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Financial Stability Review

December 2001

**In publishing this issue of the *Financial Stability Review*,
Bank of England staff remember the many financial services workers,
emergency service workers and others who died or were injured in the
11 September attacks in the United States.**

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. A recent addition to the *FSR* website is an 'FSR alert service' to inform readers by e-mail immediately a new issue of the *Review* is available on the website. For a summary of the main financial stability issues, two sections of the *Review* are available in htm format with hyperlinks to this and earlier *Reviews* where appropriate. 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 (The Bank's website also has details of job opportunities at the Bank of England at www.bankofengland.co.uk/jobs)

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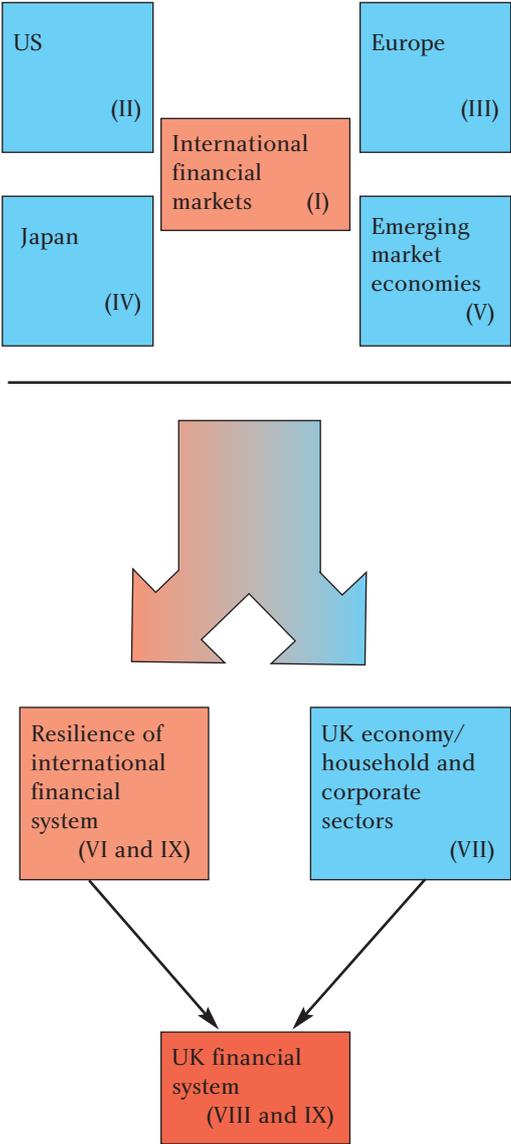
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Introduction

This review of the financial stability conjuncture and outlook discusses changes in risks to financial stability over the period since the Bank's previous assessment last June. It is structured as illustrated below:





themes and issues

Recent months have illustrated the pressures which can confront the international financial system. The broadening world economic slowdown, with the attendant rise in credit risks; the deepening problems in Argentina, spreading to its banking system; and the events of 11 September, creating temporary liquidity and infrastructure strains in New York and elsewhere – each has presented its own challenges. But perhaps more important, taken together they highlight the diversity of risks – sometimes low probability but high impact – which financial firms and infrastructure providers have to monitor and manage if the overall stability of the financial system is to be preserved, as it has been. This edition of the Bank of England *Financial Stability Review* accordingly ranges across a wide set of issues raised by the complex linkages in modern domestic and international financial systems.

As usual, the Bank's latest survey of the financial stability conjuncture and outlook opens the *Review*. It concludes – partly against the background of the developments highlighted above – that, in terms of *direction*, while the risks facing the system have probably diminished since the immediate aftermath of the 11 September attacks, they have increased somewhat since the June *Review*; but that, in terms of the *level* of risk to stability, the international and UK financial systems, taken as a whole, nevertheless remain well placed to absorb unexpected losses.

At a more general level, the contribution which capital resources can make to crisis prevention featured strongly at a Bank of England-hosted conference on Banks and Systemic Risk in May. Glenn Hoggarth's article briefly summarises the proceedings, which will be reproduced in a forthcoming special issue of the *Journal of Banking and Finance*.

The focus on banks at that conference, as in discussions more generally on systemic risk, reflects their core roles in the money and credit markets and, related to that, in payment systems. Much has been done over the past decade or so to make the key wholesale payments arrangements more robust to shocks. Put simply, the aim has been to eliminate avoidable intra-day credit exposures amongst banks. In most countries, including the UK and across the euro area, that has been achieved by moving from so-called deferred net settlement (DNS) systems to real-time gross settlement (RTGS) systems, where smooth payment flows are facilitated by central banks lending intra-day, in the majority of cases against high quality collateral. More recently, payment system operators – notably in France, Germany and the US –

themes and issues



have been developing 'hybrid' DNS/RTGS designs which may be able to combine low settlement risk with low liquidity costs. The opportunities opening up in this area are reviewed by James McAndrews of the Federal Reserve Bank of New York, and John Trundle, Head of the Bank's Market Infrastructure Division and chair of the G10 central bank task force which produced the Core Principles for Systemically Important Payment Systems.

While financial stability analysis has tended to focus principally on banks, increasing interlinkages with other financial sectors have broadened the range of markets which central banks, as well as regulators, follow. The need for this was underlined in an article by David Rule in the June 2001 *Review* on the growing market in credit derivatives, in which insurance companies as well as banks and securities dealers are active participants. In follow-up work reported here, drawing on discussions in London, New York and Bermuda with market participants, rating agencies and others, Rule traces out the increasing use of some relatively new techniques for transferring credit, market and insurance risks between banks, capital markets and insurers; and explores the varying involvement of reinsurers and life, general (property and casualty) and specialist 'monoline' bond financial guarantee insurers. The growth of risk transfer markets is welcome insofar as it disperses risks across the system, to those best able to hold and manage them. For financial stability authorities, it raises some new questions about, for example: the macroprudential tracking of risks; increased linkages between banks and insurers, and the associated counterparty risk management; and about the potential behavioural consequences of changes to regulatory, accounting and tax regimes.

Links of a different kind motivate the work by Andrew Benito, John Whitley and Garry Young on UK corporate and household sector balance sheets. These two sectors, taken together, account for almost half of UK-owned banks' on-balance-sheet lending. Assessing their resilience requires, however, more than a static interpretation of key financial ratios such as debt-to-income and debt-to-net-assets. It is necessary to be forward-looking, since the path of their debt, income, wealth etc will each be affected by developments in the macroeconomy, and by changes in the distribution of debt across individual companies and households. Benito, Whitley and Young report one possible approach to this task. They make additions to the Bank of England's main macroeconomic model, so that it can be used to produce projections of balance sheet ratios, company liquidation rates, and household mortgage arrears, together with calibrations of uncertainty and risk using stochastic simulations and stress tests. Their work represents one contribution to a wider medium-term objective at the Bank of enhancing qualitative assessments of stability with more quantitative analysis.



A concern to develop the assessment of a third variety of financial system links – those operating amongst countries, and in particular emerging market economies (EMEs) – lies behind the articles by Alastair Cunningham, Liz Dixon and Simon Hayes on analysing EME sovereign bond yield spreads and banking systems. Changes in the dispersion of EME bond spreads can, for example, help in assessing whether or not different countries are being simultaneously weakened by the same adverse developments. Against that background, it is striking (and reassuring) that dispersion has recently remained high, which is consistent with relatively little contagion from the problems in, for example, Argentina and Turkey. The maturity structure of EME yield spreads, which typically slopes upwards, can also provide some insight into the severity of a country's problems. Since the summer, Argentina's spreads have been much higher at short maturities than at longer maturities, suggesting a rise in the probability assigned by the market to an early breakdown in debt-servicing capability. The crises in various EMEs since the mid-1990s have not, though, been limited to the sovereign sector. In many cases – for example, Thailand, Korea, Indonesia and, more recently, Turkey and Argentina – the banking system has been a complicating source of vulnerability, and sometimes the sector in which confidence first broke. Alastair Cunningham's short article outlines some of the techniques which can be employed to assess EME banking system robustness using publicly available data.

Just as they highlighted new challenges for financial stability surveillance, the various EME crises have prompted an active debate about crisis management. Most obviously, the tools used by the international community in the 1980s and earlier have needed adapting given the massive increase in EME financing from international capital markets on top of that provided by banks, and in the amounts involved relative to the limited resources of the International Monetary Fund. As one contribution to that debate, in November the Bank of Canada and the Bank of England published a joint paper – reprinted here – by Andrew Haldane and Mark Kruger, introduced by Deputy Governors Paul Jenkins and Mervyn King. In it, they urge the need for a clearer framework for crisis resolution, and in particular for presumptive constraints – relaxable only in truly exceptional circumstances – on IMF lending, which they argue would help to encourage debtors and private sector creditors to reach co-operative solutions. Given clarity about how much finance the official sector would provide and on what terms, both debtors and creditors could make better-informed choices between the strategies available to them. Occasionally, one option will be a payment standstill. If implemented in an orderly way, the official sector should stand ready to support that route. The IMF's First Deputy Managing Director, Anne Krueger, has recently set out some ideas in a similar vein.

themes and issues



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The issues about how to secure effective debt workouts procedures are not unique to sovereign debt. They recur, with some important differences, in the corporate arena and in the handling of problems in major financial institutions. In a speech to the Sixth World Congress of INSOL International in London in July, Deputy Governor David Clementi examined some of those similarities and differences. While a key difference is the absence of a court-based sovereign bankruptcy mechanism, the Deputy Governor emphasised the importance of effective workout procedures at the pre-insolvency stage for all types of debtor. As well as providing the context for much of the debate on private sector involvement in sovereign debtor problems, this has also been the focus of the Statement of Principles for a Global Approach to Multi-Creditor Workouts, developed under the auspices of INSOL International by the INSOL Lenders Group, which the Deputy Governor welcomed. Compatible formal insolvency mechanisms are, though, clearly desirable. The Deputy Governor also reviewed how the principles underlying effective corporate workout and insolvency mechanisms might be applied in the international banking field. He noted the merits, if international agreement could be reached, of applying a 'single entity' approach, with creditors in the same class entitled to equal treatment worldwide in relation to a bank's worldwide assets. At present, some countries, including the US, have a 'separate entity' (or 'ring-fencing') approach.



The financial stability conjuncture and outlook

Overview: risks to financial stability

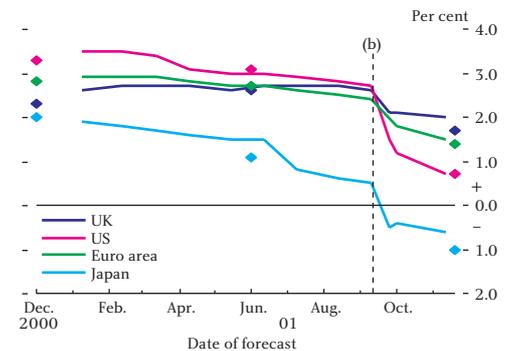
Over the past six months, financial systems have generally proved resilient in the face of a marked deterioration in the short-run global macroeconomic outlook and the disruption caused by the terrorist attacks in the United States. This latest Bank of England assessment considers the implications for global and UK financial stability of the economic slowdown and increased uncertainty. Compared with June, some forward-looking indicators point to some increase in risk, and to the uncertainties being skewed towards the downside, although much less so than shortly after the events of 11 September. Given policy responses – especially in monetary policy – around the world, a prolonged slowdown is not the most likely outlook. Furthermore, financial systems appear, on the whole, to be better positioned than a decade ago to cope if downside risks materialise. Firms may, though, need to increase the economic capital they allocate against unexpected losses.

Changes in the economic and market environment

The downward revisions to economic forecasts of near-term GDP growth have been sharper and more correlated across countries than for some time (Chart A). Prices suggest that, in parallel, expected returns have fallen and uncertainty has increased in some financial markets, although not by as much as in the immediate aftermath of the terrorist attacks. Equity price indices are lower around the world – according to the MSCI world index, by about 30 per cent since the March 2000 peak and around 10 per cent since June. But they have recovered strongly from their September lows, except in Japan (Table A). Given that lower short-term real interest rates might be expected to increase equity valuations, this probably reflects a combination since June of somewhat lower expected corporate earnings and an increase in the risk premium.

The terrorist attacks have probably increased perceptions of risks. Some may be difficult or impossible to price (and correspondingly difficult to hedge), and that may alter financial sector behaviour (as illustrated, for example, by the withdrawal of commercial cover for some airline risks). Future volatilities implied by options prices in equity, government bond, US short-term interest rate and crude oil markets are – in different degrees – higher than in June, although in several cases lower than in mid-September (Table B).

Chart A:
2002 real GDP growth forecasts^(a)



Sources: Consensus Forecasts and OECD Economic Outlook.
(a) Solid lines represent Consensus forecasts and markers represent OECD forecasts.
(b) 11 September 2001.

Table A:
Percentage changes in world equity indices^(a)

	Developed world	US	UK	Europe	Japan	EME ^(b)
Change since market peak (27 Mar. 00)	-31.9	-28.3	-25.8	-33.5	-43.2	-43.2
Change since June 2001 Review	-10.8	-10.3	-5.4	-8.5	-19.2	-11.0
Change since market trough (21 Sep. 01)	15.2	16.5	15.0	18.7	-0.7	20.1

Source: MSCI
(a) Denominated in US dollars. Market peak and trough dated according to the developed world index.
(b) Emerging market economies.

Table B:
Implied volatilities of selected financial contracts^(a)

	12 Jun 01	17 Sep 01	28 Nov 01
<i>Equities^(b)</i>			
S&P500	18.6	37.7	23.3
Dax	20.0	43.1	32.1
FTSE-100	18.5	34.5	21.1
<i>Govt bonds (Dec 2001 futures contracts)</i>			
UST 10-year	6.8 ^(c)	8.6	7.6 ^(d)
Bund 10-year	4.2	5.4	9.3 ^(e)
<i>Short-term interest rates (Dec 2001 futures contracts)</i>			
Eurodollar	19.8	37.8	51.3
Euribor	16.2	21.9 ^(c)	13.3
<i>Exchange rates (3 month forward)</i>			
Dollar/yen	10.0	13.4	10.1
Euro/dollar	11.5	14.3	10.6
<i>Oil (futures)</i>			
Jan 2002	25.8	38.4	65.2

Sources: Bloomberg and Bank of England.

(a) Implied volatilities are percentage measures.

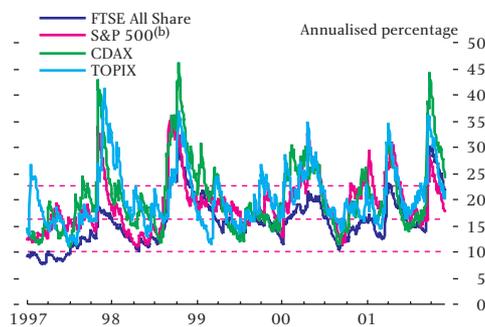
(b) A weighted average of the implied volatilities of the nearest three option contracts closest to at-the-money strike prices.

(c) 19 June 2001.

(d) 21 November 2001.

(e) 14 September 2001.

Chart B:
Historical volatility of equity indices^(a)



Sources: Thomson Financial Datastream and Bank calculations.

(a) Volatility calculated over a 252-day rolling exponentially weighted moving average.

(b) Dashed lines denote S&P 500 average and standard deviations, calculated from 1994.

Chart C:
A-rated investment-grade spreads over swap rates^(a)



Source: Bloomberg.

(a) Ten-year maturity bond yields less ten-year swap rates. Five-day moving average.

(b) Vertical line indicates change in EU series used.

Measures of *ex post* volatility have been high too, especially for European equities, suggesting that markets have had a lot of news to assimilate (Chart B). That will have tended to raise firms' 'value-at-risk' measures for given portfolios.

Given little evidence that corporate debt has decreased internationally, the combination of lower equity prices and slightly higher implied equity price volatility suggests some rise in corporate credit risk. So do corporate bond spreads (Chart C). The reductions in 2001 H1 have largely been reversed across industrial countries, although, as with equity prices, six-month comparisons mask a sharper movement in September followed by recovery. Markets have remained liquid – supported by decisive central bank action in the immediate aftermath of 11 September – and bond issuance in particular has remained strong, helping to extend the average maturity of corporate debt. High-yield telecom issuers remain excluded. And some firms have found access to the conventional commercial paper (CP) market restricted because of rating downgrades; some have instead raised funds in the bond market or via asset-backed CP. Although conditions for initial public offerings remain difficult, some have taken place recently, and there have been some large secondary issues.

Sources of risk

Against that background, the *Review* focuses first, as usual, mainly on downside risks rather than on the most likely outlook, because its objective is to identify potential threats to stability and consider the robustness of financial systems in the face of those threats. The crucial issue of the resilience of the international and UK financial systems is considered later.

Uncertainty about the US outlook

In June's *Review*, four – not mutually exclusive – US scenarios were discussed, with differing consequences for stability. First, an early recovery after a relatively short slowdown. Second, a more prolonged slowdown, in the event that it took longer to work off excess inventories and investment. Forecasts have generally put back the expected date of the trough in activity, but only to next year. Third, a significant rise in household saving prompted by excessive household indebtedness; the saving rate has indeed risen (and according to revised data released in November, did not fall as far last year as previously thought), but it is not yet possible to judge whether consumers were altering longer-term behaviour or simply saving part of the 2001 Q3 tax rebate. The fourth, and potentially most serious, scenario was the possibility of increased doubts about whether prospective long-run productivity growth would be high enough to warrant current levels of asset prices and debt. Subsequent data revisions suggest that productivity growth has not increased as much in recent years as originally recorded, but forecasts of long-run corporate earnings growth remain high by historical standards.

Credit risk is reflected in rising bankruptcies (Chart D); increased new US bank provisions (30 per cent up in 2001 H1 on 2000 H1); reports of deteriorating loan quality, including some problems in the sub-prime consumer sector; and tighter credit conditions – at a time when both the corporate and household sectors are more vulnerable because of further increases in debt-income and capital gearing ratios (Charts E and F). But this needs to be put in perspective. The financial deficits of the household and non-financial corporate sectors have stabilised, lower interest rates (and mortgage refinancing) have helped keep income gearing in check, and bank provisions are still at historically low levels.

Uncertainty about the global outlook

One risk flagged in previous *Reviews* was the possibility of an abrupt change in foreigners' appetite for US financial assets, given the weaker and more uncertain prospects for US investment returns, at least in the short run. That still cannot be ruled out. But the US current account deficit and corresponding capital inflows have moderated gradually since the data reported in June. There has been little net movement so far in the configuration of exchange rates, or in forward-looking measures of exchange rate uncertainty.

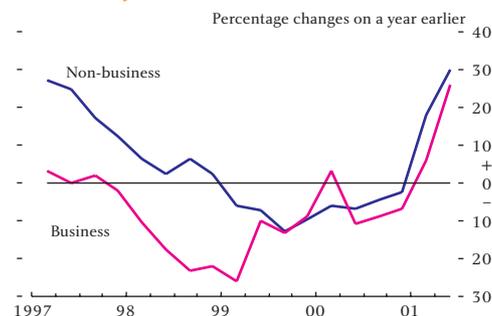
Despite the risks, the longer-term outlook in the United States has probably not deteriorated relative to Europe and Japan, where aggregate P/E ratios have fallen since June. Globally, broad equity indices still appear high by historical standards, despite the deflation of the bubble in technology, media and telecommunications (TMT) stocks. The possibility remains of a further market correction in the event of an increase in risk premia or a substantial downward revision in the GDP and corporate earnings growth expected in the longer term.

The drop in demand for high technology and the global slowdown have hit the open economies of East Asia particularly hard. Their capacity to cope depends partly on whether financial sector and external balance sheet vulnerabilities have been addressed since the crises of 1997/98. That varies across countries.

Sectoral stresses

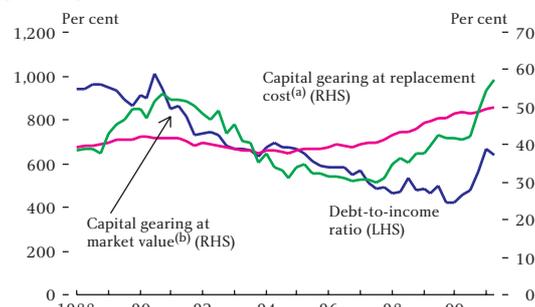
Whereas the TMT sector stood out in June, sectoral developments since have been more mixed (correlations between weekly returns on world TMT and non-TMT equity price indices have increased (Chart G)). Structural change is not necessarily a problem for financial institutions – indeed, one of their roles is to facilitate it. However, when it happens rapidly, lenders can find it difficult to reprice their existing exposures as fast as their assessments of risk change. If, in addition, some lenders have concentrations of risk in the sectors with suddenly declining prospects, and if those sectors are relatively highly geared, rapid structural change can impose stresses on financial systems.

Chart D:
US bankruptcies



Source: Administrative Offices of US Courts.

Chart E:
US non-financial corporate sector capital gearing and debt-to-income ratio

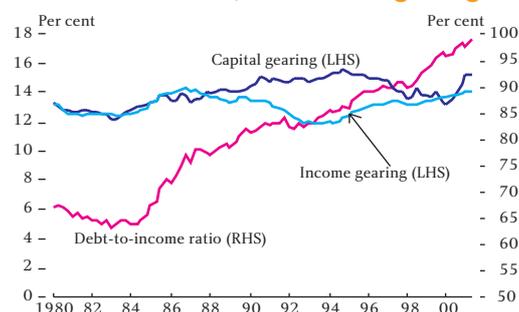


Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2001 Q2.

(a) Tangible assets valued at replacement cost.

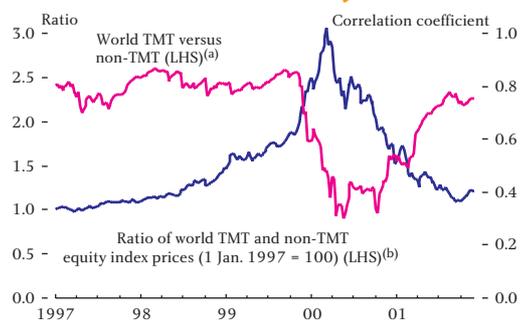
(b) Debt minus cash and deposits, over capital stock at market value.

Chart F:
US household capital gearing, debt-to-income ratio, and income gearing



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

Chart G:
World TMT and non-TMT share price ratio
and correlation of their weekly returns

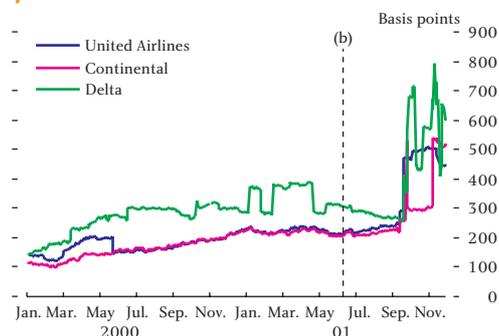


Sources: Thomson Financial Datastream and Bank calculations.

(a) Weekly correlations (of exponentially weighted moving average log returns) calculated over a five-year rolling window.

(b) Ratio of world TMT and non-TMT equity index prices (for both indices, 1 Jan. 1997=100).

Chart H:
Spreads on EETC^(a) debt of US airlines

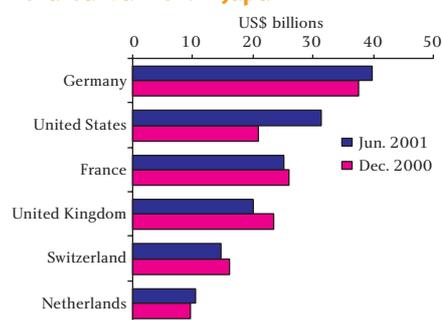


Source: Bloomberg.

(a) Enhanced Equipment Trust Certificate.

(b) June 2001 Review.

Chart I:
Consolidated international claims of
BIS-area banks on Japan^(a)



Sources: BIS.

(a) The data are on-balance-sheet claims and do not include yen lending of BIS-area banks' Japanese offices to Japanese residents. The German figures are to a small degree overstated, as some inter-office exposures are not netted out.

The events of 11 September have had a particularly adverse impact on travel-related industries, especially airlines – which were already facing financial pressures as a result of a downturn in traffic and rising costs. There have been sharp falls in airline equity prices and increases in related bond spreads (Chart H). The external financing requirements of airlines are large, and the decline in cash flows after 11 September led to financial distress in the industry, partially addressed by a range of special government measures. Any impact on the financial system, however, is likely to be mitigated by the wide dispersion of risks, including to non-bank lessors.

While financial markets seem so far to have been able to accommodate the deflation of the TMT bubble, the sector remains a potential source of risk: spreads on US and European telecom indices have increased by more than those on broader indices for similarly rated issues since the June Review. Several of the larger firms need substantial funds to roll out 3G networks and products, and it may become more difficult to syndicate the required borrowing widely. But some heavily indebted telecom companies have been able to strengthen their balance sheets since June.

More generally, given the rise in debt across a range of sectors, stresses might emerge not during the slowdown but in the early stages of recovery, when interest rates begin to rise and demand for working capital and investment financing increases.

Financial system links among countries

Evidence from economic indicators and financial markets testifies to the global nature of the current slowdown. It would be a concern for stability if any consequent pressures on one country's financial system were exacerbated by problems in another's. Such problems are perhaps most evident in Argentina and Turkey, and – for different reasons – in Japan. So far, major adverse knock-on effects have not materialised.

The outlook for growth in Japan has been revised downwards sharply, and banks' non-performing loans have continued to increase despite substantial write-downs. Credit ratings of Japanese banks depend heavily on the presumption that the authorities will support the banking system, and hence are affected by recent downgrades of sovereign debt. The proposed move from full to partial deposit protection next spring may lead depositors to differentiate more amongst the banks. Meanwhile, life insurers continue to suffer from high guaranteed nominal obligations, low asset returns, and hence narrowing solvency margins. While UK and BIS-country banks' international on-balance-sheet claims (including JGBs) on Japan remain fairly low (Chart I), there are of course exposures via, for example, foreign exchange forward and swap contracts and interest rate swaps. Another possible external link is via Japanese bank

lending to third countries. None of these possible channels has yet, however, been significant.

Argentine sovereign bond prices have fallen sharply, and so spreads have risen sharply, in contrast to those in other EMEs (Chart J); and over the past few months there have been substantial net withdrawals of both peso- and dollar-denominated bank deposits. Encouragingly, the spillover to other countries has been limited. In contrast to 1998, increased volatility in Argentine spreads has not coincided with a rise in average EME spread volatility (Chart K). Until October, Brazil appeared to be suffering from its trade and financial links with Argentina, but it has since benefited from a strong recovery in asset prices.

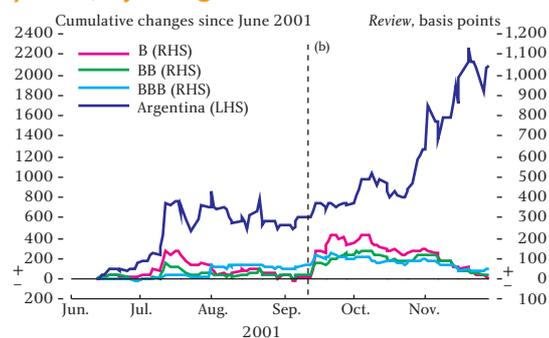
11 September and international systemic resilience

It is perhaps fortunate that there have been long enough intervals between recent challenges – the Asian crises, the Russian default, LTCM, Brazil, Y2K, the TMT bubble and the terrorist attacks – for financial institutions to have had the opportunity to adjust their books before the current slowdown materialised. That may help to explain why market participants in general appear to be less leveraged and more liquid than in autumn 1998, so that ‘credit events’ and spikes in market volatility have been less disruptive.

Given the slowdown and weaker asset prices, international banks’ earnings – probably especially from investment banking – are generally falling just when many are likely to want to increase forward-looking provisions and their capital allocations against credit risk. This might have been compounded in some continental European countries by longer-running structural constraints on margins and returns on equity. However, for the system as a whole, existing cushions of capital are substantial. Crucially, given the suddenness of the US slowdown, big US banks are in a much better position than at the end of the 1980s to weather any deterioration in credit quality. Compared with 1989, just before a sharp slowdown hit the United States, banks are better capitalised, with greater cover of identified impaired loans by provisions (Chart L); their loan portfolios are better covered by equity and seem to be more diversified by sector and region (Chart M). As a result, they are more highly rated. Credit risk is also dispersed more widely, thanks to new capital market instruments. It is, however, unclear how much credit risk could flow back to the banking system given the scale of the back-up liquidity lines provided to corporate customers and financing vehicles.

The most striking demonstration of resilience in the international financial system, and in particular Wall Street, was its response to the infrastructure and liquidity strains following the 11 September attacks, perhaps aided by confidence about

Chart J:
Changes in EME sovereign US\$ bond spreads, by rating^(a)

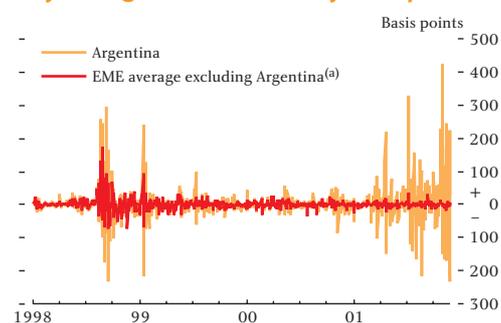


Sources: JP Morgan Chase & Co and Standard & Poor's.

(a) Based on latest ratings.

(b) 11 September 2001.

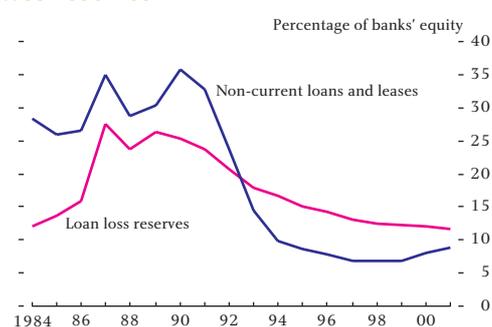
Chart K:
Daily changes in EME bond yield spreads



Sources: JP Morgan Chase & Co and Bank calculations.

(a) Arithmetic average of one-day spread changes of all country sub-indices of the EMBI Global index excluding Argentina.

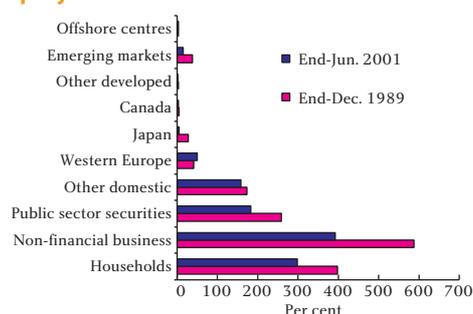
Chart L:
US banks' non-performing loans and loan loss reserves^(a)



Source: Federal Deposit Insurance Corporation.

(a) Figures for 2001 Q3 are preliminary (released on 30 November).

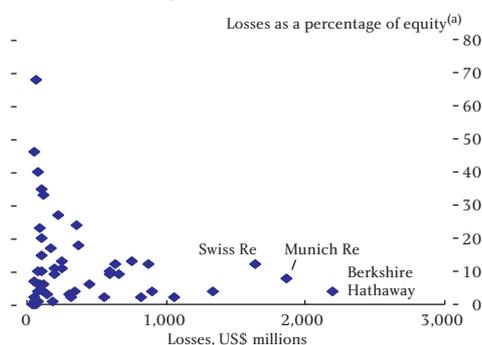
Chart M:
US banking system: domestic sectoral and international exposures as a percentage of equity^(a)



Sources: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States 2001', Q2, Federal Financial Institutions Examination Council 'Country Exposure Survey' and Federal Deposit Insurance Corporation.

(a) Excluding derivatives etc.

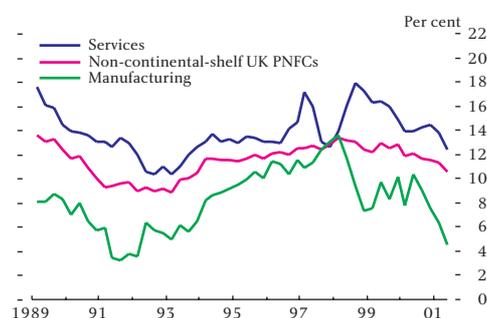
Chart N:
Distribution of insurance losses arising from the 11 September terrorist attacks



Source: Standard and Poor's (29 October).

(a) Shareholder's equity at the end of 2000.
 (b) On 27 November, Lloyd's of London, not included in these data, estimated its total net loss at £1.9 billion (US\$2.7 billion), equivalent to 34 per cent of the total net resources of the Society of Lloyd's and its members at the end of 2000.

Chart O:
UK corporate sector net rate of return on capital^(a)



Source: ONS.

(a) Net operating surplus/net capital employed.

counterparty creditworthiness. There are, of course, many lessons to be learnt about contingency planning and the potential systemic importance of different types of firm; some firms' services may effectively be akin to market infrastructure and need to be especially robust (Box 6). These and other issues concerning the robustness of the financial system in the face of disruption are under review in the United Kingdom and elsewhere.

The 11 September attacks had a big impact on the global insurance and reinsurance sectors (Chart N). Financial markets have apparently differentiated between insurers according to their strength and their ability to benefit from a prospective rise in premium rates. However, some questions inevitably remain, including about the ultimate cost of the insurance claims (given the divergence between 'top-down' and 'bottom-up' estimates) and the degree of risk spreading that will in practice be achieved by reinsurance arrangements. At the same time, some life insurance companies – particularly in Europe – have been adversely affected by falling nominal interest rates and, on the asset side of their balance sheets, by lower equity prices. In the event that some general insurers or life insurance companies were, in these circumstances, to make sharp balance sheet adjustments to meet shareholder expectations, guarantees to customers, or regulatory requirements, there would be some potential for financial market disturbance. These questions are, perhaps, of growing importance because of increasing links between the banking and insurance sectors¹. The potential for spillovers is probably still modest at present. But the importance of sound counterparty credit risk management is underlined, just as it proved to be in the rather different circumstances of LTCM and, more recently, Enron.

The United Kingdom

The issues raised above are important to the UK financial sector, either directly, or indirectly via links with the international financial system. But UK-specific developments are, of course, particularly relevant given that, for example, roughly half of UK banks' lending² is to the domestic non-bank private sector.

The UK outlook remains better than that for most industrial countries, as robust final domestic demand growth has to some extent lessened the impact of the global slowdown. The November modal projection of the Bank's Monetary Policy Committee envisaged that growth would slow moderately in the near term before recovering to around trend. Upside and downside risks around the modal projection were balanced (see the November *Inflation Report*, page 50).

1: See the article by David Rule in this issue of the *Review*

2: Excluding lending to the UK public sector and other UK banks

There remain, however, substantial imbalances within the UK economy (*Inflation Report*, page 54). The tradables sector has continued to face a much more difficult environment than the non-tradables sector, reflected most obviously in the sharp fall in manufacturing profitability (Chart O). Separately, rapidly rising commercial property borrowing raises the question of whether credit quality would be sustained in the event of a more prolonged slowdown than currently anticipated; property-related lending is the largest component of UK banks' domestic commercial loan portfolios (Chart P). The current position seems, however, to be less vulnerable than during some past episodes.

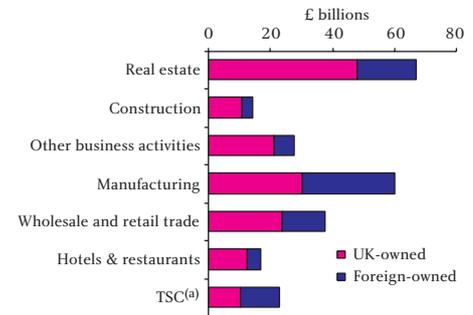
The growth rates of consumption and external demand have also continued to diverge. If consumption continues to grow more rapidly than is sustainable in the long run, and that is accompanied by continued rapid growth in borrowing, household debt is likely to rise further in relation to income and wealth, increasing vulnerability to adverse shocks. The MPC concluded in November that there is a significant probability that household spending growth could remain stronger for longer than currently projected with a sharper correction subsequently; but there are also substantial downside risks to consumption growth (November *Inflation Report*, page 54). While capital gearing has risen, and both unsecured and secured lending have continued to grow rapidly, household income gearing is low by historical standards, given low interest rates (Chart Q). House prices are above their long-run historical average relative to earnings, but loan-to-value ratios have been relatively stable.

The UK financial system

The relative importance of domestic business to the balance sheets and profitability of UK banks has helped to cushion them so far from the global slowdown, given the robustness of domestic demand. Like banks elsewhere, they are facing some increase in credit risk, particularly in parts of the corporate sector. And, given the economic conjuncture, there are risks latent in rapid consumption and household borrowing growth. But the system seems relatively well positioned to cope with any unexpected deterioration, given high Tier 1 capital ratios and sustained strong profitability (Chart R).

The UK insurance sector, by contrast, currently faces some pressures, from 11 September claims and significant falls over the past year or so in equity prices and government bond yields, affecting solvency margins (Chart S). These, however, do not necessarily entail an increase in systemic risk. There is a broader issue about who bears the risks associated with households' long-term saving contracts, including life insurance. For example, companies of all kinds with defined-benefit pension schemes are exposed to market risks. To the extent that some have to top up

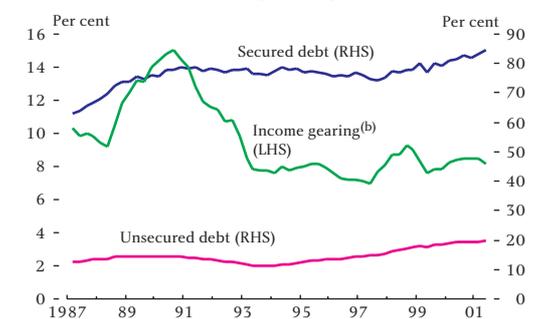
Chart P:
UK-resident banks' stock of loans to corporates, 2001 Q3



Source: Bank of England.

(a) Transport, storage and communication. This includes the provision of telecoms services.

Chart Q:
Household secured debt and unsecured debt as a percentage of disposable income, and income gearing^(a)

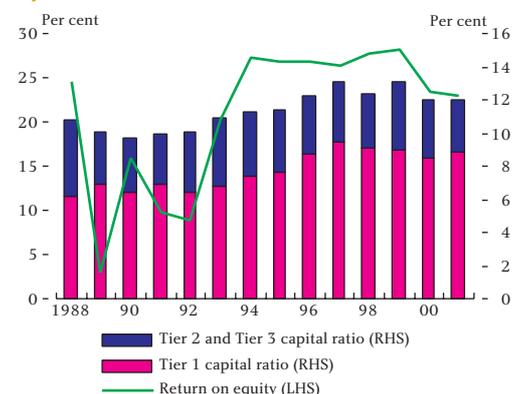


Sources: ONS and Bank of England.

(a) Disposable income is seasonally adjusted.

(b) Income gearing is total household interest payments as a percentage of total household disposable income.

Chart R:
Major UK banks' profitability and capitalisation^{(a)(b)}

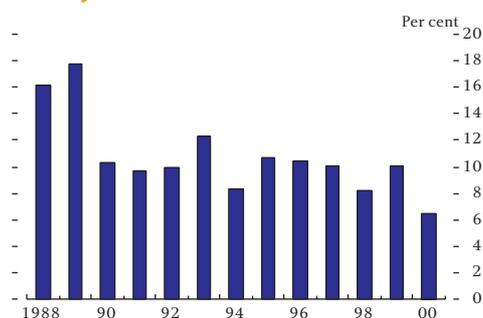


Source: BBA.

(a) Barclays, Lloyds/Lloyds TSB, Midland/HSBC Bank, Abbey National, RBS Group, NatWest 1988-1999, Alliance and Leicester from 1995, Halifax from 1996, Woolwich 1997-1999, Northern Rock from 1998, Bradford & Bingley 1999-2000.

(b) 2001 figure is for H1.

Chart S:
Free-asset ratio for UK life insurance industry^{(a)(b)}



Sources: Standard & Poor's and Bank calculations.

(a) UK-resident life insurers.

(b) Individual company ratios of net assets admitted for regulatory purposes (after deductions for reserves for liabilities and the required margin of solvency) to gross admissible assets. These company level ratios are then weighted by total assets to obtain the industry ratio.

their pension funds, that would tend to weaken company balance sheets. That might perhaps be more noticeable since changes in the accounting treatment of pensions (Financial Reporting Standard 17) are making such costs more explicit.

Finally, of the many developments in UK and international financial infrastructure, the introduction of inter-bank payment in central bank money in the CREST gilt and equity settlement system is particularly noteworthy. It eliminates very large uncollateralised intra-day credit exposures amongst the biggest UK banks and so, seven years after the introduction of real-time gross settlement in the CHAPS wholesale payment system, removes a significant structural vulnerability in the UK financial system.

I International financial markets

Since the June *Review*, there have been major changes in the external environment relevant to financial stability, the most important being the deepening slowdown in the global economy and the terrorist attacks on the United States on 11 September. These developments are important for the United Kingdom, as a global financial centre, and for UK banks, given their direct and indirect exposures to the international economy and markets.

The global fall in demand for information, communications and technology (ICT) goods and services has continued. Forecasts of GDP growth in 2002 for the United States, Japan and the euro area had been revised downwards even before the attacks (Chart 1), although recoveries are generally expected to start at some point next year. Economic forecasters' uncertainty about growth has increased. External developments have added to Japan's existing economic weaknesses and financial-sector fragility, and have led to a worse outlook for exporters in emerging market economies (EMEs). Pressures on some EMEs have increased, but there has been very little contagion from Argentina. Crude oil prices have fallen despite political tension in the Middle East.

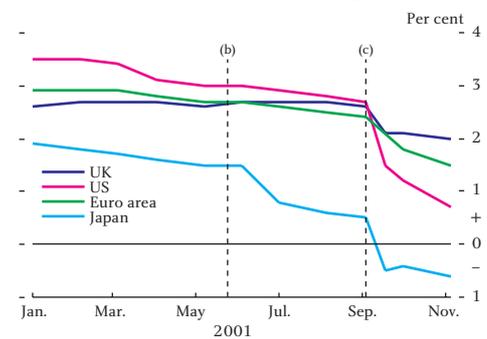
Central banks have responded to the weakening global economic outlook by easing monetary policy. The US government is also planning a significant discretionary fiscal stimulus. US dollar, euro and sterling government bond yield curves have shifted down and steepened since the June *Review*, as investors have revised estimates of the depth of the global economic slowdown and the timing and strength of recovery¹. Implied forward US dollar, euro and sterling interest rates begin to rise around 2002 Q2 and US dollar forward rates are about 3½ per cent by December 2002, suggesting expectations of a relatively strong recovery next year (Chart 2).

The economic impact of the terrorist attacks remains uncertain. Immediate effects on air transport and other travel-related industries, together with any decline in consumer or business confidence, may have reduced aggregate demand in the short run. But the size and duration of any effects are unclear. The need for additional security, higher insurance costs and reduced willingness to travel will tend to lower aggregate productivity and supply capacity in the longer term². Greater uncertainty might also lead investors to charge higher risk premia. Implied volatilities derived from traded options on equity indices, government bond prices, short-term interest rates, exchange rates and commodities spiked upwards after 11 September. Although

1: See the Markets and Operations article in the Winter 2001 *Bank of England Quarterly Bulletin*.

2: See the November 2001 *Inflation Report*, page 52.

Chart 1:
Consensus forecasts for GDP growth^(a)



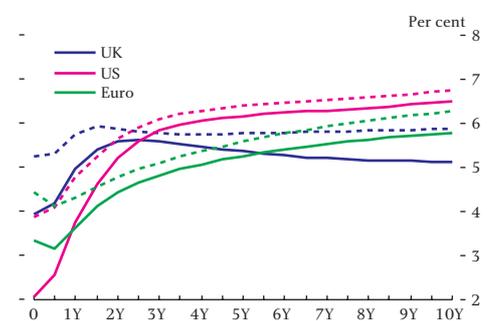
Source: Consensus Forecasts.

(a) Mean of forecasts.

(b) June 2001 *Review*.

(c) 11 September 2001.

Chart 2:
Three-month implied bank liability forward curves^(a)



Source: Bank of England.

(a) As at 28 November 2001. Dashed line represent 12 June 2001.

Table 1:
Implied volatilities of selected financial contracts^(a)

	12 Jun 01	17 Sep 01	28 Nov 01
<i>Equities^(b)</i>			
S&P500	18.6	37.7	23.3
Dax	20.0	43.1	32.1
FTSE-100	18.5	34.5	21.1
<i>Govt bonds (Dec 2001 futures contracts)</i>			
UST 10-year	6.8 ^(c)	8.6	7.6 ^(d)
Bund 10-year	4.2	5.4	9.3 ^(e)
<i>Short-term interest rates (Dec 2001 futures contracts)</i>			
Eurodollar	19.8	37.8	51.3
Euribor	16.2	21.9 ^(e)	13.3
<i>Exchange rates (3 month forward)</i>			
Dollar/yen	10.0	13.4	10.1
Euro/dollar	11.5	14.3	10.6
<i>Oil</i>			
Jan 2002	25.8	38.4	65.2

Sources: Bloomberg and Bank of England.

(a) Implied volatilities are percentage measures relative to the underlying contract.

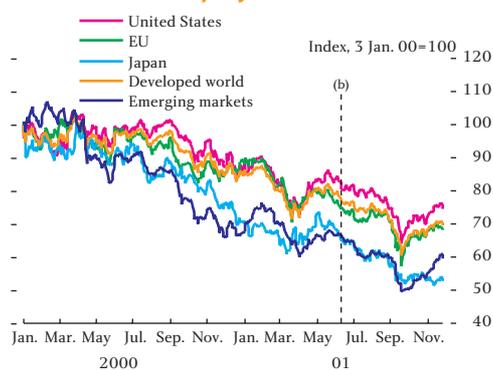
(b) A weighted average of the implied volatilities of the nearest three option contracts closest to at-the-money strike prices.

