquidity difficulties for countries with short-term liabilities as well as for banks.⁷ One response to such a crisis would be for the IMF to act as an international LOLR and provide liquidity assistance to make good the outflow of funds. This should reduce the incentives for individual creditors to run. In practice, however, the IMF cannot act like a central bank in a domestic banking crisis. For example, the IMF cannot provide unlimited liquidity assistance.⁸ The IMF's usable resources plus available borrowing under the GAB and NAB⁹ are equivalent to only about 10% of middle income countries' outstanding stock of external debt.

Catalytic finance relies on part of the financing gap being filled by spontaneous capital inflows induced by the IMF acting as a partial LOLR, but recent theoretical work casts doubt on whether a partial LOLR can be effective. It cannot provide a cast-iron assurance to creditors that they will be repaid and hence may fail to restore confidence and prevent them running. As Eichengreen (2002, page 123) explains, the intercreditor co-ordination problem may remain unsolved because "each investor prefers other investors to be the source of the additional liquidity."¹⁰

Some recent research suggests that the catalytic effect *can* work in certain circumstances. Corsetti et al (2003) and Morris and Shin (2003) suggest that the IMF can be effective as a partial LOLR by reducing the number of speculators who run, but the catalytic effect only operates under limited conditions (discussed below).

In these models, an important factor determining success of the catalytic effect is the absolute size of IMF lending. Corsetti et al (2003, page 3) find that in

their model "this 'catalytic effect' is stronger, the larger is the size of IMF funds."¹¹ So the lending channel might require a high lending threshold for restoring confidence, but if confidence is only restored by large IMF lending, then the IMF, rather than private investors, would be covering the bulk of the liquidity shortfall. This is clearly not the same as the IMF's intervention succeeding in leveraging up total capital flows to fill a financing gap.

The lending channel is likely to operate in a binary fashion depending on whether confidence is restored. In cases where the desired outcome is not achieved, one option is that the original IMF programme is increased. This has been the case in some recent programmes (Box 1). However we might expect such an augmentation to have a weaker impact on private lending. Although it would provide added liquidity, presumably an augmentation would only be necessary if the original programme had run into problems. Under such conditions, it would be more difficult for additional IMF lending to achieve a significant boost in market confidence.

Policy channel

The policy channel is based on the assumption that the IMF's influence on countries' domestic policies should encourage greater private investment. This might work through a variety of routes. First, if the IMF has informational advantages over private market participants, then its willingness to lend to an EME could be viewed as a positive signal by the market.¹² For example, the IMF's dialogue with governments may provide it with better, or more timely data, which might enable the Fund to form a more informed view of a country's future policies and creditworthiness. Secondly, IMF conditionality may help EME governments to commit more credibly to pursuing policies that private investors and the IMF favour.¹³ A related argument is that IMF advice might lead to better-designed policies, particularly if governments

7: For an example from the banking literature, see Diamond and Dybvig (1983), and from the sovereign crisis literature see Chang and Velasco (1999).

8: The IMF administers special drawing rights (SDRs) which can act as international reserve assets, but the SDR is not like the currency created by a domestic central bank; it is a potential claim on the freely usable currencies of IMF members. The IMF can only allocate additional SDRs with the approval of members representing 85% of the total IMF votes.

9: Under the General Arrangements to Borrow (GAB) and New Arrangements to Borrow (NAB), a number of IMF member countries have agreed to lend additional funds to the IMF under certain circumstances.

10: Also see the discussion in Frankel and Roubini (2001, pages 87–89), as well as Zettelmeyer (2000) and Jeanne and Wyplosz (2001).

11: Mody and Saravia (2003) and Ghosh et al (2002) also note that programme size can be important.

12: Rodrik (1995).

13: Cottarelli and Giannini (2002) have more on conditionality and related arguments.

Box 1: IMF programme projection errors in recent crises

Ghosh et al (2002) provide evidence on the IMF's programme projection errors for current and capital account balances in a sample of capital account crises. A comparison of the programme projections with the outcomes provides evidence of the IMF's impact on capital flows relative to its expectations, and so helps evaluation of the catalytic effect. The same methodology is applied to recent programmes in Argentina, Brazil, Turkey and Uruguay (Table 1).¹ Given that these countries have borrowed repeatedly from the IMF, we have included results for a total of ten programmes, but have also highlighted four key programmes that share features with the cases included in Ghosh et al.²

Although these programmes responded to diverse problems and the results vary considerably, there are some common features. All four highlighted programmes involved exceptional access where IMF lending was equivalent to 500% of quota or more; the original Uruguay programme was only 97% of quota but this was augmented to nearly 700%. IMF financing was also large relative to these countries' external financing needs: on average across all of the programmes, the planned disbursements accounted for over 16% of the projected financing need for that year.