(c) 19 June 2001.

(d) 21 November 2001.

(e) 14 September 2001.

Chart 3:
Selected world equity indices^(a)

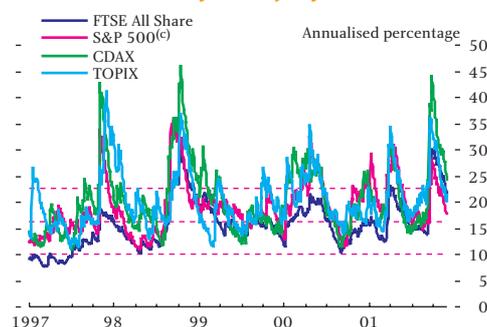


Source: MSCI.

(a) Denominated in US dollars.

(b) June 2001 Review.

Chart 4:
Historical volatility of equity indices^{(a)(b)}



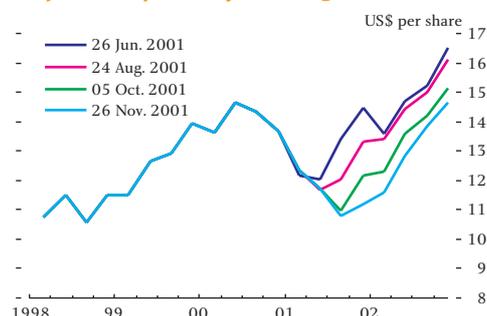
Sources: Thomson Financial Datastream and Bank calculations.

(a) Volatility calculated over a 252-day rolling exponentially weighted moving average.

(b) S&P 500 average and standard deviation calculated from 1994.

(c) Top dashed line is S&P 500 average plus one standard deviation; middle dashed line is S&P 500 mean; bottom dashed line is S&P 500 average less one standard deviation.

Chart 5:
Analysts' projections of S&P 500 companies' quarterly earnings



Source: I/B/E/S.

most have declined subsequently, equity, government bond and crude oil implied volatilities remain higher, to different degrees, than before the attacks (Table 1).

The potential implications of these developments for financial stability are explored in subsequent sections. Here, changes in financial market prices (and quantities) are used to assess the nature and scale of the shocks and to trace out their differential effects on sectors and regions.

Equity markets

Equity indices are lower globally than at the time of the June Review (Chart 3). The MSCI developed world index has fallen by around 10 per cent in US dollar terms and is now around 30 per cent below its March 2000 peak. It had fallen before 11 September and the rate of decline increased immediately following the terrorist attacks, but it has risen since 21 September. Volatility of daily equity index returns has been high by past standards since 11 September, though more so for European and Japanese than US indices (Chart 4). This suggests that the amount of 'news' to be assimilated has increased during the period.

Given that the sharp monetary easing this year is likely to have reduced risk-free real interest rates, at least in the near term, the decline in equity prices is likely to have been due to some combination of downward revisions to expected corporate earnings and higher required risk premia. Both factors have probably played a role.

First, with the downward revisions to economic growth forecasts for 2002, analysts' forecasts for US corporate earnings now incorporate a steeper decline and a delayed recovery (Chart 5). The upturn in earnings, when it comes, is still nevertheless forecast to be strong. Section VI discusses further what current equity market valuations may imply about market expectations of growth.

Second, turning to the issue of risk premia, the implied volatility of the S&P 500 index (as calculated from option prices) is lower than an average of the implied volatilities derived from options on its constituent stocks, because diversification across the index allows aggregate risk to be reduced. Following 11 September, the gap narrowed but has since risen again (Chart 6). That might suggest that systematic risks temporarily became relatively more significant than risks associated with individual companies or industry sectors. On this measure, systematic risks have become relatively somewhat more significant than idiosyncratic risks in 2001, compared with 2000, when the gap was relatively high by historical standards.

One possible explanation is that the risk premium may have risen. The steep fall and then bounce-back in equity indices after 11 September, combined with upward spikes in implied volatilities and in credit spreads on bonds (see below), may indeed have reflected such an increase, albeit one which has perhaps largely reversed.

It is not implausible that investors require higher risk premia in times of global political uncertainty. The S&P 500 declined immediately following events such as the Cuban Missile Crisis, the Tet Offensive in the Vietnam War and the Gulf War (Table 2). These declines have typically reversed within twelve months, perhaps as uncertainty about the implications of the crisis declined. But the implications of 11 September are perhaps particularly difficult to assess at present. If, as seems plausible, risk premia are higher now than on 10 September, the fact that equity indices are now also higher suggests that the monetary policy easing in the interim has more than offset any further deterioration in expected future earnings growth.

Credit markets

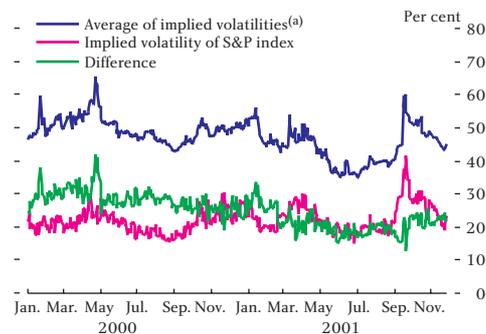
A combination of lower equity prices and higher implied equity price volatility would typically suggest that credit risk has increased (unless capital gearing falls)³. Consistent with that, spreads (over swaps) on global, US dollar, euro and sterling-denominated and sub-investment-grade corporate bond indices have risen since the June Review, and US dollar investment-grade spreads are slightly higher too (Charts 7, 8, 9 and 10). Most bond yield spread indices are close to or higher than the peaks reached at the end of 2000. Over a longer period, spreads on long-term US dollar corporate bonds over 30-year Treasury yields are close to, but still below, the peaks reached in the early 1980s and in 1987 (Chart 11) – this may partly reflect lower yields on government bonds because of a decline in their relative supply.

Chart 12 shows spreads over government bonds on broad indices of corporate bonds in order to try to capture general changes in assessments of corporate creditworthiness⁴. Indices of bonds with a common rating (eg A-rated) are less useful as an indicator of changing corporate creditworthiness at times when a relatively large number of companies are being re-rated. For example, since the June Review, 13 per cent by value of the companies in the global A-rated Merrill Lynch bond index have been re-rated, with

3: See, for example, Merton, R C (1974) 'On the pricing of corporate debt: the risk structure of interest rates' *Journal of Finance*, May, pp 449-470. A box on page 25 of the December 2000 Review briefly summarised Merton's model. Changes in equity prices and equity price volatility are used here as proxies for changes in corporate asset values and the expected volatility of asset values.

4: The indices used are the following from Merrill Lynch: the US dollar-denominated corporate bond index, the euro-denominated corporate bond index, the sterling-denominated, non-gilt bond index and the US dollar-denominated high yield index. Together, these indices currently account for around 7,000 issues with a market value of around US\$2.7 trillion.

Chart 6:
Implied volatility of S&P 500 compared with average implied volatility of S&P 500 stocks



Source: Bloomberg.

(a) Average is calculated across individual stocks.

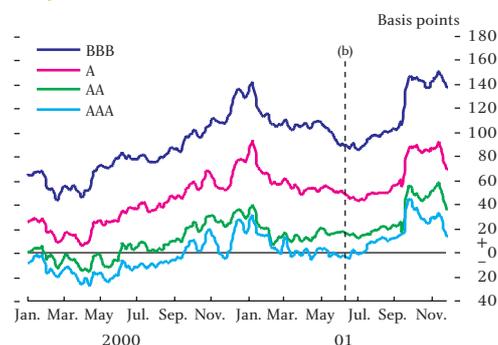
Table 2:
S&P 500 performance during wartime uncertainty

Event	Reaction period	Initial reaction	One year later ^(a)
Pearl Harbor	07/12/41-29/12/41	-10.2	15.3
Korean War	25/06/50-17/07/50	-12.9	31.4
Cuban Missile Crisis	25/08/62-26/10/62	-8.8	36.6
Tet Offensive, Vietnam War	31/01/68-05/03/68	-5.6	13.7
Iraqi invasion of Kuwait	02/08/90-16/01/91	-11.1	32.3

Source: Bloomberg and Bank calculations.

(a) One year after the specified reaction period.

Chart 7:
US dollar investment-grade spreads over swap rates^(a)

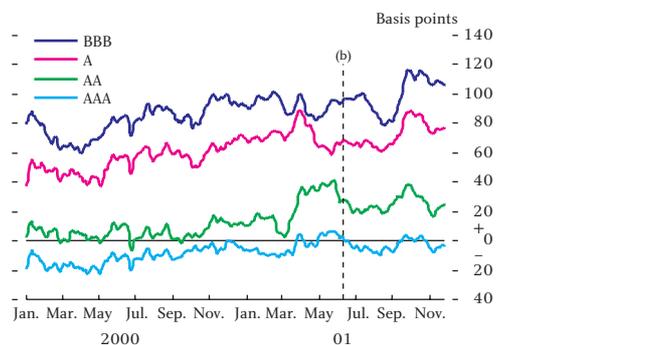


Source: Bloomberg.

(a) Ten-year maturity bond yields less ten-year swap rates. Five-day moving average.

(b) June 2001 Review.

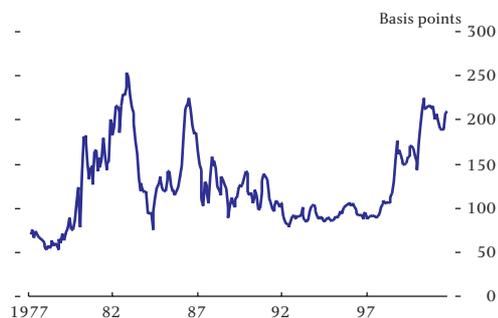
Chart 8:
Sterling investment-grade spreads over swap rates^(a)



Source: Bloomberg.

- (a) Ten-year maturity bond yields less ten-year swap rates. Five-day moving average.
- (b) June 2001 Review.

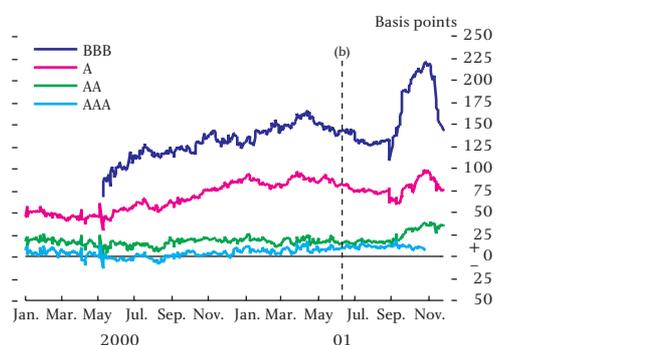
Chart 11:
Moody's corporate bond spreads over Treasury yields^(a)



Sources: Moody's Investors Service and Board of Governors of the Federal Reserve System.

- (a) Moody's corporate bond yield average over 30-year constant maturity US Treasury yields.

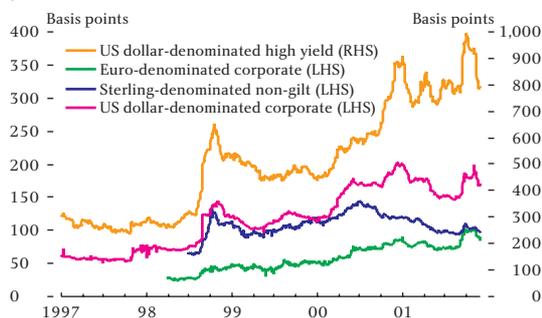
Chart 9:
Euro investment-grade spreads over swap rates^(a)



Source: Bloomberg.

- (a) Ten-year maturity bond yields less ten-year swap rates.
- (b) June 2001 Review.

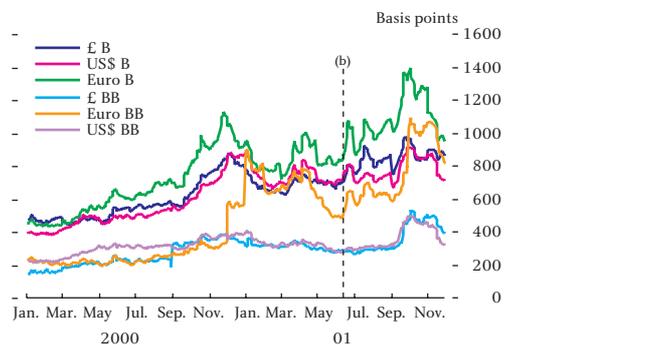
Chart 12:
Selected broad corporate bond yield spreads^(a)



Source: Merrill Lynch.

- (a) Option adjusted spreads of sectoral bond indices over government yields.

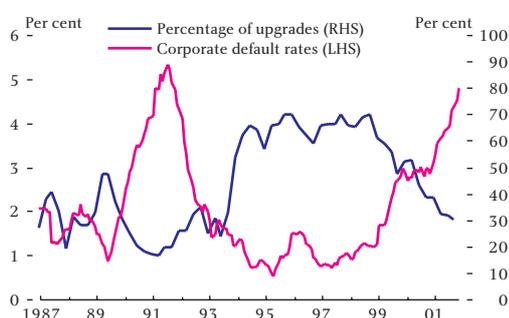
Chart 10:
Sub-investment-grade corporate bond spreads: US dollar, euro and sterling^(a)



Sources: Merrill Lynch and Bloomberg.

- (a) High-yield indices spread over maturity-matched swap rates.
- (b) June 2001 Review.

Chart 13:
Value of upgrades as a percentage of total rating changes and corporate default rates^{(a)(b)(c)}



Sources: Moody's Investors Service

- (a) Annual data.
- (b) Trailing one-year default rate calculated as the number of defaulting issuers divided by the number of rated issuers over the preceding year.
- (c) US corporates.

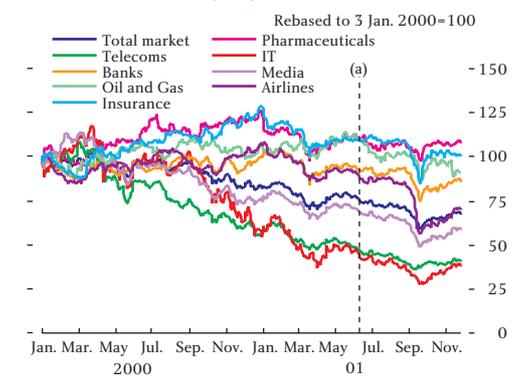
many moving to the index of BBB-rated companies following downgradings. In principle, movements in indices of bonds with identical ratings should show changes in spreads for a given credit risk (averaged over the cycle), reflecting primarily changes in risk premia. In practice, however, spreads may change within ratings categories because the change in credit risk is insufficient to push a company over a ratings threshold, or because there is a delay in adjusting announced ratings.

A key difference from previous periods of high spreads is that yields themselves remain relatively low. In the early 1980s, when inflation expectations were much higher, BBB-rated companies were paying *nominal* interest rates of around 16 per cent on ten-year bonds, rather than the current 8 per cent. Despite the rise in credit spreads, companies rated above single-A in US dollar and BB in euro have seen their nominal cost of funding remain the same or fall since June. A fall in nominal yields reduces immediate debt-service demands on corporate cashflow and can help to improve corporate liquidity by reducing the 'frontloading' of real interest payments that inflation premia tend to bring about.

Another indicator of increasing credit risk is the ratio of the amount of debt affected by upgrades to the total amount affected by rating changes, calculated for rated companies. Using Moody's data for US firms, this was 22 per cent in 2001 Q3, compared with an average of around 45 per cent since 1987 (although changes in the rated population over time mean that comparisons must be treated with care). This ratio has tended to decline since 1998, but has not yet reached the lows of the early 1990s. Rising default rates confirm the picture (Chart 13). A further indicator of higher credit risk is the increasing number of downgrades in the collateralised debt obligations (CDO) market.

Unexpected declines in credit quality pose a particular risk to lenders. Those holding traded debt may suffer mark-to-market losses on their holdings, while those holding non-traded debt may have to increase general provisions (which ideally would be forward-looking) and/or allocate more economic capital against potential credit losses. Such declines can also constrain borrowers. For example, the rating agencies have downgraded some large companies to the point where their commercial paper is no longer rated A1/P1, limiting their access to the CP market – given, for example, the regulatory restrictions on money market mutual fund holdings. Some have responded by increasing the maturity of their borrowing and switching to issuance of bonds (often at increased cost), or by increasing the securitisation of their cashflows. In consequence, US dollar corporate issuance of commercial paper has declined this year, whereas investment-grade bond issuance has been strong and the

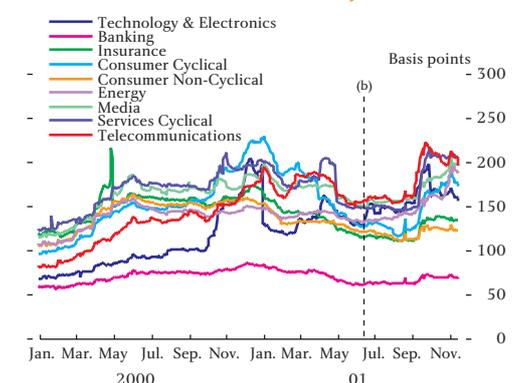
Chart 14:
World sectoral equity indices



Source: Thomson Financial Datastream.

(a) June 2001 Review.

Chart 15:
Global sectoral bond index spreads^(a)

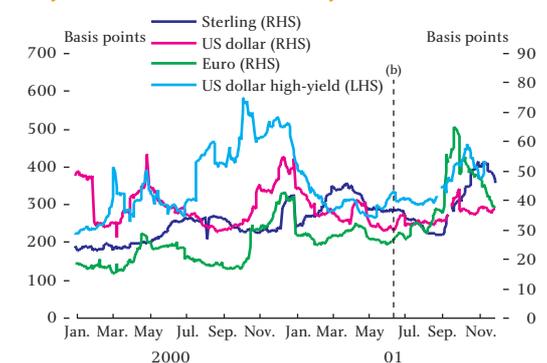


Source: Merrill Lynch.

(a) Option adjusted spreads over government yields.

(b) June 2001 Review.

Chart 16:
Dispersion of bond index spreads^(a)

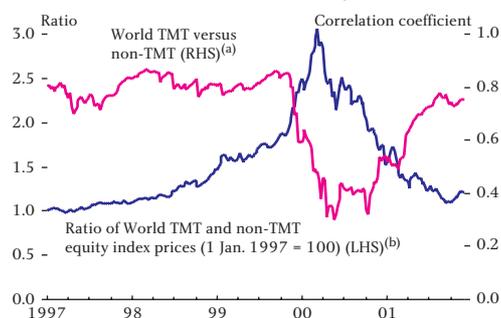


Source: Merrill Lynch and Bank calculations.

(a) Calculated as the standard deviation of the option adjusted spreads of the different sectors.

(b) June 2001 Review.

Chart 17:
World TMT and non-TMT share price ratio
and correlation of their weekly returns

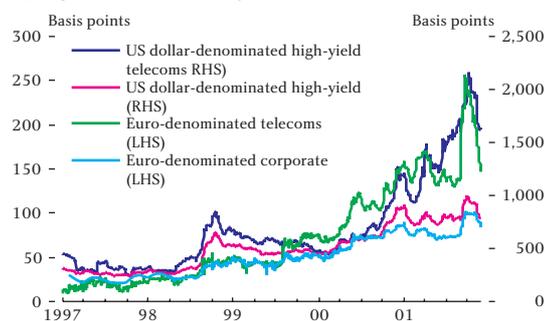


Sources: Thomson Financial Datastream and Bank calculations.

(a) Weekly correlations (of exponentially weighted moving average log returns) calculated over a five year rolling window.

(b) Ratio of World TMT and non-TMT equity index prices (for both indices, 1 Jan. 1997=100).

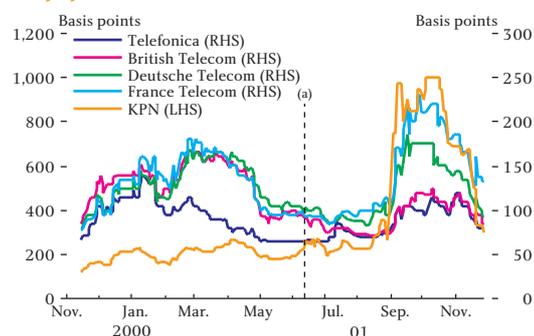
Chart 18:
Euro investment grade and US dollar
high-yield sectoral spreads^(a)



Source: Merrill Lynch.

(a) Option adjusted spreads of sectoral bond indices over government yields.

Chart 19:
Telecom company 5-year credit default
swap prices



Source: JP Morgan Chase and Co.

(a) June 2001 Review.

asset-backed commercial paper market has continued to grow (see Section VI).

Variation by industry sector

Although there has been some recovery since mid-September, global share price indices have fallen and spreads over government bonds on bond indices have widened for most industry sectors since the June Review (Charts 14 and 15). Nonetheless, variation by sector has been considerable. For example, the dispersion of spreads over swaps across sectoral bond indices has increased for investment and sub-investment-grade US dollar, euro and sterling-denominated bonds (Chart 16). Assessment of creditworthiness by sector is important, because the implications of structural change for financial stability depend not only on its pace but also on sectoral gearing and the degree of sectoral concentration of lenders' portfolios.

The telecom, media, and technology sectors

The June Review pointed out that falls in share prices since March 2000 had been concentrated in the TMT sectors, particularly telecom, telecom equipment manufacturing and IT software. TMT sector indices have fallen further since June. The former sharp distinction between TMT and non-TMT sectors has, however, diminished. Correlations between weekly returns on US TMT and non-TMT sector indices have increased (Chart 17). Both TMT and non-TMT global sector indices fell from June until mid-September and then rose. One interpretation is that the reassessment of the TMT sectors relative to the rest of the market is nearing completion. But, in common with other industries, expected earnings of TMT companies have been revised downwards to reflect the deepening slowdown in the global economy. As the June Review pointed out, the TMT sector is not a monolith. The biggest fall within TMT since then has been in the media sector, which is exposed to declining advertising revenue. The events of 11 September have emphasised the importance to business of local telecoms connectivity, helping some telecom supply companies.

The market assessment of credit risk in the telecom sector nevertheless remains high. Spreads over government bonds on indices of bonds issued by US and European investment-grade and sub-investment-grade telecom companies increased by more than those on broad bond market indices for similarly rated issues from June to around the end of the third quarter, although that widening has since largely reversed (Chart 18). Among the large European telecom operators and equipment manufacturers, credit default swap prices suggest that assessments of creditworthiness have varied since June, as attempts to reduce debt and strengthen balance sheets have enjoyed varying degrees of success (Chart 19).

Capital markets remain closed to most 'alternative' telecom operators. Moody's data show that sub-investment-grade telecoms defaulted on US\$15.8 billion of debt in 2001 H1 compared with US\$6.5 billion in the whole of 2000. To the extent that shareholders and bondholders mark their positions to market, remaining exposures should on the face of it be limited by the extent of the steady fall in prices over the past eighteen months.

Non-TMT sectors

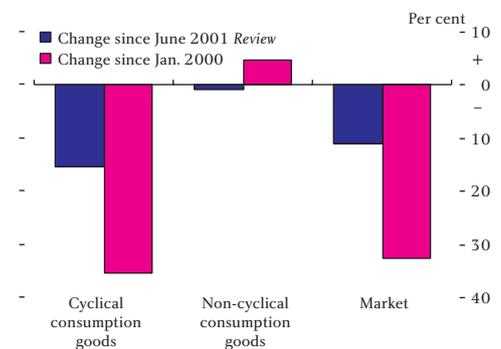
The decline in global TMT share price indices has been broadly similar to that in non-TMT indices since the June Review. But, whereas TMT indices are now about 45 per cent below their January 2000 valuation, broad non-TMT indices are close to unchanged.

In June, the TMT sector stood out. In the past six months, a wider range of industries has raised financial stability issues. The share price falls since June have been greater in sectors more exposed to a decline in aggregate demand. For example, the share price index for US cyclical goods manufacturers (cars, car parts, retailers, luxury goods, household appliances, clothes) has declined relative to that for non-cyclical goods manufacturers (pharmaceuticals, food, drinks, supermarkets, personal care) (Chart 20), for some of which share prices have increased. Spreads over swaps have increased most since June on indices of US-dollar denominated bonds issued by companies in the cyclical services, cyclical consumer goods and energy sectors.

The consequences of the terrorist attacks on 11 September were felt directly in travel-related industries and insurance. Global sectoral equity indices for airlines and airports fell by 22 per cent and for hotels by nearly 15 per cent between the June Review and end-November. The knock-on reduction in demand for commercial aircraft prompted a 30 per cent decline in the aerospace manufacturing sector. Similarly spreads over swaps on bonds issued by companies globally in the cyclical services sector (which includes air travel) increased by more than any other sector in the week following 11 September.

Insurance and reinsurance sector equity prices also fell in that week as investors came to recognise the scale of insurance claims. But these sectors have since more than recovered, in anticipation of reduced industry capacity and rising premium rates (although performance by company has varied according to the market's assessment of their relative financial strength and ability to benefit from new opportunities). Declines in global sectoral indices since the June Review are consequently among the smallest for these industries. Subsequent sections consider the financial system implications of developments in the airline and insurance industries in more detail.

Chart 20:
Cyclical and non-cyclical sectors



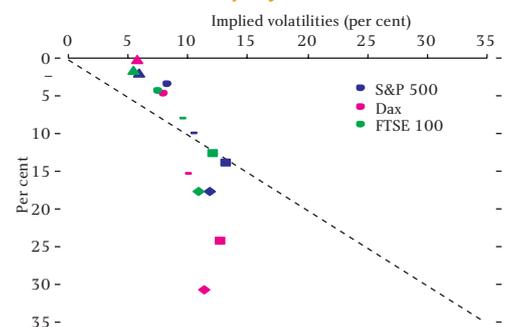
Source: Thomson Financial Datastream.

Table 3:
Percentage changes in world equity indices

	Developed world	US	UK	Europe	Japan	EME
Change since market peak (27 Mar. 00)	-31.9	-28.3	-25.8	-33.5	-43.2	-43.2
Change since June 2001 Review	-10.8	-10.3	-5.4	-8.5	-19.2	-11.0
Change since market trough (21 Sep. 01)	15.2	16.5	15.0	18.7	-0.7	20.1

Source: MSCI
(a) Denominated in US dollars. Market peak and trough dated according to the developed world index.

Chart 21:
Volatilities implied from options contracts in June versus realised percentage changes in selected world equity indices



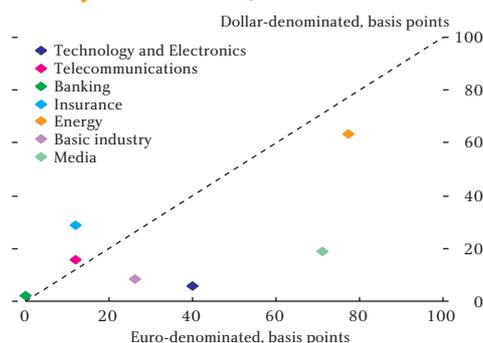
Source: Bloomberg.

(a) July=triangle, August=circle, September=line, October=diamond, November=square.

(b) The colours represent the different equity indices.

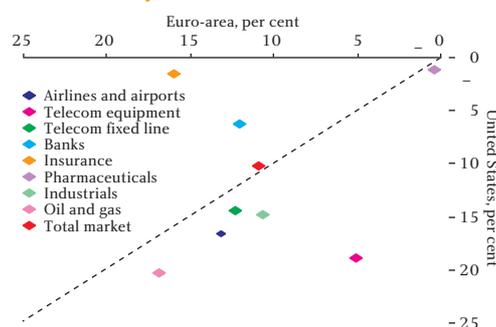
(c) The implied volatility is scaled down to the number of days between June and the desired month.

Chart 22:
Changes in bond spreads over swaps by industry sector since June 2001 Review^(a)



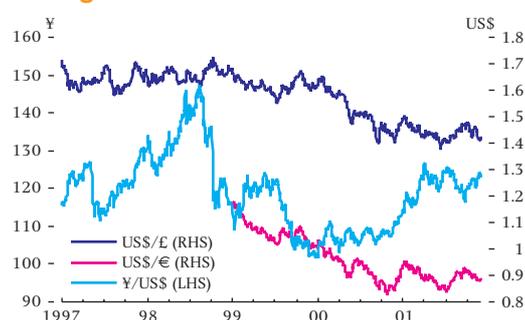
Source: Merrill Lynch.
 (a) Investment grade.

Chart 23:
Changes in share indices by industry sector since June Review^(a)



Source: Thomson Financial Datasream.
 (a) Denominated in US dollars.

Chart 24:
Exchange rate movements



Source: Bloomberg.

Variation by region

The pattern of lower equity indices and wider credit spreads is common across most regions of the world. Equity index falls have been similar in Europe, the United States and EMEs, in US dollar terms, but somewhat greater in Japan (Table 3).

One way of assessing the extent to which price changes over the past six months may have surprised investors is to compare them with the degree of price volatility expected in June, as derived from prices of equity index options⁵. On this measure, the falls in the S&P 500 and FTSE 100 from June to October were larger than one standard deviation of the implied probability distribution of prices (ie the diamonds in Chart 21 lie below the 45° line). But more recent rises in these indices mean that the net declines between June and November fell within one standard deviation. Participants in these equity markets appear to have judged the net impact of economic news since June about corporate prospects to have been modest relative to the range of possibilities envisaged in June. The falls in the DAX 30, by contrast, have been greater than one standard deviation between June and September, June and October, and June and November. This might suggest that the deterioration in German prospects has come as more of a surprise to market participants.

Similarly, bond spreads over government bonds have widened in Europe, Japan and EMEs as well as the United States. Charts 22 and 23 show both the correlation across European and US equity and credit markets and the variation between industry sectors.

Exchange rates and global capital flows

Exchange rate behaviour also suggests a global rather than a regional or sectoral shock. The US dollar has weakened a little against the euro and sterling since June, but major exchange rates have remained relatively stable in the face of the slowdown in the global economy, the terrorist attacks and the increased volatility in equity markets (Chart 24). Thus there has been little evidence of sharp changes in the net demand for one region's financial assets relative to another's (although gross flows may have been reduced by a decline in cross-border M&A activity). This is discussed further in the US context in Section II.

Likewise, implied volatilities derived from options on three-month forward exchange rates are broadly unchanged, having spiked up briefly following 11 September, and are now once again closer to historical volatilities. So uncertainty about the pattern of future exchange rates does not appear to have increased significantly.

⁵ The implied volatility is taken from options contracts in June 2001 and scaled to the number of days between June and the reference month to give the implied volatility between June and the reference month. This is plotted against the realised change in equity indices between June and the reference month.

II The United States

As noted in Section I, the US economic slowdown has proved to be sharper than expected at the time of the *June Review*⁶. Even before the 11 September terrorist attacks, investment had weakened (as in many other industrial economies) and GDP growth expectations for both 2001 and 2002 were beginning to edge down. Since then, uncertainties about the overall economic outlook have increased (Chart 25), and prospects for sectors such as airlines and travel have deteriorated. Output fell by 0.3 per cent in Q3 on a seasonally adjusted basis⁷, and indicators of business and consumer confidence have generally reinforced expectations that GDP will decline further in Q4.

Against that background, the Federal Reserve has continued to cut rates – bringing the cumulative reduction this year to 4.5 percentage points. A further fiscal stimulus is also contemplated, beyond the effects of automatic stabilisers and already agreed measures.

Capital flows and the current account

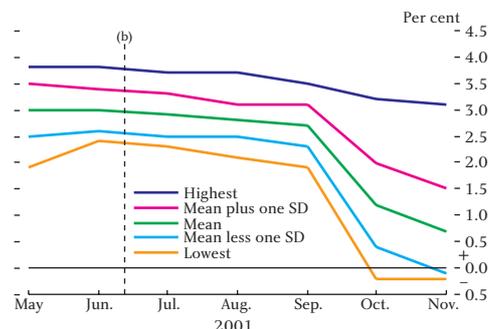
Previous *Reviews* have identified a possible risk to stability stemming from the substantial US current account deficits and accumulation of external debt. Depending on expectations about economies elsewhere, there is a risk of a capital flow reversal to the extent that there has been over-investment, at least in some sectors; or if expectations of continuing faster productivity growth in the long run were to be revised down. If any reversal were sudden compared with the adjustment of export and import demand, it might lead the dollar to weaken suddenly. To date, however, there have been no signs of this risk crystallising.

The deficit in external trade in goods and services narrowed sharply in 2001 Q3. While much of this was accounted for by payments by foreign insurers and reinsurers following the 11 September attacks, the underlying deficit has contracted in each quarter this year as exports have fallen by less than imports. The cyclical slowdown in demand is likely to be partly responsible – in particular investment-goods imports have fallen – but this may nevertheless presage a smooth adjustment of the external imbalances. Revisions to US national accounts data released since the *June Review* implied somewhat lower productivity growth in the late 1990s, but this does not seem to have affected views of an improvement in the underlying trend or to have disrupted the capital account. Despite larger interest rate cuts in the United States, the dollar's effective exchange rate has hardly changed since the *June Review*; and, as noted in Section I, forward-looking measures of exchange rate uncertainty have not increased.

6: UK banks' consolidated international exposure to the United States represents roughly 20 per cent of UK global exposure; 13 per cent of it is to the US banking sector.

7: This preliminary estimate was released on 30 November.

Chart 25:
Dispersion of 2002 US GDP growth projections^(a)

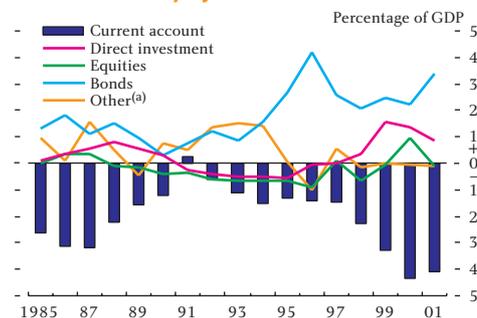


Source: Consensus Forecasts.

(a) Projections made in month shown.

(b) June 2001 *Review*.

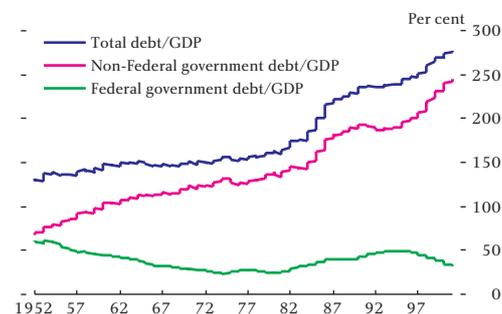
Chart 26:
US balance of payments



Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States 2001', Q2.

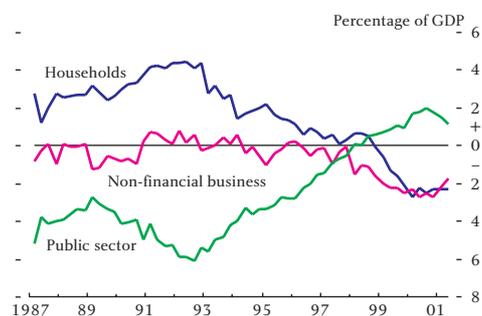
(a) Includes external transactions of the banking sector.

Chart 27:
Shares of US Federal Government and other debt



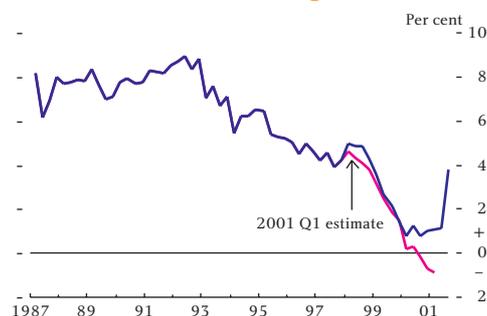
Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States 2001', Q2.

Chart 28:
US domestic sector financial balance^(a)



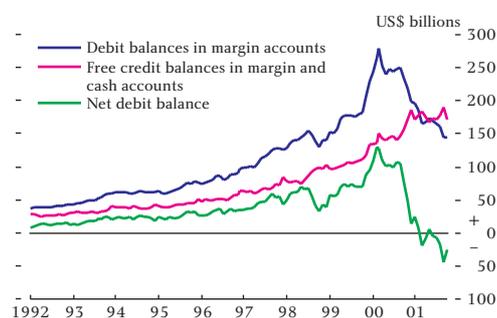
Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States 2001', Q2.
(a) Financial balance based on national income and product accounts estimate of household income.

Chart 29:
US household sector saving ratio^(a)



Sources: Bureau of Economic Analysis and US Department of Commerce.
(a) Personal saving as a percentage of disposable personal income.

Chart 30:
Margin and cash accounts with US securities dealers



Source: New York Stock Exchange.

Taken together with the relatively stable exchange rate, the smaller net capital inflow in 2001 H1 – the counterpart to a narrower current deficit – gave little indication of a reduced willingness by foreign investors to hold US assets. The inflow included a very large take-up by foreign investors of substantially higher bond issues by US companies; corporate bond issuance has since been lower. Foreign portfolio investment in US equities broadly matched US portfolio investment abroad. Both gross and net flows of direct investment fell slightly, but the net inflow into the US remained high (Chart 26). The balance of other (largely banking) flows remained small.

Overall, despite falling interest rates and lower profits, capital inflows appear to have remained robust. There are, however, continuing imbalances in the economy, associated with the build-up of debt in the household and corporate sectors in recent years.

The non-bank private sector

The economy-wide debt-to-GDP ratio has risen to around 275 per cent, and the share of non-Federal Government debt – carrying varying degrees of credit risk – has increased further since the mid-1990s (Chart 27). The financial deficits of the household and non-financial corporate sectors stabilised from mid-1999 and have shrunk slightly with the recent economic slowdown. This has been broadly matched by a decline in the public sector surplus, which is likely to continue given the recent fiscal measures (Chart 28).

The household sector

Data revisions now show that household sector incomes were higher than previously thought, and that the saving ratio stopped falling from early 2000. The spike in 2001 Q3 (Chart 29) will probably prove to have been temporary; the mid-year tax rebates appear to have been largely saved, although households may have increased spending ahead of actual payments once the rebates were announced.

Households' net borrowing in 2001 Q2 was a little higher than in Q1, but 2001 H1 borrowing was well down on 2000 H2. The pattern varies across the different components of household debt. There was a further decline in margin debt (perhaps because many retail 'day traders' have withdrawn from the market) and accounts with securities dealers were in net credit overall (Chart 30). Net consumer credit borrowing also fell back sharply in Q3, with growth in new revolving facilities (which includes credit card borrowing) particularly weak. The recent time-limited offer of interest-free financing on cars may, however, temporarily reverse the fall in the non-revolving component of consumer credit (and boosted car sales in October).

Mortgage borrowing, meanwhile, has remained strong. There has been significant refinancing of fixed-rate mortgages, encouraged by a fall in long-maturity bond yields which persisted until very recently (Chart 31). *Ceteris paribus*, this should improve the household sector's income gearing as interest-servicing obligations will be lower. The ability to refinance at lower nominal interest rates also protects households from a rise in the real burden of their long-maturity fixed-rate debt when inflation outturns are lower than expected. Where refinancing is accompanied by mortgage equity withdrawal, however, capital gearing would tend to rise.

Households have also been making what might be precautionary adjustments to their financial asset portfolios. For example, while in Q2 households moved funds from money market into equity mutual funds, the equity price falls in Q3 were associated with significant net redemptions of equity mutual funds, and transfers to money market and bond funds, particularly after 11 September (Chart 32). Some equity mutual fund managers did, however, report stronger sales in October.

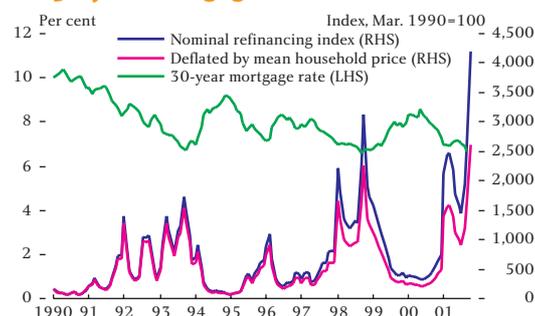
While data on financial flows provide important incremental information, key indicators for analysing potential vulnerabilities are the balance sheet (or stock) data. These tend to be available with a lag. The latest data (for 2001 Q2) offer mixed signals for the strength of household balance sheets overall. Household wealth recovered somewhat in Q2 following a temporary recovery of equity prices, but the equity component (including holdings of mutual funds) will have fallen slightly since then. Housing wealth has benefited from rising house prices since the mid-1990s (Chart 33). Given the larger increase in debt than in wealth, household capital gearing has risen slightly this year (to 15 per cent). Debt accumulation has also continued to outpace income growth, and in Q2 the aggregate debt-to-income ratio rose to almost 100 per cent (Chart 34).

However, while gross interest payments have been generally rising as a proportion of disposable income since 1993, lower interest rates helped stabilise income gearing in 2001 Q2 (Chart 35). It is likely that income gearing will fall in Q3 given the further interest rate reductions.

Personal bankruptcy filings totalled 390,000 in 2001 Q2 – the highest on record and significantly more than a year ago (Chart 36). This might be attributable in part to the increase in indebtedness in recent years, coupled with a more difficult economic climate, but it may also reflect consumers seeking court protection in advance of proposed bankruptcy law changes (that would make it harder to have debt discharged).

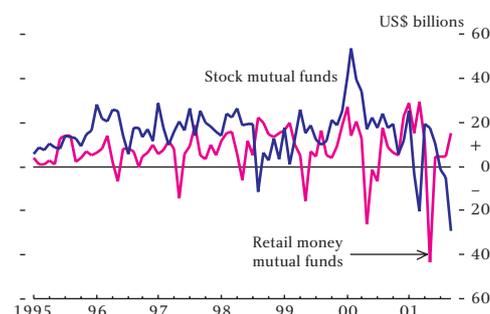
In summary, while the pace of borrowing growth has slowed and income gearing may have declined since Q2 because of lower

Chart 31:
Real, nominal mortgage refinancing index and 30-year mortgage rate



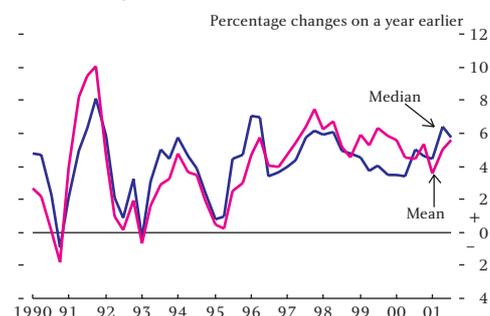
Sources: Bloomberg, Mortgage Bankers Association of America, US Department of Commerce and National Association of Realtors.

Chart 32:
Net sales of mutual funds



Sources: Investment Company Institute and Board of Governors of the Federal Reserve System.

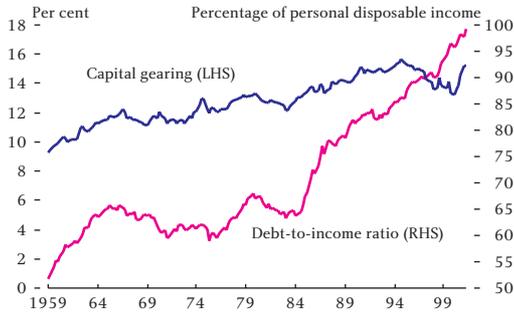
Chart 33:
US house prices^(a)



Source: National Association of Realtors.

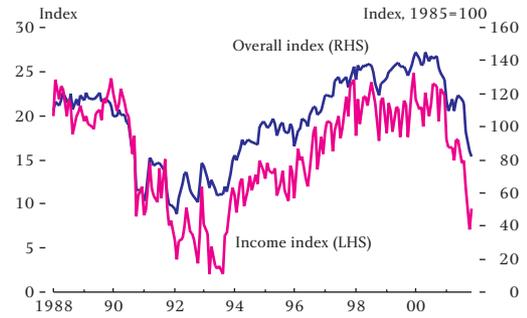
(a) Data are quarterly averages.

Chart 34:
US household capital gearing and debt-to-income ratio



Sources: Board of Governors of the Federal Reserve System; 'Flow of Funds Accounts of the United States 2001', Q2 and Bureau of Economic Analysis.

Chart 37:
US consumer confidence



Source: Conference Board Consumer Confidence Survey.

Chart 35:
US household income gearing^(a)



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

(a) The final observations are for 2001 Q2.

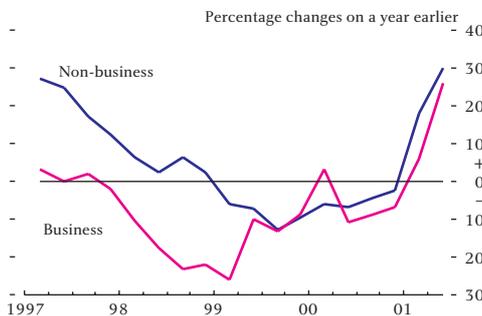
Chart 38:
US corporate sector capital gearing^(a)



Source: Board of Governors of the Federal Reserve System; 'Flow of Funds Accounts of the United States', 2001 Q2.

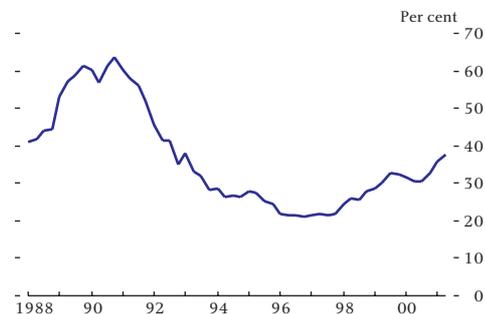
(a) Debt less cash and deposits, over capital stock at market value.

Chart 36:
US bankruptcies



Source: Administrative Offices of US Courts.

Chart 39:
US non-financial corporate business income gearing^(a)



Source: Bureau of Economic Analysis.

(a) Net interest/corporate profit (with inventory valuation and capital consumption adjustments).

interest rates, household sector debt remains high relative to income. Capital gearing, reflecting weaker asset markets since the June Review, has also recently edged up. Personal bankruptcies have increased, and there are likely to be further debt problems as the economy slows. How material this proves to be will depend on corporate sector conditions and their impact on employment. Consumer confidence, already softer, fell sharply following the 11 September terrorist attacks (Chart 37), but has since begun to recover.

The corporate sector

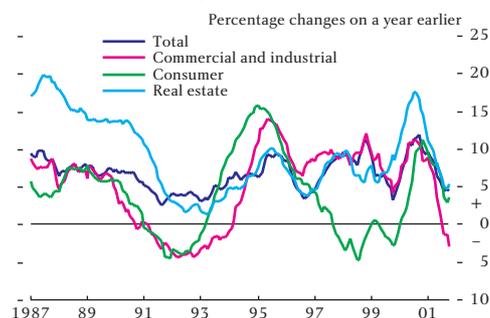
Firms have continued to adjust their balance sheets in the face of the slowdown in demand, the fall in profits, and less favourable conditions for raising new equity. The decline in corporate profits, which began in 2000 Q3, moderated in 2001 Q2. Companies continued to reduce capital spending and inventories. Balance sheet adjustments were similar to 2001 Q1: a much reduced acquisition of financial assets (mainly a retirement of outstanding vendor financing and other trade receivables) and a slower accumulation of new gross liabilities. Within the latter, companies' net retirements of equity were sharply reduced, reflected in a decline in aggregate new debt issuance. Companies' outstanding commercial paper issues fell, and an increasing proportion of new issues were asset-backed, while issuance of longer-term bonds rose.

Capital gearing fell back slightly in 2001 Q2 (Chart 38), although that may have been reversed since by the falls in the equity market. Income gearing rose to almost 40 per cent, the highest level since the early 1990s (Chart 39), but may have moderated slightly in Q3 given the further interest rate reductions. The extent to which high income gearing translates into debt-servicing difficulties will depend crucially on profitability.

Corporate bankruptcy applications exceeded 20,000 in the first half of 2001 – a significant increase on 2000 (Chart 36). Much of this rise reflects more challenging economic conditions, but – as with the household sector – prospective changes to the US bankruptcy law may also have brought forward some bankruptcy applications.

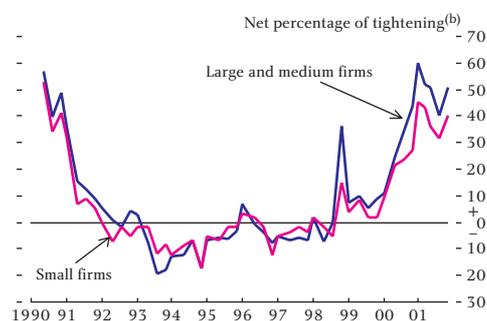
As highlighted in Section I, the current economic slowdown and, in particular, the 11 September attacks are affecting different parts of the corporate sector in different ways, so that an aggregate picture may mislead. The Federal Reserve's November Beige Book indicated that transportation, travel and entertainment were amongst the sectors most adversely affected (see Box 1 on US airline financing). In contrast, defence and security companies may be benefiting. The indebtedness of these sectors varies considerably in absolute terms. Of those that have been most troubled this year, telecoms and hotels and leisure are

Chart 40:
US banks' lending



Source: Board of Governors of the Federal Reserve System.

Chart 41:
Bank lending conditions for commercial and industrial loans^(a)

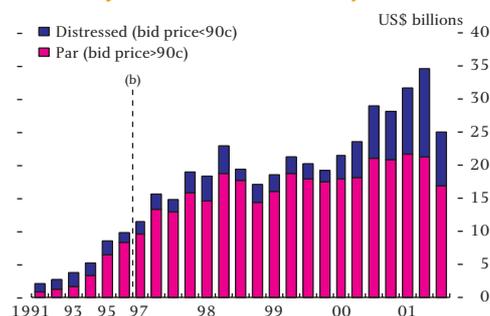


Source: Board of Governors of the Federal Reserve System: Senior Loan Officer Opinion Survey.

(a) Latest survey conducted in October 2001.

(b) Net percentage of surveyed banks in the United States reporting tighter credit standards.

Chart 42:
Secondary market for loans – purchases^(a)

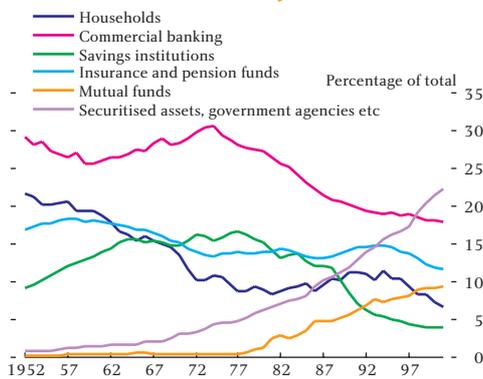


Source: Loan Pricing Corporation.

(a) Quarterly survey of 23 institutions on par side and 15 on distressed side.

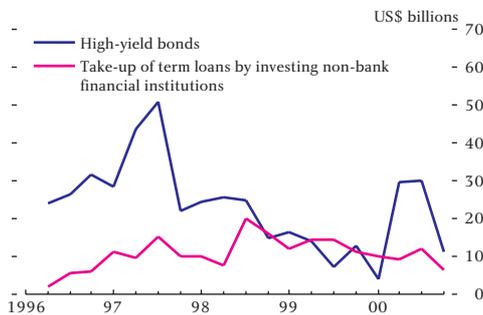
(b) Annual data from 1991 to 1996, quarterly thereafter.

Chart 43:
US share of total debt by holder



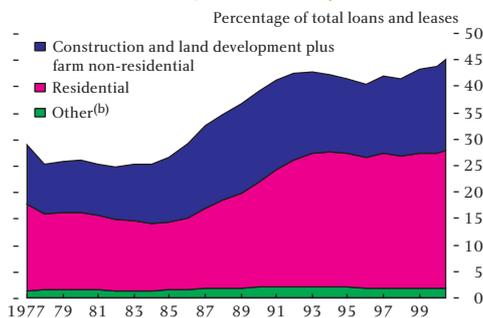
Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States 2001', Q2.

Chart 44:
US issuance of high-yield bonds and take-up of loans by non-banks



Source: Loan Pricing Corporation.

Chart 45:
US banks' lending secured by real estate^(a)



Source: Federal Deposit Insurance Corporation.

(a) Final observations are end-June 2001.

(b) Includes farmland and lending from banks' foreign offices.

among the most indebted, whereas construction and heavy engineering are relatively lightly indebted.

The US domestic banking system

The weaker prospect described above will inevitably impair the quality of banks' loan portfolios and depress earnings. The extent of these pressures will depend on the depth and duration of the slowdown, and on the strength of bank balance sheets.

Loan markets

Since the *June Review*, bank lending has become increasingly sluggish across the board (Chart 40), with the commercial and industrial sector making net repayments in recent months. Most commentators and bank contacts see this as the consequence of falling demand for credit, reflecting the inventory adjustment and reduced investment. The Federal Reserve's October Senior Loan Officer Survey supports that. It also indicated, however, that banks have again tightened lending standards significantly, especially on corporate lending (Chart 41). This provides one line of defence against deteriorating credit quality.

Other risk management tools are available given the growth of secondary markets for credit risk, both for funded loans (Chart 42) and via credit derivatives. Perhaps more important is the apparently secular change in the pattern of debt holdings. In recent years, the shares of total debt held by mutual funds, asset-backed security issuers and home loan agencies have risen sharply, while those of banks and savings institutions, of insurance companies and pension funds, and of households have fallen (Chart 43). Of course, this is partly the result of a greater securitisation of debt, with the development of the high-yield bond and asset-backed markets. But it is not just that. Some demand for standard bank loans has been satisfied by non-bank institutional purchasers (Chart 44). Continuing robust institutional demand for bank-originated credits cannot however be guaranteed, as their appetite may be curbed somewhat by recent and prospective credit losses. Reassuringly, market participants report that a widespread reintermediation into the banking sector is not expected.

Notwithstanding the wider dispersion of credit risks across the financial sector over the past decade, the US banking system does still carry a very large loan portfolio (Box 2) – larger relative to GDP than in 1989. Some key areas and issues are discussed below.

Lending secured on property

Around 45 per cent of US banks' loans and leases (and about 27 per cent of their total assets) is secured on property, and the share has risen since the mid-1990s (Chart 45). Despite this, the potential threat posed to banks' collateral seems limited unless there were a very severe shake-out in the property market. In

Box 1: US airline financing

Even before 11 September, airlines globally were facing financial pressures as a result of a downturn in traffic and rising costs. Following the terrorist attacks, the US Air Transport Association (ATA) revised down its 2002 passenger traffic forecast by over 10 per cent. Although traffic has grown twice as fast as GDP since 1970, industry profitability is highly cyclical (Chart A). Capital gearing of major carriers has risen somewhat since 1998, and the cash coverage that pre-sales of tickets provides is regarded as an important indicator of financial health (Chart B).

The industry's financing requirements are large. In June 2001, US airlines belonging to the ATA had placed firm orders for 955 aircraft with options on a further 1,663. A significant proportion of aircraft fleets is leased by airlines from financial institutions, often via specialist subsidiaries. These subsidiaries are large issuers of debt (not typically guaranteed by the parent), some of it securitised with receivables or secured by the aircraft.

The special characteristics and risks of aircraft financing – large sums are involved; aircraft operate across jurisdictions; and accidents trigger large insurance claims – have been addressed through special techniques, most commonly in the United States. In a leveraged lease, a trust is established whereby the lessor puts up an equity portion and lenders the remainder, often through a private placement of debt. Lenders have no recourse to the lessor but rely on a security interest in the aircraft and the credit standing of the airline lessee. Lessors own the aircraft, and enjoy tax advantages such as depreciation allowances, although part of the economic benefit may effectively be passed down to the lessee via the terms of the lease payments. As an operating lease, this is a source of off-balance-sheet financing for the airline.

In the United States, Equipment Trust Certificates are specialised aircraft financing instruments. They are a form of financial lease where a special purpose vehicle finances the purchase of an aircraft through the issue of debt, often in senior and subordinated tranches. Where the airline provides the subordinated segment, the debt is known as an Enhanced Equipment Trust Certificate (EETC). EETC debt is usually rated higher than other debt secured on aircraft, because of (i) security of collateral; (ii) the absence of cross-default clauses between EETC contracts and other airline debt; (iii) liquidity provisions to enable airlines to make interest payments while an aircraft is being repossessed. Industry contacts suggest that EETCs now constitute around 80 per cent of new debt financing for US airlines. However, a sharp rise in spreads following the attacks (Chart C) demonstrated that EETCs are not immune to a downturn in the airline industry, since aircraft collateral is vulnerable to weaker airline earnings and demand.

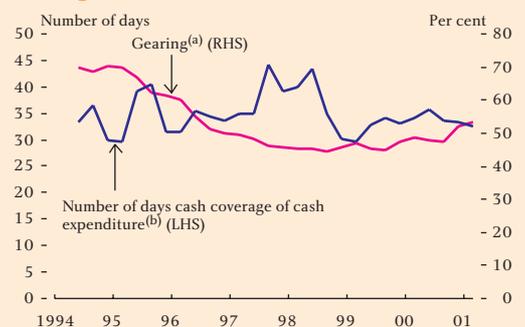
Chart A:
Airlines' operating profit as a percentage of US corporate profits net of capital consumption^(a)



Sources: US Air Transport Association, US Department of Commerce and Bureau of Economic Analysis.

(a) Ratio of scheduled airlines' operating profits to total corporate profits less capital consumption.

Chart B:
US major airlines capital gearing and cash coverage

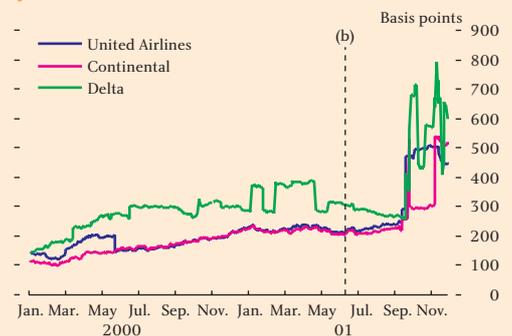


Source: Department of Transportation, Office of Aviation Analysis: 'Airline Quarterly Financial Traffic Review'. Data end in Q2, and so before 11 September.

(a) Debt to total investment.

(b) Data refer to the four quarters ending in the quarter in question.

Chart C:
Spreads on EETC^(a) debt of US airlines

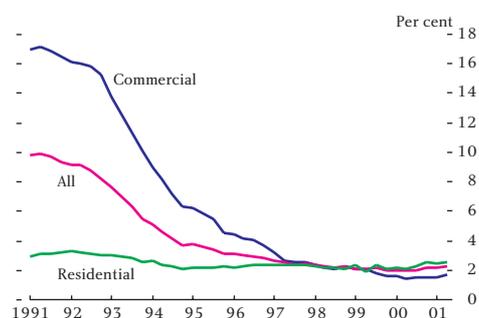


Source: Bloomberg.

(a) Enhanced Equipment Trust Certificate.

(b) June 2001 Review.

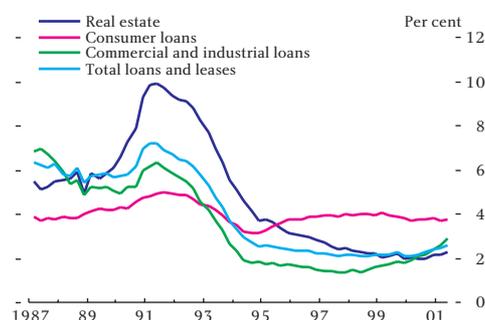
Chart 46:
Largest 100 US banks: delinquency rates on real estate loans^(a)



Source: Board of Governors of the Federal Reserve System.

(a) Loans past due 30 days or more, including those still accruing interest as well as those in nonaccrual status. Measured as a percentage of end-of-period loans. Data are seasonally adjusted.

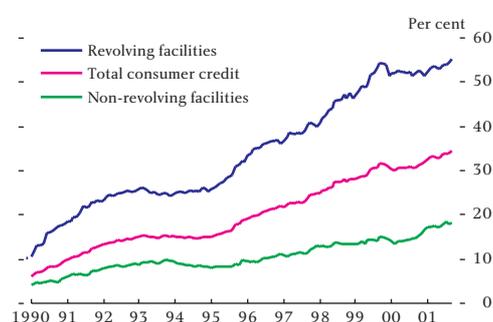
Chart 47:
Largest 100 US banks: loan delinquency rates^(a)



Source: Board of Governors of the Federal Reserve System.

(a) Loans past due 30 days or more, including those still accruing interest as well as those in nonaccrual status. Measured as a percentage of end-of-period loans. Data are seasonally adjusted.

Chart 48:
Shares of securitised pools in US consumer credit



Source: Board of Governors of the Federal Reserve System.

contrast to the late-1980s, the current slowdown has not come on the heels of a particularly strong property boom. Lending is less regionally concentrated, loan-to-value ratios are lower and servicing costs will have benefited from the reduction in real interest rates.

In the commercial market, there has been a sharp rise in vacancies this year, largely concentrated in areas associated with the fallout in the high-tech sector, although the increase is from a low level. In general, market sources suggest that there has been less speculative commercial building across the United States as a whole than a decade ago and that current defaults are considerably lower than during the early 1990s' recession.

In the residential market, a fairly steady rise in house prices has yet to be significantly affected by the slowdown (Chart 33) and, as noted above, homeowners have been refinancing fixed-rate mortgages at lower interest rates. While further rises in unemployment could lead to debt servicing difficulties and so rising arrears, this type of business has typically had a low default rate in the past (Chart 46).

Consumer credit

After a decade of strong growth, unsecured consumer indebtedness could strain some segments of the banking industry if the household sector's financial position were to deteriorate significantly. In particular, default rates on credit card and other debt would be likely to rise if unemployment increased sharply. However, margins on this lending are typically high and losses have in the past been less variable than on commercial lending (Chart 47).

Average credit quality may have deteriorated as a wider range of households have gained access to credit, some of whom are likely to be the most vulnerable to a deteriorating labour market. In the inevitable absence of long runs of data on the servicing of loans to these 'new' borrowers, there is a risk that losses could prove greater than anticipated in creditors' pricing. Lenders with the largest exposures to the increasingly vulnerable sub-prime consumer market are relatively weak; in November the equity market value of two such companies collapsed following Q3 results showing higher than expected losses.

As already discussed, since the early 1990s' recession, an increasing proportion of consumer and other loans (particularly mortgages) have been securitised and sold to non-bank investors (Chart 48). This will, helpfully, have reduced the concentration of household credit risk within the banking system: but it may also mean that the average quality of credit remaining on banks' balance sheets will have fallen.

Box 2: US banking system exposures 1989-2001

Between end-1989 – just ahead of the early-1990s recession – and end-June 2001, total on-balance-sheet claims of the US banking system nearly doubled in absolute terms and rose as a proportion of GDP from around 55 per cent to slightly over 60 per cent¹. Scaled by GDP (Chart A(i)), banks' exposures to the US household, public and non-bank financial sectors all increased somewhat, while their exposure to non-financial business fell slightly. The rise in exposure to households took place despite active securitisation of mortgage and unsecured consumer credit, which removed a portion of claims from banks' balance sheets. There was relatively little change in the share of the banking system's claims in the total debt liabilities of US non-financial business and households: these remained at just under a quarter and one-third respectively.

Overall, cross-border, on-balance-sheet foreign exposure of the banks was approximately unchanged, with a rise in exposure to Western Europe broadly matched by falls in other exposures, notably Japan where the dollar value of claims more than halved. The increasing exposure to Western Europe and, to a lesser extent, off-shore banking centres reflects the increasing internationalisation of banking and capital market activity encouraged, *inter alia*, by the liberalisation of capital controls and restrictions within domestic financial markets.

Since 1989, the US banking system's capital has increased considerably. Chart A(ii) presents the data in Chart A(i) scaled by the banks' total equity capital rather than GDP. With the exception of Western Europe, exposure as a proportion of equity fell in all the foreign regions and domestic sectors shown.

The data in the first two charts, however, include only on-balance-sheet exposures and, for foreign exposures, exclude the banks' foreign offices' local country business. During the 1990s, the off-balance-sheet business of banks grew rapidly and more comprehensive measures of exposure would take this into account. For example, the total of undrawn commitments of banks rose nearly six-fold over the period compared with just a doubling of on-balance-sheet claims. And, at end-June 2001, the notional value of US banks' derivatives was US\$47.8 trillion (470 per cent of GDP). The credit-equivalent exposure of these positions was much lower (see below): just over US\$500 billion or about 8 per cent of the on-balance-sheet exposures identified.

1: For definitions, see the note at the end of the Box. As the domestic exposure, foreign exposure and system equity data are taken from different published sources, the developments described above should be taken as an indicative rather than as a precise measure.

Chart A:
Domestic sectoral and international
exposures

(i) as a percentage of GDP^(a)



(ii) as a percentage of equity^(a)



(a) Excluding derivatives, etc.

Chart B:
External exposures by main region



(a) Including derivatives, gross local currency claims and commitments.

(b) Including derivatives, and net local currency claims.

(c) Excluding derivatives, etc.

Sources: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States 2001', Q2, Federal Financial Institutions Examination Council 'Country Exposure Survey' and Federal Deposit Insurance Corporation.

Measuring foreign exposures

While more comprehensive data for end-1989 are not available, there are various measures of banks' foreign exposures for end-June 2001.

The green bars of Chart B show cross-border exposure on the same basis as in Chart A, whereas the red bars of Chart B provide a broader measure of transfer-risk claims. The latter include gross revaluation gains on banks' cross-border derivatives exposures, and the sum of net positive balances of banks' local country liabilities and claims (including revaluation gains and losses on derivatives transactions). This will be the most appropriate measure for considering exposure to countries facing external financing difficulties.

The blue bars provide a very wide exposure measure by substituting gross local country claims for net claims and adding undrawn commitments². This measure may be more appropriate when considering the banks' exposure to current or potential credit risks. Undrawn commitments totalled US\$183 billion, or 21 per cent of the sum of cross-border on-balance-sheet and derivatives exposures and gross local country claims. However, the scale of commitments relative to drawn exposures varied across regions, being over 25 per cent for Western Europe, Canada and off-shore banking centres, around 11 per cent for Japan and emerging markets, and 9 per cent for 'other developed' countries. Despite this much more comprehensive measure of exposure, the end-June 2001 figure for Japan (blue bar in Chart B) remains lower than the restricted measure for end-1989 (green bar), while that for emerging markets is only slightly higher.

Data sources and definitions

Data for domestic on-balance-sheet exposure have been taken from the Federal Reserve's 'Flow of Funds'. Figures for total off-balance-sheet commitments and banks' equity are from the Federal Deposit Insurance Corporation. Data on banks' total derivatives exposure and their credit risk equivalent are from the Office of the Comptroller of the Currency. Figures for external exposures, including derivative and commitments, have been taken from the Federal Financial

Institutions Examination Council's 'Country Exposure Survey'. As the domestic and foreign exposure data are drawn from different sources, they may not be strictly comparable.

The banking system is defined to comprise US chartered banks, foreign banking offices in the US, bank holding companies and banks in US-affiliated areas. External exposure data includes that of foreign-owned US banks and bank holding companies.

The household sector includes household farms and non-profit organisations. The non-financial business sector includes non-corporate and farm businesses. The 'other developed' external region includes international and regional organisations.

Claims on non-financial businesses include foreign bonds, which are not separately identified in the source data, and all commercial mortgages. (The household sector's liabilities at June-2001 included US\$122.6 billion of commercial mortgages but the lender cannot be identified from the available data). 'Other domestic assets' include financial sector plus other domestic claims not identified by sector. The category includes, *inter alia*, bank holding company investments in non-bank financial subsidiaries, lending to security dealers and equity stakes in government-sponsored enterprises.

In all three charts, the geographic allocation of external data reflects adjustments for risk transfers. (So where a claim is guaranteed by the resident of a third country, the exposure is allocated to that third country and not to that of the original borrower.) Banks' direct investment abroad is excluded. Local country claims are claims held by US banks in their foreign offices on residents of the country in which the office is located. Local country liabilities are liabilities to third parties held by US banks in their foreign offices and payable only in those offices. Local country claims and liabilities include, respectively, revaluation gains and revaluation losses on foreign exchange and derivative products.

2: Overall, at end-June 2001 US banks' local country liabilities exceeded their local country claims by over US\$200 billion. This net liability position contrasts with the sum of net positive local country claims of US\$54 billion incorporated in Chart B (but not explicitly shown in the Chart). The banks' net local country liability positions were held in Western Europe (US\$134 billion) and with foreign bank and other counterparties operating from off-shore banking centres (US\$84 billion). In all other regions gross claims exceeded liabilities.

Syndicated lending

Credit risk on lending to companies may also have risen more rapidly than banks expected (see Section I on spreads on sub-investment-grade corporate lending). Consistent with this, the US regulators' 2001 annual survey of large syndicated loans (representing about a quarter of total bank-originated credit in the United States) indicated a deterioration in loan quality since the previous survey, with 9.4 per cent of loans having problems, or subject to potential problems, as against 5.1 per cent a year earlier⁸. The proportion of problem loans was, however, below the level in the early 1990s, although experience then indicates that the position can occasionally deteriorate quickly (Chart 49).

The survey corroborates the increased dispersion of risk through the financial system. Forty per cent of syndicated loans were held by foreign banks, which also held a disproportionate share of higher risk credits to sectors such as telecoms, indicating the potential for credit conditions in the United States to affect banking systems elsewhere – see Section VI. Less than 10 per cent – although, again, a disproportionate share of weaker credits – had been acquired by non-banks.

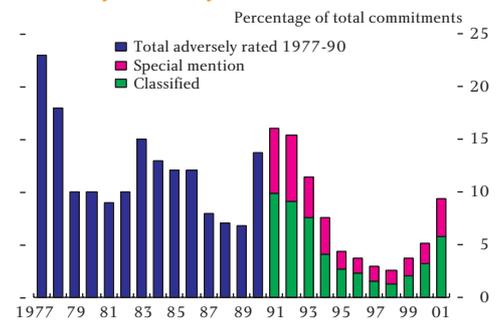
Capital and profitability

The key defences against risk are, of course, earnings and capital. US bank earnings for 2001 Q3 were affected by a downturn in investment banking activity, further losses on proprietary direct equity holdings, and a significant rise in provisions or charge-offs on previously unprovisioned claims. Provisions were, in consequence, much higher than in the corresponding period in 2000, reaching a ten-year high of US\$11.6 billion. That partly reflected the proportion of non-current loans to total loans rising from 1 per cent in 2001 Q1 to 1.3 per cent in Q3.

But this needs to be put in perspective. First, returns on assets and equity were only slightly lower in the first three quarters than a year earlier (Chart 50). Second, despite the deterioration in credit quality, accumulated loan loss reserves continue to exceed non-current loans by a substantial margin, although coverage fell from 150 per cent in 2000 to 132 per cent in 2001 Q3 (Chart 51). And third, a sustained period of strong earnings over the past decade has enabled banks to build up a high cushion of equity capital; capital ratios are well above the Basel 8 per cent minimum (Chart 52).

This is reflected in rating agency credit ratings. On the basis of Moody's ratings of the largest 50 US bank holding companies, the asset-weighted average rating today is around two notches higher than in 1989 – Aa3 compared with A2 (Chart 53). While ratings have in the past occasionally dropped sharply – for example, between 1989 and 1991 (Chart 54) – there is evidence

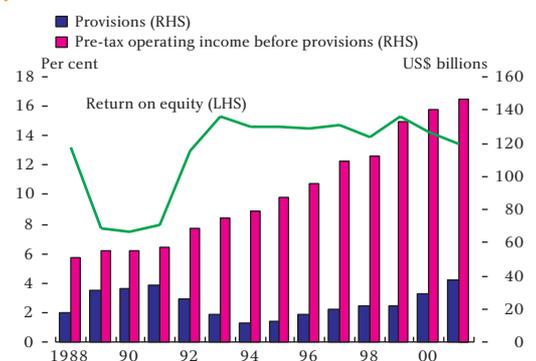
Chart 49:
Adversely rated syndicated loans^(a)



Sources: Board of Governors of the Federal Reserve System, Federal Deposit Insurance Corporation and Office of the Comptroller of the Currency.

(a) Data are at end-March. 'Classified' loans include 'substandard', 'doubtful' or 'loss' categories, representing increasing degrees of expected loss to the lender. 'Special mention' loans may involve a future loss if potential weaknesses are not addressed. No split between 'classified' and 'special mention' loans is available before 1991.

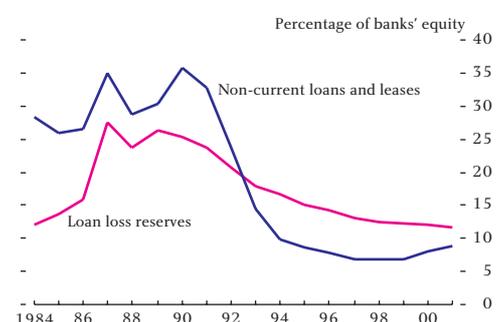
Chart 50:
US commercial banks' earnings and provisions^(a)



Source: Federal Deposit Insurance Corporation.

(a) 2001 Q3 preliminary (released 30 November), series have been annualised.

Chart 51:
US banks' non-performing loans and loan loss reserves^(a)

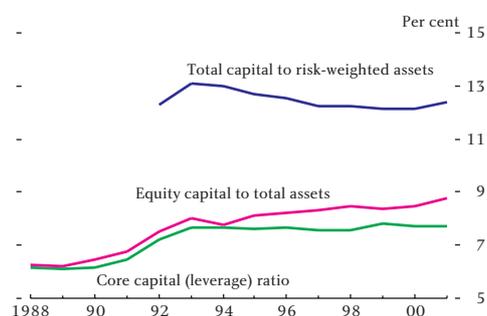


Source: Federal Deposit Insurance Corporation.

(a) Figures for 2001 Q3 are preliminary (released on 30 November).

8: The survey covers facilities outstanding at end-March of the year in question.

Chart 52:
US banks' capital ratios^{(a)(b)}



Source: Federal Deposit Insurance Corporation.

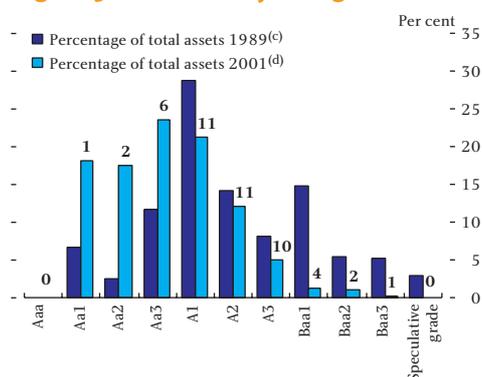
(a) Assets are on-balance-sheet only.

(b) Final observations are end-June 2001.

of material change in bank balance sheets over the past decade, as described in Box 2 on changes in risk concentrations across broad sectors and regions. (The Box does not, however, address the possibility that the make-up of sectoral/regional loan portfolios has altered over the past decade or the distribution of exposures across banks.)

Overall, the US banking system, taken as a whole, currently seems relatively well placed to absorb increased loan losses, which, in degree, will inevitably accompany a slowdown in the economy.

Chart 53:
Largest 50 US BHCs by rating^{(a)(b)}



Sources: Board of Governors of the Federal Reserve System, National Information Center and Moody's Investors Service.

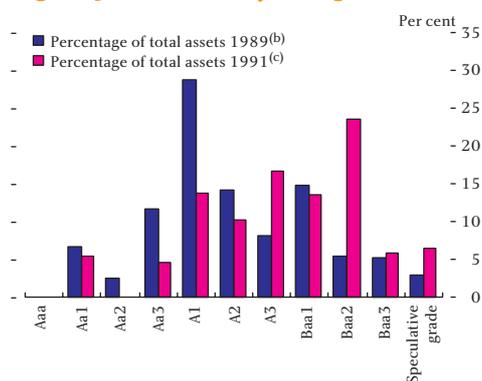
(a) Ratings in most cases refer to senior debt.

(b) Emboldened figures refer to number of banks in 2001.

(c) Total assets as of December 1989. Ratings as of 29 January 1990 (two banks did not have ratings).

(d) Total assets as of end-June 2001. Ratings as of 28 November 2001 (two banks did not have ratings)

Chart 54:
Largest 50 US BHCs by rating^(a)



Sources: Board of Governors of the Federal Reserve System and Moody's Investors Service.

(a) Ratings in most cases refer to senior debt.

(b) As footnote (c) above

(c) Total assets as of December 1991. Ratings as of 1 March 1992 (six banks did not have ratings).

III The euro area⁹

The June *Review* concluded that the risks to financial stability in the euro area appeared slim. The evidence since then, reviewed below, suggests that they are still moderate relative to risks during the recession of the early 1990s, although they may have increased a little since June.

Macroeconomic developments

Annual real GDP growth in the euro area slowed to 1.7 per cent in Q2 and 1.3 per cent in Q3, well down on growth rates in the first half of 2000, and below trend. As noted in Section I, this appears to be a global phenomenon, and the growth rate of exports has slowed particularly sharply in recent quarters. But domestic developments have also been significant, for example in Germany. Forecasts for 2001 and 2002 real GDP growth in all European countries are now significantly lower than forecasts a year ago.

Among the largest economies, GDP growth has slowed more sharply and more unexpectedly in Germany than in France or Italy. However adjustment in some smaller, fast-growing countries has so far been smoother than initially feared. The divergence between the highest and lowest consumer prices (HICP) inflation rates in the euro area has diminished, as has the gap between faster and slower GDP growth rates. Producer price inflation rates in the manufacturing sector have also converged in recent months, which may reflect price competition in the tradable goods sector.

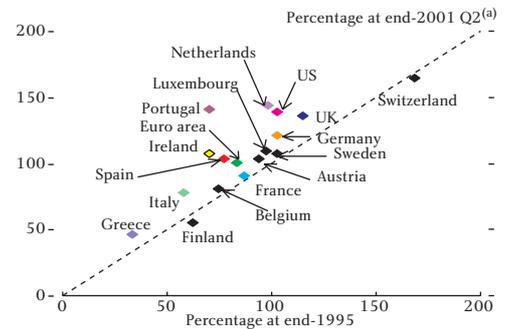
Sectoral balance sheets

Though debt-to-GDP ratios usually change slowly, over the past five years private sector bank debt has risen markedly faster than output in some smaller countries – notably Ireland, the Netherlands, and Portugal. Particularly where debt is already high, this probably implies increased vulnerability to any prolonged deterioration in the economic environment (Chart 55). Attempts to limit the burden of debt in the light of changing economic circumstances may help to account for falling rates of credit growth in these and other euro-area countries.

The household sector

The ratio of household debt to disposable income has risen in each of the three largest euro-area economies since the early or mid-1990s (Chart 56). In Germany, it rose 15 percentage points between 1995 and 2000, broadly in line with growth of overall private sector bank debt relative to GDP. In France, it increased

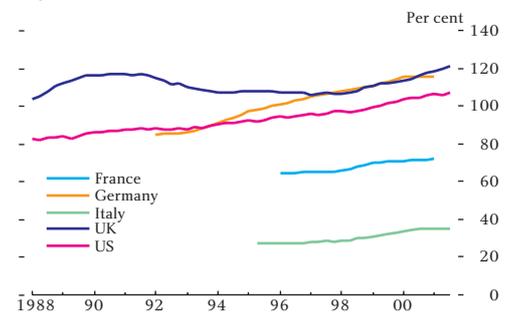
Chart 55:
Private sector bank debt as share of GDP



Sources: IMF, Eurostat and Bank calculations.

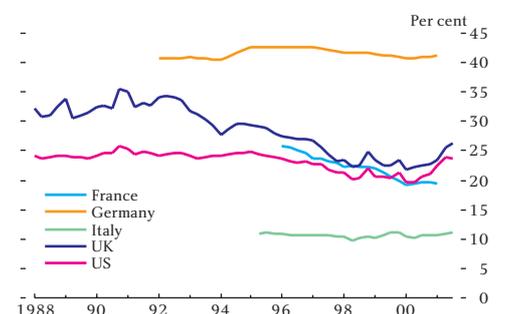
(a) End 2000 Q3 for Sweden and end 2000 Q4 for Luxembourg and Portugal.

Chart 56:
Ratio of household debt to annual disposable income



Sources: Banca d'Italia, Banque de France, Board of Governors of the Federal Reserve, Deutsche Bundesbank, OECD, ONS, National Institute Global Econometric Model and Bank calculations.

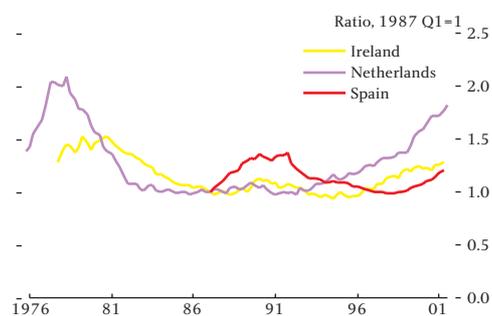
Chart 57:
Household sector debt burden: total liabilities over total financial assets



Sources: Banca d'Italia, Banque de France, Board of Governors of the Federal Reserve, Deutsche Bundesbank, ONS and Bank calculations.

9: UK-owned banks' consolidated exposure to the euro area represents around 35 per cent of total international exposure; exposure to euro-area banking sectors accounts for 47 per cent of exposure to overseas banks.

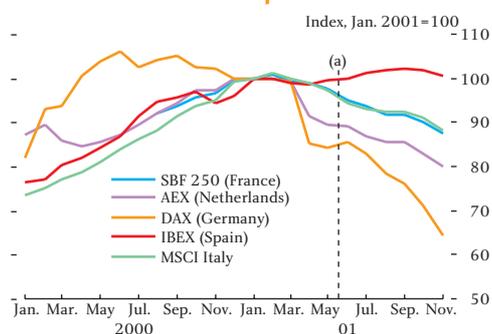
Chart 58:
Ratio of quarterly house price indices to income^(a)



Sources: BIS, National Institute Global Econometric Model and Bank calculations.

(a) Ratio of quarterly house price index to sum of pre-tax disposable income over previous four quarters.

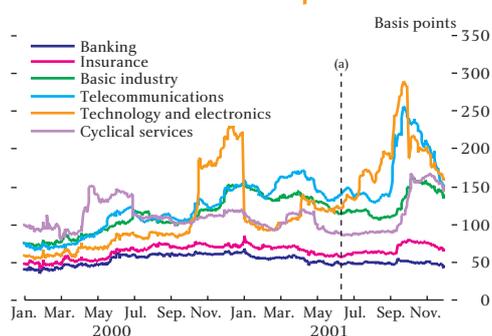
Chart 59:
Twelve-month forward profit forecasts



Source: Institutional Brokers Estimate System.

(a) June 2001 Review.

Chart 60:
Euro-denominated credit spreads



Source: Merrill Lynch.

(a) June 2001 Review.

around 8 percentage points while overall private debt to GDP barely changed. And in Italy, it also increased by 8 percentage points, though this was much less than the 19 percentage point increase in private sector bank debt to GDP. In contrast to debt, the ratio of household gross interest payments to disposable income – income gearing – appears considerably below 1990s levels¹⁰; interest rate cuts by the European Central Bank have contributed to a further easing in recent months.

Higher debt-to-income ratios can increase vulnerability to interest rate rises, and hence the risk of possible future debt servicing difficulties. But the rate of household loan growth is now declining in the three largest countries. It is also notable that alternative measures of indebtedness, such as the ratio of total financial liabilities to financial assets, have changed little in Germany and Italy – and declined significantly in France – over recent years (Chart 57). This measure is, of course, affected by changes in asset prices, but the reduced flows into equity relative to money market mutual funds in recent months suggest that household appetite for risk may be diminishing.

As discussed in previous *Reviews*, in countries where rapid credit growth has been associated with buoyant housing markets, such as Ireland, the Netherlands and Spain, households and banks have potentially been vulnerable to sharp corrections in house prices. In these countries, ratios of house prices to income have generally continued to rise, although they remain below the peaks of the past 25 years (Chart 58). House price inflation has shown some signs of slowing recently, particularly in Ireland and the Netherlands.

The non-financial corporate sector

As elsewhere, reflecting the slowdown in global demand, the outlook for the non-financial corporate sector has deteriorated since the June Review. Business confidence has fallen across Europe, as have equity prices and profit forecasts (Chart 59). The slowdown has imposed particular stresses on some industries. So, while credit spreads on non-financial corporate bonds have generally increased, this is most notable in the cyclical services and technology and electronics sectors (Chart 60).

Aggregate corporate sector gearing ratios appear considerably healthier than in the 1993 recession. Income gearing¹¹ is close to a historic low in France – the only one of the three largest euro-area economies for which data for recent quarters are available. While the ratio of corporate debt to total assets has increased since early 2000 in France, Germany and Italy, it remains well below levels during the early 1990s (Chart 61). Recent

10: Where data are available to construct up-to-date estimates.

11: Gross interest payments over gross operating surplus.

movements mainly reflect fluctuations in equity prices, while differences across countries are in part due to differing traditional methods of financing firms.

Major banking sectors

Against the background of a more difficult macroeconomic environment and pressures on particular sectors, risks in bank asset portfolios have probably increased. This is perhaps one element in the fall in banking sector equity prices in most European countries since the June Review (Chart 62).

The techniques available to euro-area banks in managing credit and balance-sheet risks have been strengthened by the development over recent years of a European market for securitised loans and other debt instruments (Chart 63). Securitisation of corporate loans has increased particularly strongly since 1997, as European banks have tried to reduce their relatively high balance-sheet exposures to corporate debt. Of course, the extent to which the securitisation of loan portfolios reduces the exposures of the aggregate banking sector depends on who purchases the securitised assets, and also whether any reputational or legal risks remain for the issuing banks.

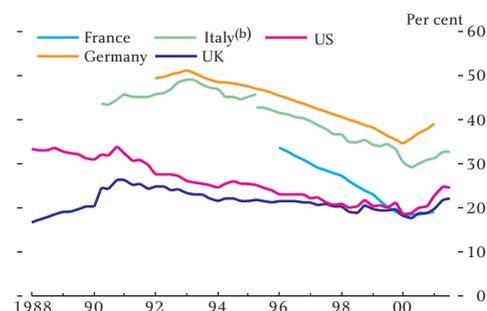
Profits and capital, however, are more important shields against risk. Aggregate banking profits data for the first nine months of 2001 are not available for most European countries. However, several internationally active European banks reported declines in profit growth. For France and Italy, this occurred after strong increases in profitability from 1996 to 2000. For Germany, profitability did not increase over the period, and is now lower than in France or Italy.

Reflecting strong growth in profits, provisions as a share of pre-provision earnings have decreased sharply in France, and to a lesser extent in Italy, since the mid-1990s. In Germany the ratio has increased slightly. In total nominal terms, provisions in 2000 rose by 37 per cent in Germany, were relatively flat in France and fell by 13 per cent in Italy. Risk-weighted capital adequacy ratios in Germany and Italy are over 10 per cent, but lower than in the United States or United Kingdom. Equivalent ratios are not publicly available for France. However, according to Moody's, Tier 1 ratios in 2000 were around 8 per cent in France (broadly similar to the United Kingdom and United States), and just over 6 per cent in Germany and Italy.

On one rating agency's measures, in October 2001 average bank financial strength¹² ratings in France, Germany and Italy were respectively B, C+ and B-, compared with B+ for the United Kingdom and B for the United States. The ratings

12: Financial strength ratings exclude the probability of government or other support. Their categories differ from those for long-term ratings.

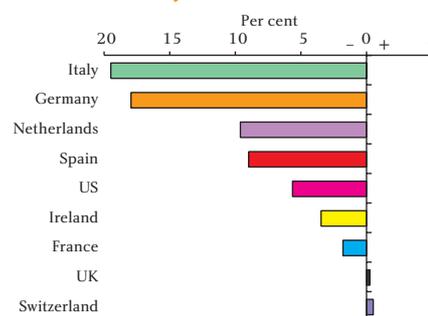
Chart 61:
Private non-financial corporates' debt burden^(a)



Sources: Banca d'Italia, Banque de France, Board of Governors of the Federal Reserve, Deutsche Bundesbank, ONS and Bank calculations.

(a) Interest-bearing debt over total assets at market price.
(b) There is a break in the Italian series due to pre- and post- ESA95 accounts.

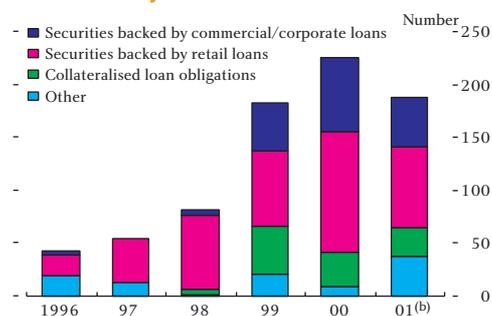
Chart 62:
Percentage changes in bank equity indices^(a) since June 2001 Review



Source: Thomson Financial Datastream.

(a) In US dollar terms.

Chart 63:
Issuance of European asset-backed securities^(a) by number

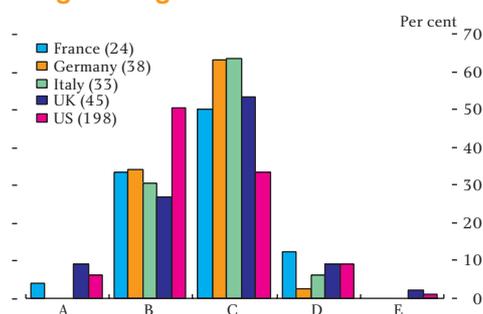


Source: Dealogic.

(a) Includes only securities backed by loans, not by bonds or receivables. Nationality of bond issuer defined as the nationality of the underlying collateral. Excludes bonds issued with UK collateral, except where collateral is from a range of European economies including the UK. 'Other' includes securities backed by commercial and retail loans.

(b) To end-October.

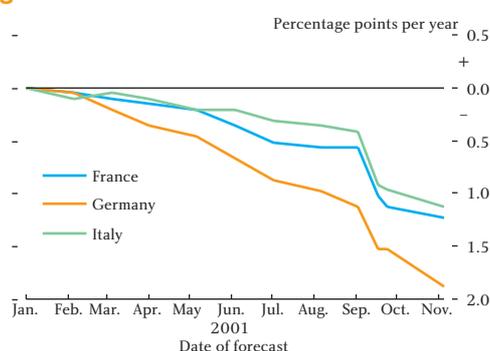
Chart 64:
Distribution of banking sector financial strength ratings^(a)



Source: Moody's Investors Service.

(a) Figures in brackets indicate number of banks.

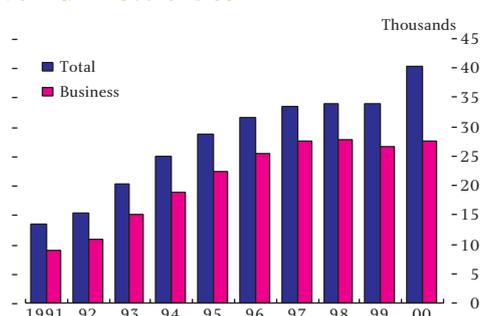
Chart 65:
Change in expected two-year real GDP growth^(a)



Source: Consensus Forecasts.