Despite this large-scale IMF lending, the IMF's projections consistently over-estimated the capital

Table A:
Programme projections and actual balance of payments developments in some recent capital account crises

Country and programme date	Year evaluated	Programme Size		Capital account (% GDP)				Current Account (% GDP)			
		Planned disbursements as percentage of total external financing need for that year	Total headline programme amount as percentage of quota	Programme projection capital account/outcome GDP	Outcome capital account/outcome GDP ^(c)	Error ^(a)	Of which programme GDP error ^(b)	Programme projection current account/outcome GDP	Outcome current account/outcome GDP	Error ^(d)	Of which programme GDP error ^(e)
Argentina March 2000	2000	7.0	255	5.6	2.7	-2.9	-0.2	-4.7	-3.1	1.5	0.2
Argentina January 2001	2001	21.3	500	2.2	-6.5	-8.8	-0.2	-3.6	-1.5	2.2	0.3
Argentina September 2001	2002	22.1	800	8.2	-13.1	-21.3	-5.3	-7.9	9.4	17.3	5.1
Turkey December 1999	2000	5.8 ^(f)	300	4.6	3.5	-1.2	-0.3	-1.9	-4.9	-3.0	0.1
Turkey December 2000	2001	24.0	900	6.5	-11.2	-17.6	-2.0	-5.0	2.3	7.3	1.5
Turkey May 2001	2002	2.8	1,560	3.6	0.7	-2.9	-0.1	-0.9	-0.8	0.1	0.0
Turkey February 2002	2002	37.9	1,330	-1.6	0.7	2.3	-0.2	-1.1	-0.8	0.3	-0.1
Brazil September 2001	2002	13.5	400	5.1	-0.9	-6.0	-0.9	-5.4	-1.7	3.7	0.9
Brazil September 2002	2002 ^(e)	12.0	752	4.5	-0.9	-5.4	-0.3	-4.0	-1.7	2.3	0.2
Uruguay March 2002	2002	N/A ^(f)	97	-6.6	-33.7	-27.1	1.5	-2.2	2.1	4.3	0.5

Sources: IMF Executive Board documents and International Financial Statistics data as at 21 October 2003.

(a) This follows Ghosh et al (2002), where error = (outcome current or capital account/outcome GDP) – (programme current or capital account)/outcome GDP).

(b) Calculated as (programme current or capital account/programme GDP) – (programme current or capital account/outcome GDP).

(c) This definition follows Ghosh et al (2002); it comprises the sum of the financial account, net errors and omissions, and exceptional financing.

(d) This uses the projected total external financing need for 2000 included in the December 2000 programme.

(e) This is evaluated for 2002 as 2003 data are not available; but in other cases programmes that were agreed after Q1 are evaluated the following year.

(f) In the original programme the projected financing requirement was negative (ie an anticipated surplus), however it was augmented on two occasions later in 2002.

1: Following Ghosh et al (2002) we evaluate the programme projections at a roughly one-year horizon.

2: The programmes in Argentina in January 2001 and Brazil in September 2002 followed rapid deteriorations in market confidence; the May 2001 programme in Turkey followed exchange rate liberalisation; and the programme in Uruguay in March 2002 followed problems in the banking sector and contagion from Argentina.

account balance.³ The average capital account projection error for the four key programmes was 11.0% of GDP (7.1% across all the programmes), nearly double the 6.4% average for the sample in Ghosh et al. The March 2002 Uruguay programme stands out as the capital account error was more than a quarter of GDP and the original programme was augmented twice in following months. In the other key programmes, the scale of the errors was comparable to those in Ghosh et al.

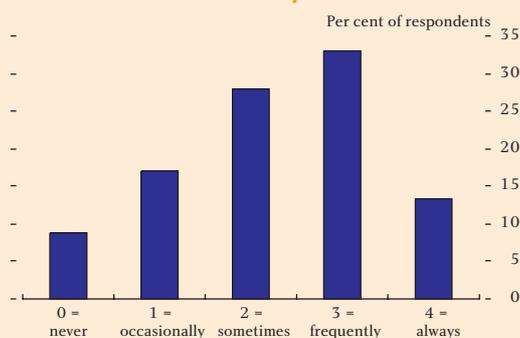
By contrast, the IMF's current account projections appear to be more accurate in recent crises. The average error for the four key programmes was 2.2% of GDP (3.5% across all programmes), compared with 6.6% in the earlier cases in Ghosh et al. Nonetheless, over-optimism remains a problem, consistent with the larger than anticipated capital outflows.⁴ The outlier in these results is the September 2001 programme in Argentina where the current account swung dramatically into surplus, resulting in an error of 17% of GDP. This is not surprising as Argentina's subsequent default had not been factored into the programme, and the resulting loss of access to foreign exchange forced a very sharp adjustment in the current account.

Since these results are scaled by GDP, it is also interesting to see that in nearly all of the cases GDP projections were over-optimistic and contributed to the balance of payments projection errors. The scale of the GDP projections errors is relatively small, with the exception of the September 2001 Argentina programme where, as noted above, the default helps to explain the large errors.

Another issue that stands out in looking at the experience of these four countries is their repeated reliance on IMF programmes. The subsequent augmentations or follow-up programmes suggest that the original programmes were not successful. Failure is likely to result, to a large extent, from the over-optimism in the original programme assumptions. Staff incentives appear to contribute to this forecast bias. The IMF's Independent Evaluation Office (IEO) conducted a survey of mission chiefs that

suggests that *ex-ante* over-optimism is often knowingly built into programme assumptions in order to meet the requirement that programmes demonstrate progress toward viability (Chart A).

Chart A:
Incentives towards over-optimism



Source: Independent Evaluation Office survey of IMF mission chiefs; Independent Evaluation Office (2002, p. 65).