(a) Changes in forecasts for compounded 2001 and 2002 real GDP growth since January 2001, at an annualised rate.

Chart 66:
German insolvencies



Source: Creditreform.

distribution in all three banking sectors was narrower than in either the United States or United Kingdom (Chart 64). Particular developments affecting the German, French and Italian banking systems are explored further below.

An immediate challenge facing the European banking system is the euro changeover starting on 1 January 2002¹³. Euro-area authorities report that banks have devoted considerable resources to ensuring the smooth conversion of customers' bank accounts and related products. Banks will also play a central role in the introduction of euro notes and coin and withdrawal of legacy currencies in early 2002. To help address any attendant risks, national central banks have been monitoring preparations closely and there has been a regular exchange of information, for example among members of the Banking Supervision Committee of the European Central Bank. In particular, a significant effort has been made to minimise any potential operational or security risks. Even if such risks were to materialise, it is difficult to envisage circumstances in which they could jeopardise financial stability.

Germany

Germany has suffered a sharper downward revision of 2001 and 2002 real GDP growth prospects than either France or Italy (Chart 65). Over the past decade, Germany has also experienced the longest run of growth below expectations of any G7 country¹⁴. In contrast to France and Italy, the number of corporate bankruptcies increased through most of the past decade¹⁵ (Chart 66). In the first half of 2001, corporate bankruptcies were 20 per cent higher than in the first half of 2000. As already noted, German firms and households appear to face a relatively high debt burden compared with French, Italian, US and, on some measures, UK counterparts (Charts 56, 57 and 61).

Banks and the financial sector

Germany is UK-owned banks' second largest consolidated international exposure¹⁶ (after the United States), and claims on banks in Germany amount to over 70 per cent of this exposure. German banks are also active participants in London inter-bank business, and in lending to UK non-financial companies.

13: See also the December issue of *Practical issues arising from the euro* at www.bankofengland.co.uk

14: Because lending and borrowing decisions are based on expectations, credit risk is affected by deviations from expected output as well as the actual level.

15: Despite a 1 January 1999 change in the insolvency law that was expected to increase both business and consumer bankruptcies, there was a marginal fall in 1999.

16: Consolidated international exposures include the gross on-balance-sheet claims of all UK-owned banks' offices on public and private entities in Germany, but exclude the *local currency* lending of *German offices* of UK-owned banks and lending by UK-owned banks to German companies' UK offices. See Box 10 for further details.

Box 3: Uses of BIS banking statistics in financial stability analysis

In this section and elsewhere in this assessment, the Bank uses international banking data, collated by the Bank for International Settlements (BIS), to monitor some of the links between banks in different countries¹. These data report international claims by *location* of the lending banks, and by *nationality* of lending banks on a consolidated basis. Because the two series can be broken down in different ways, they reveal different information about international banking flows and exposures, and so are suited to answering different types of question. This Box considers when it is appropriate to use them².

Locational banking statistics

The BIS locational banking statistics show the gross, mainly on-balance-sheet, financial claims and liabilities of all banks *located* in a reporting country vis-à-vis entities *located* in other countries. The data can be broken down by currency, allowing them to be exchange-rate adjusted. They are thus suited to monitoring cross-border bank lending flows and provide information on the possible transmission of currency shocks and credit events. Because these data are produced on the same residence basis as balance of payments and external debt data, they can also be used to evaluate the relative importance of bank lending in the external financing of a country. Finally, they can be used to assess the importance of individual countries as financial centres, measured by international banking business; and, for example, the scale of banking intermediation via offshore centres.

Consolidated banking statistics

The BIS consolidated banking statistics show the gross on-balance-sheet claims of banking groups' global offices (domestic and foreign) on entities *located* in foreign countries. Claims between offices of the same banking group are netted out. Because the data are available according to the country of residence of the head office, they can be used to monitor the international credit exposures of banks of various nationalities. Data published by the

Bank of England for UK-owned banks³ and by the BIS in aggregate for all reporting banks, can also be broken down in two ways: (i) into claims on the banking sector, non-bank private sector and public sector in each country, allowing greater analysis of sector-specific credit risks (Box 10); and (ii) by maturity, allowing some analysis of liquidity risk.

The consolidated data provide a detailed but not comprehensive picture of on-balance-sheet international exposures by nationality of reporting bank. For example, they exclude the local currency lending of foreign offices to local residents, on the grounds that, to some degree, it will be funded by local depositors⁴. To the extent that these claims are not funded by local currency deposits, they may also be subject to currency risks. And, in any case, whatever the currency of the funding, a parent is directly exposed to credit risk taken by local branches, and may feel obliged to cover any losses suffered by local subsidiaries. In some circumstances, the Bank further adjusts the consolidated data by adding foreign offices' local currency claims on local residents to get aggregate on-balance-sheet group credit exposures to a particular country. Throughout this *Review*, this is referred to as 'total foreign exposures'.

The BIS also publishes, for all reporting banks in aggregate, consolidated data that have been adjusted to take account of risk transfers. Where a claim is guaranteed by a third party, it is reallocated from the country of the *debtor's residence*, to the country of *residence of the guarantor*. These data are useful because they provide an indicator of *where credit risks may ultimately lie*. For example, if a UK bank had lent to a company in the United States, which was guaranteed by a company in Germany, the ultimate risk would lie with the German firm. However, not all risk-transfer instruments are covered by these data (e.g. credit derivatives), and the set of instruments that are used differs between countries.

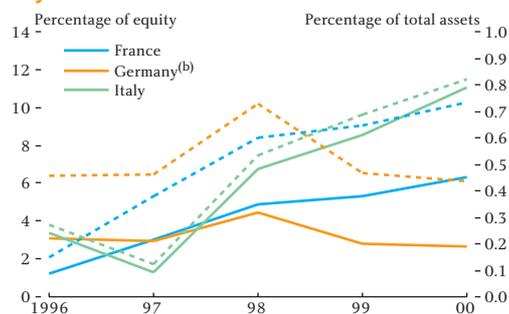
1: See the statistical annex of the BIS Quarterly Review, available at www.bis.org/publ/r_qto109.htm.

2: The compilation of the BIS data was explained in the June *Review*, page 108. A Guide to the international banking statistics is also available on the BIS website at www.bis.org/publ/metho7.htm.

3: See www.bankofengland.co.uk/mfsd/latest.htm.

4: These data are published only in aggregate for all BIS-reporting banks vis-à-vis individual countries and so do not permit analysis of the lending countries' banking system exposures as opposed to the borrowers.

Chart 67:
Bank profitability^(a) in France, Germany and Italy

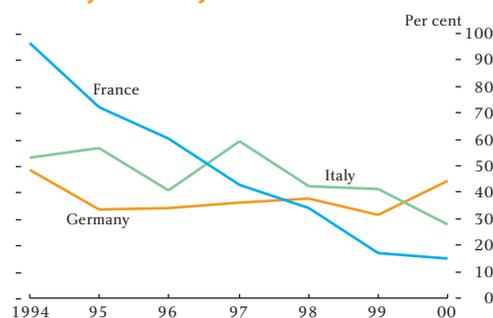


Sources: Banca d'Italia, Commission Bancaire and Deutsche Bundesbank.

(a) Solid lines indicate post-tax return on assets; dashed lines indicate post-tax return on equity.

(b) The sharp rise in German bank profits in 1998 was due to 'extraordinary profits' such as sale of participating interests.

Chart 68:
Provisions and write-downs as percentage of pre-provision operating profits in France, Germany and Italy^(a)



Sources: Banca d'Italia, Commission Bancaire and Deutsche Bundesbank.

(a) Differences in the classification of problem loans and provisioning rules make cross-country comparisons difficult.

While Germany's banking sector is heterogeneous, aggregate profitability has recently tended to be weaker than among EU peers (Chart 67). In 2000, pre-tax return on equity fell to its lowest level in the past decade. The average net interest margin fell to its lowest recorded level, and is lower than elsewhere in Europe. Whether this reflects competition or structural factors, provisions have absorbed a higher proportion of operating profit for the sector as a whole than in other major European countries (Chart 68). In 2000, many larger German commercial banks had a ratio of loan-loss provisions to total loans that was low relative to the average for large banks in other European countries. Results to the third quarter of 2001 indicate that provisions have been increased, while operating profits were lower than in the first nine months of 2000. Although individual performance has varied, German bank share prices fell by more, up to end-November, than those in most other European countries since the *June Review*. Of the big commercial banks, share price falls varied from around 35 per cent, to less than 15 per cent.

German-owned banks' total on-balance-sheet foreign exposures amounted to around one third of their balance sheet in mid-2001¹⁷. But domestic lending accounted for by far the greatest proportion of provisions in 2000 and early 2001. Whilst overall provisions rose in 2000, provisioning for foreign loans fell. Domestic losses caused some small banks to call on mutual deposit guarantee schemes and, in November, a consortium of the big commercial and Bavarian public banks rescued a private bank from bankruptcy.

Germany's big commercial banks have underlined a determination to reinforce long-term profitability and financial strength through extensive cost cuts. Since the *June Review*, the big four banks have announced plans to cut around 27,000 jobs (just over 10 per cent of total staff) by 2004, as well as branch closures. These measures should help to increase resilience in the event of a more prolonged slowdown.

Germany's public banks, particularly the Landesbanks, face the additional challenge of responding to an agreement between the German government and European Commission on the phasing out, between 2005 and 2015, of public guarantees for their liabilities. The Competition Commissioner had concluded that the guarantees amounted to an unfair competitive advantage for the public banks.

Landesbanks earn a higher proportion of their profits from net interest income than do their big commercial bank rivals. Their net interest margins are, however, lower than for most German

17: German-owned banks' BIS consolidated international claims plus their foreign branches and subsidiaries' gross local currency claims on local residents compared to their consolidated balance sheet total. See Box 3 for further detail. Chart 72 covers claims of banks located in Germany rather than of German-owned banks.

bank peer groups, reflecting relatively low yields on their lending to other banks, large companies and the public sector, and their greater reliance on wholesale fundraising (Chart 69). Although the Landesbanks' net interest margin has held up better than those of peer groups over the past decade, albeit at a lower level, this may change if any financing cost advantage they may have enjoyed through the guarantees is eroded. The Landesbanks have a considerable period to adjust to the new environment. Rating agencies have said that more competitive strategies could increase financial strength, but have also noted that a number of Landesbanks already have some relatively high risk exposures with, for example, gross exposures to the airline sector amounting to over 50 per cent of supervisory capital in some cases.

Other structural developments may help to enhance the robustness of Germany's banking system. First, perhaps in part reflecting a desire to limit counterparty credit risk, the proportion of inter-bank lending via repo, rather than unsecured, has increased¹⁸. Second, a slight increase in the ratio of asset-backed securities to total loans in the first nine months of 2001 could be evidence that banks with concentrated exposures are diversifying risk by securitising loan portfolios.

In the insurance sector, life insurers have faced the challenge of covering guaranteed return obligations while the falls in stock markets have reduced the value of some of their assets¹⁹. In November, the German authorities announced plans to amend measures which, by requiring that equities kept on balance sheet be valued at their lowest historical price, had risked inducing insurance companies to sell into falling markets.

France

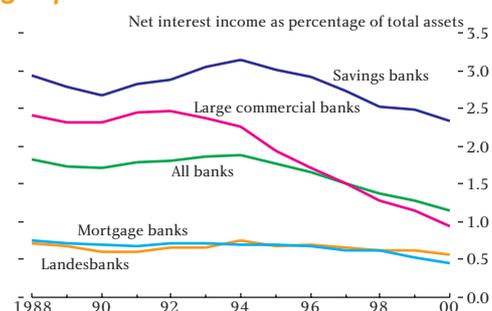
GDP growth has fallen less sharply in France from its peak in 1999 Q4 than in Germany. Growth forecasts for 2001 and 2002 have also been revised down less. Non-financial corporate profits remain high in comparison with the 1990s but declined slightly in the first half of 2001. The number of business insolvencies, after falling continuously since 1993, has picked up²⁰ (Chart 70). Interest gearing in the non-financial private sector is low by historical standards, although it has increased slightly this year (Chart 71). The ratio of interest-bearing debt to total assets has risen from an end-1999 low point, but remains well below levels in the mid-1990s.

18: Deutsche Bundesbank Banking Statistics, October 2001. See also the ECB's July 2001 report 'The euro money market'.

19: See David Rule's article in this *Review*.

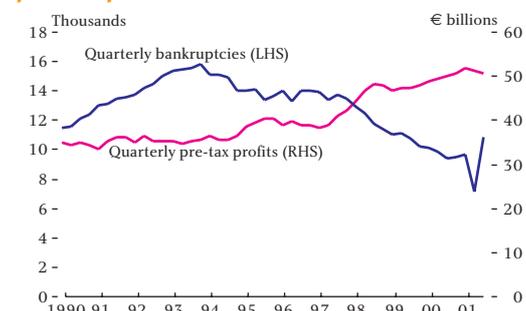
20: A strike by the commercial courts in France early in the year reduced the number of judgments, so part of the subsequent pick-up will be due to postponed cases.

Chart 69:
Net interest margins for German bank peer groups



Source: Deutsche Bundesbank.

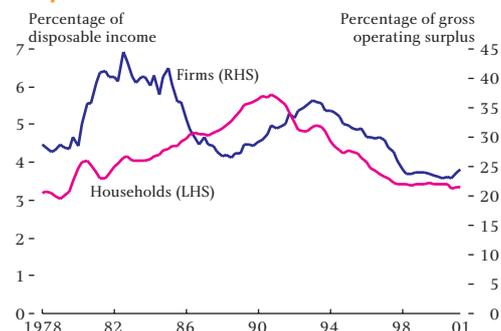
Chart 70:
French corporate bankruptcies^(a) and pre-tax profits



Sources: INSEE and Bank calculations.

(a) Seasonally adjusted. In addition to actual bankruptcies, this series also includes companies granted a six-month bankruptcy protection by courts.

Chart 71:
Income gearing for non-financial companies^(a) and households^(b) in France

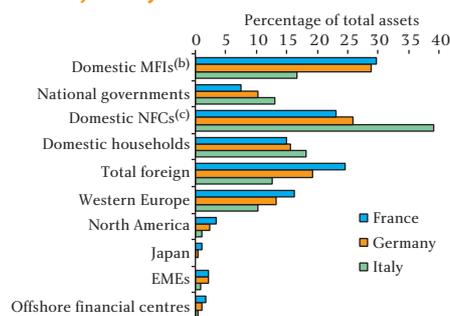


Source: INSEE.

(a) Gross interest payments over gross operating surplus.

(b) Gross interest payments over disposable income.

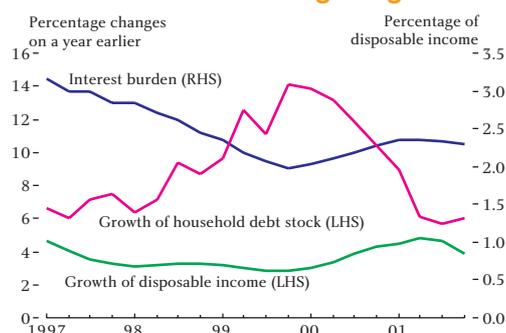
Chart 72:
Estimated exposure^(a) of resident banking sectors, end-June 2001



Sources: Deutsche Bundesbank, Banque de France, Banca d'Italia, BIS and Bank calculations.

- (a) On balance sheet.
- (b) Monetary and financial institutions.
- (c) Non-financial companies.

Chart 73:
Italian households' income gearing^(a)



Sources: Banca d'Italia, National Institute Global Econometric Model, OECD and Bank calculations.

- (a) Estimated gross interest payments as percentage of disposable income.

Banks and the financial sector

France is UK-owned banks' third largest consolidated international exposure²¹, with claims on banks representing nearly 60 per cent of total exposure. The balance sheets of French banks appear more robust than before the 1993 recession, with the strong profitability in recent years having helped to build up capital reserves. The results of the major banks for the first three quarters of 2001, while not repeating the previous year's strong profits growth, generally held up well. The relative strength and size of domestic markets have helped protect banks from the global slowdown; in particular, a continuing good performance of domestic retail banking has compensated for the deterioration in the profitability of investment banking.

Strong competition in a low interest rate environment has, however, squeezed margins in the French retail banking market. And, despite a slight widening in 2000, French regulators remain concerned that narrow margins could affect banks' ability to cover costs and loan loss expenses²². A slowdown in growth in loan volumes, as the operating environment deteriorates, would inevitably put retail profits under some pressure at a time when non-performing loans might be increasing. But banks themselves have generally sought to move away from traditional lending activities (particularly lending to large firms) to look for more profitable, non-interest, sources of income. For example, banking groups now manage about 70 per cent of French mutual fund inflows and write some 60 per cent of life assurance policies.

Although the total on-balance-sheet, cross-border exposure of banks located in France is greater than that of banks located in Germany or Italy, it amounts to only one quarter of total assets (Chart 72); a large proportion is to other western European countries.

Italy

Italy has suffered a smaller downward revision to expected GDP growth in 2001 and 2002 than the United States, Japan or Germany. Italian firms face this slowdown with a ratio of interest-bearing debt to total assets much lower than in the 1990s, despite some increase since a low in the first quarter of 2000. The share of investment funded from profits has increased since the early and mid-1990s, and company bankruptcies fell for the sixth consecutive year in 2000. For households, ratios of both debt to financial assets and debt to disposable income had risen, by mid-2001, to their highest since at least 1995, but remain low by international standards. Estimates of gross household interest payments over disposable income suggest that the interest

21: See footnote 16 and Box 3 for further detail.

22: Commission Bancaire's annual reports 1999 and 2000.

burden for Italian households fell in the second and third quarters along with nominal euro-area interest rates. But *ex-post* real interest rates paid by households fell less than nominal rates in the first nine months of 2001. The fall in interest gearing partly reflects the real interest burden being shifted from this to future years (Chart 73).

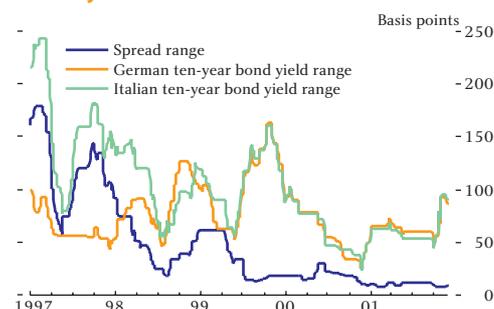
Italy is UK-owned banks' fourth largest on-balance-sheet consolidated international exposure²³, with claims on the Italian public sector accounting for almost two thirds of this exposure. Following EMU, changes in Italian government bond yields have tracked those in Bund yields increasingly closely (Chart 74). Despite shocks to the global financial system, and discussions about Italy's likely failure to meet budget deficit reduction targets previously agreed as part of its Stability Programme, the spread between the yield on Italian and German ten-year bonds has varied by less than nine basis points during the second half of 2001.

Banks and the financial sector

The remaining third of UK-owned banks' on-balance-sheet claims on Italy is largely on banks. Italian banks have significantly increased their profitability in recent years: return on equity rose steadily to a high of around 11.5 per cent in 2000 from a low of under 2 per cent in 1997. Returns for the largest banks were higher, at just over 13 per cent in 2000. Sustained higher profits strengthen banks' defences against a cyclical deterioration in credit quality, but third quarter results suggest that profits are likely to have fallen in 2001. Increased profitability in recent years has been used to support loan growth and acquisitions; risk-weighted capital ratios have actually declined (Chart 75). The Banca d'Italia has expressed concern that they should now be strengthened. It has also reported pressure on liquidity ratios, such as that of liquid assets to total loans²⁴, as a result of strong lending growth accompanied by relatively slow growth in domestic fund-raising. The deficit between retail deposit flows and new lending has in part been filled by inter-bank borrowing, including from London²⁵. The recent narrowing of the gap between annual growth in lending to residents²⁶ and growth in non-bank deposits, from a high of 12 percentage points in May 2001 to 4 percentage points in October, will reduce pressures on liquidity.

Securitisation of loan portfolios, encouraged by 1999 legislation permitting the creation of on-shore special purpose vehicles, has

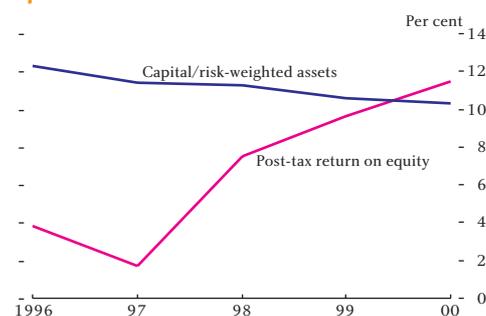
Chart 74:
Italian and German government bond price volatility^(a)



Source: Bloomberg.

(a) Calculated as highest minus lowest yield over previous six months, and highest minus lowest spread between the yield on Italian and German ten-year bonds over previous six months.

Chart 75:
Italian banks' profitability and capitalisation



Source: Banca d'Italia.

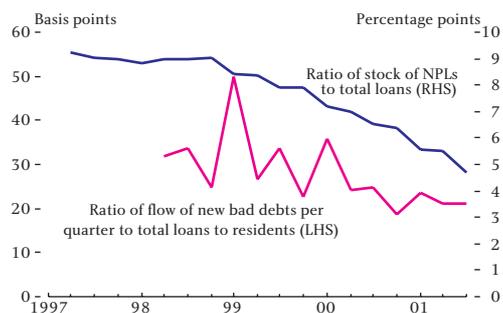
23: See footnote 16 and Box 3 for further detail.

24: Banca d'Italia Annual Report for 2000.

25: The net external debts of banks in Italy rose to \$95.8 billion at end-June 2001 from \$77.6 billion at end-December 2000. Total gross lending by banks in the UK to banks in Italy rose to £58.2 billion at end-June 2001 from £47.2 billion at the end of 2000.

26: Excluding loans to monetary and financial institutions.

Chart 76:
Italian banks' stocks of non-performing loans and flows of new bad debts



Source: Banca d'Italia.

provided another liquidity management instrument. It has also created new opportunities for banks to diversify away from concentrated regional and sectoral exposures. The securitisation of €8.3 billion of non-performing loans (NPLs) accounted for almost all of a 14 per cent fall in the stock of NPLs on Italian banks' balance sheets in 2000. This reduced the ratio of NPLs to total loans to its lowest level since Italy's 1993 recession. Further securitisation of distressed debt took the NPL/loans ratio lower still by June 2001 (Chart 76), although the flow of NPL securitisations is now expected to slow following the end, on 29 May 2001, of an accounting rule that allowed banks to amortise losses on securitised loans over five years. To the extent that default risk has been sold outside the banking system, recourse to the originating bank and counterparty risk avoided and alternative lower risk assets purchased by banks, securitisation may have reduced the credit risk carried by the banking sector as a whole.

As a measure of trends in credit quality, the flow of new bad loans²⁷ is perhaps a better measure than the stock of NPLs. The ratio of new bad loans to total outstanding loans has fallen in recent years, albeit less dramatically than the stock. Rating agencies have welcomed the improvement in banks' assessment and monitoring of credit risks. But the lag between extension of new loans and the emergence of repayment problems means that the flow of new bad debts is likely to have been below its steady state level during the period of rapid credit growth in Italy since 1998. The decline in new bad loans is, perhaps, unlikely to be sustained as the economic slowdown is felt.

²⁷: Total loans outstanding to a borrower when the borrower is reported to Italy's Credit Register as a bad debt for the first time in a given quarter.

IV Japan

Recent economic and financial developments have intensified the challenges facing Japan. They are discussed here together with the links through which they may affect the international financial system²⁸.

Recent economic and financial developments

Japan's economy was already contracting at the time of the June Review. Since then, declines in external demand have caused sharp falls in export volumes and in industrial production. Deflation, which exacerbates the financial impact of the downturn, has persisted (Chart 77). Land prices have also continued to fall, further eroding loan collateral.

The consensus GDP forecasts for growth in both 2001 and 2002 were revised down by one percentage point between the June Review and early September, and the 2002 forecast was cut by a further percentage point following 11 September (Chart 78). Both Bank of Japan (BOJ) and consensus forecasts predict continued deflation in 2002.

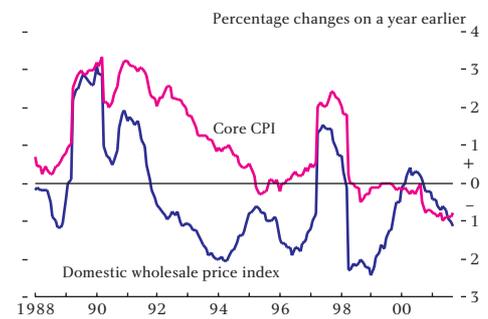
Policy responses

Japan's authorities have responded with policies to support the economy and limit financial disruption. Following 11 September, the BoJ sought to expand money market liquidity beyond its ¥6 trillion excess reserves target, and on 18 September formally increased the reserves target to 'above ¥6 trillion', reduced the discount rate from 0.25 to 0.10 per cent and extended the duration of its Lombard lending facility. Short-term interest rates have remained at virtually zero, while market expectations of future nominal interest rates have remained low since the previous Review (Chart 79). The government has announced two supplementary budgets: the first in October with ¥1 trillion net new spending, and the second in November with ¥2.5 trillion.

Household sector finances

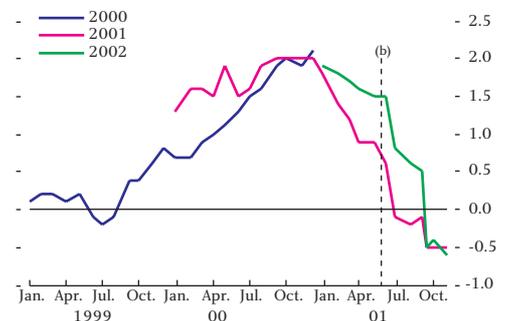
Bank lending to households, which is mostly secured, accounts for only a fifth of Japanese banks' total domestic loans (Chart 80). Banks have classified only 2 per cent of household loans as non-performing, compared with over 7 per cent of corporate loans. Unsecured lending to households is mostly provided by specialist consumer finance companies, which have suffered a sharp rise in credit defaults from previously low levels. The recent rise in unemployment may cause financial strains for some households. Net financial assets, which had been broadly stable in recent years, fell by ¥5 trillion in the fiscal year to

Chart 77:
Measures of inflation



Source: Thomson Financial Datastream.

Chart 78:
Consensus forecasts for Japanese GDP growth^(a)

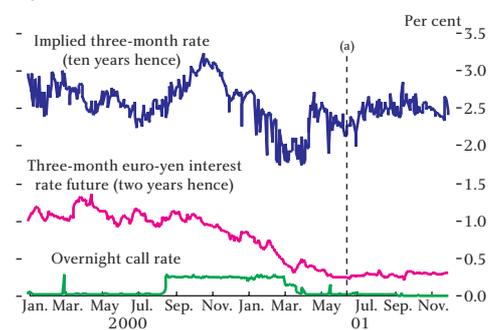


Source: Consensus Forecasts.

(a) Mean of forecasts compiled by Consensus Forecasts.

(b) June 2001 Review.

Chart 79:
Japanese interest rates and market expectations

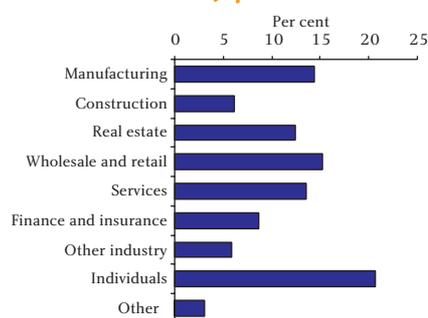


Source: Bloomberg.

(a) June 2001 Review.

28: As at end-June, UK banks' consolidated international on-balance-sheet exposure to Japan represented 3.5 per cent of UK global exposure, while international claims on Japan's banking sector represented 3.2 per cent of UK global exposures to banks (see also footnote 16).

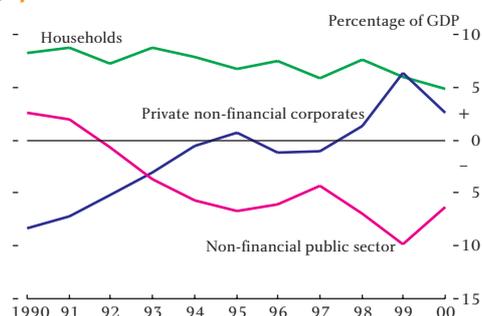
Chart 80:
Domestic loans of Japanese banks^(a)



Source: Bank of Japan.

(a) Loans and discounts of banking accounts of domestically licensed banks, as at end-March 2001.

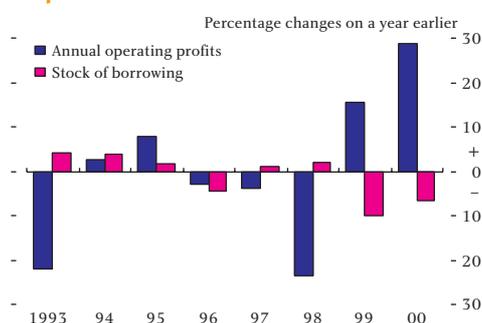
Chart 81:
Japanese financial balances^(a)



Sources: Bank of Japan and Economic and Social Research Institute, Japanese Cabinet Office.

(a) Financial years. Revised figures for the year to end-March 2001 were released in September.

Chart 82:
Profitability and indebtedness of Japanese companies^(a)



Source: Japanese Ministry of Finance.

(a) Financial years.

March 2001, as capital losses on securities more than offset a slightly reduced financial surplus (Chart 81).

Corporate sector financial health

Lending to companies accounted for 67 per cent of Japanese banks' domestic loan book, and 92 per cent of their non-performing loans (NPLs) as at end-March 2001. Adjusted for write-offs, it fell by nearly 2 per cent in the twelve months to October. Most evidence, including the latest BoJ Senior Loan Officers Survey, suggests that this fall has been due to further weakening of loan demand from firms, consistent with the continuing (albeit smaller) corporate sector financial surplus and efforts by firms to deleverage and restructure balance sheets.

Aggregate operating profits for the corporate sector increased and debt fell in each of the two years to March 2001 (Chart 82). But non-financial listed companies' operating profits for the six months to September fell 24 per cent on a year earlier, and full-year profit forecasts have been revised down. Corporate performance varies widely, with a significant proportion of companies persistently recording falling operating profits and rising debts²⁹. The vulnerability of such companies means that any further or prolonged downturn in the economy, or any material tightening of credit conditions, could trigger a rise in the number and size of bankruptcies (Chart 83). Financial strains are particularly evident in certain sectors. The incidence of non-performing bank loans in real estate and construction, which have suffered most from Japan's continuing asset price deflation, was about 12½ per cent at end-March 2001, compared with around 7½ per cent for total corporate lending.

Impact on Japan's financial sector

Non-performing loans and capital ratios of Japan's banking sector

Japan's Financial Services Agency (JFSA) reported that NPLs increased slightly in the year to March 2001 (Chart 84), despite substantial NPL disposals during the year. NPLs fell at the major banks, but this was more than offset by net increases at regional banks (following intensified JFSA inspections). In April, the government asked major banks to dispose of existing NPLs within two years and new NPLs within three years. Banks who fail to do so will be required to sell the loans to the government-owned Resolution and Collection Corporation (RCC). In October, proposals were drawn up to expand the RCC's role in the securitisation of loans and real estate collateral, and in the purchase of NPLs.

In the six months to September, the eight major banking groups reported higher-than-expected loan-loss charges, which, together

29: Corporate sector performance dispersion and vulnerabilities are documented in David Atkinson (2001) 'Totally rethinking Japanese asset quality' (Goldman Sachs), which analyses 2,823 non-financial listed companies.

with valuation losses on investment securities (discussed further below), resulted in ¥0.6 trillion net losses, ¥1.1 trillion worse than previously forecast.

Doubts about the adequacy of banks' NPL recognition and provisions were renewed in September by the collapse of Mycal, Japan's fourth largest retailer, which led some banks to increase their loan-loss provisions substantially. The JFSA announced that it would increase the frequency of comprehensive inspections of major banks (from biennial to annual); start new special inspections of major banks, focusing on borrowers whose market reputation has changed substantially; and ask banks to use market signals (shares prices, bond yields, external ratings) in their provisioning process. The major banks have revised up their forecasts of loan-loss charges for the year to March 2002 from ¥2.2 to ¥6.3 trillion.

The average published capital adequacy ratios of major banks fell from 10.9 per cent at end-March to 10.6 per cent at end-September. But capital adequacy ratios for the banking sector as a whole are still higher than immediately prior to Japan's 1997/98 banking crisis (Chart 85).

Mark-to-market accounting

Banks' accounts for end-September were the first legally required to be produced under Japan's new mark-to-market accounting standard³⁰, which extended fair value accounting from trading securities to investment securities. Any net unrealised losses on investment securities must now be deducted directly from retained earnings in the bank's balance sheet, reducing Tier 1 capital but not affecting the accounting measure of profits. After reporting net unrealised gains of ¥0.2 trillion at end-March, banks faced net unrealised losses of ¥3.1 trillion at end-September.

Since April 2000, banks have been required to write down the value of individual securities that fall more than 50 per cent below book value (unless the banks and their auditors believe the price fall is temporary) and report the resulting loss in their profit and loss account. The 20 per cent fall in the Topix index (Chart 86) triggered an estimated ¥1½ trillion of valuation losses for the major banks in the six months to September.

In order to reduce banks' exposure to equity market volatility, Japan legislated to restrict banks' shareholdings, by 2004, to no more than their Tier 1 capital, and to establish a Bank Shareholding Purchasing Corporation in January 2002, with an initial ¥2 trillion government guarantee, to help banks reduce their shareholdings.

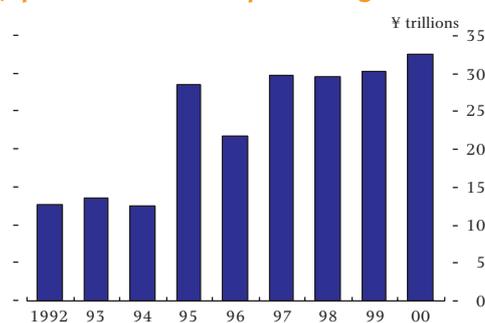
³⁰: Three major banks and 91 regional banks voluntarily introduced mark-to-market accounting for the financial year to March 2000.

Chart 83:
Japanese corporate bankruptcies



Source: Bloomberg.

Chart 84:
Japanese banks' non-performing loans^{(a)(b)}

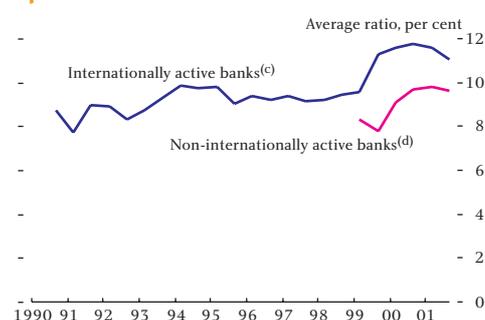


Source: Japanese Financial Services Agency.

(a) Financial years.

(b) The chart shows NPLs as measured by risk management loans (RML), the definition of which was widened in financial years 1995 and 1997. RMLs now comprise 'loans to legally bankrupt companies', 'loans past due for three months or more' and 'restructured loans'.

Chart 85:
Capital ratios^{(a)(b)}



Source: Bank of Japan.

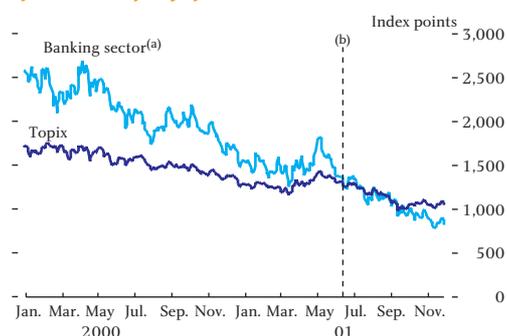
(a) Data are end-September and end-March.

(b) Capital to risk-weighted assets, consolidated basis for internationally active banks.

(c) Banks subject to the international standard at end-March 2001.

(d) Banks subject to the domestic standard at the end of each accounting period.

Chart 86:
Japanese equity prices

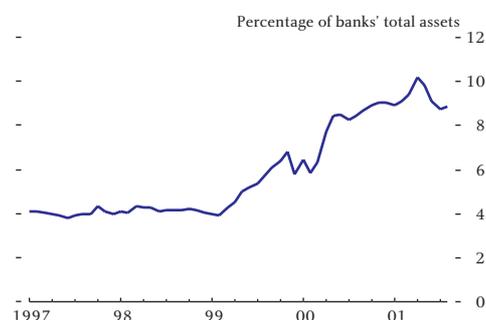


Source: Bloomberg.

(a) Rebased to equal Topix on 12 June 2001.

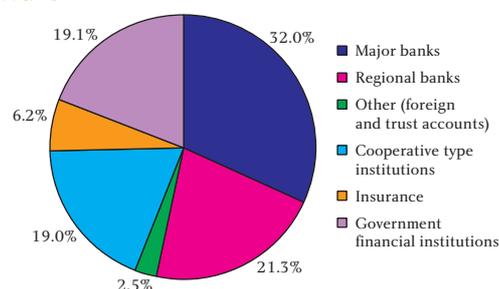
(b) June 2001 *Review*.

Chart 87:
Japanese banks' holdings of government securities



Source: Bank of Japan.

Chart 88:
Japanese financial institutions' share of loans^(a)



Sources: Bank of Japan and Bank calculations.

(a) End-March 2001.

Japanese banks reduced their holdings of Japanese government securities from an end-April peak of 10.2 per cent of total assets to just under 9 per cent by end-August (Chart 87). They may, however, still be exposed to bond-like risks through interest rate swaps and derivatives – see below – which if classified as ‘macro hedges’ (against unspecified portfolio risk) remain temporarily exempt from mark-to-market accounting.

Banking sector restructuring

The shrinking demand for credit (due to deflation and declining business investment) has increased pressure for financial sector restructuring. Japan's major banks have responded with mergers aimed at securing economies of scale, and are planning further cost reductions and branch closures. Notwithstanding the four mega-bank mergers (discussed in the past two *Reviews*), major banks' market share of total loans and deposits remains modest (Charts 88 and 89). Public sector financial institutions (subsidised to varying degrees) have a sizeable market share which continues to constrain the profitability of commercial banks.

In September, Asahi Bank and Daiwa Bank agreed to form a holding company by end-March 2002, to become Japan's fifth largest banking group with ¥50 trillion in assets. The two banks have been perceived to be relatively weak, judging by their low and falling share prices, and by their withdrawal from international business.

Changes to deposit protection

Japan's current 100 per cent deposit protection is due to be replaced, from April 2002 for time deposits and from April 2003 for sight deposits, with a partial deposit guarantee covering only ¥10 million (approximately US\$80,000) per depositor per bank. The authorities will retain a ¥15 trillion fund to deal with banks posing systemic risk. This planned regime change should reduce moral hazard, but could trigger shifts of funds to deposits which are still covered by deposit insurance, and to institutions perceived to be less at risk of failure. Data on deposits suggest that this has occurred to a modest degree in recent months, although shifts from time into sight deposits could have been partly due to the low interest rates on the former.

The insurance sector

Japan's banks and life insurers have longstanding ties, including cross-holdings of capital. Life insurers continue to suffer from poor asset returns and shrinking business. Solvency margins fell between March and September, in part because of a 20 per cent fall in the Topix. Total assets and the number of policies in force have also fallen further, as policyholders have reassessed their claims on the sector. September interim results show that investment returns fell short of guaranteed returns, although part of these ‘negative spread’ losses have been offset by

lower-than-budgeted expenses and mortality gains³¹. In the June Review, it was noted that insurers might be allowed to cut their guaranteed rates of return. Such proposals were abandoned, however, following strong opposition from the industry and a warning from Standard and Poor's (in August) that any move to cut policyholders' guaranteed entitlements would be treated as default. Meanwhile, the paid-in funds of the Life Insurance Policyholders' Protection Corporation industry safety net have been virtually exhausted.

Life insurers' ability to consolidate through mergers is constrained by their mutual status. General insurers, which are mostly listed, are consolidating more rapidly, from 15 at the beginning of 2001 to eight in April 2002. The new top three will account for two thirds of net premium income. The biggest merger, comprising Tokio Marine and Fire, Nichido Fire and Marine, and Asahi Life, has been brought forward to March 2003, along with Tokio's acquisition of Asahi Life's new business. The second biggest merger was delayed by the bankruptcy (on 22 November) of Taisei Fire and Marine Insurance, Japan's smallest listed general insurer, due to ¥74 billion 11 September-related aircraft reinsurance losses. Two other general insurers also disclosed large losses, and the Marine and Fire Insurance Association of Japan has increased its estimate of members' payouts for damage related to 11 September from ¥30 to ¥133 billion.

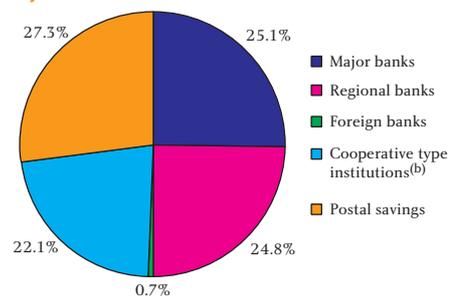
The impact on public sector finances

Japan's public finances face the risk of further calls on public funds to support the economy generally or the financial sector in particular. Japan's financial sector in turn remains exposed to Japanese government bonds (JGBs) and assets carrying related risks.

Japan's general government financial deficit narrowed to 6.1 per cent of GDP in the fiscal year to March 2001, from 9.8 per cent the previous year. The deficit will probably have widened since, however, as the economic downturn is likely to have lowered tax receipts. The downturn may also have increased the risk of calls on public funds to cover some of the contingent liabilities outlined in the previous Review. On 21 September, the government issued a Reform Schedule with a timetable for implementing a large number of reform proposals, including a ¥30 trillion limit on net central government bond issuance for the fiscal year to March 2003.

Japan's long-term domestic credit rating has been cut by one notch, to AA by Standard and Poor's and Fitch IBCA, and to Aa3 by Moody's. The downgrades had only a limited impact on the JGB market. JGBs are still largely owned by Japanese institutions, including many public bodies (Chart 90). Foreign firms do,

Chart 89:
Japanese financial institutions' share of deposits^(a)

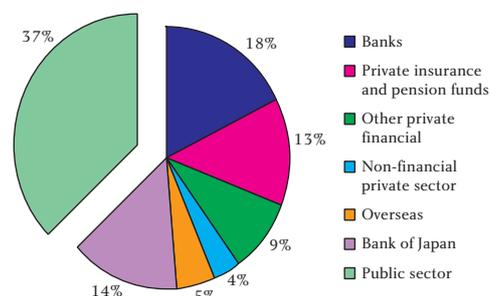


Sources: Bank of Japan and Bank calculations.

(a) End-March 2001.

(b) To avoid double counting central organizations and federations are excluded.

Chart 90:
Sectoral holdings of central government securities^{(a)(b)}

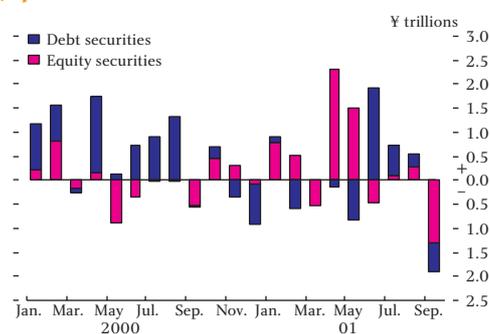


Sources: Bank of Japan and Bank calculations.

(a) End-June 2001.

(b) JGBs, Treasury Bills and Fiscal Investment Loan programme bonds issued by the Fiscal Loans Fund.

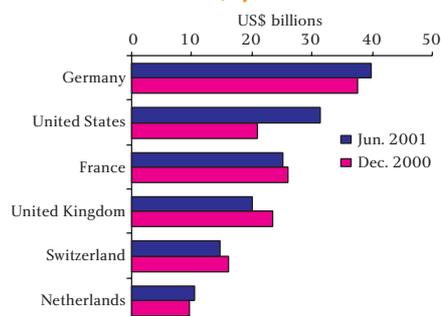
Chart 91:
Foreign portfolio investment flows into Japanese securities



Source: Bank of Japan.

31: Japanese life insurers have little annuity business and more life assurance, so benefit from increased life expectancy.

Chart 92:
Consolidated international claims of
BIS-area banks on Japan^(a)



Sources: BIS.

(a) The data are on-balance-sheet and do not include yen lending of BIS-area banks' Japanese offices to Japanese residents (see Box 3). The German figures are to a small degree overstated, as some inter-office exposures are not netted out.

Table 4:
Credit ratings of Japanese banks^(a)

	'Individual rating'	'Long-term debt'
Mizuho Group ^(b)	D/E	A-
Sumitomo-Mitsui Banking Corp	D/E	A-
Mitsubishi-Tokyo Financial Group ^(c)	D	A
United Financial of Japan ^(b)	D/E	A-
Asahi Bank	D/E	BBB-
Sumitomo Trust	D/E	BBB+
Chuo Mitsui Trust	E	BBB-

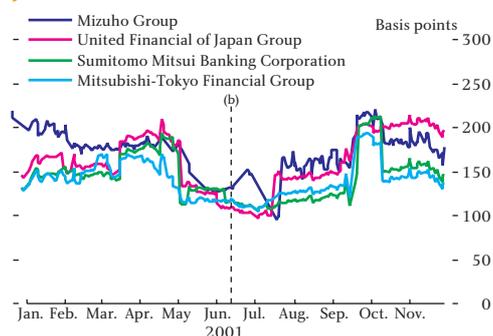
Source: FitchIBCA.

(a) A bank with an individual rating of E has very serious problems and 'either requires or is likely to require external support'.

(b) Based on ratings of member banks.

(c) Bank of Tokyo-Mitsubishi.

Chart 93:
Japanese banks' subordinated debt
spreads^(a)



Source: Bloomberg.

(a) Yield spread of US\$ subordinated notes maturing in 2009 and 2010, over equivalent US swap rates.

(b) June 2001 Review.

however, account for an increasing number of transactions in JGBs, sometimes taken as collateral. Any lower rating could complicate risk management in yen capital markets.

Links to the international financial system

The most obvious financial stability risks from Japan's economic and financial difficulties appear to be to Japan's own financial system, via the health of the corporate sector and the quality of financial intermediaries' assets. The impact of any further adverse developments in Japan on international financial markets would depend on the extent of economic and financial system links.

Foreign claims on Japan

Foreign investment in JGBs and Japanese equities has slowed since the June Review, with net sales by foreign investors recorded in some months (Chart 91).

UK and other BIS country banks' international on-balance-sheet lending to Japan remains low (Chart 92); about a third are exposures to Japanese banks. Major Japanese banks retain branches that trade in the London and New York wholesale markets, and, based on assumptions of continued government underpinning, retain respectable long-term credit ratings. They still face no significant Japan premium in the short-term money market. Any doubts about the underpinning could of course lead to sharp changes in market perceptions of Japanese bank risk, given the much lower stand-alone individual ratings (Table 4). In November, Fitch IBCA downgraded the long-term ratings of the major banks because it judged that "the capacity of the government to support the banks, in the event of need, is weakening due to the country's poor economic performance and deteriorating public finances." Standard and Poor's placed its long-term ratings of twelve Japanese banks on 'CreditWatch'. Market-based indicators of longer-term risk, such as share prices, credit default swap prices and subordinated debt spreads (Chart 93), also suggest that Japanese bank risk may have increased since the June Review.

As well as their on-balance-sheet exposures, major internationally active banks have *off-balance-sheet* positions with Japanese financial institutions through derivative transactions, such as interest rate swaps and structured notes (Box 4). Some exposures may involve so-called 'wrong-way' risk: counterparty risk correlated with the underlying market risk. For example, Japanese financial institutions may provide hedges against yen interest rate risk, while at the same time being themselves exposed, directly and indirectly, to the same risk.

Links with offshore financial centres

Links with offshore financial centres, especially the Cayman Islands, as measured by Japanese banks' claims, have increased sharply in recent years (Chart 94). Some of the increase in claims

Box 4: Yen structured notes

Faced with conflicting demands to earn higher investment returns than Japan's low nominal interest rates, while not exposing yen principal to market risk, Japanese investors have bought various 'yield-enhancement' structured notes. In the first eleven months of 2001, according to Bloomberg, there were 474 issues of yen-denominated structured notes, totalling ¥1,338 billion. Recent typical notes offered a high fixed coupon (1½-2 per cent) for the first three years, followed by ten years of coupons calculated as long-term (10 or 20-year) yen swap rates minus two-year yen swap rates plus x basis points, with a zero per cent coupon floor to protect the principal from market risk.

Such deals generate three sets of transactions (Chart A), which satisfy each party involved:

- Investors secure three years of high fixed yield, followed by ten years of yield-curve spreads, while the principal protection exempts the security from mark-to-market valuation. If swap rates evolve as implied by the forward curve, the structured note coupon will be initially higher, and subsequently lower, than similarly rated straight bonds and floating-rate notes, implying some degree of intertemporal switching (Chart B).
- The issuer (usually a high-rated Japanese company) typically swaps the issue into cheaper floating-rate funding than could be obtained with a straight floating-rate note or bank loan.
- The arranger (usually an investment bank) hedges its risk with a combination of constant maturity swaps, swaptions and bond options.
- Other market participants have been keen sellers of such options, even at implied volatilities which are low by international standards, perhaps in order to generate premium income in lieu of investment income.

Each transaction involves counterparty risk. The market value of net claims, and the replacement cost of swap contracts, will depend on the path of the swap curve over time – which may also affect the value of other financial claims between the parties involved. Counterparty risk is probably the least transparent in the final leg of the transaction: the hedging of extreme swap curve risk and of the coupon floor (principal protection) with swaptions and bond options. Dynamic hedging of such positions, if sufficiently widespread, could trigger short covering and perhaps exacerbate any sharp move in swap rates. There could also be so-called 'wrong-way risk', if writers of options are exposed to the underlying risk that they are selling protection against.

Chart A:
Structured note

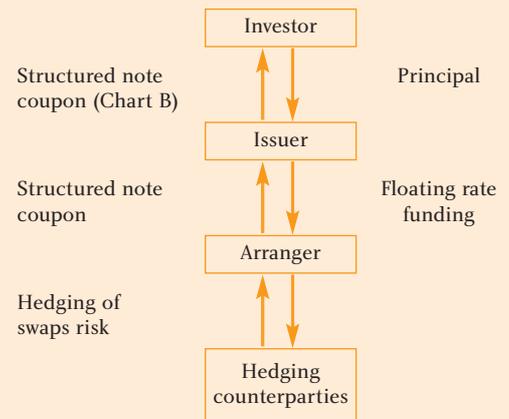
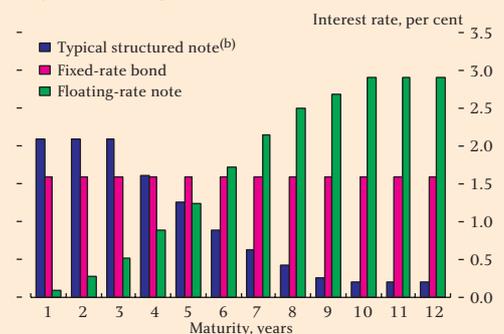


Chart B:
Projected coupon flows^(a)

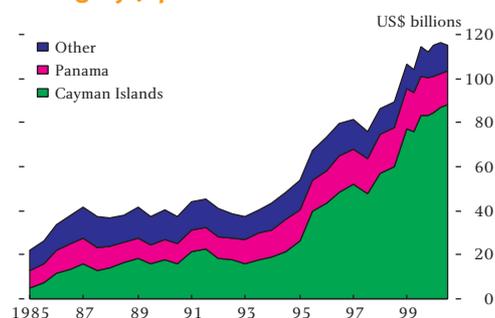


Source: Bloomberg.

(a) Assuming interest rates move as implied by the swap curve.

(b) For illustration the projections are based on a structured note issued by Mitsubishi Corp with initial coupon of 2.1 per cent.

Chart 94:
Lending by Japanese banks to OFCs^{(a)(b)}

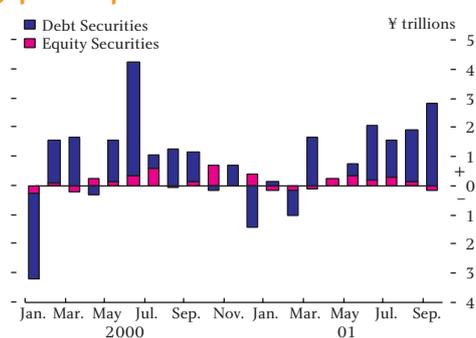


Sources: BIS.

(a) Consolidated claims, not adjusted for risk transfers.

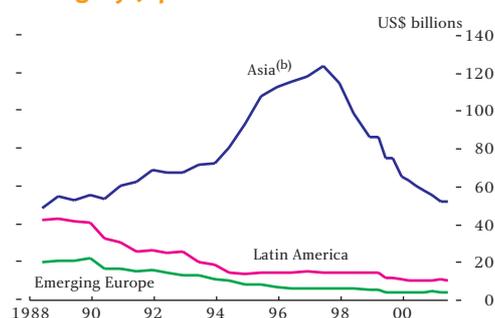
(b) Excludes Hong Kong and Singapore.

Chart 95:
Japanese portfolio investment overseas



Source: Bank of Japan.

Chart 96:
Lending by Japanese banks to EMEs^(a)



Source: BIS.

(a) Consolidated claims, not adjusted for risk transfers.

(b) Excludes Hong Kong and Singapore, which are classified as offshore financial centres.

is likely to reflect growth in securitisation of loans using offshore Special Purpose Vehicles, which may have off-setting claims on Japan not disclosed in the BIS statistics. Limited disclosure makes it difficult to assess what risks, if any, these structures may pose to Japan's banks or to any international counterparties.

Japan's international investment

If Japan's external assets were to be repatriated on a large scale, it could potentially have a significant impact on international markets. Since the *June Review*, Japanese net portfolio investment outflows have increased (Chart 95). Anecdote suggests that repatriation flows were probably most significant following the events of 11 September, and ahead of the end-September interim book close. The risk to global stability appears, however, minimal. In September Japan conducted ¥3.2 trillion worth of official foreign exchange intervention to limit the appreciation of the yen.

Japanese banks' international lending

For international financial markets, past withdrawals by individual Japanese banks have generally proceeded in an orderly way, as is the case with Asahi Bank's current exit from international business. Any sharp withdrawal of bank funding could, in theory, disrupt financing in countries or sectors heavily reliant on Japanese banks, but solvent borrowers should be able to find alternative sources of funds, albeit with possible refinancing or search costs. One possible area of concern could be international airline financing, where some Japanese banks have been providing syndicated loans. Another could be Asian emerging market economies (EMEs), which, despite continuing declines in international lending from Japan, are still the main recipients of Japanese bank lending to EMEs (Chart 96), and remain exposed (as discussed in Section V) to both macroeconomic weakness and any tightening of credit conditions in Japan.

Japan's macroeconomy, corporate sector financial health, financial sector vulnerabilities and public sector finances are interrelated in a complex way. To varying degrees, all have deteriorated since the *June Review* – though this is hardly surprising given the magnitude of external shocks during this period and the previously identified weaknesses and vulnerabilities within Japan. So far, however, these adverse developments within Japan appear to have had little impact on the international financial system. And recent evidence on links between Japan and the rest of the world does not suggest any increase since the *June Review* in the risk of such contagion. The forthcoming IMF Financial Stability Assessment Programme (FSAP) review of Japan may help clarify the extent of financial stability risks.

V Emerging market economies

Since the June 2001 *Review*, the economic and financial prospects of emerging market economies (EMEs) have been affected by three main developments: growing evidence of a global slowdown; the terrorist attacks in the United States on 11 September; and a further deterioration in the financial position of Argentina.

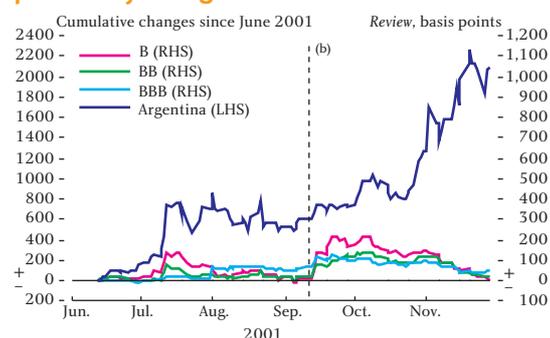
In July 2001, a run on deposits in Argentine banks and further evidence of a weakening of the government's fiscal position prompted an increase in Argentine sovereign bond spreads by around 800 basis points (Chart 97). This had an effect on other EME bond spreads, especially lower-rated sovereigns – but only temporarily. By late July, higher-rated EME sovereign spreads had largely returned to June levels; lower-rated bond spreads did so by early August. Similar movements in bond spreads occurred after 11 September. Lower-rated sovereign spreads rose more than higher-rated sovereigns, with the former taking longer to return to pre-attack levels. However, when Argentine bond spreads rose sharply again in October and November, there was no discernible effect on other EMEs. With Argentina's then large weight in the index, the EMBI Global rose to around 950 basis points³². But excluding Argentina, the net effect of recent events is that sovereign spreads are little changed since the June *Review* (Chart 98).

Overlaying these specific events has been accumulating evidence of a global slowdown. This may affect EME growth prospects through trade and capital account channels. Countries have differing capacities to cope with this slowdown, depending on the strength of their external balance sheet positions, banking systems and macroeconomic frameworks. Those countries that took advantage of the relatively benign international financial and economic conditions of recent years to address their macroeconomic, structural or balance sheet vulnerabilities have seen their relative prospects improve. Countries that failed to grasp the opportunities, on the other hand, are more exposed. The pattern of bond spread movements since the June *Review* suggests that markets are increasingly differentiating between countries on the basis of their fundamentals: in the immediate aftermath of an adverse event all spreads rise, but confidence returns most quickly to those with more robust economies³³.

32: JP Morgan Chase and Co. Emerging Market Bond Index. The fall in value of Argentine debt combined with the recent domestic debt exchange on 4 December have resulted in Argentina's weight in the index falling from 19 per cent to 4 per cent since the June *Review*.

33: The article 'Analysing yield spreads on emerging market sovereign bonds' by Alastair Cunningham, Liz Dixon and Simon Hayes in this *Review* discusses some tools for analysing bond spread movements.

Chart 97:
Changes in EME sovereign US\$ bond spreads: by rating^(a)

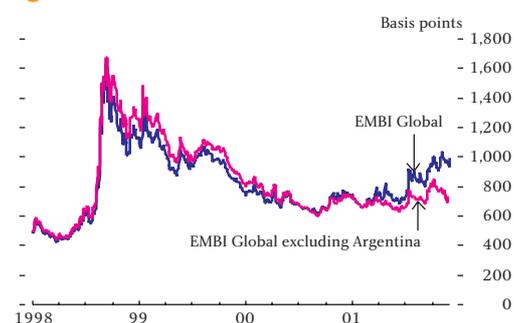


Sources: JP Morgan Chase & Co and Standard & Poor's.

(a) Based on latest ratings.

(b) 11 September 2001.

Chart 98:
EME spreads including and excluding Argentina



Source: JP Morgan Chase & Co.

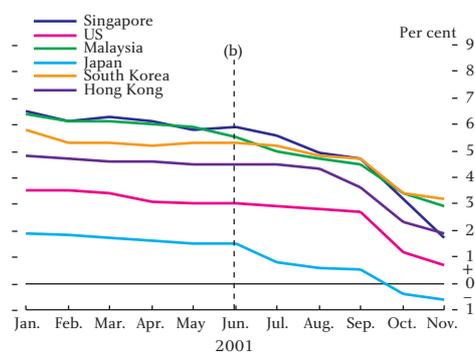
(a) Russian Prins and Ians taken out of EMBI Global on 14 April 2000, and replaced by new eurobonds issued in exchange.

Table 5:
Exports to major markets as a percentage of total exports: 2000

Country	US	Japan	EU
Argentina	11.4	1.5	19.8
Brazil	22.6	4.6	29.0
Colombia	49.7	1.9	17.4
Mexico	84.1	1.4	4.0
China	26.9	14.6	19.0
Hong Kong	21.4	5.3	9.2
India	22.8	5.4	26.4
Indonesia	15.5	22.3	15.5
Korea	22.5	11.4	13.4
Malaysia	21.8	12.6	15.5
Philippines	30.2	14.7	18.0
Singapore	17.2	7.4	12.1
Thailand	22.6	15.7	19.1
Czech Republic	3.8	0.4	68.8
Hungary	5.3	5.7	68.6
Poland	3.2	0.2	70.1
Russia	7.7	2.7	42.6
Turkey	10.6	0.5	59.0

Source: IMF Direction of Trade Statistics.

Chart 99:
Consensus Forecasts for GDP growth in 2002^(a)

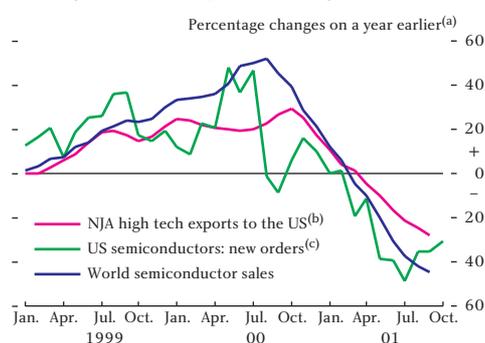


Source: Consensus Forecasts.

(a) Mean of forecasts.

(b) June 2001 *Review*.

Chart 100:
Non-Japan Asia high-tech exports



Sources: Bloomberg, Thomson Financial Datastream, IFS and US Census Bureau.

(a) Three-month moving averages.

(b) Defined as SITC 75,76,77.

(c) Seasonally adjusted, data for October 2001 based on advance sample.

Slowing EME growth prospects

Even those EMEs with diversified export markets have been affected by the simultaneous fall in demand from the major developed economies (Table 5). As a result, according to Consensus Forecasts, all major EMEs except Russia have had their growth forecasts revised downwards since the *June Review*, in many cases significantly so.

Mexican growth prospects have been affected by the slowdown in the United States, its largest export market, and by the fall in the oil price from over \$30 per barrel a year ago to the current level of around \$19 per barrel. But Mexico is better placed to cope with external shocks than at the time of the 'Tequila' crisis in 1994/95. The banking sector has been restructured, including the sale of several large entities to foreign groups and banks with some foreign participation now account for around 80 per cent of banking system assets³⁴. Public sector debts are of longer maturity and no longer linked to the exchange rate. The fiscal position is also more robust – a primary surplus of 2.8 per cent of GDP is forecast for 2001. But fiscal revenues remain vulnerable, as oil provides over a quarter of total revenues, and Mexico has large external financing needs in 2002, amounting to around 60 per cent of foreign exchange reserves. Nevertheless, largely as a result of its reforms, Mexican spreads have effectively decoupled from Argentina. Although they rose by around 100 basis points in the weeks following the terrorist attacks in September, they quickly fell below pre-attack levels.

Growth forecasts for many of the open economies of non-Japan Asia have also been substantially downgraded since the *June Review* (Chart 99). Growth has weakened particularly sharply in recent quarters in economies highly exposed to demand for electronic products, reversing strong export growth in 1999 and 2000 when world demand was high (Chart 100). Singapore and Taiwan entered recession in 2000 Q3 following two quarters of negative growth.

Weaker external demand has also reduced exports from Korea, Indonesia and the Philippines, but in each case relatively robust domestic demand has supported overall growth. Prospects in Indonesia and the Philippines have benefited from reduced political uncertainty following the peaceful transitions to new governments this year. Domestic demand is also likely to sustain strong growth in the less open economies of China and India: latest Consensus forecasts are for growth in 2002 of 7.4 per cent and 5.7 per cent³⁵ respectively.

34: 'Assessing the stability of emerging markets' banking systems' by Alastair Cunningham in this *Review* discusses tools for assessing EME banking sector strength.

35: Fiscal year April 2002 to March 2003.

The scope to offset the trade slowdown through policy action to stimulate domestic demand varies considerably in Asia. Many countries have reduced interest rates this year, with Hong Kong, for example, cutting official rates by 450 basis points, in line with the United States. But in some of the former crisis countries the scope to lower interest rates and effectiveness in stimulating growth is dampened by the imbalances remaining in bank and corporate sector balance sheets. Despite some progress in rehabilitating their banking sectors, the financial systems of these economies remain weak, impairing their ability to supply credit to the corporate sector. For example, non-performing loans (NPLs) in Indonesia and Thailand accounted for 55 per cent and 25 per cent of total loans, respectively, at end-June 2001 (Table 6). Leverage remains high in the corporate sector in these economies, restraining demand for additional borrowing.

Fiscal packages have recently been announced by Hong Kong, Korea, Malaysia and Singapore, countries with relatively strong budgetary positions. But the scope to use counter-cyclical fiscal policy is constrained in some Asian economies by the legacy of previous banking sector recapitalisations. In Indonesia, China, Korea and Malaysia, banks were recapitalised by the transfer of NPLs to government-owned asset management companies (AMCs). The fiscal impact was particularly marked in Indonesia, where public debt rose from zero in 1997 to 51 per cent of GDP in 2000 (Table 7). Fiscal prospects in these economies depend in part on future progress in disposal of AMC assets, which will be influenced in turn by the effectiveness of debt workout procedures. Progress to date has been mixed. The Indonesian AMC purchased 85 per cent of the banking system's total NPLs following the crisis, but has sold just 6 per cent so far. By contrast, the Malaysian AMC received 40 per cent of banks' NPLs and has sold around 83 per cent of them. In China, public debt remains relatively low, but according to the World Bank³⁶ potential future liabilities from bad debts and contingent claims in the state-owned banking and corporate sectors could reach 75 per cent of GDP.

Capital account effects

The global slowdown could also affect EMEs through the availability of finance in international capital markets. A rise in the perceived relative riskiness of EME assets would raise the cost and lower the quantity of capital flows to EMEs. Income or wealth shocks to international investors may also prompt them to cut back on EME investments. Against this, however, investors may be attracted by the higher yields on offer in EMEs as returns fall globally.

Aggregate data suggest that gross international financing flows to EMEs have fallen so far during 2001 relative to 2000: flows in

Table 6:
Non performing loans including transfers to AMCs^(a) (percentage of total loans)

	1998 Dec	1999 Dec	2000 Dec	2001 Mar	June
Indonesia			57.1	57.2	55.2
Korea		19.7	20.3	19.9	19.3
Malaysia	15.0	15.8	14.5	15.6	16.6
Philippines ^(b)	11	12.7	14.9	16.6	16.6
Thailand		40.5	26.8	26.5	25.1

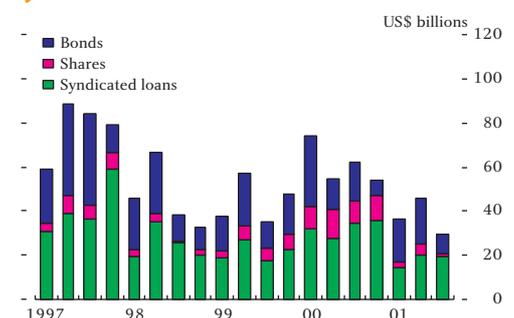
Source: Asian Development Bank.
(a) Asset management companies
(b) The Philippines does not have a centralised AMC.

Table 7:
Fiscal balances and domestic public sector debt in Non-Japan Asia

	General government balance as % of GDP, 2001 (forecast)	Domestic public sector debt as % of GDP, end-2000
China	-3.2	22.6
Hong Kong	-0.2	0 ^(d)
India	-4.7 ^(a,b)	66.1 ^(e)
Indonesia	-3.7 ^(a)	50.7
Korea	-0.2	23.1 ^(f)
Malaysia	-5.7 ^(a)	30.9
Philippines	-4.0 ^(a)	64.4 ^(g)
Singapore	6.1	84.5 ^(g)
Thailand	-4.7	56.9

Sources: IMF, World Bank, Asian Development Bank, official national sources.
(a) Central government budget projection.
(b) 2001/2002.
(c) Federal government.
(d) Government debt.
(e) End March 2001.
(f) Excluding financial restructuring bonds.
(g) 1999 data.

Chart 101:
EME gross international currency financing:
by instrument



Source: Dealogic.

36: World Bank East Asia Update, October 2001.

2001 Q3 were the lowest since the first quarter of 1995 (Chart 101). There are several reasons, however, why this might give an unduly pessimistic impression of current financing conditions facing EMEs. First, planned gross EME sovereign bond issuance was lower this year than last year. Second, for much of this year Argentina and Turkey, two of the larger issuers, were unable to borrow from international capital markets. Excluding Argentina and Turkey, sovereign bond issuance over the year to date is higher than the total last year. Third, many countries had completed their planned financing by the middle of the year. Furthermore, sovereign issuers who wanted to borrow in 2001 Q4, including Bulgaria, Colombia and Turkey, have done so with relatively little difficulty.

Table 8:
EME external financing: 2002 forecasts^(a)

Date of forecast:	May 01	Sep 01
Current account balance	-16.5	-18.5
Net external financing	194.3	147.5
Net private flows	155.8	117.0
Net private credit	37.2	10.3
Net official flows	1.3	20.2
Net domestic lending	-131.2	-95.8
Reserve accumulation	-43.7	-33.1

Source: Institute of International Finance.
(a) US\$ billions.

Looking forward, though, the external financing needs of a number of EMEs remain significant relative to their foreign exchange reserves. Moreover, the Institute for International Finance (IIF) recently revised its forecasts for 2002 net external financing flows to EMEs sharply downwards (Table 8). The forecast 2002 EME current account deficit has been revised slightly upwards, and forecasts of equity and credit portfolio flows have been reduced. The IIF has also revised down its forecasts for foreign direct investment (FDI) flows, citing a reduction in privatisations and potential postponement of projects owing to increased uncertainty.

Table 9:
EME liabilities to foreign banks, by country of creditors^(a) (2001 Q2)

Country	US	Japan	Germany
Argentina	15.8	2.7	12.4
Brazil	23.4	4.6	14.2
Colombia	23.1	9.3	16.0
Mexico	24.6	4.0	9.5
Venezuela	22.2	3.7	15.0
China	4.1	20.9	10.2
Korea	12.0	7.7	23.2
Hong Kong	6.4	32.3	5.8
India	9.6	13.0	21.4
Indonesia	7.2	26.1	21.2
Malaysia	6.0	17.5	13.1
Philippines	10.7	19.1	11.4
Singapore	4.2	1.2	55.7
Thailand	4.4	34.6	15.5
Poland	5.4	27.1	12.1
Russia	4.4	2.0	35.8
South Africa	11.8	19.4	19.6
Turkey	8.7	4.4	29.7

Source: BIS consolidated data.
(a) Percentage of total claims.

Some EMEs have, up to now, been highly reliant on a small number of countries for their capital and may not easily be able to find substitute lenders (Table 9). These countries may therefore be particularly affected by any balance sheet pressures in capital exporting countries. Latin American borrowers, for example, have historically depended on the United States. Growth forecasts for 2002 have fallen significantly in Latin America, in line with the United States (Chart 102).

Brazil, with significant external financing needs, remains among the most exposed to any abrupt or substantial halt in the supply of capital. During 2001 it has also been affected by an energy crisis and by events in Argentina. Its vulnerability is compounded by the structure of Brazilian public debts. Federal real-denominated debts are of short maturity and, despite some improvement since the crisis in 1998, many bonds are indexed to the exchange rate (31 per cent) or short-term interest rates (49 per cent). Up until mid-October, the Brazilian real had weakened sharply, down 30 per cent from the beginning of the year (Chart 103) and official short-term interest rates rose in response. As a consequence, the cost of servicing Brazil's debt increased sharply. The authorities have, however, continued to run large primary surpluses – 4.7 per cent of GDP in the first nine months of 2001 – and in September the IMF approved a US\$15.7 billion stand-by arrangement with the Brazilian authorities. Since the trough in mid-October, Brazil appears to

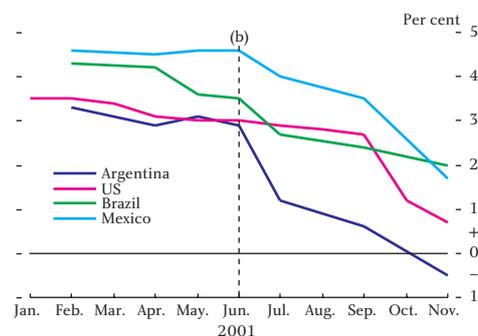
have effectively decoupled from Argentina, with the exchange rate recovering sharply (up over 10 per cent) and interest rates falling. This has provided some relief to Brazilian debt dynamics.

Some Asian EMEs are potentially vulnerable to a sustained tightening in capital market conditions in Japan (discussed in Section IV). But many East Asian countries have reduced short-term debt and increased foreign exchange reserves over recent years. China, Taiwan and Hong Kong have the highest foreign exchange reserves in the world after Japan. But the financial positions of those countries with substantial financing needs, such as the Philippines and Indonesia, remain fragile and would be weakened by failure to meet their budget deficit targets.

Countries may also sometimes be vulnerable because of large external imbalances. Recent *Reviews* have noted the scale of Poland's current account deficit, which reached 8 per cent of GDP in March 2000 but has since fallen to 4 per cent (in September 2001). In the Czech Republic and Hungary, the current account deficits are also significant, at 5.5 per cent and 2 per cent of GDP respectively. External deficits in Central Europe have largely been funded through FDI, including, importantly, foreign participation in privatisations. But the successful completion of many privatisation programmes suggest that future funding from this source might fall. The fiscal outlook in Poland has deteriorated, with the budget deficit expected to exceed 4 per cent of GDP in both 2001 and 2002. These twin deficits could affect the exchange rate, with potentially adverse consequences for bank balance sheets. In Poland, the Czech Republic and Hungary, banks have built up large derivative positions off-balance sheet – the gross derivative positions of banks in Poland and the Czech Republic were respectively 13 and 34 times capital in 2000. To the extent that speculative positions are being run, they may magnify the adverse effects on the banking sector of any shock to exchange rates. Overall, however, banking systems in these countries are considered fairly resilient by the IMF; the Polish and Czech financial system stability assessments³⁷ released this year report that they are likely to be reasonably robust in the face of sharp asset price changes. The banking sectors in these countries are now largely foreign-owned. And, although gross derivatives positions are large, net positions may be smaller.

Russia has been able to reduce its short-term external financing needs because of the considerable improvement in its current account and fiscal position in recent years. The current account surplus has continued to rise: US\$28 billion between January and September 2001, compared with US\$14 billion over the same period in 1999. The primary surplus between January and

Chart 102:
Consensus Forecasts for GDP growth in 2002^(a)

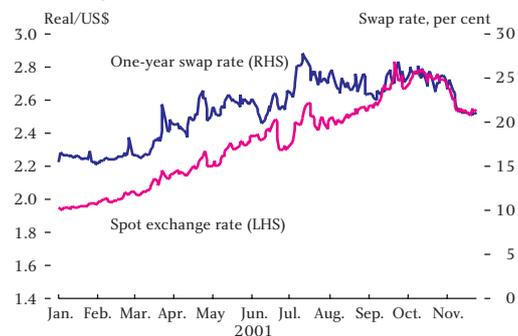


Source: Consensus Forecasts.

(a) Mean of forecasts.

(b) June 2001 *Review*.

Chart 103:
Brazil: exchange rate and one-year interest rate swap

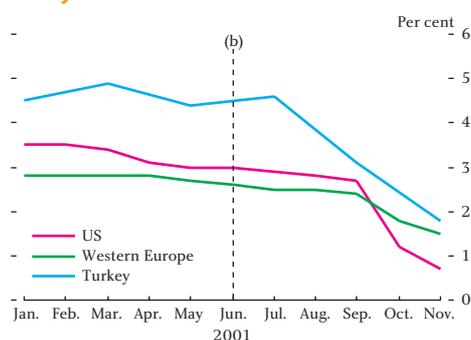


Source: Bloomberg.

37: See Section IX for more on Financial Sector Assessment Programmes and FSSAs.

September is estimated at 6 per cent of GDP, compared with 2 per cent in 1999. These improvements have largely reflected the recent strength of energy prices, but other exports and taxation revenue have also increased, partly as a result of steady progress on structural reform. Russia faces large external financing needs in 2003 and beyond, however, with external debt service for 2003 and 2004 amounting to US\$23 billion and US\$17 billion respectively. Thus, sharp falls in the prices of oil and gas could still have adverse effects on the public sector balance sheet.

Chart 104:
Consensus Forecasts for GDP growth in Turkey 2002^(a)



Source: Consensus Forecasts.

(a) Mean of forecasts.

(b) June 2001 Review.

Recent crisis cases

Over the past twelve months, fiscal and debt problems in Turkey and Argentina have evolved into fully-blown financial crises, necessitating the involvement of the International Monetary Fund. In Turkey there has been some success in implementing reform, but the public debt position remains fragile. Meanwhile, Argentina recently approached its creditors to restructure its debts but its problems have become more acute.

Turkey

In June, the Turkish authorities exchanged US\$7.5 billion of domestic debt for lira and dollar-linked debt maturing between 2002 and 2006. This helped resolve the government's immediate cashflow needs for 2001, but at the cost of higher debt servicing in subsequent years. Public debt to Gross national product, estimated to be around 90 per cent, remains very high, necessitating large primary surpluses. The government has budgeted real expenditure cuts of 2 per cent of GNP in 2002 and a primary surplus of 6.5 per cent of GNP. The fiscal contraction is likely to have an adverse effect on domestic demand, compounding the external effects of the 11 September attacks. These developments are reflected in the fall in Consensus forecasts for GDP in 2002 and the Turkish authorities expect GNP to fall by 8.5 per cent in 2001 (Chart 104).

Against this background, market concerns about the sustainability of the public finances persist. Despite progress with structural reforms, domestic interest rates averaged 90 per cent between June and October. More recently, interest rates have fallen to 75 per cent, reflecting speculation about further official support for Turkey. Turkey was also able to issue foreign currency bonds in October and November. However, *ex ante* real rates of around 30 per cent, based on government inflation forecasts, remain extremely high, posing challenges for debt sustainability.

The IMF programme has helped the Turkish authorities address vulnerabilities in the financial sector, but it remains fragile. Bank holdings of government debt rose from US\$14 billion at the end 2000 Q2 to US\$25 billion at the end of 2001 Q2. Over the same

period, credit to the private sector fell from US\$39 billion to US\$30 billion, reflecting an increase in credit risk – NPLs have risen to 15 per cent of total loans³⁸ – and falling demand for credit. Such vulnerabilities could exacerbate exchange rate pressures, further denting confidence. The lira has continued to depreciate since the IMF programme, and has fallen by around 20 per cent since the June Review.

Since 11 September, the IMF has estimated that a financing gap of around US\$10 billion has arisen for the remainder of 2001 and 2002³⁹. The IMF Managing Director announced on 15 November that he intended to recommend a new stand-by arrangement, to be negotiated with the Turkish authorities over the following month.

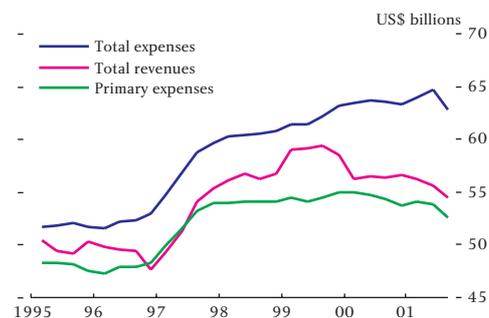
Argentina

Argentina's financing problems stem from a heavy public-sector debt-servicing burden – interest payments were US\$7 billion in the first eight months of 2001 – and difficulties in achieving sufficiently large primary surpluses at the central and provincial level to cover these payments. While non-interest expenditure has remained broadly unchanged over recent years, tax revenues have fallen, partly reflecting a decline in economic activity (Chart 105). In an attempt to increase the primary surplus, the Argentine government adopted a 'zero deficit' policy in July under which monthly expenditure would be matched to monthly tax receipts. The zero deficit policy held (on a cash basis) until September but tax receipts have continued to fall – down by 11 per cent in the year to October 2001.

Argentina completed a debt exchange in June 2001, exchanging US\$29.5 billion in peso and dollar instruments for five new bonds maturing between 2006 and 2031. But the debt exchange had only a limited effect on confidence. Argentina's public sector financing needs remain large, with principal repayments on bonds of US\$10 billion during 2002. In July, bond prices of sovereign debt fell sharply (Chart 106) and there were large outflows of deposits from the Argentine banking system. Deposits fell by US\$9.2 billion between end-June and mid-August (Chart 107). As there was widespread withdrawal of both peso and dollar-denominated deposits, this suggests that investors may have been concerned about the overall state of the banking system as well as the currency board.

A new IMF programme was announced in August, under which Argentina drew US\$6.3 billion when it was agreed in September. Deposit withdrawal was halted temporarily but the additional IMF support did not affect Argentine sovereign bond spreads

Chart 105:
Argentina: non-financial public sector revenue and expenditure^(a)



Source: Ministry of Economy (Argentina).

(a) Non financial public sector, including interest.

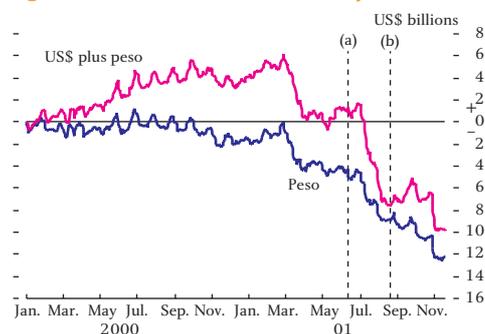
Chart 106:
Argentine bond prices



Source: Bloomberg.

(a) June 2001 Review.

Chart 107:
Argentina: cumulative bank deposit flows



Source: Bloomberg.

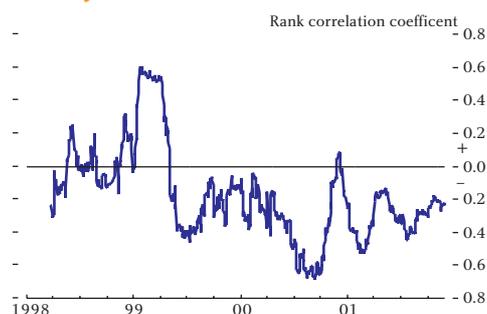
(a) June 2001 Review.

(b) Announcement of Argentine IMF programme.

38: Turkish Bankers Association.

39: <http://www.imf.org/external/np/sec/nb/2001/nbo1116.htm>

Chart 108:
Correlation between country weight and volatility^{(a)(b)}

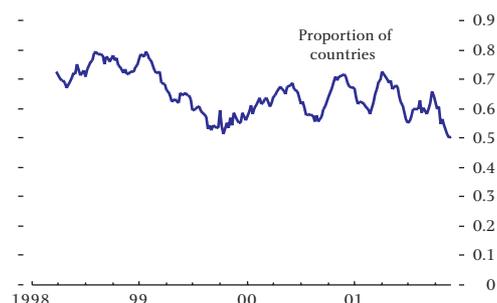


Sources: JP Morgan Chase & Co and Bank calculations.

(a) The series is a daily rank correlation between country EMBI Global weights and daily percentage spread volatilities calculated over a 60-day rolling window.

(b) Weights are updated monthly until February 2000, and weekly thereafter.

Chart 109:
Comovement of EME bond spreads with Argentina^(a)



Sources: JP Morgan Chase & Co and Bank calculations.

(a) The series measures the 13-week average of the proportion of countries that had the same-signed weekly change in spreads as Argentina.

significantly. In November, following continued weak economic activity and falling tax revenues, the authorities announced a new set of economic measures, including the exchange of both domestically and externally held government securities for instruments paying a lower interest rate and with later amortisation. In early December, the authorities announced that US\$50 billion had been offered by local investors. A debt exchange will be negotiated with foreign creditors in due course. Bond prices roughly halved between the June *Review* and end-November (Chart 106). Between mid-August and end-November US\$2.3 billion in deposits left the banking system. The government imposed restrictions on the withdrawal of bank deposits and limits on currency transfers abroad in early December following a further run.

Links to the international financial system

Do the risks and pressures faced by some EMEs have implications for the international financial system, through their effects on other EMEs and the profitability of international banks?

Links among EMEs

In the main, bilateral trade flows between EMEs are relatively small, with two exceptions. One is non-Japan Asia (NJA), where intra-regional trade is high. NJA is part of an international supply chain, particularly for electronics, and intra-regional trade has fallen as global demand for high-tech products has dropped. The second exception is Brazil and Argentina. However, since both economies are relatively closed, the trade effect on growth is less significant. The main trade channel affecting EMEs is competition in third-country markets, primarily developed countries. On this, Brazil and Colombia would be adversely affected if the Argentine currency board were to break. On a similar basis, Bulgaria and Romania are most affected by falls in the Turkish lira.

Concentrations of credit can also create linkages between EMEs. If two countries are highly reliant on a 'common creditor', then a credit event affecting one can have wider effects. For example, the June 2001 *Review* discussed the relatively high exposure of Spanish banks to Latin America. If Spanish banks were to suffer significant losses and reduce their international lending, Mexico and Colombia might be most affected because of their reliance on credit from these banks.

EMEs can also be affected by increased risks in another EME if there is 'proxy' hedging or speculation in bonds with liquid secondary markets. For example, investors wishing to reduce their exposure to Latin American debt, due to concerns about Argentina, may sell Brazilian or Mexican bonds because the markets for other Latin American bonds are less liquid. The correlation between the volatility of spread changes and their

weight in the EMBI Global is an indirect test of this proposition (Chart 108). Countries with a large weight in the index would generally have more liquid markets and less volatile spreads and hence a negative correlation. However, if large portfolio reallocations are taking place, a positive correlation may occur. On this basis, it appears that proxy hedging is not a general phenomenon. It occurs only transiently during periods of market turbulence and has not been an important feature recently.

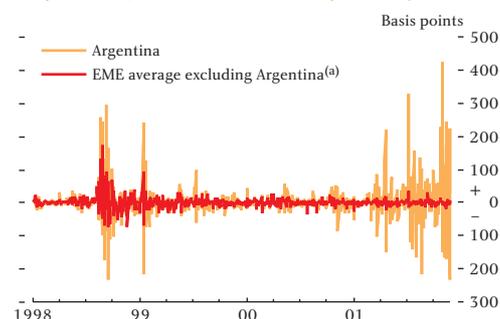
Developments in Argentina could potentially affect the supply of credit to EMEs more generally. Taken together, the domestic and the proposed external bond exchanges will be the largest sovereign debt restructuring to date and the orderliness of the restructuring may have implications for the EME bond market. There is considerable uncertainty about how any legal complexities surrounding the exchange will be resolved. Market anecdote suggests that there is a large volume of Argentine credit default swaps outstanding, although technically Argentina might not currently be in default. External creditors will be mindful of how they are treated relative to domestic creditors. As the restructuring is at an early stage, any long-term consequences for EME financing from international capital markets remain unclear.

That said, increased concerns about prospects in Argentina so far seem to have had only a limited effect on other EMEs. Until October, Brazil appeared to be suffering from its trade and financial exposures to Argentina. More recently, financial markets appear to have reassessed Brazil's vulnerability to events in Argentina, with asset prices and the exchange rate recovering strongly. More generally, spreads have been falling on sovereign bonds across credit grades despite the sharp rise in Argentine spreads. Furthermore, the co-movement of EME spreads with Argentina has fallen to its lowest level in recent years (Chart 109). Increased volatility in Argentine spreads has also not coincided with a rise in average EME spread volatility, in contrast to what occurred in 1998 (Chart 110).

Links to the international banking system

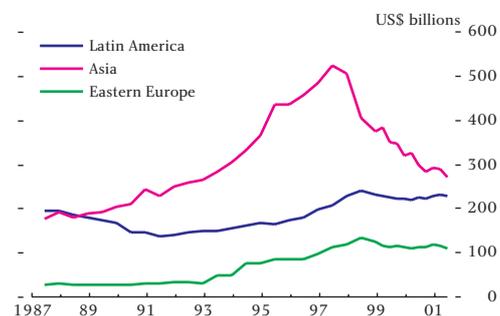
Events in EMEs can also have effects on the wider international financial system through globally active financial institutions. In part this reflects direct bank credit exposures to EMEs. Although these tend to be small relative to banks' global exposures (10 per cent of total international claims in 2001 Q2), they are more risky. Total BIS-reporting banks' consolidated international claims on EMEs have been falling both in absolute terms and relative to all international claims in recent years (Chart III). This has not, however, reduced these banks' exposure to potential losses in EMEs. An article in the June 2000 *Review* described a method based on bond spreads for estimating 'expected default losses' on international loans. On this basis, there has been a change in the pattern of expected losses since both the 1998

Chart 110:
Daily changes in EME bond yield spreads



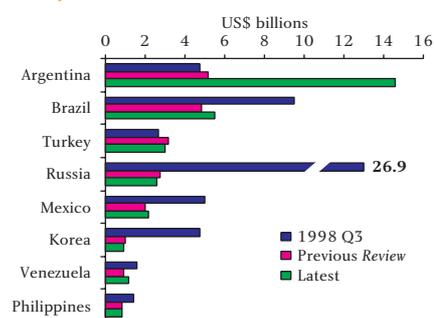
Sources: JP Morgan Chase & Co and Bank calculations.
(a) Arithmetic average of one-day spread changes of all country sub-indices of the EMBI Global index excluding Argentina.

Chart 111:
Total BIS consolidated claims on EMEs



Source: BIS.

Chart 112:
Expected default loss ranking (BIS-area banks)^(a)



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

(a) Probability of default calculated using simple yield spread model.

Table 10:
Foreign bank ownership in selected EMEs

Country	Foreign participation ^(a)		Percentage Point Change
	December 1994	December 1999	
<i>Eastern Europe</i>			
Czech Republic	7.1	47.3	40.2
Hungary	38.8	59.5	20.7
Poland	5.2	36.3	31.1
Turkey	3.2	1.6	-1.6
<i>Latin America</i>			
Argentina	17.2	41.7	24.5
Brazil	12.4	18.2	5.8
Mexico	0.9	18.6	17.7
<i>Asia</i>			
Korea	7.9	11.2	3.3
Malaysia	8.5	14.4	5.9
Thailand	1.4	6.0	4.6

Sources: Bureau van Dijk Bankscope and IMF.
(a) Percentage of bank assets.

Russian crisis and the June 2001 *Review* (Chart 112). The two crisis countries, Argentina and Turkey, now have higher expected losses than in 1998 Q3. Against this, expected losses from two previous crisis countries, Mexico and Korea, have fallen substantially. Summing the 17 major EMEs that can be tracked consistently, expected loss is at its highest level since 1998 Q4⁴⁰. To the extent that banks have marked positions to market or, where not, have provided for or hedged against expected losses, the system already has a degree of protection.

A second channel through which events in EMEs may affect international banks is through overseas branches and subsidiaries. International banks have expanded their overseas activities, in part through the purchase of EME banks. This expansion has been taken further in Central Europe and Latin America than in Asia (Table 10). Asset sales since December 1999 in the Czech Republic will take foreign ownership to about 90 per cent in 2001. Also since December 1999 Spanish and US banks have acquired more Latin American banks, particularly in Mexico.