Persistent over-optimism could reduce the likelihood of the catalytic effect working. The IEO points out (Independent Evaluation Office 2002, page 65) that over-optimism contributes to programmes going off track: "This creates a cumulative impression of poor implementation on the part of borrowing countries and also poor program design on the part of the IMF, eroding the credibility of both."

Forecasting in a crisis is clearly difficult and IMF programme projections are made under the assumption that programmes will be successfully completed. Errors often reflect programmes going off-track. Nevertheless, the consistency of these IMF forecast errors – particularly for the capital account – is striking. Despite large-scale lending, these IMF programmes did not achieve their desired impact on private capital flows. As a result, current account adjustments were more severe than expected, and the original programmes were not successful and required subsequent augmentations or follow-up programmes. This evidence exemplifies the risks associated with the reliance on the catalytic effect. Moreover, over time, market participants might expect a cycle of over-optimism and programme augmentation or prolonged use. This would seriously undermine prospects for the catalytic effect working in future.

3: Only in one case, Turkey February 2002, was the capital account position better than projected. This is also the only case other than Uruguay in our sample where the IMF projected a capital account deficit. The capital account improvement in Turkey may be explained by a better than expected capital account balance in the aftermath of the 11 September 2001 terrorist attacks.

4: The current and capital balances do not sum to zero, in part because of balancing items like reserves.

are more willing to accept policy suggestions from multilateral institutions than from private creditors.

In order for private investors to react positively to IMF programme conditionality, however, they would have to expect that policy conditions will be met. A recent IMF paper finds that, of stand-by arrangements approved between 1992 and 1998, over 40% suffered irreversible interruptions and roughly one in four conditions were not implemented.¹⁴ Based on survey results, Bird and Rowlands (2000) suggest that IMF conditionality is not a key factor in private sector lending decisions, and report that investors make their own assessment of programme implementation. In addition, as Rodrik (1995) points out, the convention that IMF loans are senior to those of private lenders might weaken the credibility of the signal provided by its involvement; rarely is the IMF's own money at risk.

More fundamentally, conditionality will not be effective in stimulating investment if private investors do not believe that the IMF's policy advice will improve a country's economic prospects. Some have argued that IMF-sponsored structural adjustment programmes often involve higher interest rates and fiscal austerity, which can constrain growth and might discourage foreign investors.¹⁵ In addition, Cottarelli and Giannini (2002) point out that the IMF may not adequately tailor policies to specific countries' needs. Such problems may explain the incidence of persistent recourse to IMF programmes in some countries. The IMF's IEO found that 51 countries were 'prolonged-users' of IMF resources, with an IMF programme in operation in at least 7 out of 10 years, during the period from 1971 to 2000.¹⁶ We would expect the policy channel to be weaker for such countries, and in cases where programmes are augmented, as the signalling value of the IMF's role would be undermined.

A final issue is that conditionality requires IMF funds to be disbursed over time depending on performance. This results in uncertainty about the amount and timing of lending. As markets require reliable information on the amount and timing for the

lending channel to be most effective in catalysing private flows, there is an inherent tension between the lending and policy channels for the catalytic effect.¹⁷

Recent models

Recent models have considered the interaction of the lending and policy channels. Although the models differ, Penalver (2003), Morris and Shin (2003) and Corsetti et al (2003) all find that the catalytic effect can operate, but only under strict conditions. IMF lending can encourage creditors to stay by alleviating liquidity pressures and supporting policy adjustment, but there are circumstances under which IMF lending can serve as a disincentive to policy adjustment – so-called debtor moral hazard – which, in turn, could discourage private capital flows.

These models find that for relatively large shocks, IMF lending can encourage policy effort. Without IMF assistance, the country would be faced with default. If the IMF fills part of the financing gap the country may be able to meet the remainder through domestic adjustment. And greater adjustment effort should, in turn, encourage private lending. In this scenario IMF lending acts as a complement to domestic effort and private lending, and the catalytic effect can operate. As Morris and Shin (2003, page 3) explain, "IMF assistance affects economic policy by altering the slope of the trade-off between the costs of adjustment and the costs of repudiation." So there are circumstances where the debtor is encouraged to expend additional effort when supported by IMF assistance, with an accompanying catalytic effect on private capital flows.

These papers also suggest that the window of effectiveness is a narrow one (Figure 1). For example, if a shock is too large, IMF intervention may not be sufficient to reverse weak economic fundamentals, through a combination of financing and adjustment. In cases where the debtor is facing insolvency, an increase in private investment in response to an IMF programme is likely to reflect creditor moral hazard. Meanwhile, for less severe shocks, IMF lending may act as a substitute for domestic adjustment effort

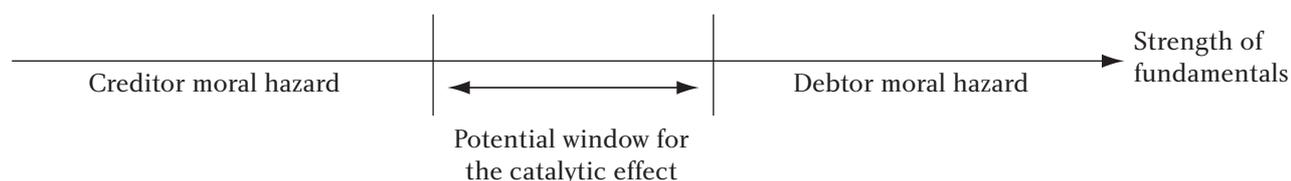
14: Ivanova et al (2003, pages 5–7).