This has benefits for EME financial systems. First, international banks generally have a higher return on assets than domestically owned banks in EMEs, suggesting that increased foreign ownership can improve efficiency and competitiveness⁴¹. Second, subsidiaries may, if necessary, be able to call on capital from their parent to absorb losses. International banks attempting to develop a long-run presence in EMEs may be less likely to withdraw capital in the face of financial stress. There is some evidence that US money centre banks increased their offshore branches and subsidiaries lending in recent financial market crises⁴². This suggests that greater foreign ownership of domestic banks may increase stability of financial flows to EMEs.

Increased foreign bank presence in EMEs has both costs and benefits for the international financial system. In essence, risk has been transferred from EME to international shareholders on the expectation of receiving higher returns. To the extent that internationally active banks can better hedge risks that they take on directly, rather than by cross-border financing of local intermediaries, this could enhance the stability of the international financial system.

40: Box 5 discusses a more refined version of the 'expected default loss' approach to assessing risk to UK financial institutions.

41: Mathieson, D and Roldos, J (2001) 'The Role of Foreign Banks in Emerging Markets', in *Open Doors: Foreign Participation in Financial Systems in Developing Countries*, eds Litan, R, Masson, P and Pomerleano, M, Brookings Institution Press, Washington DC.

42: Palmer, D. (2000) 'US Bank Exposure to Emerging-Market Countries during Recent Financial Crises', *Federal Reserve Bulletin*.

Box 5: Ranking threats to UK financial stability from EMEs

There are many possible ways of assessing the relative importance of EME risks to UK financial stability. An article in the June 2000 *Review* outlined two potential measures that ranked risks based around estimates of 'expected default losses'¹. One used sovereign spreads on US\$-denominated bonds to derive 'expected loss' on UK-owned banks' international claims. The other derived expected losses by applying default probabilities associated with sovereign credit ratings. There were many caveats, one of which was that credit ratings do not take into account expected recovery following default².

Both those measures used sovereign credit risk as a proxy for country credit risk. However, a large part of the UK-owned banks' EME claims is on banks and corporates (Table A). Proxying risks by sovereign ratings is likely to bias downwards estimates of the probability of default if sovereigns are less risky. It might also present a misleading ranking of the potential losses associated with UK international claims.

Chart A compares Moody's long-term foreign currency sovereign debt credit ratings of EMEs with their average corporate and bank ratings. Ratings of sovereigns are almost always higher than those of corporates and banks.

This box presents an alternative measure which aims explicitly to consider sectoral risks to UK-owned banks' exposures to EMEs. A country's expected default loss is the sum of sector losses. These are calculated by multiplying claims outstanding by the average default probability for the sector in that country (based on credit ratings). One caveat is that the method assumes that all non-banking private sector exposures are to the corporate sector. Any lending to households may have different risk characteristics. Furthermore, some loans to corporates, such as trade credit, are collateralised and less exposed to loss given default. Chart B shows expected default losses for UK-owned banks' international claims derived from this new sectoral credit risk measure, together with the sovereign credit ratings measure.

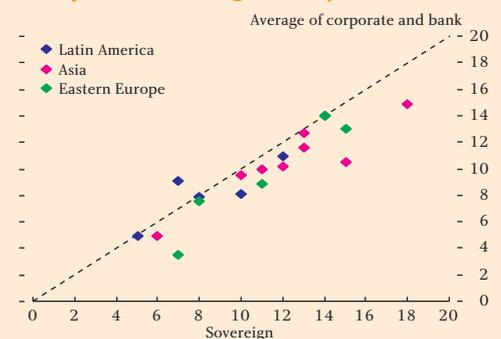
Two points stand out. First, and unsurprisingly, expected default losses are typically higher when the sectoral composition of exposures is taken into account. But, second, the rankings are broadly similar. The main exception is China, which ranks fourteenth among EME risks when the sovereign rating is used but fourth when the average corporate and banking ratings are used.

Table A:
Sectoral distribution of UK-owned banks' claims on EME regions (end-June 2001)

Region	Public sector	Banks %	Non-bank private sector %
Non-Japan Asia	13	36	51
Latin America	36	28	36
Eastern Europe	46	25	29

Source: Bank of England.

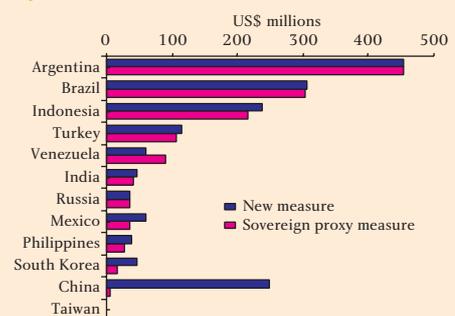
Chart A:
Moody's bond ratings: 1 September 2001^(a)



Sources: Moody's Investors Service and Bank calculations.

(a) The average is derived by converting ordinal ratings to numerical values using a linear scale from D/SD=0 to Aaa=21.

Chart B:
Expected default loss



Sources: Moody's Investors Service and Bank calculations.

1: 'A possible international ranking for UK financial stability', June 2000 *Review*, by Simon Buckle, Alastair Cunningham and E Phillip Davis.

2: Other caveats were discussed in the original article. See note 1.

VI International financial system

Sections I – V record a series of challenges that the international financial system has faced since the *June Review*. None has been more acute than the disruption following the events of 11 September, with which New York coped strikingly well and from which lessons are being drawn for all financial centres. This section picks up those issues; and also discusses the resilience of the international financial system in the light of the credit and market risks apparent in the current conjuncture.

Immediate consequences of the 11 September attacks

Many financial firms located in downtown Manhattan needed to relocate to contingency sites in other locations. An immediate practical problem was contacting employees. Markets required key people in different firms to be able to communicate in order to resume functioning. Fixed-line telecommunications were severely disrupted and mobile telephone networks could not cope with the volume of calls. Some bankers found wireless email devices the most resilient method of communication. Industry groups such as the New York Foreign Exchange Committee distributed details of contingency sites so that firms could contact each other. Most firms were able to back-up key trading, risk management and settlement systems to other offices in a remarkably short period.

Table 11:
Federal Reserve domestic liquidity support
in September 2001

US\$ billions	Change from previous Wednesday	
	12 Sep. 2001	19 Sep. 2001
Reserve balances with Federal Reserve banks	82	-90
Factors supplying reserve funds (increase +)	90	-93
of which		
US government securities bought outright	-12	-4
Repurchase agreements	30	-21
Loans to depository institutions	45	-43
Float	21	-21
Other Federal Reserve assets	6	-5
Factors absorbing reserve funds (increase -)	8	-4
of which		
Currency in circulation	1	0
All other Federal Reserve liabilities and capital	7	-3

Source: Board of Governors of the Federal Reserve System: 'Factors affecting reserve balances', Weekly release table H.4.1.

Money and foreign exchange markets

No payment or securities settlement system had direct operational problems, although the grounding of aircraft led to delays in cheque processing. But the overnight money market in Fed funds was dislocated. The Federal Reserve put out a statement at 11.30am on 11 September that 'The Federal Reserve System is open and operating. The discount window is available to meet liquidity needs.' The Federal Reserve distributed liquidity actively using open market operations with primary dealers, the discount window for depository institutions, the float on cheques being processed, and overdrafts for Federal Reserve customers (Table 11). Using agreements prepared for possible Year 2000 problems, it extended the range of collateral against which it would provide funds through the discount window.

The market struggled to distribute liquidity because key intermediaries experienced problems initiating and receiving payments, settlement instructions and securities (especially collateral) transfers. For example, the Bank of New York (BoNY) lost the use of its main data processing centre and data transfer links. It is one of the two largest clearing banks for transactions in US Treasury bonds. Because of the widespread disruption, some market participants could not repo securities to obtain funds and/or were unable to issue short-term commercial paper. As a consequence, overseas banks, securities firms and large

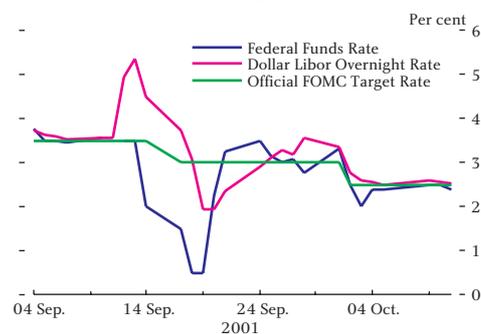
companies sought to borrow unsecured from US commercial banks, including using commercial paper back-up lines and other committed lines. The counterpart to these short positions included large positive balances left on accounts of investors throughout the banking system.

In general, the large US commercial banks were willing to accommodate the liquidity needs of their customers. At the same time, they discouraged any significant pre-emptive hoarding of liquidity. Fedwire remained open until just before midnight on 11 and 12 September, enabling the largest banks to lend to each other overnight. For these reasons, overnight Federal Reserve lending to banks through the discount window, although significant, was less than it otherwise might have been; some banks' intra-day overdrafts in Fedwire were much larger. By 14 September the overnight Fed funds market was functioning more normally again and most banks were able to make and receive payments freely. US dollar commercial paper issuance had also returned to a more usual level by the following week.

The Federal Reserve's action to supply liquidity freely to the market led Fed funds to trade at unusually low overnight rates for a few days (Chart 113). In Europe, US dollar LIBOR rates were higher on the 12 September, reflecting demand for overnight funds by banks in Europe experiencing problems obtaining liquidity in New York. In response, the European Central Bank announced a quick tender for overnight euro funds followed that evening by an arrangement to swap euro for dollars under a US\$50 billion facility arranged with the Federal Reserve. Euro-area banks borrowed US\$5.4 billion under the facility. The operation was repeated on 13 (US\$14.1 billion) and 14 September (US\$3.9 billion). The Bank of England and Bank of Canada arranged similar US dollar swap facilities, for US\$30 billion and US\$40 billion respectively, but banks in these countries did not use them.

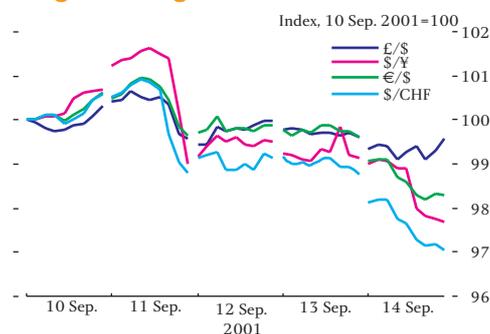
Foreign exchange trading continued following the attacks, with some US banks transferring certain trading and risk management operations to London offices. The Operations Managers Sub-group of the New York Foreign Exchange Committee co-ordinated conference calls amongst member firms. Trading volumes were low and, although some reported initial flows out of the US dollar, the key US dollar/euro exchange rate remained relatively stable (Chart 114). The Swiss franc, perceived as a 'safe haven', appreciated strongly. The yen also appreciated, with market anecdote suggesting repatriation of funds by Japanese institutions and closing of speculative short yen positions in order to reduce risk. The Bank of Japan intervened heavily in the second half of September, selling more than ¥3 trillion for dollars.

Chart 113:
US\$ overnight lending rates and the Official Fed Funds Target Rate



Sources: Bloomberg, British Bankers Association and Garban International.

Chart 114:
Foreign exchange rates^{(a)(b)}



Source: Bank of England.

(a) Intraday prices taken between 8am and 4pm London time.

(b) Each exchange rate is indexed to 100 at 8am on 10 September. A fall in value of an index represents a depreciation of the US\$.

Securities markets

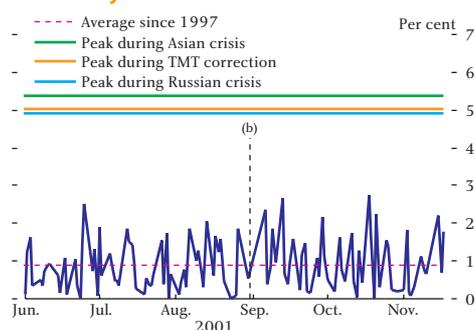
Disruption to the operations of key market participants meant that the Treasury bond market closed until 13 September. Trading resumed in on-the-run stocks but remained limited in off-the-runs for a few weeks, with problems in the inter-dealer market affecting price discovery. Cantors – an inter-dealer broker – suffered particularly grievous losses, although, remarkably, dealing through its electronic system resumed on 13 September. Trading in the Treasury bond and US dollar short-term interest rate futures contracts at the Chicago Board of Trade and Chicago Mercantile Exchange and in over-the-counter interest rate derivatives also began again on 13 September. Secondary trading of US-dollar-denominated corporate bonds recovered more slowly, with higher bid-ask spreads, especially on sub-investment grade issues.

The Treasury bond repo market was affected by the widespread communications difficulties, including the operational problems affecting BoNY and links to the Government Securities Clearing Corporation, the central counterparty for Treasury bond and some repo transactions. The inability of counterparties to return repoed securities at maturity led to a backlog of settlement fails, with knock-on effects for those seeking to borrow particular securities to cover short positions or to repo securities in order to raise cash. Fails remained abnormally high into October, particularly in on-the-run Treasuries in which dealers typically take short positions for trading or to hedge other bonds, and for which there was strong demand in a ‘flight to quality’. Repo rates for these securities traded very low. Operational problems and the potential for fails – together with the normal practice of some lenders at end-calendar quarters – led some to withhold Treasuries from the repo market, reducing liquidity further.

In response, the Federal Reserve relaxed some constraints on its securities lending programme. The Treasury also cancelled two debt buy-back operations scheduled for September and made an unscheduled issue (‘tap’) of US \$6 billion of the on-the-run ten year Treasury Note on 4 October. The SEC relaxed its normal capital requirements for securities firms on failed trades. In addition, the Bond Market Association agreed to changes to Treasury and agency bond market conventions to ease the pressure on clearing and settlement. It recommended a moratorium on collateral substitutions in repo trades from 17-25 September and an extension of the settlement period from T+1 to T+5.

US equity markets closed until 17 September, mainly because of damage to telephone communications and power systems supporting trading on the New York Stock Exchange and the non-accessibility of the American Stock Exchange trading floor. Trading of US equities on overseas exchanges was suspended. Trading continued in non-US equity markets, with sharp price

Chart 115:
Absolute percentage change in S&P 500 divided by NYSE market volume^(a)



Sources: Bloomberg and Bank calculations.

(a) Market volume calculated as a proportion of a 60-day moving average. Peak during the Asian crisis dated 27 October 1997. Peak during Russian crisis dated 31 August 1998. Peak during the TMT correction dated 14 April 2000.

(b) 11 September 2001.

falls in the airline and insurance sectors and high volatility (see Section I). When US markets reopened, equity indices fell sharply but trading was orderly, with record volumes suggesting two-way liquidity (Chart 115).

Market resilience

The attacks caused significant operational and logistical problems for those financial firms with operations located in downtown Manhattan, including a number of key intermediaries. These operational problems, however, did not develop into a financial crisis. The swift and effective actions of the Federal Reserve to provide ample liquidity to the market, and the willingness of the large commercial banks to extend credit to their customers, limited any knock-on effects of dislocation in the Fed funds and Treasury repo markets. One important source of strength was the robust financial position of most US financial firms, which meant the commercial banks had confidence to extend credit where necessary. Also – perhaps following market stresses in recent years – few market participants seem to have been running large leveraged positions, which might otherwise have left them exposed to the fall in market liquidity and rise in price volatility. Hedge funds, for example, are said to have met margin calls with few difficulties. Box 6 considers some of the lessons being debated amongst market participants and the authorities.

Primary markets

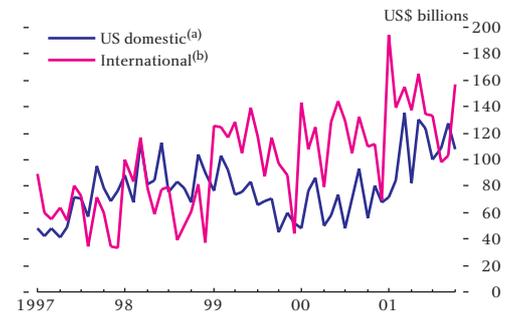
Investment grade bonds

Although some issuers delayed intended bond issues following 11 September, other transactions were completed, including some that were in the process of being underwritten at the time. The June *Review* noted the strength of primary bond markets in the first half of 2001 – particularly US domestic markets but also international markets – which had allowed companies to lengthen the maturity of their debt and offered an alternative to bank lending. Since June, investment grade bond issuance has been lower but the markets have remained liquid (Chart 116).

Sub-investment grade bonds

Sub-investment grade bond issuance has also been lower in the second half of the year in the US and international markets, particularly following 11 September. Markets have remained effectively closed for most sub-investment grade telecom issuers but credit is available, sometimes at a higher price, for issuers in other industries. The June *Review* noted the rapid growth in convertible bond issuance in the first half of 2001, particularly by sub-investment grade companies in US dollars. Issuance has declined from that level but convertibles seem to have remained a ‘capital market of last resort’ (Chart 117). Hedge funds are said

Chart 116:
Investment-grade bond issuance

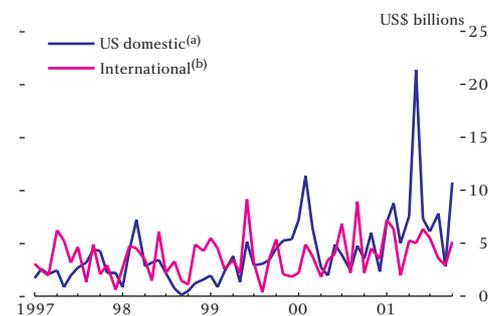


Sources: Dealogic and SDC Platinum.

(a) US dollar-denominated issues in the US domestic market.

(b) US dollar- and other currency-denominated issues in the international bond markets.

Chart 117:
Convertible bond issuance

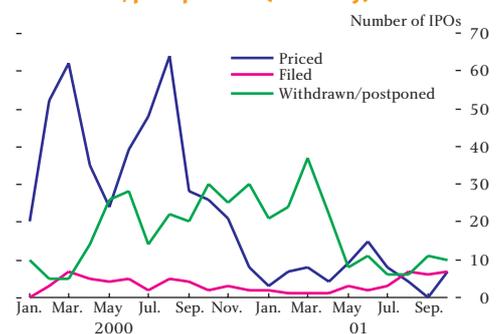


Sources: Dealogic and SDC Platinum.

(a) US dollar-denominated issues in the US domestic market.

(b) US dollar- and other currency-denominated issues in the international bond markets.

Chart 118:
Number of US IPOs filed, priced and withdrawn/postponed (monthly)



Source: IPO.com

Box 6: Possible system-wide business continuity lessons from 11 September

Business continuity arrangements

The immediate impact of the attacks on firms operating out of the World Trade Center and nearby was massive. The subsequent resilience of New York's financial markets reflects, in no small part, the effectiveness of firms' and infrastructure providers' business continuity arrangements. Most were able to transfer operations, redirect communications and re-establish chains of command without sustained disruption. Co-ordination between the authorities and practitioners was a key factor in the resumption of business across the financial sector after only a few days. There are, from this experience, lessons for the international financial community.

Some firms had understandably based their plans on the assumption that, in the event of their having to use their contingency arrangements, the cause of the problem would be relatively localised. Contingency sites were sometimes located close to primary sites, and occasionally operated by third parties on behalf of a number of firms. Many were intended to cope with the transfer of only part of a firm's business. And while most firms had prepared for communicating with other firms' primary sites from their contingency site, few envisaged the need to be able to communicate between contingency sites. Firms' common reliance on essential infrastructure such as local telecommunications, water and electricity was demonstrated; as was the need for markets to be able to adapt trading arrangements to take account of crisis conditions. Some firms, too, had to face the devastating impact of widespread loss of staff. Across the financial system as a whole, there was the challenge of restarting operations in an unfamiliar environment in such stressful circumstances.

Firms and financial authorities in all major financial centres are reviewing the effectiveness of their contingency arrangements. As with any aspect of risk management, trade-offs need to be struck. For example, firms could limit their reliance on third party shared sites, but at some cost – both direct and in terms of office space lying unused. Greater distance between primary and contingency sites lowers the risk of simultaneous disruption but potentially creates problems of accessibility.

Other issues to be considered are: the scope for and means of sharing information amongst firms in relation to contingency arrangements; the role of the authorities and market associations in providing 'information clearing' during a crisis itself; the capability of market groups to help co-ordinate an effective response to disruption, and of the authorities to aid such groups; interdependencies amongst telecoms and other infrastructure providers and means to identify and minimise them etc. These and other issues concerning the robustness of the financial system in the face of disruption are under review in the United Kingdom and elsewhere.

Firms as 'infrastructure'

The terrorist attacks also provided further evidence of the extent to which financial markets rely on certain critical services from private sector firms (custody, clearing etc). Difficulties affecting those firms can have knock-on effects for their customers and counterparties, and consequently can have a severe impact on the functioning of markets. This is not a new issue. But the 11 September events, and continuing industry consolidation, have highlighted it.

to hold perhaps one half of convertible bonds outstanding as part of so-called convertible bond arbitrage trades⁴³.

Equities

Numbers of IPOs in the United States and elsewhere have remained low (Chart 118). No IPOs were completed in the US market in September as issuers postponed transactions until uncertainty decreased. Institutional investors are said to have ample funds available for IPOs or secondary equity offerings, but only for those with established track records of earnings. For example, some insurance and reinsurance companies have been able to raise substantial equity in the US and European markets in the past month.

Insurance and long-term savings institutions

Claims following 11 September attacks

The scale of insurance losses following the terrorist attacks remains unclear. Estimates range from US\$25 billion to US\$80 billion. Claims are expected on property, business interruption, aviation, liability, workers' compensation and life policies. Chart 119 shows the largest losses (net of contracted reinsurance) disclosed by insurers and reinsurers; Chart 120 shows an estimated industry distribution. The discrepancy between 'bottom-up' estimates from company disclosures and 'top-down' estimates of total claims partly reflects remaining uncertainties about, for example, the extent of business interruption and liability claims and the number of insurance 'events'⁴⁴ Other reasons for the difference might include use of equalisation reserves to smooth losses by continental European companies; and of so-called finite risk reinsurance⁴⁵.

Bank exposures to insurers and reinsurers may increase if they seek letters of credit to evidence their ability to meet claims and draw down bank lines rather than sell assets to raise liquidity to pay them. Exposures have probably risen in any case over the past few years, primarily through counterparty risk on credit and other derivatives⁴⁵.

Prospects for general insurance and reinsurance markets

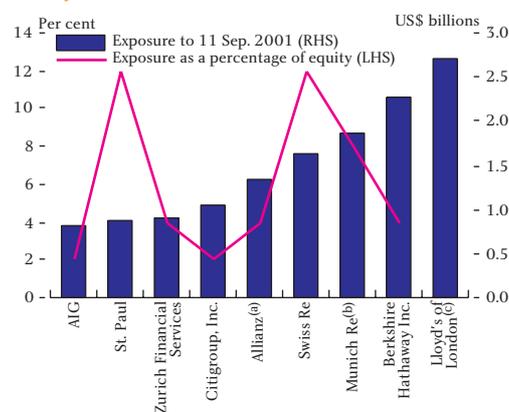
Global sector share price indices for general, life and reinsurance companies fell relative to wider global indices in the two weeks following 11 September (Chart 121). Subsequently, however, they have increased strongly, particularly for reinsurance companies. Existing and new (mostly Bermudian) insurance and reinsurance companies have raised more than \$15 billion of new equity capital since mid-October.

43: See below and Box 5 in the 'Financial Stability Conjecture and Outlook' section of the June 2001 Review.

44: Swiss Re and the manager of the World Trade Center towers are contesting a US legal case over whether the attacks on the two towers comprised a single event (one claim up to the insured limit) or two separate events (two claims, each up to the insured limit).

45: See the article by David Rule in this Review.

Chart 119:
Largest insurance claims arising from 11 September terrorist attacks



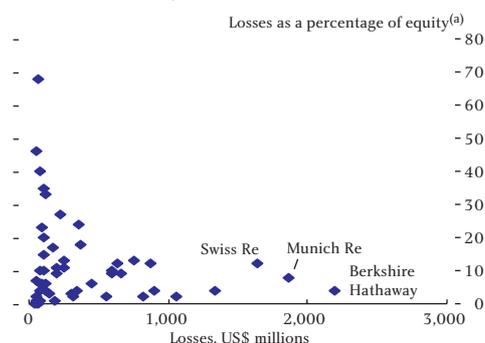
Source: Standard & Poor's (October 29).

(a) Allianz data are their own estimate (November 14).

(b) Munich Re data are their own estimate (November 29).

(c) On 27 November, Lloyd's of London estimated its total net loss at £1.9 billion (US\$2.7 billion), equivalent to 34 per cent of the total net resources of the Society of Lloyd's and its members at the end of 2000. A comparison in terms of percentage of equity is inappropriate.

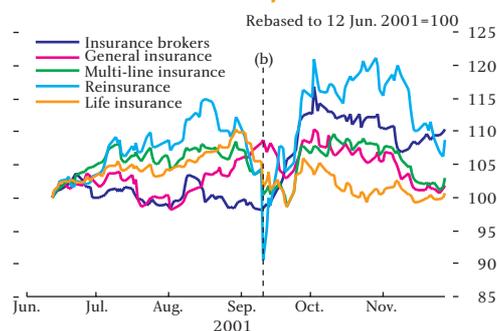
Chart 120:
Distribution of insurance losses arising from the 11 September terrorist attacks



Source: Standard & Poor's (29 October).

(a) Shareholders' equity at the end of 2000.

Chart 121:
World insurance share price indices^(a)



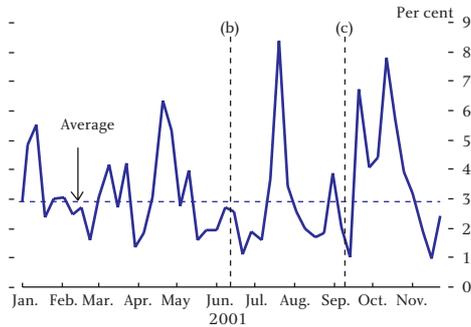
Source: Thomson Financial Datastream.

(a) Indices scaled relative to the world share index.

Datastream 'non-life insurance' index re-defined as general insurance. Datastream 'other insurance' index re-defined as multi-line insurance. Datastream 'life assurance' re-defined as life insurance.

(b) 11 September 2001.

Chart 122:
S&P 500 property and casualty insurance index - equity price dispersion^(a)



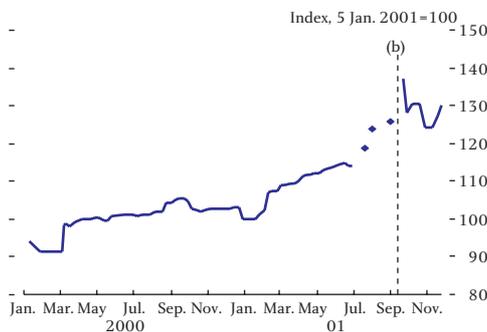
Sources: Bloomberg and Bank calculations.

(a) Dispersion is measured as the standard deviation of the weekly excess percentage returns, where excess returns are defined as the returns on the constituents of the index less the return on the aggregate index. Average calculated from 1991.

(b) June 2001 Review.

(c) 11 September 2001.

Chart 123:
Catastrophe bond yield spread index^(a)

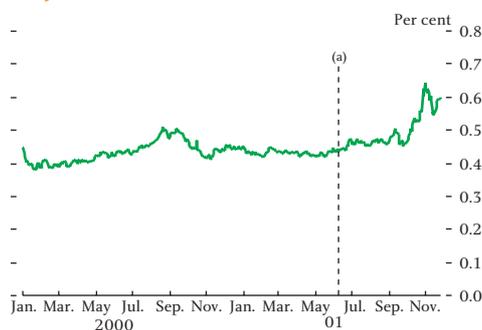


Sources: Goldman Sachs International and Bank calculations.

(a) Index comprises an unweighted average of yield spreads derived from highly indicative bid prices for eight catastrophe bonds (linked to earthquakes and windstorms).

(b) 11 September 2001.

Chart 124:
Implied volatility of 15-year/15-year Euro swaptions



Source: Deutsche Bank.

(a) June 2001 Review.

Investors appear to expect an increase in insurance premiums sufficient to outweigh any increase in risk going forwards (for example, in the light of revised assumptions about potential correlations of losses across different lines of business). The temporary rise in dispersion of changes in the share prices of individual insurance companies suggests that the market expects some companies to benefit more than others – primarily the larger multiline insurers and reinsurers (Chart 122).

The reinsurance market has been in a state of flux since 11 September and the extent of premium increases will not be clear until most annual policies are renewed in early January. Indicative dealer quotes suggest that yields on catastrophe bonds were already increasing through much of the year – consistent with anecdote about premiums firming – and stepped up following 11 September (Chart 123). Insurers are expected to pass on higher reinsurance costs to customers. Prospective demand for insurance cover is difficult to determine. On the one hand, greater perception of risk may lead it to rise. On the other hand, higher premiums may lead some insurers to buy less reinsurance and some corporate customers to ‘self insure’ to a greater extent – for example, using company or industry captives. Reinsurance markets seem to be more integrated globally than, for example, commercial banking markets. A tightening of reinsurance conditions might have a more uniform effect across domestic insurance markets than a tightening of credit conditions following a banking shock of similar size.

Insurance company exposure to market risk

In recent years, many general insurance companies seem to have relied on investment income to offset underwriting losses. Some now face a decline in investment returns and an increase in claims. Most property and casualty insurance policies are annual, so that rates can be adjusted without too much delay. Life insurers, by contrast, have long-term liabilities associated with household savings products (eg pensions, life policies) and, in a number of countries, they have offered guaranteed minimum nominal returns to policyholders, either explicitly or implicitly. Such companies are exposed to falling nominal returns on equities and bonds, whether because of lower real returns or falls in expected inflation.

Sections VIII and IX refer to temporary changes made to UK and permanent changes to German insurance regulations since the June Review, designed partly to avoid forced selling of equities in falling markets. At a more fundamental level, some, but not all, companies have sought to hedge their interest rate risk by purchasing long-dated options to enter into interest rate swaps (swaptions), giving them protection if they are unable to purchase bonds in the future with yields that match those they have guaranteed policyholders. Buying of euro swaptions by some continental European insurers is said to have been one

factor behind a recent rise in the implied volatility of long-dated euro interest rates (Chart 124)⁴⁶.

Internationally active banks: cross-border exposures

In terms of systemic stability, the robustness of the international banking system remains most important, despite the growth of risk transfer between financial sectors. Sections II and III surveyed US and Euro-area banking systems respectively against the background of the widespread economic slowdown, and Section VIII below does the same for the UK system. This section discusses potential cross-country links via the activities of internationally active banks and securities dealers.

US banking system

Large money centre banks in the US hold nearly 80 percent of the total external exposures⁴⁷ of the 84 banks⁴⁸ that submit returns on cross-border lending and about three quarters of exposures to emerging markets (Charts 125 and 126). Their total exposure was just over three times Tier 1 capital at end-June, little changed from the position at end-2000. Their exposure to emerging market economies (EMEs) was over 50 per cent of capital, around two-thirds being to Latin America, with claims on Mexico around ten per cent of capital. Exposures to Argentina and Turkey, the two largest countries currently experiencing debt-servicing problems, were respectively five and one per cent of capital.

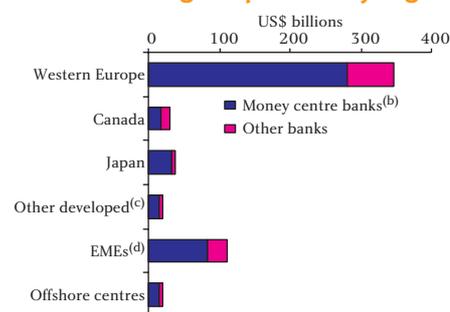
At end-June, the US banking system's claims on Japan were equivalent to 13 per cent of Tier 1 capital, close to the end-2000 level. However, BIS data for US-owned banks' cross-border consolidated claims on Japan (which exclude those of foreign-owned US bank holding companies) rose sharply, from around \$20 billion to just over \$30 billion (Chart 127).

European banking systems

Within Europe, German banks have the largest absolute exposures to the United States and EMEs by some margin⁴⁹ (Chart 128). Data for the late 1990s indicate that, exposures of

Chart 125

US banks' foreign exposures by region^(a)



Source: Federal Financial Institutions Examination Council.

(a) As of 30 June 2001.

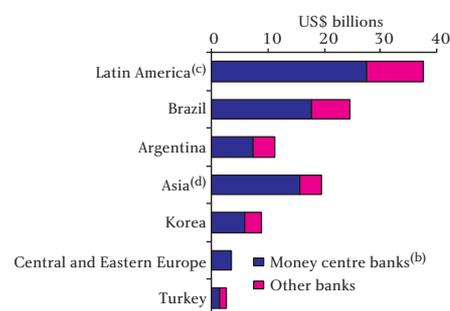
(b) 'Money centre banks' are Bank of America, Bank One, Citigroup, JP Morgan Chase & Co and Taunus Corporation.

(c) Including international and regional organisations.

(d) Including Turkey and South Africa.

Chart 126:

US banks' exposures to emerging markets^(a)



Source: Federal Financial Institutions Examination Council.

(a) As of 30 June 2001.

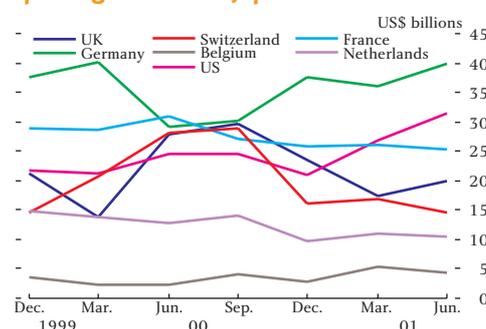
(b) 'Money centre banks' are Bank of America, Bank One, Citigroup, JP Morgan Chase & Co and Taunus Corporation.

(c) Excluding Argentina and Brazil.

(d) Excluding Korea.

Chart 127:

Consolidated international claims of reporting banks on Japan



Source: BIS.

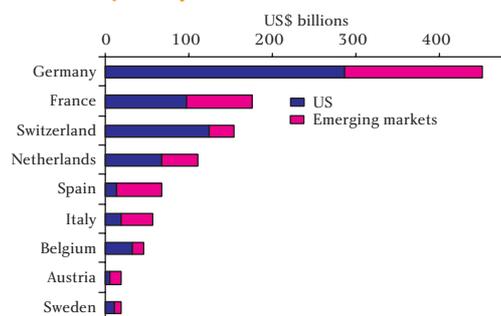
46: See the article by David Rule in this Review.

47: The US measure of exposure used here is inclusive of *net* local country claims where positive, and the market value of foreign currency and derivatives contracts with a positive value. The regional distribution reflects risk transfers that arise when a counterparty in one country guarantees a bank's exposure to a customer in another; in such cases the exposure is attributed to the country of the guarantor. The US measure and institutional coverage differs somewhat from that of the BIS, which is described in Box 3 in this Review.

48: Assets of the 84 banks totalled \$4,643 billion at end-June 2001, about 73 per cent of all US banks' assets (recorded by FDIC) of \$6,360 billion. Money centre banks' total assets of \$2,565 billion represented 40 per cent of the US banking system's assets.

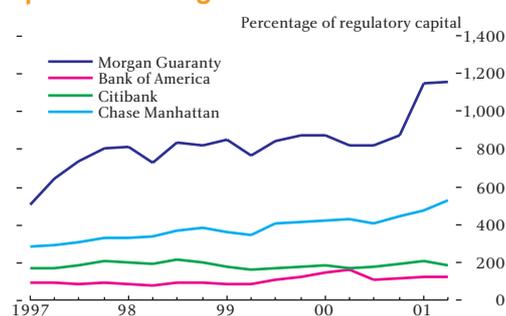
49: Data have been taken from the BIS Consolidated International Banking Statistics, second quarter 2001. To some extent the size of German banks' claims reflects the fact that the figures are not collected on a fully consolidated basis.

Chart 128:
European banks' exposure to United States and EMEs, end-June 2001



Source: BIS.

Chart 129:
US banks with largest counterparty credit exposures relating to OTC derivatives^{(a)(b)}

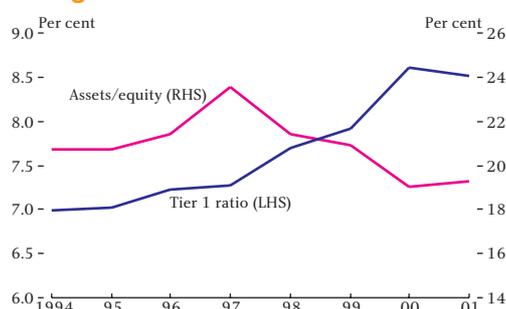


Source: Office of the Comptroller of the Currency.

(a) Credit exposure defined as bilaterally netted exposure (gross positive MTM value of all contracts after bilateral netting) plus future exposure add-ons.

(b) Regulatory capital is sum of Tier 1 plus Tier 2 capital.

Chart 130:
Gearing and Tier 1 ratios for LCFIs



Sources: Bureau van Dijk Bankscope, earnings releases and SEC filings.

Swiss, Dutch and Belgian banks are, however, higher in relation to capital⁵⁰.

In the first half of the year, a large recorded increase in German banks' international claims partly reflected the acquisition by HypoVereinsbank of Bank Austria, the largest bank in Austria. Partly in consequence, Austrian banks' international claims showed a fall of nearly a half during 2001 H1. Taken together – so as to abstract from the impact of the Bank Austria acquisition – Austrian and German banks' total international claims rose eight per cent in 2001 H1. Within this, their combined claims on the US rose by nearly a quarter. Swiss and Dutch banks' claims on the US also rose strongly.

With the exception of Belgian banks (whose claims rose 50 per cent from a low level), European banks' claims on Japan were little changed (Chart 127). In general, claims on EMEs fell during 2001 H1.

Overall, cross-border exposures between US and European banking systems continued to increase in 2001 H1. US banks' exposures to Japan and EMEs increased but most European banking systems' exposures to these countries were little changed or fell.

Large and complex financial institutions

While it remains sensible to analyse banking sectors by region (see Sections II-IV and VIII), some of the largest and most complex groups (LCFIs) have come to transcend national boundaries, in the sense that their overall profitability and robustness may no longer depend disproportionately on the health of a 'home' market. As a result, they have become an increasingly important channel in their own right for the cross-border transmission of financial market developments, separate from the more traditional international banking linkages described above. For example, OTC derivatives business is highly concentrated within a small number of LCFIs. Among US banks, three large groups have about 90 per cent of the banking system's counterparty credit exposure on OTC derivatives (Chart 129). Each of them has a significant international presence.

Box 7 explores correlations between the share price performance of a group of large banks and securities dealers selected according to the scale of their activities in international financial markets. Different criteria would, of course, produce different groups.

Since the mid-1990s the aggregate profitability and capital position of this LCFI peer group has strengthened and its

⁵⁰: Recent, system-wide aggregate capital data for all the countries shown are not available.

Box 7: Analysis of LCFI share prices

Have the largest and most complex financial institutions become global in scope? Do they share common exposures? One approach to such questions, using publicly available data, is to analyse share price movements. To distinguish changes affecting LCFIs from those affecting all large global companies, the following analysis compares LCFIs to a control group of big non-financial companies.

A sample of LCFIs was selected according to the scale of their activities in capital markets, as measured using objective, if fairly arbitrary, criteria¹. The control group comprises the 14 largest companies in the Datastream world non-financial index².

Chart A shows average pairwise rolling correlations of weekly equity returns amongst the sample of LCFIs and the control group. Correlations have varied over time but have been higher amongst LCFIs than the control group in recent years.

One possible explanation might be a common greater exposure to the global economy. Chart B shows similar rolling correlations between LCFIs and the Datastream world equity index (as a proxy for global economic factors); again the control sample is also shown. The increase in correlations since 1993 might be associated with the growing global breadth of LCFIs, but correlations were also high in 1991. The falls in correlations in the early and late 1990s might reflect movements in the world index associated with the decline in the Japanese market and the TMT bubble respectively, which affected LCFIs and companies in the control group to varying extents.

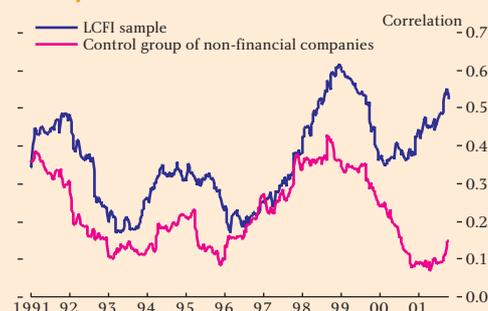
LCFI share prices might also be correlated because they share exposure to other common factors. Chart C shows average correlations between the 'excess returns' on individual LCFIs and 'excess returns' on the 'LCFI' index³. There is no clear evidence that any factors common to LCFIs have grown in importance, despite industry consolidation. But measured correlations increased in 1998, particularly for European LCFIs, perhaps reflecting common exposure to financial market stress.

1: It comprised those institutions amongst the largest ten participants in two or more of the following activities in 2001: bookrunners of international bond issues (Thomson Financial), bookrunners of international equity issues (Thomson Financial), bookrunners of global syndicated loans (Thomson Financial), notional interest-rate derivatives outstanding (Swapsmonitor), foreign exchange revenue (FX Week based on 2000 data), and world-wide custody assets (Globalcustody.net). On these criteria, the group comprised ABN Amro, Bank of America, Barclays, BNP Paribas, Citigroup, Credit Suisse, Deutsche, Goldman Sachs, HSBC, JP Morgan Chase, Lehman Brothers, Merrill Lynch, Morgan Stanley, Societe Generale and UBS. Goldman Sachs is omitted from the exercise as it was not a public company until 1999. In the case of mergers, the largest company by market capitalisation is taken as the predecessor.

2: Measured by market capitalisation. General Electric, Microsoft, Pfizer, Exxon, Wal Mart, Intel, IBM, Vodafone, Johnson and Johnson, BP, Glaxosmithkline, Cisco, AOL Time Warner and Merck.

3: Excess returns are calculated as the weekly change in share prices less the change in the Datastream world equity index.

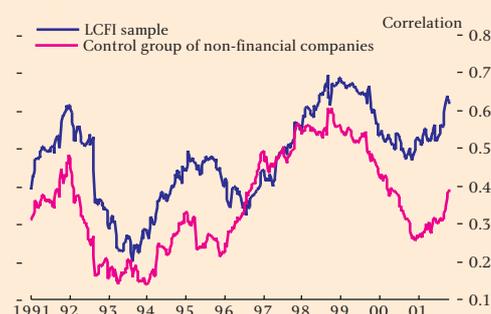
Chart A:
Share price correlations^(a)



Sources: Thomson Financial Datastream and Bank calculations.

(a) Calculated as the average of the pairwise 52-week rolling correlations between weekly changes in the share prices of all the firms in the group and each other.

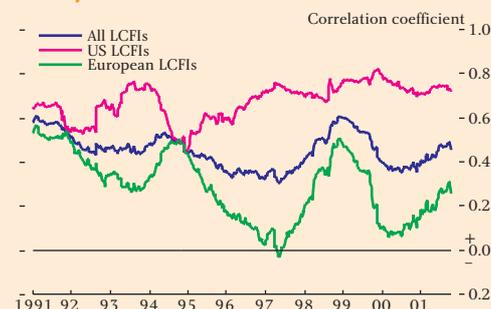
Chart B:
Share price correlations with the world index^(a)



Sources: Thomson Financial Datastream and Bank calculations.

(a) Calculated as the average of the pairwise 52-week rolling correlations between weekly changes in the share prices of all the firms in the group and weekly changes in the Datastream world index.

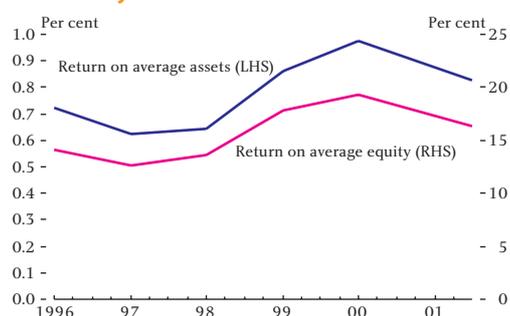
Chart C:
Correlation of excess returns on LCFI share prices with excess returns on an LCFI share price index^(a)



Sources: Thomson Financial Datastream and Bank calculations.

(a) Calculated as the average of the pairwise 52-week rolling correlations between weekly excess returns on LCFI share prices and weekly excess returns on an index of LCFI share prices. Excess return calculated as the change in the share price less the change in the Datastream world index.

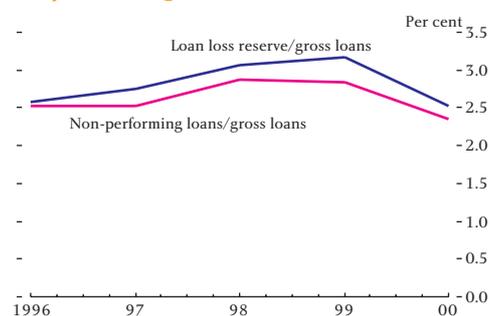
Chart 131:
Profitability of LCFIs^(a)



Source: Bureau van Dijk Bankscope, earnings releases, SEC filings and Bank calculations.

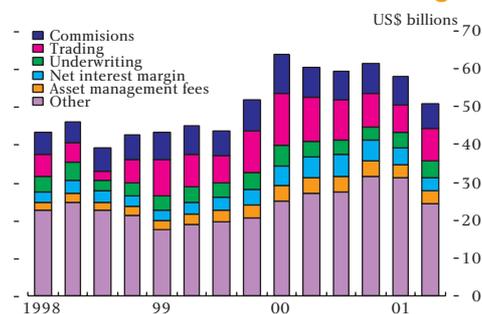
(a) 2001 data are H1 annualised.