15: An example is Stiglitz (2002). Bird and Rowlands (1997) also discuss this as a potential problem.

16: Independent Evaluation Office (2002, page 9).

17: Cottarelli and Giannini (2002) and Ghosh et al (2002) also note this problem.

Figure 1:
Constraints for the catalytic effect



and private lending. In these cases, reduced domestic effort (debtor moral hazard) undermines the policy channel and the overall catalytic effect becomes negative. Conditionality could reduce debtor moral hazard to some extent, but there is still a risk that IMF lending could be associated with weakened reform.

These recent papers provide modest support for the catalytic effect. Penalver, Morris and Shin, and Corsetti et al find circumstances when IMF support can encourage greater reform than in the absence of a programme, but the circumstances under which the catalytic effect operates are narrow and specific. Against that background, what light does empirical evidence shed on the effectiveness of the catalytic effect?

Evidence

A number of recent studies have investigated the catalytic effect empirically. A key challenge in any empirical assessment is identifying the appropriate counterfactual: how capital flows would have performed in the absence of IMF intervention. Existing research has tried to address these identification problems and some key results are discussed below.¹⁸

Case-study analysis

One approach to investigating the catalytic effect uses case studies. Bird et al (2000) conclude that the involvement of international financial institutions like the IMF and World Bank is neither necessary nor sufficient for securing private capital inflows; that country commitment to reform and ownership of programmes seem to be key factors behind capital inflows; and that IMF lending appears to have a largely negative impact on capital flows.

Ghosh et al (2002) provide case studies of eight countries that faced capital account crises in the 1990s. They compare IMF programme projections with outcomes for current and capital account balances.¹⁹ They find that capital outflows were greater than expected by the IMF, and that as a result IMF programmes systematically underestimated the extent of both the current and especially the capital account adjustment required. Charts 4 and 5 show the average outcomes and IMF projections for a sample of countries.

In the cases examined by Ghosh et al, IMF lending appears not to have succeeded in restoring confidence over the time-scale envisaged in the original programmes. They conclude that: “The catalytic effect of programs in reversing outflows failed to materialise, at least in the short run.” (Ghosh et al 2002, page 8).

Applying the same approach to some recent crises suggests similar results (Box 1). IMF programme projections for capital account balances have continued to be over-optimistic. In fact, in recent crises in Argentina, Brazil, Turkey and Uruguay where the IMF intervened with large-scale lending, the errors in the programme capital account projections have been even larger than in the earlier cases covered by Ghosh et al. The average capital account projection error for key programmes in these four countries was 11.0% of GDP, compared with 6.4% for the sample in Ghosh et al. It is also notable that in each of these four countries, the original programmes required augmentations or follow-up programmes. This exemplifies the risks associated with relying on a catalytic effect that may operate in a binary fashion.

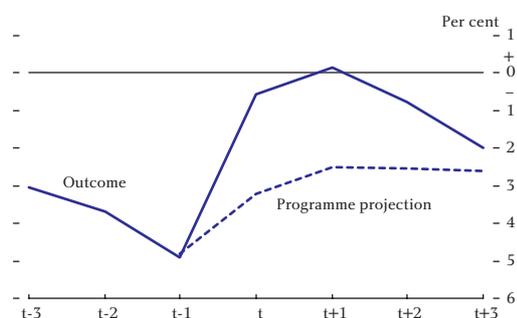
Studies on the cost of sovereign borrowing

Another strand of research examines the cost of sovereign borrowing (the price counterpart to

18: Also see Cottarelli and Giannini (2002) for a survey of empirical work.

19: This differs from our definition of the catalytic effect ($\text{catalytic effect} = E_{t-1}(\text{PSI}_t^{\text{IMF}}) - E_{t-1}(\text{PSI}_t^{\text{IMF=0}})$) in several respects. Ghosh et al use *ex-ante* projections, but compare them with *ex-post* outcomes. And the expectations are those of the IMF and hence already incorporate information about the programme. The choice of counterfactual is a challenge for all empirical work.

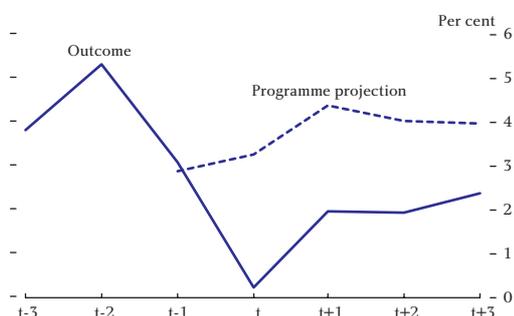
Chart 4:
Average current account developments (percentage outcome GDP)^(a)



Source: IMF.

(a) Sample of countries covers: Argentina (t=1995), Mexico (t=1995), Brazil (t=1999), Philippines (t=1998) and Turkey (t=1994).

Chart 5:
Average capital account^(a) developments (percentage outcome GDP)^(b)



Source: IMF.

(a) This definition of the outcome capital account follows Ghosh et al (2002); it comprises the sum of the financial account, net errors and omissions, and exceptional financing.

(b) Sample of countries covers: Argentina (t=1995), Mexico (t=1995), Brazil (t=1999), Philippines (t=1998) and Turkey (t=1994).

quantities of capital) around capital account crises. Haldane (1999) finds that for a number of EMEs that experienced capital account crises, sovereign spreads did not appear to change significantly after the announcement of an IMF programme and remained high for a considerable period. More recently, Mody and Saravia (2003) test the impact of IMF programmes on borrowing costs, measured as spreads at the time sovereign bonds are issued. They note that while on average IMF programmes have been associated with poorer access terms, when they control for country and market factors, Fund programmes are typically associated with greater issuance and lower spreads. Mody and Saravia use a wide sample of countries (not just EMEs affected by capital account crises), and highlight diversity among

countries and programmes. Consistent with the theoretical models discussed above, they argue that there is evidence for a catalytic effect for certain ranges of fundamentals. They also note that programme size can enhance the credibility of a programme, which would be important for the lending channel. However, Mody and Saravia stress that the effectiveness of the catalytic effect depends on market perceptions of the likelihood of a programme's success.

Econometric investigation of capital flows using cross-country data

Finally, a number of econometric studies have examined the impact of IMF programmes on private capital flows.²⁰ Typically, these are cross-country panel studies with different types of capital flows as the dependent variable, and a dummy variable for IMF programmes. They cover a wide range of different types of programmes over time, some of them in countries requiring significant medium-term adjustment and with restrictions on capital flows. Since this approach uses *ex-post* capital flows and includes observations over a broad range of programmes, it does not capture the catalytic effect as defined here. Overall, these studies have failed to find evidence for a positive impact of IMF programmes on private capital flows. Rodrik (1995) does not find a significant impact of IMF programmes on various types of private investment, and the results in Bird and Rowlands (1997, 2000) also suggest that the impact of IMF lending on private capital flows is either negative or insignificant. Moreover Edwards (2003) finds that IMF programmes have a significant negative effect on portfolio flows.

Conclusions

Understanding the likely impact of IMF programmes on capital flows is vital for the successful resolution of capital account crises. Recent theoretical models and empirical evidence suggest that the catalytic effect is fragile. If conditions have deteriorated to the point where there are severe solvency concerns, it is unlikely that IMF action will suffice to restore investor confidence in the near term. Larger IMF programmes have a greater chance of restoring confidence, but such programmes also increase the risk that IMF lending induces moral hazard on the part of private creditors and/or the debtor.

20: These include Rodrik (1995), Bird and Rowlands (1997, 2000) and Edwards (2003).

Evidence from empirical studies shows that IMF programmes have been over-optimistic about the catalytic effect. As a consequence, the realised adjustment in the current account balance was much larger than projected, and in a number of cases programmes required augmentation. Looking ahead, it is important for policy-makers to recognise the significant downside risks to reliance on the catalytic effect. In addition to the consequences for the country, if a large programme fails to restore confidence then this leaves the Fund with large exposures to a debtor country that remains in distress. The revised exceptional access criteria that have recently been agreed by the IMF's Executive Board aim to reflect these risks.²¹ They set an even higher hurdle

for programme success, and require that a country should have good prospects of regaining access to private capital markets during the programme.

Overall, the lesson for future crisis management is that IMF programmes should be more selective about the cases where they rely on a catalytic effect. Recent work has provided important insights into those circumstances where the catalytic effect is most likely to work, and this could help policy-makers in evaluating difficult policy choices in future. There has also been a lively debate on potential alternatives for addressing capital flight, including payments standstills or concerted roll-overs.²² These merit continuing consideration.

21: International Monetary Fund (2003).

22: Examples are Haldane and Kruger (2001) and the 'Rey Report' – see Group of Ten (1996).

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Financial stability: maintaining confidence in a complex world

Sir Andrew Large, Deputy Governor for Financial Stability, Bank of England

In his speech, delivered at the City of London Central Banking Conference in London on 17 November 2003, the Deputy Governor outlines the Bank's role in maintaining confidence in the financial system, including surveying risks to financial stability, strengthening the financial infrastructure and managing financial crises.

I AM OFTEN ASKED what we mean by financial stability and what the Bank, or 'the authorities' generally, are doing to maintain it.

Let me start with the observation that maintaining financial stability is different in a number of important respects from conducting monetary policy. There is no quantified target; no foolproof way of deciding where to look for potential threats; and no fixed timetable for policy decisions. Financial stability is altogether less tangible and more elusive. But it is nevertheless extremely important – as the substantial costs associated with financial instability demonstrate.

The Bank of England has had an interest in financial stability for a very long time. But for most of that time its interest was implicit rather than explicit. In the more formal structure put in place in 1997, after the Bank was granted operational independence on monetary policy, our financial stability role was laid down in a published Memorandum of Understanding (MoU) between HM Treasury, the Bank and the Financial Services Authority (FSA). Today I would like to make a few observations on some of the issues at the top of our current agenda.

Financial crises are nothing new. Indeed the Bank has been handling them since the eighteenth century. Some are signalled well in advance. Others are more of a surprise, such as LTCM.¹ What is certain is that financial crises can be very costly. Research suggests that they can run to a loss of 15–25% of GDP.² For Chile in the early 1980s they were closer to 40%. So the art of minimising the emergence of crises, and

mitigating their effects when they do nevertheless occur, are matters of public importance.