Chart 132:
LCFI loan loss reserves and non-performing loans



Source: Bureau van Dijk Bankscope.

Chart 133:
US securities firms: sources of earnings



Source: Securities Industry Association.

on-balance-sheet gearing has declined (Charts 130 to 132). More recently, earnings have fallen with the global economic slowdown. For those with significant commercial banking operations, provisions against bad debts have increased, but from a low base (Chart 50 in Section II). Investment banking earnings have also been under some pressure. A downturn in some kinds of domestic and international capital markets activity from the very high levels of 1999-2000 has reduced trading, underwriting and other sources of earnings significantly.

Chart 133 shows the quarterly path of the US securities industry gross earnings, including some of the firms in the LCFI peer group discussed above. The value of new equity underwritten and the value of equities traded on the NYSE and Nasdaq were nearly 30 per cent lower in the first ten months of 2001 than a year earlier, although underwritings of corporate and municipal debt were around 40 per cent higher. Investment management fees have also been affected by the fall in equity portfolio values; and by lower net cash flows into equity mutual funds, partly offset by transfers into money-market funds.

As measured by average Value-at-Risk (VaR) as a proportion of shareholders' funds, market risk in trading activities was higher for a number of LCFIs in H1 2001 than in 2000, perhaps partly because of higher historical volatility in financial markets. But, according to published data, exposures remained a fraction of shareholders' equity and below 1999 levels (Chart 134). Since then, market participants, taken as a whole, appear to have avoided large trading losses in spite of the large movements in some prices since 11 September.

The June Review reported that most intermediaries were thought to remain 'long' equity and bond market volatility, so that they would benefit from high and rising price volatility; but that these positions had decreased in size as large companies had unwound programmes of writing put options on their shares. Contacts suggest that this pattern has continued. There has been some demand from institutional investors for protection against large equity market falls, which would give an option writer a short volatility position unless balanced elsewhere in their book.

Credit risk issues

Section II stressed the strength of the US banking system compared with a decade or so ago. Section III presented a picture of broad strength in continental Europe, qualified perhaps by structural issues in some national banking systems. This section has underlined the increases in LCFI capital in recent years. Given the deterioration in the global economic outlook and the increased uncertainty, however, there are inevitably issues on both the credit and market risk fronts.

As discussed in Section I, forward-looking indicators, such as spreads over risk-free rates on corporate bonds, suggest corporate credit risk may have increased since the June Review, especially on sub-investment grade borrowers. Higher spreads on securities backed by portfolios of loans to US and UK households (eg residential mortgage and credit card securitisations) might also point to rising personal sector credit risk.

Credit risk on syndicated loans

One way of estimating changes in credit risk is to analyse the pricing of cohorts of syndicated loans. Data from Dealogic Loanware show that the value of outstanding international syndicated loan facilities at end-October 2001 was around US\$5 trillion. Many of these facilities were made between 1996 and 1998, when prevailing spreads were lower than more recently (Chart 135). Assuming that the population of borrowers did not change fundamentally between 1996-98 and 1999-2001, banks' own assessments of credit risk appear to have increased, reflected in their loan pricing. The scale can be estimated by calculating annual interest income on outstanding loan facilities, using prevailing rates from the years in which they were made, and subtracting it from annual interest income, using spreads on loans made in 2001 with the same residual maturities – a crude form of 'mark to market'. Using this method, the total shortfall would be around US\$6 billion.

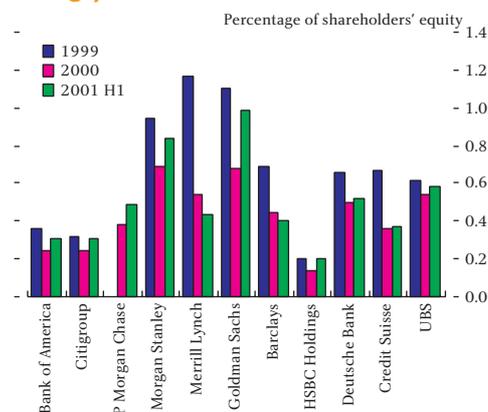
Given the roughness of the method, the numbers are less important than the general point that banks appear to have revised upwards their estimates of the credit risk latent in a significant part of their loan books.

Demand for finance in 2002

In the past corporate failures have often accelerated as economic recovery begins and banks have to decide whether they are prepared to increase lending in order to finance working capital. Data on outstanding syndicated loans suggest that, in any case, an unusually high proportion will need to be refinanced next year, reflecting the preponderance of one-year facilities arranged in 2001 and of five-year facilities in 1997 (Chart 136). Banks appear to be in a strong position to meet the potential demand for borrowing, and companies have a range of capital markets alternatives but there could, nonetheless, be a potential 'bunching' in demand for finance.

Telecoms are among the companies with heavy maturities in their borrowing facilities next year. Over the next few years, they will also need to finance construction of 3G mobile telephone networks. If banks and others have limited appetite for further telecom exposure, lending might be more difficult to distribute beyond companies' relationship banks, typically headquartered in their home markets.

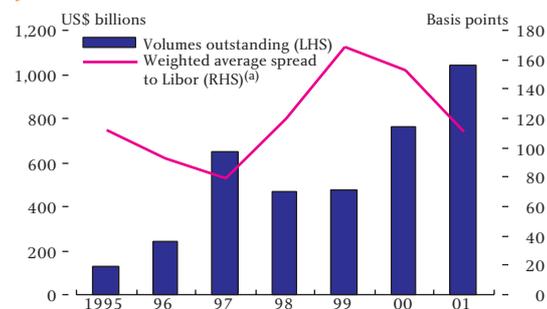
Chart 134:
LCFIs' average value at risk (VAR) in trading portfolios^(a)



Sources: Annual reports and SEC filings.

(a) Data for JP Morgan Chase & Co for 1999 are unavailable. VARs have been standardised to a ten-day holding period and 99 per cent confidence interval.

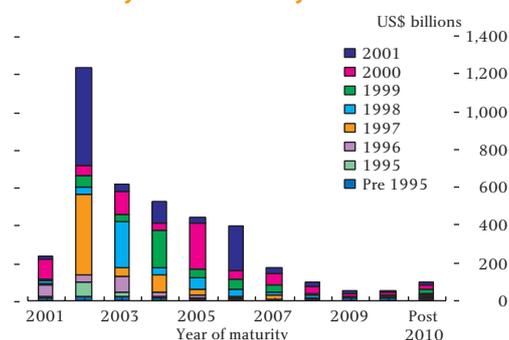
Chart 135:
Outstanding syndicated lending facilities by year of issue and weighted average spread to Libor



Sources: Dealogic and Bank calculations.

(a) Weighted by size of issue.

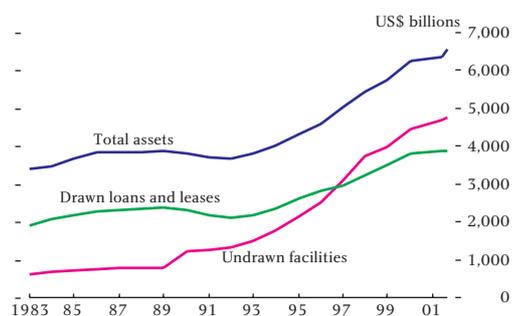
Chart 136:
Syndicated loans outstanding^(a) by year of issue and year of maturity



Sources: Dealogic and Bank calculations.

(a) At 31 October 2001.

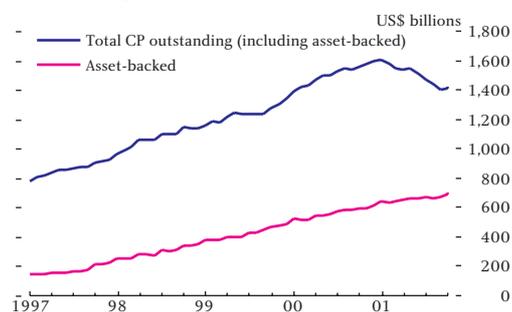
Chart 137:
US commercial banks' drawn and undrawn facilities^(a)



Sources: Board of Governors of the Federal Reserve System and Federal Deposit Insurance Corporation.

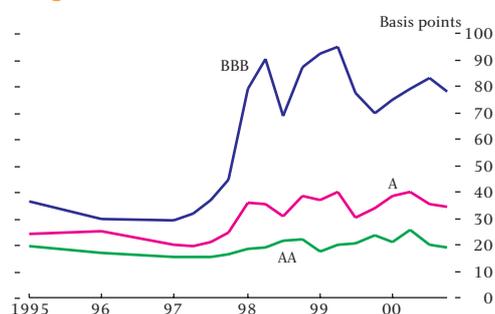
(a) Final observations are 2001 Q3 (released 30 November).

Chart 138:
US dollar-denominated commercial paper outstanding



Source: Board of Governors of the Federal Reserve System.

Chart 139:
Spreads on drawn 364-day facilities by rating^(a)



Source: Loan Pricing Corporation.

(a) Data before 1998 are end-year.

Reintermediation

Banks' on-balance-sheet lending and leverage are becoming a less reliable guide to potential credit exposures. For example, US banks' undrawn commitments have exceeded their loans since 1997 (Chart 137). Some of these facilities are forms of 'liquidity insurance' to back commercial paper issuance or other borrowing through capital markets.⁵¹ The US dollar-denominated asset-backed commercial paper (ABCP) market has grown particularly rapidly in recent years, with banks extending liquidity facilities that often bear the greater part of the credit risk on the underlying assets (Chart 138)⁵². Pricing of drawn one-year facilities was tight in the mid-1990s but has increased since 1999, especially for lower-rated credits (Chart 139). When companies lose access to capital markets, they typically draw down committed lines and seek additional bank loans. Enron is a recent example. The lengthening in the maturity of corporate debt described above is welcome partly because it might decrease banks' contingent exposures through these various forms of 'liquidity insurance'.

Market and counterparty credit risk issues

While credit risk is probably more significant at the current conjuncture, Section I described the uncertainty facing markets, and the rise in historical volatility, which would tend to affect Value-At-Risk measures used in firms' risk management. As discussed in previous *Reviews*, the crystallisation of market risk can be most serious when it is associated with credit and liquidity problems. That tends to become more likely if market risk positions are highly leveraged.

Hedge funds and leverage

In spite of the recent market volatility, no large hedge funds have failed and few appear to have made large losses. Indeed, the CSFB/Tremont index of hedge funds' net asset value was close to unchanged over the third quarter of 2001. Hedge fund leverage is said to remain low, although reverse repo lending to non-residents by UK-resident banks and BIS area banks' lending to the non-bank private sector in the Cayman Islands – two possible proxies for bank lending to leveraged funds – have accelerated (Chart 140). One possible explanation may be the rapid growth in hedge funds. There are, however, relatively few very large funds (eg capital of more than US\$5 billion).

Investment flows into hedge funds have remained high, particularly through 'funds of funds' (Chart 141). Banks continue to offer forms of principal protection on these funds, as reported in the June *Review*. In one variant, the bank invests in the funds as principal and issues notes to investors. The bank takes the risk

51: Undrawn commitments with an original maturity of under one year have no capital requirement under the 1988 Basel Accord.

52: See also the article by David Rule in this *Review*.

that it cannot liquidate holdings in the funds as their value falls (a form of portfolio insurance). A few insurers/reinsurers are also said to write principal guarantees on sufficiently diversified fund portfolios. Some banks are also said to offer customers leverage to invest in funds through margin accounts.

New investment has been directed mainly into convertible bond arbitrage funds and equity funds that specialise in stock picking (so-called 'long-short' funds), short-term trading of perceived irregularities in relative stock prices (so-called 'statistical arbitrage') or trading opportunities associated with corporate events (eg taking positions in two companies that have announced a merger on the assumption it will go ahead). Convertible bond arbitrage, which was described in the June Review, has some elements of a 'crowded trade'⁵³. Those convertible bond arbitrage funds that did not hedge fully the credit risk on sub-investment grade bonds may have suffered market losses following the rise in spreads over recent months. Event-driven funds are also likely to take similar positions and may be exposed to unexpected failures of large corporate mergers or acquisitions (eg as a result of regulatory intervention).

Competition amongst banks and securities dealers to offer prime brokerage services to hedge funds is said to be intensifying. Some offer margining across a hedge fund's portfolio, taking account of assumed correlations in price movements, rather than by instrument type or individual trade. Larger, established funds are not required to give initial margin.

More generally, banks have growing exposures to non-bank participants in OTC derivatives and other capital markets, such as insurance companies⁵⁴, energy companies and many large multinational companies. The recommendations of the official and private sector reports on counterparty risk management⁵⁵ following LTCM crisis were addressed particularly to banks' hedge fund exposures. But the Enron case shows that many apply more widely, particularly the need for counterparties to make adequate financial disclosure.

Equity valuations

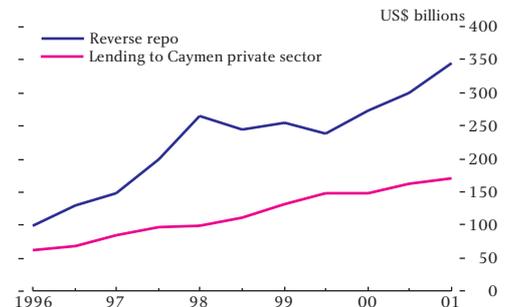
A market risk about which debate continues is the valuation of equity markets. One indicator of the market's assessment of the possibility of large equity price changes is provided by equity option prices. The probability distribution of price changes in the S&P 500 – although not the FTSE 100 – over the next six months, derived from prices of index options, is more skewed towards price falls than at the time of the June Review

53: See Box 5 of 'The financial stability conjuncture and outlook' in the June 2001 Review.

54: See the article by David Rule in this Review.

55: Eg *Improving Counterparty Risk Management Practices*, Counterparty Risk Management Policy Group, June 1999.

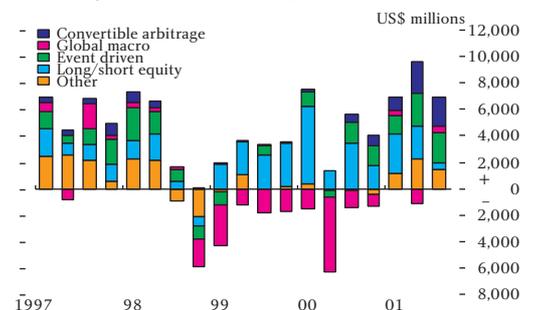
Chart 140:
Lending to the non-bank private sector in the Cayman Islands^(a) and reverse repo lending to non-residents by UK banks



Sources: BIS and Bank of England.

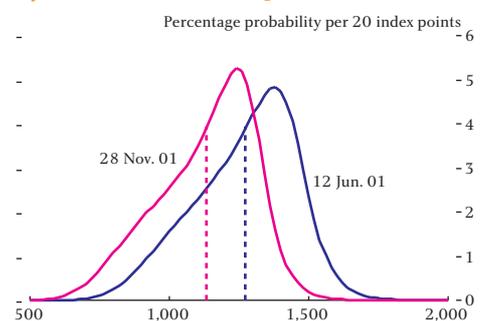
(a) Cross-border lending by BIS reporting banks. Adjustments for risk transfers are not available for individual economic sectors.

Chart 141:
Quarterly flows into hedge funds



Source: Tass Research.

Chart 142:
Implied PDFs for S&P 500^{(a)(b)}

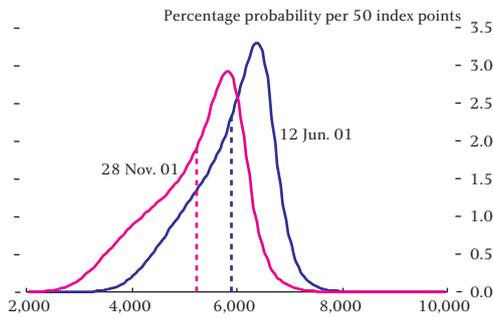


Sources: Chicago Mercantile Exchange and Bank calculations.

(a) Probability density functions calculated from six-month futures contracts.

(b) Dashed lines show the mean.

Chart 143:
Implied PDFs for FTSE 100^{(a)(b)}

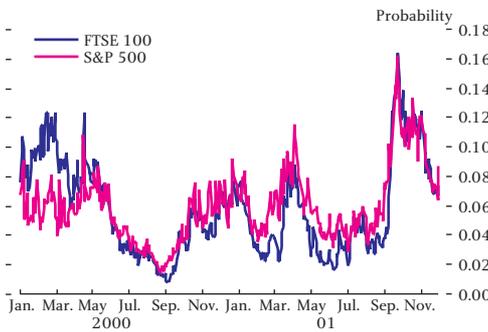


Sources: LIFFE and Bank calculations.

(a) Probability density functions calculated from six-month futures contracts.

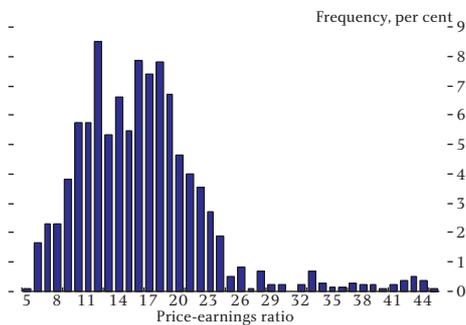
(b) Dashed lines show the mean.

Chart 144:
Implied risk-neutral probability of a greater than 20 per cent fall in the FTSE 100 and S&P 500 in the next three months



Sources: LIFFE, CME and Bank calculations.

Chart 145:
Histogram of S&P 500 price-earnings ratio^(a)



Sources: R. Shiller's web site: www.econ.yale.edu/~shiller, Thomson Financial Datastream and Bank calculations.

(a) 1881-2001 period.

(Charts 142 and 143)⁵⁶. The risk-neutral probabilities assigned to a fall of greater than 20 per cent in either index are higher, although they have decreased since September (Chart 144). Market perceptions of the likelihood of large price falls appear to have peaked following 11 September and diminished during the subsequent equity market rise, but they remain higher than in June.

An alternative approach is to analyse equity market valuations in relation to relevant income flows. Valuations of broad indices of US equity prices still appear high by comparison with average historical ratios of share prices to corporate earnings, corporate dividends and GDP. For example, the ratio of the price of shares in the S&P500 to the constituent companies' current earnings (P/E ratio) is around 31 compared with an average P/E ratio of just under 16 since 1881 (see Chart 145 for the distribution of S&P 500 P/E ratios over that period)⁵⁷. Using nominal GDP rather than corporate earnings as the denominator tells a similar story (Chart 146). The ratio of S&P 500 equity prices to US GDP is currently nearly 1.3 times its average since 1949, although this is comparable with the ratios in the 1950s and 1960s. Compared to the time of the *June Review*, P/GDP ratios have fallen but P/E ratios have increased, reflecting lower corporate earnings.

A third benchmark for equity valuations is the dividend discount model (DDM)⁵⁸, according to which equity prices should equal the value of current and expected future dividends (which, in the simple model, are assumed to grow at a constant rate) discounted at the cost of equity capital (risk-free real interest rates plus an equity risk premium). Valuations depend on assumptions about the expected future dividend growth rate and the equity risk premium. Varying the parameter values can alter the implied equity valuations substantially. For example, using the US historical real dividend growth rate of 2.2 per cent,⁵⁹ an equity risk premium of 4 per cent and a risk-free interest rate of 3 per cent, US equity prices appear to be nearly two and a half times overvalued (Chart 147). But the extent of overvaluation is nearly halved if a dividend growth rate of 3.5 per cent is used, a figure closer to historical average growth rates of real US GDP and corporate earnings (3.6 per cent⁶⁰ and 3.25 per cent respectively⁶¹). One possible reason why dividend growth has

56: See Box 3 of 'The financial stability conjuncture and outlook' in the June 2000 *Review* for a description of the technique and its limitations.

57: See also Box 2 of 'The financial stability conjuncture and outlook' in the December 2000 *Review*.

58: See Box 1 of 'The financial stability conjuncture and outlook' in the June 2001 *Review*.

59: Average annual dividend growth rate for the period 1947-1996. Source: Campbell J. (1998), 'Asset prices, Consumption and the Business Cycle', NBER Working Paper 6485.

60: Average annual GDP growth rate for the period 1930-2000. Source: Bureau of Economic Analysis and Bank calculations

61: Average annual earnings rate for the 1946-1996 period. Source: Siegel J. J. (1998), 'Stocks for the Long Run', McGraw Hill, New York.

tended to be lower than earnings growth is that other ways of paying cash to shareholders – such as share buybacks or cash-financed merger/acquisition/LBO activity – may have become more important⁶². Despite the sensitivity of measures of ‘overvaluation’ to changes in assumptions, the implication that, based on the DDM valuation technique, the US market appears overvalued seems to be robust on most plausible combinations of parameters. But the apparent degree of overvaluation has fallen somewhat since June.

Based on the DDM, the UK equity market also appears to remain highly valued, although to a lesser extent than at the time of the *June Review* or by comparison with the United States (Chart 148). Using an historical real UK dividend growth rate of nearly 2.5 per cent⁶³, and an equity risk premium and real risk-free rate similar to those used in the first US example, UK equity prices appear to be overvalued by around one half. Unlike the US example, the historical dividend growth rate is more consistent with the average historical growth rate of real UK GDP.

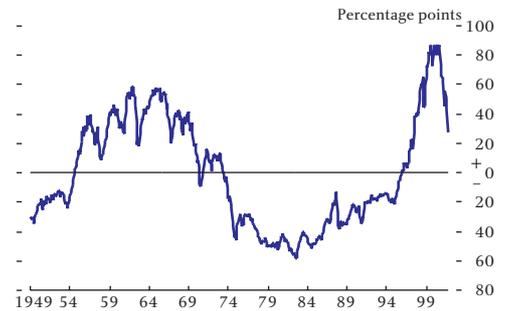
Falls in the equity risk premium might be one explanation why US and UK equity prices have risen in relation to corporate earnings over the longer term. Assuming again an expected dividend growth rate of 3.5 per cent, the DDM suggests that the current level of the US stock market is consistent with a risk premium of around 2 per cent. But assuming an equity risk premium of 4 per cent – closer to historical estimates of the premium over the post-war period – current equity prices demand an expected dividend growth rate of 6 per cent, only marginally lower than the highest annual rate since 1973. Another possible explanation might be that investors expect corporate earnings growth to resume at high rates following the current economic slowdown. Earnings forecasts (for example, as reported by I/B/E/S) over both one and five years do imply expectations of rapid growth. These forecasts suggest a ‘forward-looking’ P/E ratio for the S&P 500 of around 20, which would not be unusual (Chart 145).

The risks to equity prices are either that this rebound in earnings does not materialise; or, taking the view that the significant change over the past decade has been a fall in the risk premium, that the risk premium might increase again, raising the cost of equity capital.

62: However, if mergers and acquisitions are at fair value, firms no longer get to use the cash paid out to get a return in future, i.e. no growth in expected dividends could be explained by them.

63: Average annual dividend growth rate for the period 1919-1997. Source: Barclays Capital Equity-Gilt Study.

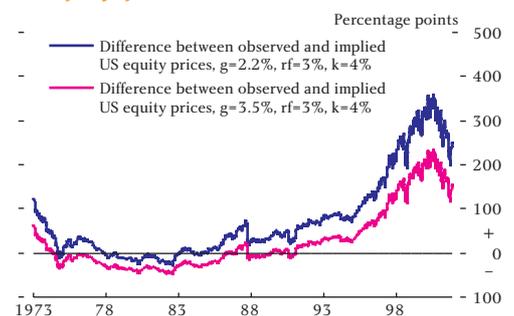
Chart 146:
Deviation from the average since 1949 of the ratio of the S&P 500 to US GDP^(a)



Sources: R. Shiller's web site: www.econ.yale.edu/~shiller, Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States 2001', Q2; and Bank calculations.

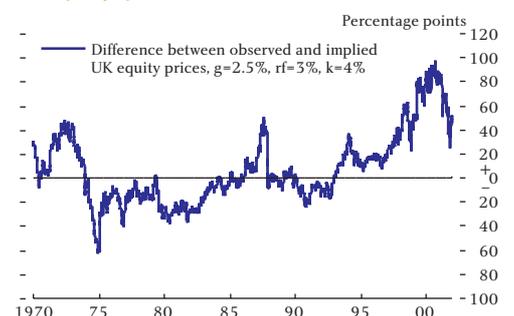
(a) Average calculated during the 1949-2001 (Q3) period.

Chart 147:
Difference between observed and implied US equity prices



Sources: Thomson Financial Datastream and Bank calculations.

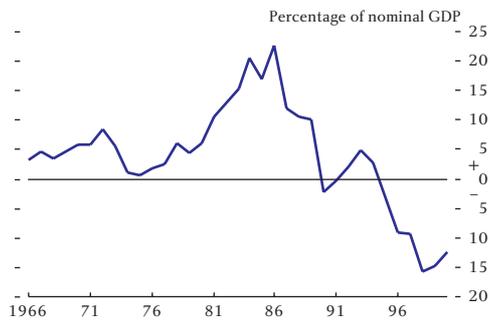
Chart 148:
Difference between observed and implied UK equity prices



Sources: Thomson Financial Datastream and Bank calculations.

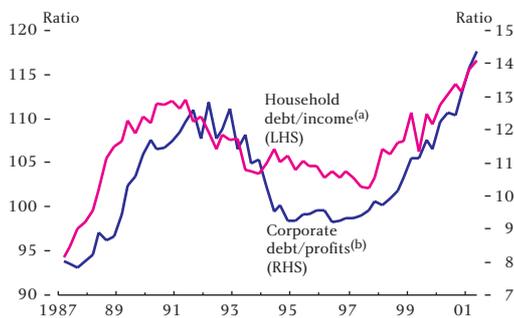
VII UK corporate and personal sectors

Chart 149:
UK net external assets



Source: ONS.

Chart 150:
Corporate debt-to-profits and household debt-to-income ratios (per cent)

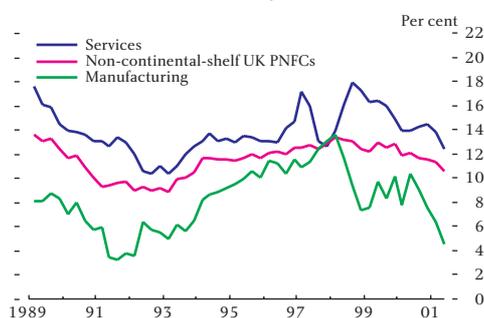


Source: ONS.

(a) Gross disposable income.

(b) Gross operating surplus.

Chart 151:
Net rate of return on capital^(a)



Source: ONS.

(a) Net operating surplus/net capital employed.

The deterioration in the international environment has implications for the UK's financial system not just because of the global links discussed in previous sections, but also through effects on the UK's external balance sheet, and via the UK corporate and household sectors. This section turns to these more domestic issues.

The macroeconomic environment and the UK's external balance sheet

Recent GDP outturns, together with a preliminary estimate of GDP growth in 2001 Q3 of 0.5 per cent, suggest that UK activity has remained resilient. The decline in global demand is, though, plainly a drag on prospective growth, and the Bank's official interest rate has been cut by 1.25 percentage points since June to keep inflation in line with the 2.5 per cent target. The November modal projection of the Bank's Monetary Policy Committee envisages that growth will slow moderately next year before recovering to around trend (see the November *Inflation Report*, page 50).

Final domestic demand has, meanwhile, continued to grow at rates above the long-run average. The imbalances in the economy – on the demand side, between consumption and net external demand and on the output side, between the tradables (especially manufacturing) sector and the non-tradables sector – have, if anything, widened since the June *Review*.

The past and expected current account deficits are, of course, associated with an accumulation of external debt. The MPC has drawn attention to the resulting downside risks to sterling (see the November *Inflation Report*, pages 54-55). A country's external balance sheet can sometimes give an indication of such vulnerabilities. Overall, however, although the numbers are very large, the UK's balance sheet position does not seem to pose a threat to financial stability.

Compared with other major economies, the UK appears to have relatively large *gross* and *net* external liabilities (Chart 149) as a proportion of GDP⁶⁴. Between end-2000 and end-June 2001, the UK's gross external on-balance-sheet assets increased by 8.4 per cent, while gross external liabilities rose by 7.9 per cent. This left estimated net external liabilities at around the level prevailing since end-1998, revaluation effects broadly offsetting the capital account inflows corresponding to the continuing current account deficits.

64: This is, however, uncertain because of shortcomings in the data. In particular, external assets (especially via direct investment) may be greater than estimated by the conventional methods, and there may be off-balance-sheet contracts which to some extent hedge on-balance-sheet risks. Moreover, a large part of the UK's external balance sheet reflects the liabilities and claims of foreign-based financial firms. It is not straightforward to assess the impact on the UK economy of changes in the external position of such firms operating in the City. For a detailed review, see "The external balance sheet of the United Kingdom: Implications for financial stability?" Senior, S and Westwood, R, *Bank of England Quarterly Bulletin*, Winter 2001, pp 388-405.

Nor has the composition of external assets and liabilities by instrument changed much recently. There is a continuing positive net asset position on direct investment and debt securities, and a negative position on equities and the banking sector's aggregate balance sheet. In its on-balance-sheet business, the UK is still 'long' in foreign currency and 'short' in sterling assets, so any fall in sterling would, other things being equal, tend to strengthen balance sheets measured in sterling. But unmeasured off-balance-sheet activity may alter that picture.

The corporate sector

The rise in the UK's external debt has, in part, reflected financial deficits in the corporate (and household) sectors. In both sectors, capital gearing and debt-income ratios have risen over the past six months (Chart 150), although income gearing has remained moderate given current low interest rates.

Aggregate corporate sector profitability and demand

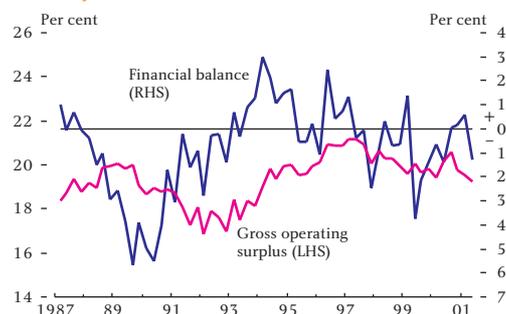
Profitability in the corporate sector as a whole (excluding oil companies) has continued to fall from the robust levels of 1997-8 (Chart 151). The gap between manufacturing and services widened further this year, and the net rate of return for manufacturing is now at its lowest since the recession of the early 1990s. Many parts of the manufacturing sector have continued to be adversely affected by the weaker external environment and sterling's strength against the euro. But the aggregate gross operating surplus of all private non-financial companies (PNFCs) as a percentage of GDP has also fallen and is at its lowest since 1994 (Chart 152). Further downward pressure on profitability might be expected from the slowdown in world demand. Profit warnings have increased significantly over the past year (Chart 153), and a number since 11 September have specifically cited the terrorist attacks as an important factor. Bank analysis shows that profit warnings contain information about short-term movements in actual profitability, and do not merely represent revisions to previously optimistic expectations.

A further fall in internally generated funds seems likely, therefore, in the short run. Whether that would have any implications for stability depends on firms' capability to adjust their cash flows (discussed in Box 8) and on their access to further external finance, through equity, bond or banking markets.

External financing and balance sheet ratios

External financing fell in 2001 H1 compared with 2000 H2, despite large equity issues by British Telecom and Vodafone in Q2. There was a further decline in Q3. In part, that might reflect more difficult market conditions. Several companies opted to postpone equity issues after 11 September. But it also reflects some slowdown recently in lending to companies by UK resident banks and in corporate bond issuance (see Section VIII for a discussion of banks' corporate lending). Corporate debt is,

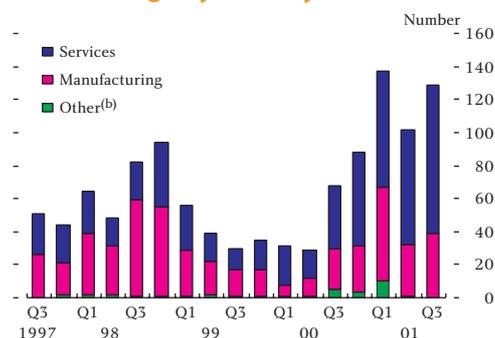
Chart 152:
PNFCs profits and financial balance^(a)



Source: ONS.

(a) As a percentage of GDP. Data are quarterly and seasonally adjusted.

Chart 153:
Profit warnings by industry^(a)

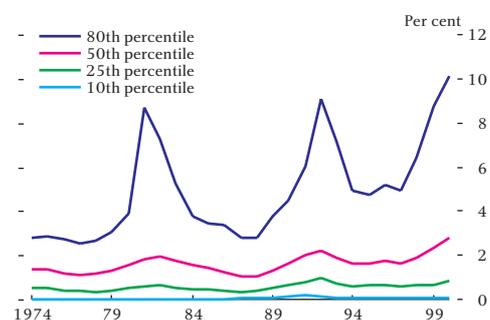


Sources: Bank of England and Financial Times.

(a) Fledgling and AIM companies are not included.

(b) Includes utilities and resources.

Chart 154:
Distribution of debt-to-profits ratio of quoted non-financial UK companies^{(a)(b)}



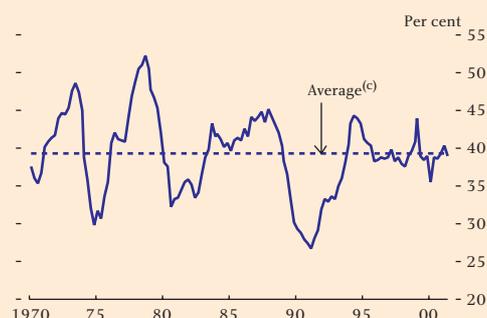
Sources: Thomson Financial Datastream and Bank of England.

(a) Ratio of gross debt to earnings before interest and tax.

(b) Companies with negative profits have their debt to profit ratio recorded to the 95th percentile of the distribution excluding such observations.

Box 8: Corporate sector adjustment mechanisms

Chart A:
Share of PNFC saving out of gross income^{(a)(b)}



Source: ONS.

(a) Gross income is sum of gross operating surplus and other sources of income (ie interest, dividends and receipts from foreign direct investment).

(b) Four-quarter moving average.

(c) Average is taken from 1970 Q1 to 2001 Q2.

How can companies adjust their balance sheets in the face of adverse developments? Broadly, they can reduce cash outflows, by cutting costs or spending; increase inflows, by working assets harder, collecting debts earlier etc; or alter the structure and quantum of their financing. The chosen methods depend on the source of the pressure, the longer-run outlook and a firm's underlying financial strength or weakness; and they affect cash flow, balance sheets, and other sectors in different ways.

In terms of adjusting the operation of the business, one of the lowest cost methods to strengthen the balance sheet is to run down inventories, which provides immediate liquidity. Moderating wage costs (or changing prices) can improve cash flows, but may, depending on the circumstances, be constrained by market conditions. Cuts in employment are generally more costly, and also reduce household incomes. Empirical work nevertheless suggests that in the past this has been a key method of adjustment for firms facing financial stress¹.

Other options are available on the corporate finance side. Before having to increase debt, companies can cut dividends, make disposals, or save more/invest less². Deferring or cancelling investment projects can generate short-term savings but at the possible cost of impeding longer-term efficiency improvements. The level of corporate net saving is one possible indicator of the potential reaction to falls in income. In the past, firms have adjusted to major slowdowns in demand by initially allowing the proportion of saving from gross income to fall, before seeking to rebuild savings through reduced expenditure (Chart A). This share is currently close to its 30-year average, suggesting some leeway to adjust in the sector taken as a whole.

1: For example, Nickell, S, and Nicolitsas, D, (1999), 'How does financial pressure affect firms?', *European Economic Review*, 43, pages 1435-1456.

2: Dividend behaviour is discussed in Benito, A, and Young, G, (2001), 'Hard times or great expectations? Dividend Omissions and Dividend Cuts by UK Firms', *Bank of England Working Paper 147*.

however, still rising more rapidly than corporate incomes, and the aggregate debt-to-profits ratio has risen above the levels of the early 1990s (Chart 150). Company accounts data suggest that the corresponding ratios for the most heavily-indebted quintile of companies reached levels in 2000 that were higher than in the recession of the early 1990s (Chart 154).

Other indicators of potential vulnerability present a mixed picture at the aggregate level. Corporate sector capital gearing at replacement cost has since the mid-1990s risen to a 30-year

high; and gearing at market value has also increased following the fall in equity prices over the past two years (Chart 155).

As well as affecting gearing, falls in equity prices have required some companies to increase their contributions to their pension funds in order to meet the solvency requirements on those funds. This would be a potential concern if the balance sheets of these companies were in any case weak. Changes in the accounting treatment of pensions (Financial Reporting Standard 17), to be implemented fully by 2003, make the cost of defined-benefit schemes more explicit. These developments may reinforce other factors, including the Minimum Funding Requirement and increased life expectancy, which are also encouraging companies to shift from defined-benefit to defined-contribution schemes. That transfers some of the risk from the corporate to the household sector. The changes may also promote a further shift in pension fund portfolios away from equity holdings towards bonds (as perhaps illustrated by Boots' recent decision to move its pension fund entirely into bonds).

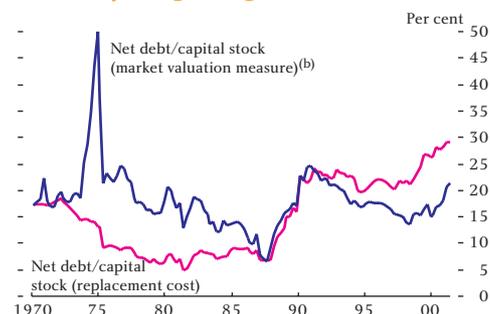
Notwithstanding apparently high corporate indebtedness, income gearing remains low by historical standards (Chart 156). Other things being equal, it would probably take a large fall in corporate income to raise income gearing to the levels reached in the early 1980s and early 1990s.⁶⁵ In any case, a rise in income gearing would not immediately imply a greater risk of default if companies have adequate liquid assets. Different aggregate measures of liquidity all tend to show a rise during 2000 and 2001 H1 (Chart 157). Company accounts data also suggest that liquidity rose in 2000 at all levels of gearing, but much more markedly for the least geared firms (Chart 158). Although there are exceptions (computer and related activities, construction and utilities), the overall liquidity position points to firms being better placed to deal with weaker cash flow than two or three years ago, perhaps balancing some of the vulnerability from increases in aggregate debt and weaker aggregate demand.

Company sector debt servicing performance

So far there is little evidence of strain in company failure rates. According to the Euler Trade Indemnity survey, the incidence of bad debts and business failures fell in 2001 Q3, while DTI and Dun and Bradstreet data also imply further reductions in corporate failures in Q3. Contacts with corporate recovery bankers, however, suggest some increase in problem cases during 2001, albeit from low levels. There have also been some suggestions that trade credit insurers have been tightening conditions, and perhaps occasionally withdrawing insurance

65: On a purely mechanical calculation, assuming unchanged debt-servicing obligations, corporate profits would have to fall by over 5 per cent of GDP to raise income gearing to those levels. This mechanical calculation takes no account of the underlying shock, corporate sector adjustment, or policy changes. Pre-tax operating profits fell by around 3 per cent of GDP between 1990 and 1992.

Chart 155:
PNFCs' capital gearing^(a)

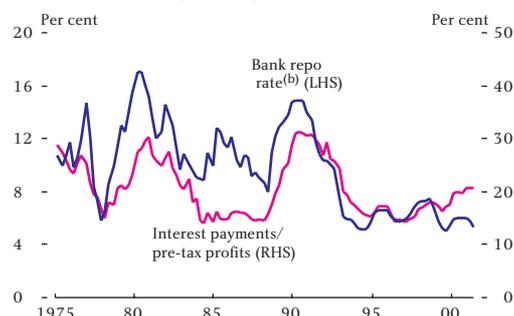


Source: ONS.

(a) Seasonally adjusted.

(b) PNFCs' net debt divided by the sum of the net debt and market value of equity.

Chart 156:
PNFCs' income gearing^(a)

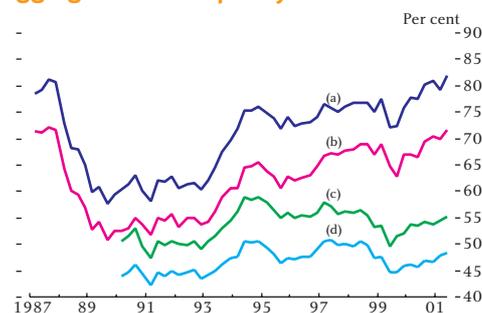


Sources: ONS and Bank of England.

(a) Seasonally adjusted.

(b) Data are quarterly averages.

Chart 157:
Aggregate PNFC liquidity



Sources: ONS and Bank of England.

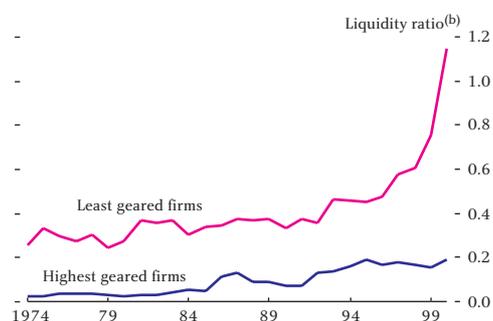
(a) Defined as all currency deposits, money market instruments (MMIs) and bonds divided by all currency short-term bank and building society lending and MMIs.

(b) As (a) excluding MMIs and bond assets.

(c) As (a) including bond liabilities.

(d) As (b) including bond liabilities.

Chart 158:
Corporate liquidity and indebtedness^(a)

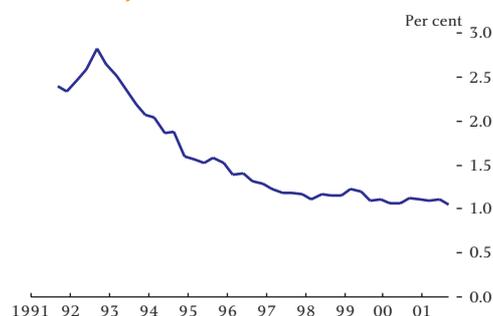


Sources: Thomson Financial Datastream and Bank of England.

(a) The least (highest) geared firms are at or below the 20th (at or above the 80th) percentile of capital gearing at replacement cost (gross debt to replacement cost of capital) in each year.

(b) Liquidity is cash/short-term debt.

Chart 159:
Rate of corporate insolvencies^{(a)(b)}

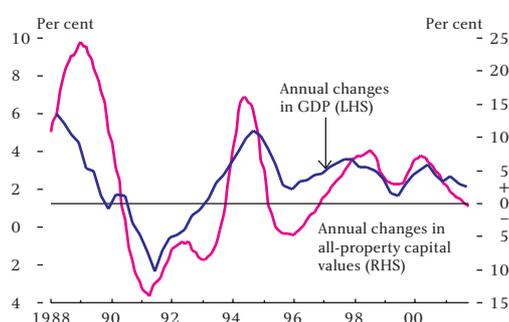


Source: DTI.

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

(b) The final observation in 2001 is for Q3.

Chart 160:
Changes in GDP and property capital values



Sources: Investment Property Databank and ONS.

quickly – affecting the availability of banking and other finance – when a firm runs into difficulties.

Nevertheless, the rate of corporate liquidations has fallen from a peak of nearly 3 per cent of the total population of firms in 1992 to just over 1 per cent in 2001 Q3 (Chart 159). A rise is likely next year, given the macroeconomic prospect outlined above, but this should be modest unless the economy weakens more than currently expected. Restructurings may limit the rise in insolvencies, but could still imply some default on debt.

Sectoral developments

Three parts of the UK corporate sector are particularly interesting in the light of recent developments. First, the commercial property sector's borrowing has increased rapidly since early 2000. Property investment is typically relatively highly leveraged⁶⁶ and has been a material source of losses to banks in the past. Property is also important as collateral. Second, airlines and associated industries have experienced an abrupt decline in business since 11 September. Third, the TMT sector remains under pressure given the fall in global demand for ICT goods and the heavy debt burden of some companies.

Commercial property

Demand for commercial property slowed in 2001 H1 and, since June, there have been indications - from rising vacancy rates and a fall in take-up of space – of some further deceleration. Discussions at the Bank's Property Forum⁶⁷ in October and with other contacts have given a more robust view of demand prospects (with 11 September judged to have had little long-term impact). On the supply side, there is evidence of an increase in available space, although there are some mixed signals from different data sources about the pace of activity in the construction sector. Reflecting these changes in current and prospective demand and supply, annual growth of capital values has fallen further since the June *Review*, and was marginally negative in September 2001 for the first time since end-1996 (Chart 160).

Capital values do not, though, look especially high in real terms. The ratio of property values to the GDP deflator is only about two-thirds of the level recorded in the early 1990s. Lenders point to an absence of a significant overhang of supply and suggest that a large downward adjustment of capital values is unlikely without an unexpected deterioration in macroeconomic conditions. Perhaps partly reflecting this view, bank lending to the commercial property sector grew rapidly throughout the first three quarters of 2001 (Chart 161). Contacts identify a key influence as being the wider gap between property yields and

66: The mean level of capital gearing has been higher in recent years for quoted FTSE-All Share property companies than for all other non-financial companies in the All-Share index.

67: For background on the Property Forum, see Box 6 on page 72 of the November 1999 *Financial Stability Review*.

banks' borrowing costs, together with a move by some institutions to finance their property portfolios via more heavily geared joint limited partnerships. The supply of lending for speculative development, however, is said to be limited. There is some evidence that so-called residual value risk (the proportion of debt not covered by the residual value of the property at the end of the loan period) has increased – see Section VIII.