For us in London the challenge is particularly real. Our focus must clearly be on the stability of the UK financial system. But markets have globalised; and they have also become more complex. With London a pre-eminent international financial centre, contagion from just about any significant financial crisis anywhere in the world has the potential to threaten financial stability here.

In a broad sense, I like to think of financial stability in terms of maintaining confidence in the financial system. Threats to that stability can come from shocks of one sort or another. These can spread through contagion, so that liquidity or the honouring of contracts becomes questioned. And symptoms of financial instability can include volatile and unpredictable changes in prices. Preventing this from happening is the real challenge.

So how do we fulfil our responsibility for the overall stability of the financial system as a whole? The Bank's role is set out in the MoU. How do we approach the tasks of reducing the threat of crises and of coping with them if they actually occur? We have a three-pronged approach: surveillance, strengthening the financial infrastructure and, as a last resort, crisis management.

We start with surveillance. We need to keep a watch on the institutions in the financial sector and their interactions, both amongst themselves and with lenders and borrowers outside the financial sector.

1: Long-Term Capital Management.

2: See, for example, Hoggarth, G, and Saporta, V (2001), 'Costs of banking system instability: some empirical evidence', *Financial Stability Review*, June.

The soundness of individual banks is a key area of the FSA's activities. And we are in daily contact with them. Reassuringly, at present this area of threat looks quite remote – in the UK itself at least. Supervision has come a long way in the past five to ten years, as have the banks' risk management systems.

But nowadays financial crises do not necessarily just involve banks. There is an increasing overlap and interaction between banks and securities markets, and between both of them and the insurance sector. A problem in one can have a knock-on impact in the others. Most of these organisations are prudentially supervised by the FSA. But there are also organisations that are not supervised but which could be of systemic importance. The case of the hedge fund LTCM is perhaps the most notable example in recent times. And one to which I will return.

But it is not just the wide range of institutions that potentially play a part in the emergence and propagation of financial crises. You also need to consider the wide range of instruments. Some of them are extremely complex. Derivatives, structured products, and so on are now centre stage in all areas of financial intermediation. We need to understand their implications and the threats they may pose as well as the benefits they can bring, and we have accordingly increased our emphasis on market intelligence in this area.

We also have to monitor the systems which underpin the functioning of markets, notably payment, clearing and settlement systems. CHAPS and BACS may be unknown acronyms to you.³ But they are the essential plumbing in handling UK cash payments. Without these systems the financial machinery as a whole could not operate. If any of them failed to perform this could rapidly lead to a liquidity crunch. So we need to understand how they operate; how robust they are; how good their risk management processes are; and how effective their corporate governance is. The Bank has a specific oversight responsibility for UK payment systems.⁴

And beyond the payment and settlement systems we need to understand the financial infrastructure more

generally. I don't just mean physical infrastructure such as stock exchanges and other trading platforms. I mean also the plethora of prudential, accounting and legal standards and conventions, such as the prudential capital rules as per the Basel II agenda; International Accounting Standards – due to be implemented in Europe in 2005; standards of good audit practice. I could go on. We need to consider whether people have confidence in the standards themselves, and are they fit for their purpose? And are the potential vulnerabilities of the networks they help to create properly understood and contained?

Threats can emanate from many areas: and you can see we could keep armies of people active scanning the horizon in real-time. We have all heard about the butterfly's wing-beat in Bali causing a hurricane in the Gulf of Mexico. And we all know that there are lots of butterflies! So we need to have some way of distinguishing between those threats which are of real significance and danger and those which are less pressing or more remote. What we do is to subject each of the potential threats that we can identify to regular scrutiny. So we prioritise the areas where we see real problems emerging, or weaknesses which make us think that the infrastructure could buckle under shocks.

But it is not sufficient just to be aware of the threats; we need to take action to mitigate them. Our second objective is, therefore, to do what we can to strengthen the financial infrastructure. And we design deliverables – work programmes and projects – to address important emerging dangers. Each deliverable will imply a response of some type.

Let me give you some recent examples of work we've been involved with.

On the domestic front, we have just completed a programme to dematerialise money market instruments.⁵ These are now integrated into the main CREST settlement system, enhancing market infrastructure and thereby reducing potential settlement risks. The settlement of transactions in these instruments can now occur with delivery-versus-payment.

3: CHAPS Sterling and CHAPS Euro are the UK's high-value payment systems, settling sterling- and euro-denominated payments on a real-time gross settlement basis. BACS handles mostly retail payments (direct debits, direct credits and standing orders).

4: See, for example, the Annex on *Oversight of payment systems in Strengthening financial infrastructure in this Review*.

5: See *Strengthening financial infrastructure in this Review*, and *Bank of England Quarterly Bulletin*, Winter 2003, forthcoming.

Internationally, we have contributed expertise and advice to the standard setting process via bodies such as the Basel Committee and the International Accounting Standards Board. And we contribute actively in the work of official international bodies like the Financial Stability Forum, the Group of Twenty and the G10 central banks' Committee on the Global Financial System (CGFS). On a separate tack, we have also increased our focus on insurance, where the FSA is developing a prudential approach along the lines of Basel II for insurance companies. We recently led work in the CGFS to better understand techniques of credit risk transfer and their implications – particularly important for reinsurance. We also wanted to obtain better data on who was shedding and who was taking on what risk. This should in due course allow more effective monitoring of the transfer and accumulation of risk.

And earlier this year, I was myself heavily involved in drawing up the Group of Thirty study 'Global Clearing and Settlement: A Plan of Action'. It detailed 20 recommendations in relation to interoperability, risk management and governance that once implemented should improve efficiency and reduce risk in securities clearing and settlement. The task now is to get them implemented: and we are involved in that process too.

So in these areas we try to help to influence standards that are being set at a global level. Standards which of course also bear directly on much UK-based activity.

In terms of improved systems to enhance risk management internationally, the Continuous Linked Settlement Bank (CLS) was successfully established in autumn 2002. It was an international response to a well recognised but partly unresolved risk: risk to foreign exchange settlement which goes back to the Herstatt crisis in 1974.⁶ CLS now settles FX transactions in eleven major currencies. And total daily values of transactions settled now exceed US\$1 trillion: a figure that is likely to grow further.

These are examples of *ex-ante* steps to reduce both the *emergence* of threats and their potential impact. But the third leg of our work is to consider what to do if there is a problem. What happens if a threat materialises?

First there is what I might call a traditional financial crisis involving one or more banks directly. All such crises ultimately manifest themselves in a shortage of liquidity, which can easily spill over from one bank to another. Clearly we need the market intelligence, expertise and operational experience to handle the liquidity aspects of such an event.

Second, there is the possibility of what I would call an LTCM-type problem. In autumn 1998, the creditors of LTCM – mainly banks and investment banks – became concerned by LTCM's financial position. The concern was partly that even though LTCM may have been short of bankruptcy, there could be attempts by its creditors to reduce their exposures, and thereby to set off major market disturbances. A crisis was narrowly averted when the counterparties were persuaded to purchase LTCM. I might say that in due course they got their money back: which only goes to show that a liquidity crisis can arise even when the solvency position of the institution remains positive.

Third, we cannot ignore the threat of a 'major operational disruption' (MOD). What I mean by this is a natural disaster, a major act of terrorism like 9/11, or an IT catastrophe such as we sought to mitigate in the Y2K preparations. Considerable time has been devoted to work in this area, on *ex-ante* mitigants to provide predictability and help to enable the system to get back to work quickly. You need robust back-up sites, operating procedures, personnel regrouping plans and so much more.

We are not on our own, of course, if a financial crisis does occur. Clearly we would work closely with FSA and the Treasury, both directly and through the Tripartite Standing Committee. The Standing Committee of representatives of the Bank, FSA and Treasury meets on a monthly basis and of course *ad hoc*. We discuss both individual cases of significance and specific threats which could be relevant to financial stability. The Committee covers surveillance, strengthening the infrastructure and crisis management. For the latter, the objectives and roles of each party are outlined on the Financial Sector Continuity Website.⁷ The Bank's roles relate to ensuring the orderly functioning of the UK markets, including the maintenance of adequate liquidity and

6: See, for example, Hills, B, and Rule, D (1999) 'Counterparty credit risk in wholesale payment and settlement systems', *Financial Stability Review*, November, and the Box on CLS and the continuing need to reduce foreign exchange settlement risk in *Strengthening financial infrastructure in this Review*.

7: www.financialsectorcontinuity.gov.uk

the functioning of payment systems. So we would act as the point of contact on operational and liquidity issues which might affect participants. Meanwhile, the role of the FSA is naturally to monitor the health of the institutions which fall within its supervisory remit, and consequently any concerns or questions in this area will naturally be addressed to them. And the Treasury will ensure that ministers are kept up to date so that government is able to act promptly. It also undertakes to ensure coherence between the financial sector and the operation of public sector continuity arrangements more generally.

A current example of such co-operation between the three authorities and the private sector is the Taskforce on Major Operational Disruption in the Financial System, of which I am the Chair. The Taskforce was asked by Treasury ministers to assess whether we need more statutory powers in this field, and if so what they should be. Our findings will be published in the next few weeks: so please watch this space!⁸

I thought in closing that you might also be interested in a few observations on several issues which confront us today. These range from very high-level issues such as leverage, to much more specific questions such as complex financial instruments.

So, the first issue, leverage. Leverage is not itself a threat to financial stability: indeed banking practice relies on leverage. But leverage can become a vulnerability once it ceases to be sustainable. And here we need to assess the global picture at several levels: not just that of the UK. First, we need to consider the sovereign level. Both in the developed and emerging worlds, government debt has, in general, risen over the past decade. Second, at the corporate level, where current levels of borrowing both to banks and through securities are high. And, third, we need to consider household debt. You have only got to read the newspapers to know that in the UK the level of debt-to-income has risen significantly. In the USA it is even higher and other countries such as Australia and Holland, which are subject to a similar low interest rate environment, are seeing similar trends.

The question is just what are the vulnerabilities? We are now at historically low rates of interest. Servicing high levels of debt seems quite realistic. But a variety

of things could get people to behave differently – to save more, or to repay debt. This could come if they felt that interest rates might rise – and we did raise them modestly earlier this month. But it could also come for other reasons: a wish to save more for retirement, for example. If a substantial change occurred it would, in the first instance, impact on monetary policy and our ability to meet our inflation targets. From a financial stability perspective too, however, we would clearly need to follow the evolution of any reactions and their consequences very closely. In the first analysis, there is comfort from the improved risk management and supervisory processes that have been developed over the past decade. But we need vigilance in terms of the possible knock-on implications for the financial systems.

Moving to a more specific, and very topical, issue I would like to mention complex financial instruments. We have all read alarmist stories. But Alan Greenspan often makes the point that one may over-estimate some of the risks and under-estimate the benefits. Shocks such as the Asian crisis, LTCM, and, 9/11 have been successfully absorbed by the global financial system. The fact is that they have not triggered a systemic financial crisis, and the instruments themselves contribute to flexibility and resilience in the system. They enable financial institutions such as banks to transfer or diversify risk to a wide variety of participants including mutual funds and insurance companies, and hence reduce concentration. My own view is that this may be true but equally we would be unwise to take too much comfort for granted.

At the Bank, we certainly feel the need for vigilance. We need to understand the implications and threats of these instruments. We start by breaking down the whole area of complex instruments into a more granular form. We focus specifically on four key aspects. First, there is the question of opacity and data. It is very hard to know both where risks have been transferred from and who is now on the receiving end. A dilemma of today's world is that despite attempts to improve transparency the new instruments themselves can actually make it more opaque. Second, there are questions of pricing and valuation. Accounting standards have a vital role to play here. Meaningful disclosure requires a common approach to valuation of contracts across the whole financial sector and the achievement of standardised

8: This has now been published: the Task Force's report can be found on the Bank's website (www.bankofengland.co.uk).

accounting requirements. Third, there is the importance of risk management processes within firms. Do firms understand the implications of the use of models in controlling their risk? And, fourth, there is the area of legal risk. Will untested contracts 'close out', particularly in adversarial circumstances? If not, this would be an area that could lead to liquidity concerns.

Then of course there is Basel II: an essential ingredient in the prudential standards being developed to strengthen the supervisory architecture. Today's near-final accord might not be ideal – and it is more complex than we wanted. But it is a great advance on the status quo in terms of aligning capital to actual risk; and over time it can be improved. It is important to meet the 2006 implementation deadline and for agreement on the framework itself to be reached next year. Banks have invested much in their implementation systems already and delay would set back progress and add to costs. Clearly both the EU and the US need to go through a domestic rule-making process, but surely this can be fitted within the timetable. By 2006, planning for Basel II will in fact have taken eight years!

Finally, an issue with which you are, I expect, all familiar – the EU Financial Services Action Plan (FSAP). I would like to echo the views expressed recently by Callum McCarthy, in his speech to the European Policy Forum.⁹ The FSAP is an important initiative aimed to create a single market, and it

promises many benefits. But the implementation of such changes over a short period of time raises some concerns; and, while considerable progress has been made in addressing the 42 Directives under the FSAP umbrella, there is still much to be done. Over the next few years, we need to implement 14 significant EU legislative measures, including, for example, the International Accounting Standards Regulation – the importance of which I highlighted earlier, as well as the new capital adequacy regime. We need to achieve so much, so quickly, that there is a danger that people will take their eye off the ball. This is relevant not just to the authorities but also the firms and institutions who need to introduce new systems and new procedures. All this needs to take place in parallel in the course of the normal business day. And, in doing so, we need to ensure that the changes which are being introduced to enhance the EU financial sector do not themselves threaten the stability of that system.

I have this morning traversed a broad territory. First, what is financial stability? Second, how do we at the Bank of England fulfil our role to maintain the stability of the financial system? And, finally, highlighting some of the key areas that are currently active on our agenda. As you see, we have to extract from the global canvas the issues that pose the greatest threats and to then focus on them. International co-operation is the key to this, and events such as today's conference with its range of distinguished speakers and attendees from across the globe can only help this process.

9: www.fsa.gov.uk/pubs/speeches/sp154.html

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Monetary and Financial Statistics

Monetary and Financial Statistics (Bankstats) contains detailed information on money and lending, monetary and financial institutions' balance sheets, banks' income and expenditure, analyses of bank deposits and lending, external business of banks, public sector debt, money markets, issues of securities, financial derivatives, interest and exchange rates, explanatory notes to tables and occasional related articles.

From 2004 Bankstats will continue to be published monthly on the Internet but paper copies will be available on a twice-yearly basis. Paper copies will be published for the *January and July editions* published on hard copy on Monday 2 February 2004 and Friday 30 July 2004 respectively, the price per annum in the UK will be £40 or £20 per copy. It is available on a monthly basis free of charge from the Bank website at: www.bankofengland.co.uk/mfsd/latest.htm

Practical issues arising from the euro

This is a series of booklets providing a London perspective on the development of euro-denominated

financial markets and the supporting financial infrastructure, and describing the planning and preparation for possible future UK entry. Copies are available from Public Enquiries Group, Bank of England, Threadneedle Street, London, EC2R 8AH and at the Bank's web site at: www.bankofengland.co.uk/euro/piq.htm

Economic models at the Bank of England

The *Economic models at the Bank of England* book, published in April 1999, contains details of the economic modelling tools that help the Monetary Policy Committee in its work. The price of the book is £10. An update was published in September 2000 and is available free of charge.

Quarterly Bulletin

The *Quarterly Bulletin* provides regular commentary on market developments and UK monetary policy operations. It also contains research and analysis and reports on a wide range of topical economic and financial issues, both domestic and international.

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