Overall, the risks in the sector have probably increased somewhat since the June *Review*, while remaining well short of the fragility of the late 1980s.

Airlines and associated industries

Most industries routinely experience shifts in costs, demand and financial conditions, and because of this operate with 'buffers' – including bank lines of credit – to facilitate adjustment. The 11 September attacks, however, caused an unusually abrupt decline in demand for travel, which places a high burden of adjustment on the airlines sector (Section II). The fall in demand has particularly affected those UK airlines with transatlantic routes and, for the industry as a whole, exacerbated underlying problems of excess capacity. In response many airlines, including some UK airlines, have announced job cuts, flight reductions and rescheduling of new aircraft deliveries, shifting some of the adjustment costs to aircraft manufacturers and the household sector.

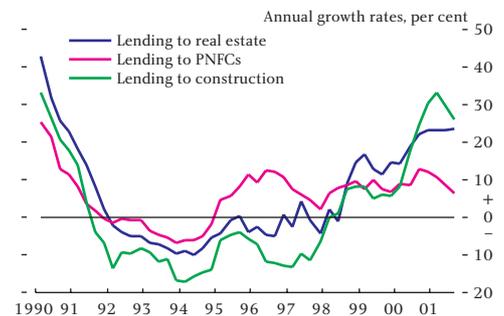
Falls in demand have also spread to firms engaged in travel-related industries and services, putting downward pressure on their cash flow and profitability. Share prices for tourism-sensitive firms have been weaker than the FTSE-100 or FTSE-250 since 11 September, and by more than for a cross-sectoral sample of firms with a high share of sales in the US (Chart 162). Relative bond spreads have also increased, most markedly for UK airlines and other tourism-sensitive firms; in some cases, sterling spreads are now higher than for telecoms firms (Chart 163).

The financing of UK airlines is structurally different in some respects from arrangements in the US market, described in Box 1 in Section II. In particular, for UK airlines, a large proportion of aircraft finance is through bank lending that is either secured or officially guaranteed through export credit assistance. A fall in the value of aircraft resulting from lower demand will increase residual value risk. (See Section VIII for a discussion of the UK bank system's exposures to airlines and other tourism-related sectors.)

TMT

As reported in the June *Review*, 'new economy' firms were strongly represented among the least profitable decile of quoted companies in 1999 and 2000. Market-based indicators suggest that the UK TMT sector continues to be perceived as relatively

Chart 161:
Lending to real estate, PNFCs and construction^{(a)(b)}

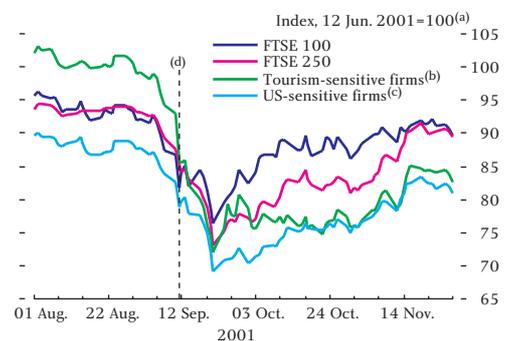


Source: Bank of England.

(a) Not seasonally adjusted.

(b) Lending to PNFCs includes banks' holdings of securities, but lending to real estate and construction does not.

Chart 162:
Equity indices for selected groups



Source: Thomson Financial Datastream.

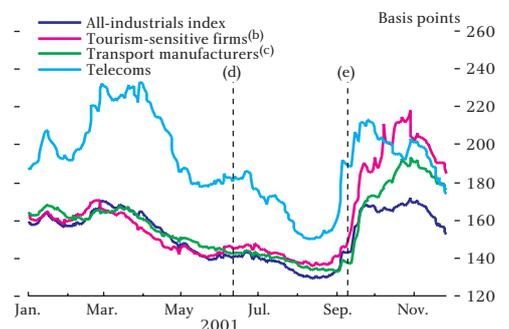
(a) June 2001 *Review*.

(b) Tourism-sensitive firms are defined as tour operators, hotels and transport operators.

(c) Firms that derived at least 25 per cent of sales from the US in 2000.

(d) 11 September 2001.

Chart 163:
Corporate sterling bond spreads by sector^(a)



Sources: Merrill Lynch and Bloomberg.

(a) Data are option-adjusted spreads: difference between par yields on index and par yields on government gilts.

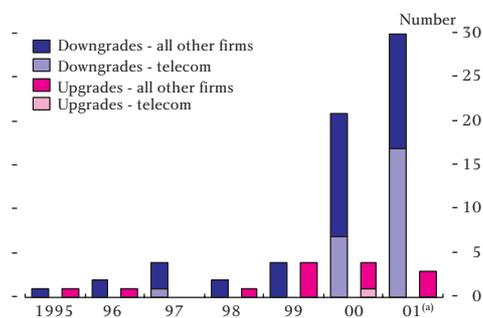
(b) Tourism-sensitive firms are in the cyclical services sector.

(c) Transport manufacturers operate in capital goods sector.

(d) June *Review*.

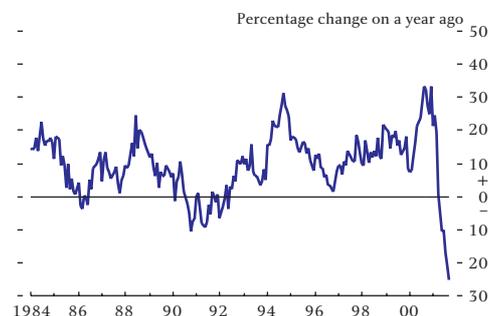
(e) 11 September 2001.

Chart 164:
Issuer ratings changes for telecom and other firms



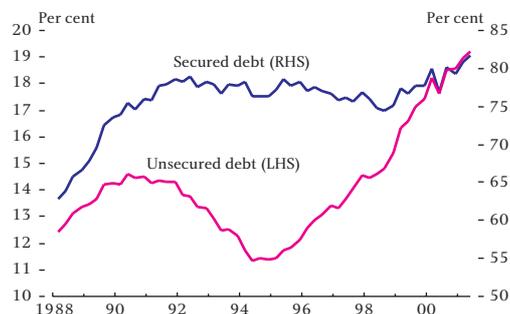
Sources: Moody's Investors Service and Bloomberg.
 (a) 2001 figure is year to 28 November 2001.

Chart 165:
Production in the ICT sector^(a)



Sources: ONS and Bank of England.
 (a) Electrical and optical engineering output as a proxy for ICT production.

Chart 166:
Secured and unsecured debt as a proportion of annual disposable income^(a)



Sources: ONS and Bank of England.
 (a) Disposable income data are seasonally adjusted.

risky, but possibly as stabilising. Share prices have fallen by more than the FTSE All-Share index since June, but have risen by more since 11 September. Corporate bond spreads for telecoms firms remain higher than an average for all industrial corporate bonds, although the gap has narrowed since June and especially since September (Chart 163). The TMT sector accounted for around one quarter of profit warnings in 2001 Q3. Seventeen out of 30 ratings downgrades in 2001 have been for telecoms firms, compared with 7 out of 21 in 2000 (Chart 164); but only four have occurred since June.

The higher-than-average credit risk in the sector is not surprising given the fall in global demand for high-tech goods. Activity information indicates that the output of suppliers to the TMT sector (ie production of ICT goods) fell sharply during 2001 H1 (Chart 165), explaining a large part of the total fall in manufacturing output over that period (see pages 22-23 of the November *Inflation Report*). There is no industry breakdown of the net rate of return in manufacturing, but National Statistics suggest that most of the fall in 2001 Q2 was accounted for by declines in the profitability of these suppliers and of pharmaceutical companies.

The household sector

Since the June *Review*, the household sector has continued to run a financial deficit, although not on the scale of 1988-89. The ratio of debt to income continued to rise rapidly in 2001 H1 (Chart 150), and there is likely to have been a further rise in Q3. Household borrowing grew by over 10 per cent in the twelve months to October, the fastest rate since the early 1990s.

Unsecured debt

Unsecured borrowing grew at an annual rate of nearly 13 per cent in October, although there were signs of deceleration in the three-month annualised rate. The ratio of unsecured debt to disposable income has almost doubled since 1994 (Chart 166). Part of the recent rise may reflect increased competition among lenders, which has increased demand by driving down effective unsecured lending rates. The proportion of total credit card balances bearing interest has also risen (Chart 167), as has the average duration of credit card debt (see the June *Review*, pages 79-80).

The monthly National Opinion Polls' Financial Research Survey (FRS) provides a window on the underlying borrowing behaviour of different income groups⁶⁸. The number of individuals taking on new unsecured loans has risen across most income bands

68: National Opinion Poll's Financial Research Survey is a monthly monitor of the personal finance markets in Great Britain. The database began in 1991. The survey questions approximately 5,000 individuals (over the age of 16) per month. It is based on a random location sample designed to provide a representative sample across the country. Data are then weighted to match the demographic and regional profiles of adults in Great Britain.

since 1991, but most markedly amongst those earning between £25,000 and £35,000⁶⁹. The average value of new loan commitments has increased across all income bands since 1997, although the increase has been smaller for those on below average incomes. In the six months to September, both the value of, and the proportion of individuals taking on, new debt stabilised across most income and age groups.

Capital gearing, mortgage borrowing, and income gearing

As in the corporate sector, aggregate vulnerability indicators are mixed. Household capital gearing has risen over the past two years from historically low levels, reflecting the build-up of debt and the effect on wealth of falling equity values (Chart 168). New and more flexible mortgage products, together with gradual reductions in interest rates charged on secured lending, may have contributed to the further growth in mortgage borrowing. Rising house prices have contained the increase in capital gearing, except insofar as they have encouraged households to increase mortgage equity withdrawal to finance non-housing consumption. House prices are above their long-run historical average relative to earnings (Chart 169), but the recent activity and survey data suggest some easing in the housing market. House prices relative to consumer prices are fairly close to their long-term trend except in London and the south-east. This suggests that the housing market is not a major source of risk for the country as a whole; as does the recent stability of loan-to-value ratios for both first-time buyers and existing owner-occupiers, and across regions.

Household income gearing fell slightly in 2001 H1 and is likely to have fallen further since then, given recent reductions in official interest rates (Chart 168). It has been low since 1993. Comparisons of income gearing over periods with different inflation rates do not, however, adequately capture differences in real debt-servicing costs. Low inflation and low nominal interest rates spread the real debt-servicing burden more evenly over the lifetime of a loan compared with the front-loading typical in a higher inflation environment. Falls in income would, of course, raise income gearing for any given level of interest rates. That would put more direct pressure on debt servicing capability than a change in asset prices⁷⁰.

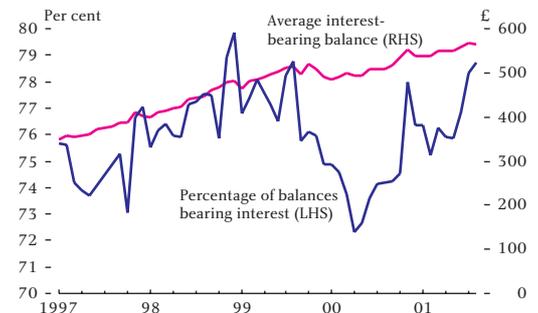
Household debt servicing performance

The emergence of debt-service problems would be more acute if any rise in unemployment were concentrated among financially weaker households. The British Household Panel Survey (BHPS)

69: National average gross annual earnings per full-time employee were £21,842 in 2000 (New Earnings Survey).

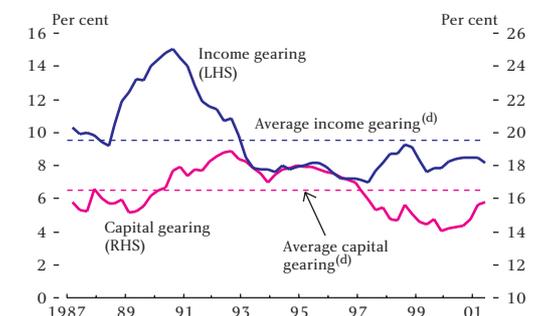
70: On a purely mechanical calculation, assuming unchanged interest-servicing obligations, personal incomes would have to fall by around 15 per cent to raise income gearing to the level prevailing *before* the large rise of 1988-90. This mechanical calculation takes no account of the underlying shock, household sector adjustment, or policy changes.

Chart 167:
Proportion of credit card balances bearing interest and average interest bearing balances



Sources: BBA and Bank of England.

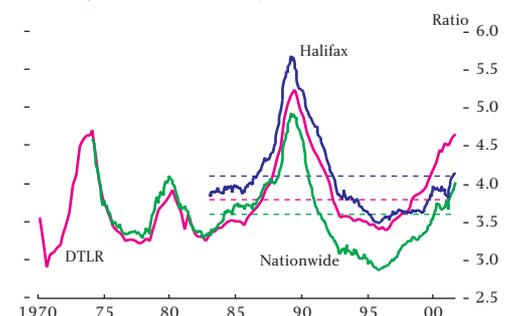
Chart 168:
Household sector income and capital gearing^{(a)(b)(c)}



Sources: ONS and Bank of England.

- (a) Capital gearing is total liabilities as a percentage of the sum of total financial assets and housing wealth.
- (b) Income gearing is total household interest payments as a percentage of total household disposable income.
- (c) Disposable income is seasonally adjusted.
- (d) Dashed lines indicate respective averages from 1987 Q1 to 2001 Q2.

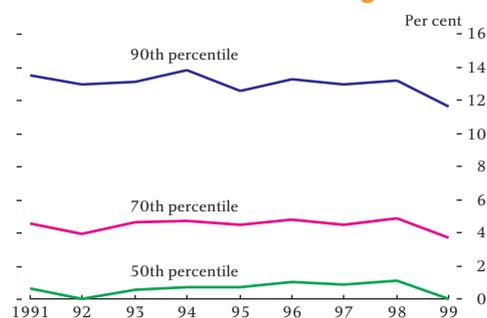
Chart 169:
House price-to-earnings ratio^{(a)(b)}



Sources: Nationwide, DTLR, Halifax, ONS and Bank of England.

- (a) House prices divided by ONS whole economy annual earnings, seasonally adjusted.
- (b) Dashed lines indicate the respective averages.

Chart 170:
Distribution of household saving ratios



Sources: British Household Panel Survey and Bank of England.

Table 12:
Per cent becoming unemployed from year t to year t+1

	No regular saving (per cent)	Regular saving (per cent)
1992	5.1	2.6
1993	4.0	3.1
1994	4.5	2.5
1995	3.2	2.2
1996	3.4	2.1
1997	3.4	2.2
1998	2.6	1.4
1999	4.9	3.2
Average	3.9	2.4

Sources: British Household Panel Survey and Bank of England.

Table 13:
Financial pressures on non-saving households

	Problem set ^(a)		Problem set ^(b)	
	A + B	A + B + C	A + D	A + D + C
1991	21.0	9.7	-	-
1993	17.7	9.6	-	-
1995	12.9	6.4	22.5	7.2
1997	11.0	5.4	18.5	5.3
1999	9.0	4.0	21.7	5.5

Sources: British Household Panel Survey and Bank of England.

A: No regular savings.

B: Mortgage payment problems.

C: Mortgage income gearing at or above the 80th percentile of mortgage income gearing.

D: Unsecured debt problems.

(a) As a percentage of household heads with a mortgage and any combination of A, B or C.

(b) As a percentage of household heads with a mortgage and any combination of A, D or C.

provides some information relevant to assessing this, although the latest survey – released in February 2001 – is for 1999. It suggested that around half of households do not save regularly (Chart 170); that around 90 per cent of those households also make no contributions to a personal pension; and that those with no regular saving are more likely to become unemployed (Table 12). Perhaps reassuringly, the proportion of households not saving on a regular basis who also had mortgage payment problems fell throughout the 1990s (Table 13); this was true even among the most heavily geared households. That may be because mortgage income gearing fell across households generally, but especially amongst the most highly geared.

The risk of default on unsecured debt is generally regarded as greater than on secured debt. According to the BHPS, the proportion of non-saving households with unsecured debt problems rose between 1997 and 1999 (Table 13). For the household sector as a whole, the proportion of accounts in arrears of three to six months in 2001 H1 was around eight times the equivalent proportion of mortgage arrears. Credit card arrears of between four to six months rose between August 2000 and March 2001, but have increased less significantly since then. Mortgage arrears and house possessions are low and falling, while personal bankruptcies (including voluntary arrangements) remain well below their peak of 11,000 in 1993.

Were financial pressures to rise, insurers would take on some of the burden because of mortgage protection and unemployment insurance. Around one-third of households have a mortgage protection policy, according to the BHPS. This share has risen since 1995, but does not differ much between those who have mortgage payments problems and those who do not. Section VIII discusses the implications of lenders' insurance arrangements.

Overall, taking the corporate and household sectors together, the increases in debt-income and capital gearing suggest that companies and households are now somewhat more vulnerable to unexpected falls in asset prices and incomes than six months ago. Modest income gearing provides some reassurance that both sectors should be able to service debts without undue difficulty in the current interest-rate environment.

VIII The UK financial sector

Previous sections suggest that, compared with the outlook at the time of the *June Review*, UK financial institutions are likely to face a sharper than expected deterioration in the international economy, somewhat wider domestic sectoral imbalances, and some new uncertainties and risks following the terrorist attacks of 11 September. But the profitability and capitalisation of the banking sector as a whole provide a substantial cushion against them.

The UK banking system

Capital and profitability

The major UK banks⁷¹ have remained highly profitable and well capitalised. Both Tier 1 and total capital ratios are well in excess of the Basel minima of 4 per cent and 8 per cent respectively (Chart 171). While an increase in the importance of mortgages in the major banks' loan portfolios will have helped to strengthen the ratios, strong profitability, reflected in retained earnings, has been a key factor. Although down on earlier peaks, the major banks' pre-tax returns on equity averaged over 20 per cent on an annualised basis in 2001 H1. This is not representative of all banks in the industry: the profitability of smaller banks over recent years has generally been both lower and less stable (see Chart 172 and Box 9)⁷². Nevertheless, whilst there is a high dispersion of performance across the sector, the return on equity of UK-owned banks in 2000 still averaged about 17 per cent⁷³.

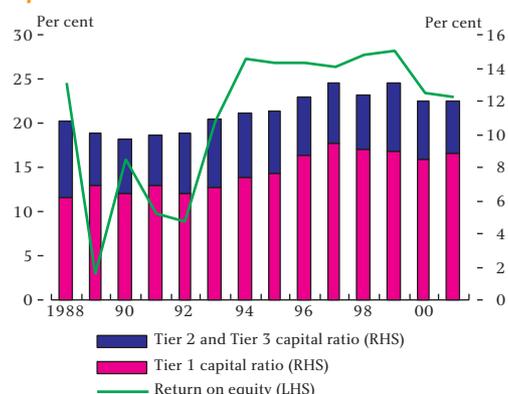
The strength of banks' profits in recent years in part reflects the fact that operating profits have remained robust (Chart 173). But there has also been a decline in their provisions since the recession of the early 1990s. A more difficult market environment would be likely to affect profit growth: investment banking earnings in particular might be adversely affected by any sustained slowdown in capital market activity. For the major UK banks, however, prospective earnings from domestic, especially retail, banking are particularly important; retail banking accounted for about 45 per cent of the major banks' pre-tax profits in 2001 H1. These earnings would be affected by slower growth in loan demand, especially if this were accompanied by narrower lending margins. But although retail spreads have tended to narrow over recent years, in part because of competitive pressures (Chart 174), they have stabilised in recent months. Current strong profitability and the relative stability of

71: Throughout, 'major UK banks' refers to the Major British Banking Groups (MBBG), constituting Abbey National, Alliance & Leicester, Barclays, Bradford & Bingley, HBOS, HSBC, Lloyds TSB, Northern Rock and Royal Bank of Scotland.

72: For details on the Bank's peer groups, see p.86 of the *June Review*.

73: Unweighted average of the MBBG banks plus Standard Chartered, and 41 smaller UK-owned banks.

Chart 171:
Major UK banks' profitability and capitalisation^{(a)(b)}

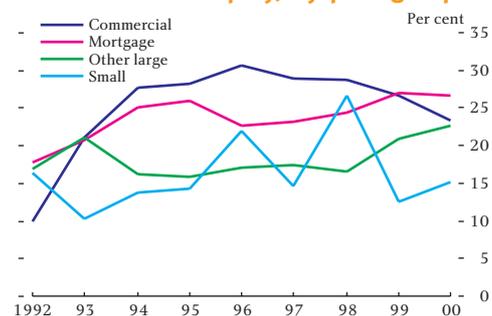


Source: BBA.

(a) Barclays, Lloyds/Lloyds TSB, Midland/HSBC Bank, Abbey National, RBS Group, NatWest 1988-1999, Alliance and Leicester from 1995, Halifax from 1996, Woolwich 1997-1999, Northern Rock from 1998, Bradford & Bingley 1999-2000.

(b) 2001 figure is for H1.

Chart 172:
Pre-tax return on equity, by peer group^{(a)(b)}

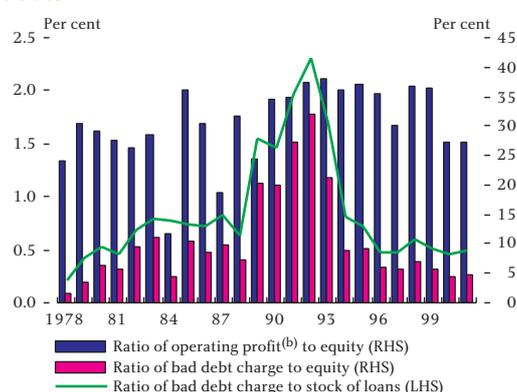


Sources: Bureau van Dijk Bankscope and published accounts.

(a) Mean pre-tax profits as a percentage of the book value of equity.

(b) Book value of equity is shareholder funds and minority interests.

Chart 173:
Major UK banks' operating profit and bad debts^(a)



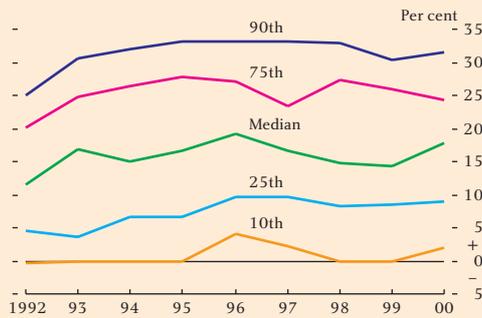
Source: BBA.

(a) The population is Barclays, Lloyds TSB and RBS. It includes TSB until 1994 and NatWest until 1999.

(b) Profit before tax and charge for bad debts.

Box 9: Performance distribution of UK-owned banks

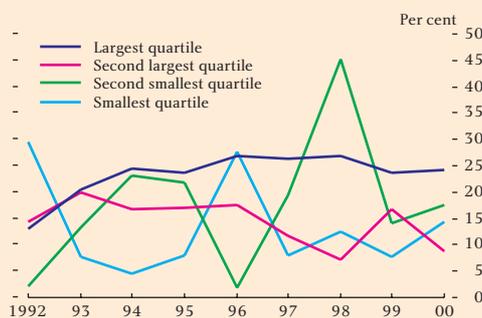
Chart A:
Pre-tax return on equity, by percentile^(a)



Sources: Bureau van Dijk Bankscope and published accounts.

(a) Pre-tax profits as a percentage of the book value of equity.

Chart B:
Mean pre-tax return on equity, by size quartile^(a)



Sources: Bureau van Dijk Bankscope and published accounts.

(a) Pre-tax profits as a percentage of the book value of equity.

Chart C:
Mean leverage ratio, by size quartile^(a)



Sources: Bureau van Dijk Bankscope and published accounts.

(a) Total assets divided by the book value of equity.

Analysis of the financial performance of UK-owned banks in previous *Reviews* has focussed more on the major UK-owned banks (MBBG) than on other parts of the sector. In part this reflects their size (they account for over 90 per cent of UK-owned banks' assets), but data limitations are also an issue. This Box reviews the dispersion of performance across all UK-owned banks since 1992. It replicates a similar analysis presented in the June 2000 *Review* for the UK corporate sector¹.

Across the sector, there has been wide dispersion of profitability since 1992 (Chart A). It has been fairly stable, with a tendency for individual banks to remain in broadly the same position within the profitability distribution (Table A). Trends in profitability through time appear less uniform when banks are distributed according to balance-sheet size (Chart B). But the relative strength and stability of profitability for the largest banks is highlighted². This may reflect their business mix, in particular their strong position in UK retail banking markets.

Leverage (total assets divided by the book value of equity) has also been fairly stable through time, both on average and for individual banks: the lowest probability of a bank remaining in the same leverage quartile in the following year was 82.6 per cent. Banks' leverage has, therefore, been somewhat more persistent than their profitability. Leverage has been positively correlated with balance sheet size (Chart C). Greater leverage may play a part in explaining the larger banks' higher returns on equity. Size and profitability are not, however, highly correlated for the other three quartiles.

Table A:
Transition matrix for one-year movements between quartiles of the distribution of the return on equity, 1992-2000^(a)

	1	2	3	4
Quartile 1 – highest	73.8	20.5	3.4	3.6
Quartile 2	16.7	60.2	18.2	3.6
Quartile 3	7.1	15.6	61.4	12.1
Quartile 4 – lowest	2.4	5.7	17.1	80.7

Sources: Bureau van Dijk Bankscope, published accounts and Bank of England calculations.

1: Benito, A. and Vlieghe, G. (2000) 'Stylised facts on UK corporate financial health'. *Financial Stability Review*, June.

2: See also Chart 152 above.

the major UK banks' earnings streams suggest that they should have scope to increase (forward-looking) provisions as necessary should asset quality deteriorate.

This generally robust picture is supported by market indicators of bank risk over recent months. The major banks' share prices did fall immediately after the terrorist attacks on 11 September, with those banks having significant US or emerging market exposures most affected. But they have subsequently recovered and have outperformed the market as a whole since June (Chart 175). Similarly, although bank bond spreads widened significantly after 11 September, much of this has subsequently been reversed.

Funding and liquidity management

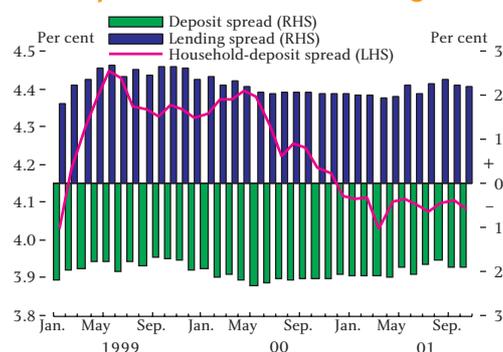
The December 2000 *Review* carried an article⁷⁴ reviewing the liquidity of the UK-resident banking system and related developments in the key sterling money markets (repo, CDs, interbank). This area is of special interest to the Bank as the issuer of the currency, manager of system liquidity, and operator of the main payment systems, and so provider of the final means of sterling settlement. The following discusses some of the key measures analysed in December and updates the June *Review*, which in particular highlighted the increasing use of securitisations as a funding instrument.

These securitisations – primarily accounted for by mortgage banks (Chart 176) – have significantly reduced the rate of growth of banks' claims on UK companies and households. As such, securitisations have contributed to a narrowing of the gap between banks' net lending to companies and households and deposits received from these sectors (Chart 177).

A second factor influencing banks' funding position has been the continued strong growth of household deposits, which increased by 9 per cent in the year to October. Building society retail deposits have grown particularly rapidly, especially relative to the mortgage banks which, as already noted, have used securitisations to reduce their retail funding requirement. Commercial banks' household deposits have also continued to grow strongly. Despite this, however, their sterling stock liquidity ratios (SLRs) have remained around the level of six months ago, after drifting down from higher levels carried over the millennium-date change (Charts 178 and 179). Banks' target levels of sterling stock liquidity may have been influenced by the need to ensure adequate eligible collateral in advance of the introduction of changes to the CREST payment mechanism on 26 November (see Section IX).

Chart 174:

Banks' spread on household lending^{(a)(b)}



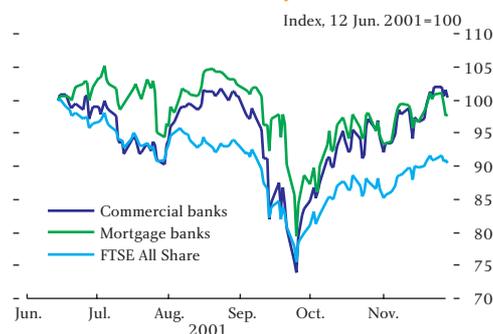
Source: Bank of England.

(a) Spreads are average rates on lending to and deposits from households, less the Bank of England's repo rate.

(b) For a description of the sample of banks, see Bailey, J & Thame, J, (2001) 'Banks' average interest rates', *Monetary & Financial Statistics*, February.

Chart 175:

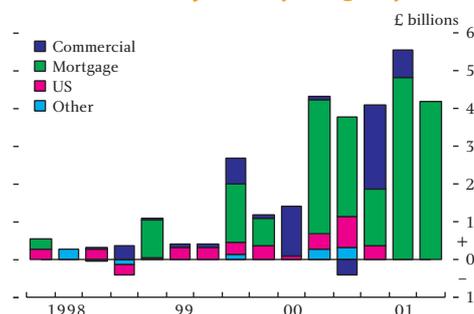
UK-owned banks' share prices



Source: Bloomberg.

Chart 176:

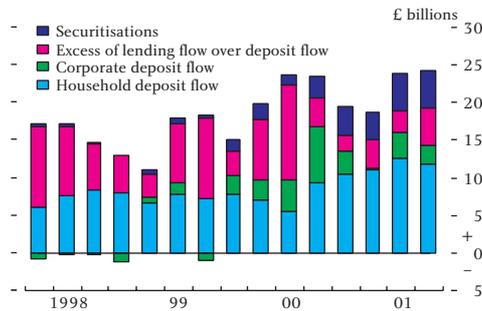
Securitisations by bank peer group



Source: Bank of England.

74: Chaplin, G, Emblow, A and Michael, I (2000), 'Banking system liquidity: developments and issues', *Financial Stability Review*, December.

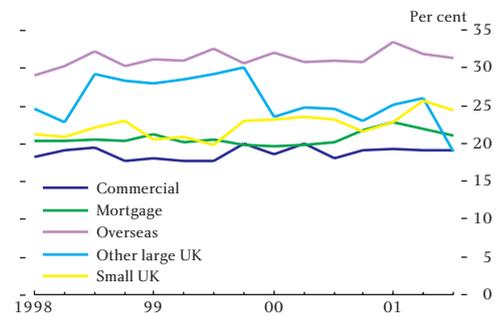
Chart 177:
Bank and building society lending to and deposits from UK corporates and households^(a)



Source: Bank of England.

(a) Two-quarter moving averages of monthly flows.

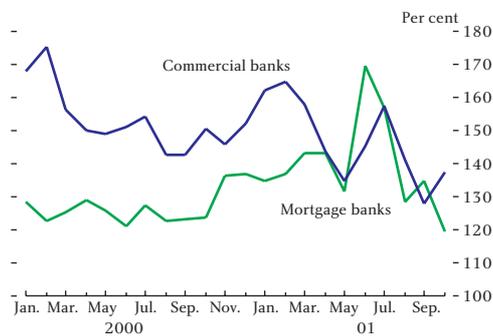
Chart 180:
UK-resident banks' tradable assets ratio^(a)



Source: Bank of England.

(a) Ratio of tradable to total assets.

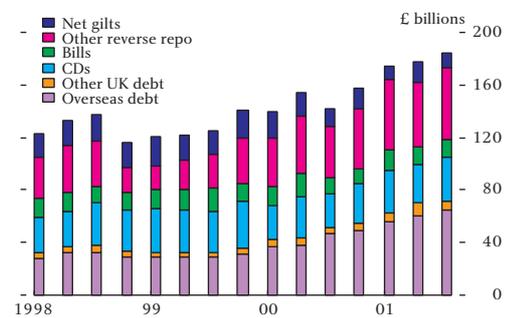
Chart 178:
Sterling stock liquidity ratios^(a)



Source: FSA.

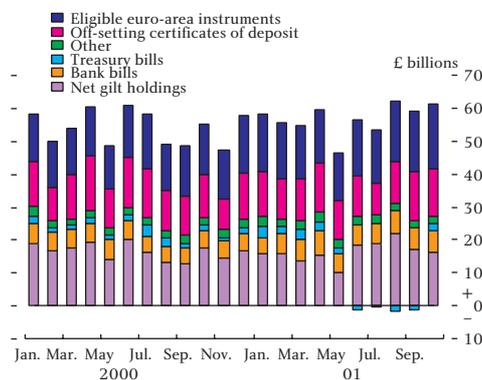
(a) Stock of sterling liquid assets as a percentage of estimated five-day sterling deposit outflows. For definitions, see Chaplin et al (2000).

Chart 181:
Commercial banks' tradable assets



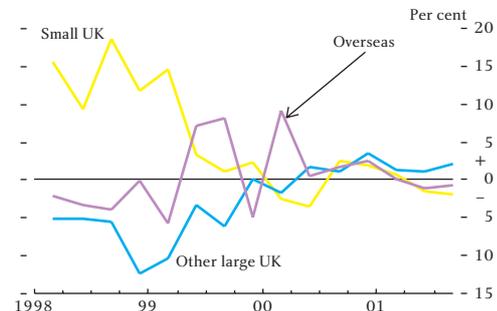
Source: Bank of England.

Chart 179:
Commercial banks' stock of sterling liquid assets



Source: FSA.

Chart 182:
UK-resident banks' three-month maturity mismatch^(a)



Sources: FSA and Bank of England.

(a) Difference between liabilities and assets of three months' maturity and under, as a percentage of total liabilities. Mismatch data not available for 'commercial banks' or 'mortgage banks'.

The response of UK banks to market conditions following the events of 11 September may have had some influence on recent SLR movements. Their liquidity was not put under significant pressure, and the sterling market continued to settle normally. Banks did, however, experience some difficulty in obtaining dollars from the interbank market and may have used some part of their stock of sterling liquidity to meet dollar funding needs (see also Section VI). Market contacts reported that there was also a preference for holding the most liquid instruments (for example, shorter maturity government bonds).

On a broader measure of liquid asset holdings – all-currency tradable asset holdings as a percentage of total assets – the commercial banks' position has been stable since the *June Review* at around 19 per cent (Chart 180). Overseas debt has continued to account for an increasing share of the stock of tradeable assets they hold (Chart 181).

Other large UK-owned banks' (mainly 'merchant banks') holdings of tradable assets fell significantly relative to total assets in September (Chart 180). This reflected a fall in holdings of Certificates of Deposits (CDs), in turn reflecting one institution closing down its money market operations in which CDs were a major asset. The effect on the banks' maturity mismatch position was broadly neutral.

The maturity mismatch of small UK-owned banks has, however, become slightly negative since the *June Review* (Chart 182), as a small rise in liquid assets was insufficient to offset rapid growth in short-term funding from UK companies and households.

The tradable assets ratio of overseas-owned banks' UK operations has declined slightly since the *June Review* (Chart 180), as their asset holdings have fallen, particularly under reverse repo⁷⁵. Their maturity mismatch has become very slightly negative (Chart 182), as the decline in liquid assets (accounted for by bank placements and reverse repo) outpaced the decline in short-term liabilities. Nonetheless, their mismatch remains low, with large short-term liabilities offset by high levels of liquid assets.

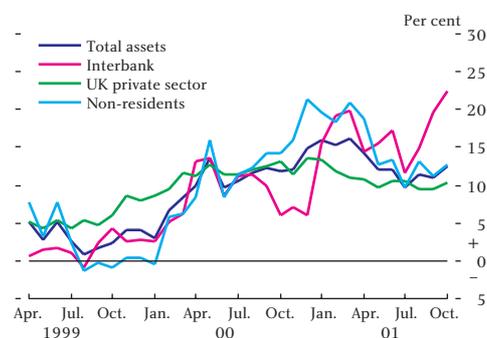
Credit risk

Data available since the *June Review* suggest growth in UK-resident banks' on-balance-sheet exposures has slowed slightly, from 14 per cent per annum in April to 12.5 per cent in October (Chart 183). This is largely the result of slower growth in lending to non-resident banks⁷⁶. In contrast, UK-resident banks' claims on non-banks overseas have continued to grow strongly,

75: The level of overseas banks' tradable asset holdings is inflated because it is not possible to calculate *net* overseas debt holdings, as it is for *net* gilts.

76: These data are unconsolidated and include lending across borders within banking groups.

Chart 183:
Growth in UK-resident banks' and building societies' assets^{(a)(b)}

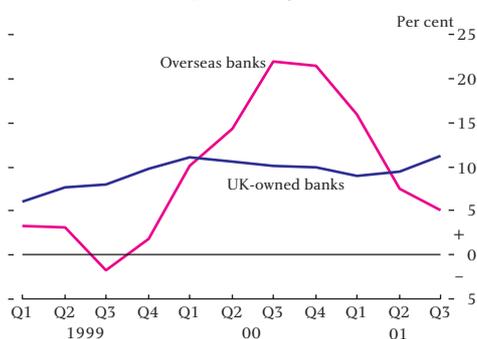


Source: Bank of England.

(a) Annual growth.

(b) All-currency lending, including the effect of securitisations (ie with securitised assets excluded).

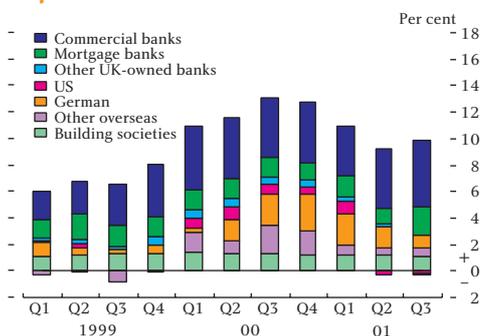
Chart 184:
Growth of lending to UK private sector^(a)



Source: Bank of England.

(a) Annual growth.

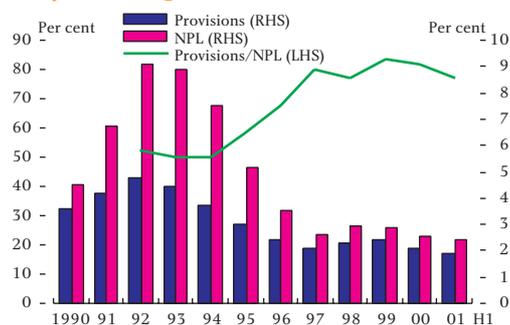
Chart 185:
Contributions to growth of lending to UK private sector^(a)



Source: Bank of England.

(a) Annual growth.

Chart 186:
Major UK banks' provisions and non-performing loans^{(a)(b)}

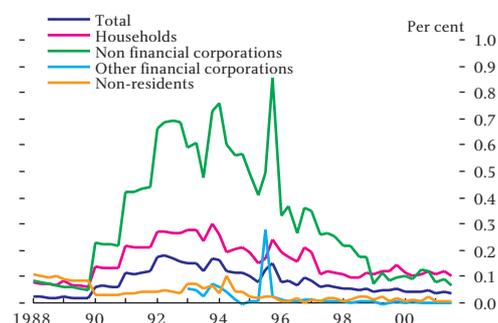


Sources: Bureau van Dijk Bankscope, BBA and published accounts.

(a) 1990-1: Barclays and Midland; Barclays, Bank of Scotland, Lloyds TSB, RBS, Standard Chartered 1992 to present; NatWest 1992-9; Midland 1992-7; HSBC Holdings 1998 to present.

(b) Provisions and NPLs as a proportion of customer loans.

Chart 187:
Write-offs and other loan revaluations^{(a)(b)(c)}



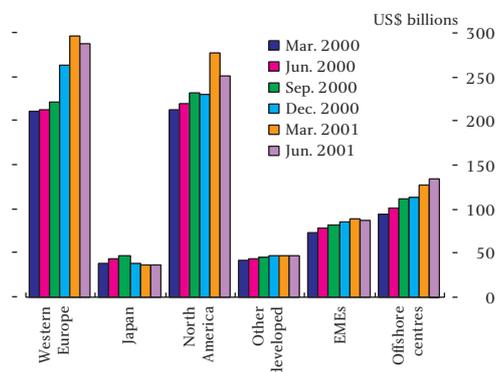
Source: Bank of England.

(a) Quarterly default rate, as a proportion of balances.

(b) Write-offs data before 1993 Q3 are annual data interpolated to provide quarterly estimates.

(c) UK-resident banks.

Chart 188:
UK-owned banks' total outstanding external claims^(a)



Source: Bank of England.

(a) Total foreign exposures, consisting of consolidated international claims plus gross local currency claims plus inward, minus outward risk transfers.

and the slowing in their lending to the UK private sector in the first few months of 2001 has not been sustained. Indeed, lending by UK-owned banks to the private sector has accelerated since 2001 Q1 (Chart 184), partly offsetting a sharp slowing in lending by overseas banks in London⁷⁷. This reflects to some extent the relative buoyancy of retail lending markets, of which the major UK-owned banks have a large share. In addition, contacts suggest that overseas banks may have adopted a less aggressive stance in some UK markets, such as lending to large corporates (see below). There has been a particularly marked slowing in the growth of US and especially German banks' lending during 2001. Their contribution to growth of total bank lending to the private sector has declined accordingly (Chart 185).

Against this background, backward-looking indicators suggest that banks' asset quality remains good. Non-performing loans (NPLs) continued to decline as a proportion of loans in 2001 H1, and the loans in question are relatively well covered by provisions (Chart 186). Write-offs remain low (Chart 187). Bank contacts similarly suggest that any deterioration in asset quality on these measures has been modest to date, perhaps surprisingly so.

It is difficult to know how far the performance of banks' loan portfolios is a result of improvements in risk management or simply of benign economic conditions over recent years. Provisions and write-offs have in the past been highly cyclical and, looking ahead, bank contacts do expect a less favourable operating environment to be reflected in some decline in asset quality, particularly on corporate portfolios (see below).

Overseas exposures

In the year to 2001 Q2, UK-owned banks' total foreign exposures increased substantially (by over 20 per cent on an ultimate risk basis⁷⁸), although there was a significant fall from Q1 to Q2, reflecting in particular a reversal of the sharp increase in US exposures in the first quarter (Chart 188). Given the weakening outlook for the US economy, the quality of UK banks' US assets are of particular interest. Box 10 highlights UK banks' relatively large private sector exposures in the US and, in particular, the extent of local currency lending from US offices. This reflects the significance of some of the major UK-owned banks' United States-based operations, which cover a wide range of business including mortgage lending, consumer credit, corporate lending and investment banking. In addition, UK-owned banks have substantial portfolio investments in the US (for example, asset-backed securities): indeed these account for over 60 per cent of consolidated international claims.

77: The distinction between UK and foreign-owned banks, and its implications for macroprudential analysis, are discussed in the June *Review*, pp 83-84.

78: See Box 6 (p.84) in June's *Review* for definitions.

Box 10: UK-owned banks' international exposures

Is it possible to build up a picture of UK-owned banks' international credit exposures from published data? There are two useful series of on-balance-sheet data¹. First, there are data on the consolidated international claims of UK-owned banks on borrowers abroad, including lending by their foreign offices in non-local currencies (see Box 10). Secondly, a separate series covers the local-currency claims on local residents of UK-owned banks' foreign offices. The former series, but not the latter, can be broken down by type of borrower (public sector, bank, non-bank private sector). It is likely that the latter is usually concentrated on the non-bank private sector, but that will not always be the case.

The sum of these exposures is referred to below as 'total foreign exposures'. This aggregation may not always be straightforward. For example, depending on the structure involved, parent banks may to a degree be ring-fenced from the business of their overseas subsidiaries. 'Total foreign exposures' is, in any case, not a complete picture as it does not include data on UK-owned banks' lending, via for example the London wholesale money markets, to UK offices of foreign-owned banks, corporates etc.

At end-June 2001, 'total foreign exposures' of UK-owned banks amounted to US\$1,086 billion (Figure A). This comprised on-balance-sheet, consolidated, international claims on foreign countries of US\$564 billion and claims on local residents in local currency by the foreign offices of UK-owned banks of US\$521 billion.

The diagram shows the eight countries to which UK-owned banks' 'total foreign claims' were largest. Local-currency claims of UK-owned banks tend, of course, to be larger in countries in which they own local banks. (For example, the Hong Kong-dollar claims of UK-owned banks' offices in Hong Kong on local residents were, at end-June, more than four times larger than UK-owned banks consolidated *international* claims on Hong Kong).

In general, between 50 and 60 per cent of UK-owned banks' consolidated international claims on these countries took the form of portfolio investments. Portfolio claims on Hong Kong and France were the main exceptions, representing around 10 per cent and 25 per cent respectively. These claims cannot be broken down by sector.

Public sector exposures accounted for the largest share of UK-owned banks' consolidated international exposures to *Japan* and *Italy*, warranting specific analysis of public finances in these countries (Sections III and IV).

By contrast, loans to the *non-bank private sector* accounted for the largest share of UK-owned banks' international claims on the *United States* and *Hong Kong*. International claims on entities operating from the *Cayman Islands* were also predominantly recorded as claims on the non-bank private sector. Given the island's status as an offshore financial centre², these are likely to include lending to investment funds, hedge funds, special purpose and other financing vehicles, which are not classified as banks.

UK international exposures to *Canada*, *France* and *Germany* were concentrated on the *banking sectors* of these countries. This highlights the relative importance, for these countries, of analysis of the structure of the loan portfolio of the domestic banking sectors, the composition of their income, provisioning policies, capital adequacy, etc. With this in mind, Figure A also shows the exposure of the foreign banking sectors to their domestic non-bank private, domestic public and foreign sectors³. Net of domestic interbank claims, the largest component of assets is generally claims on the domestic non-bank private sector.

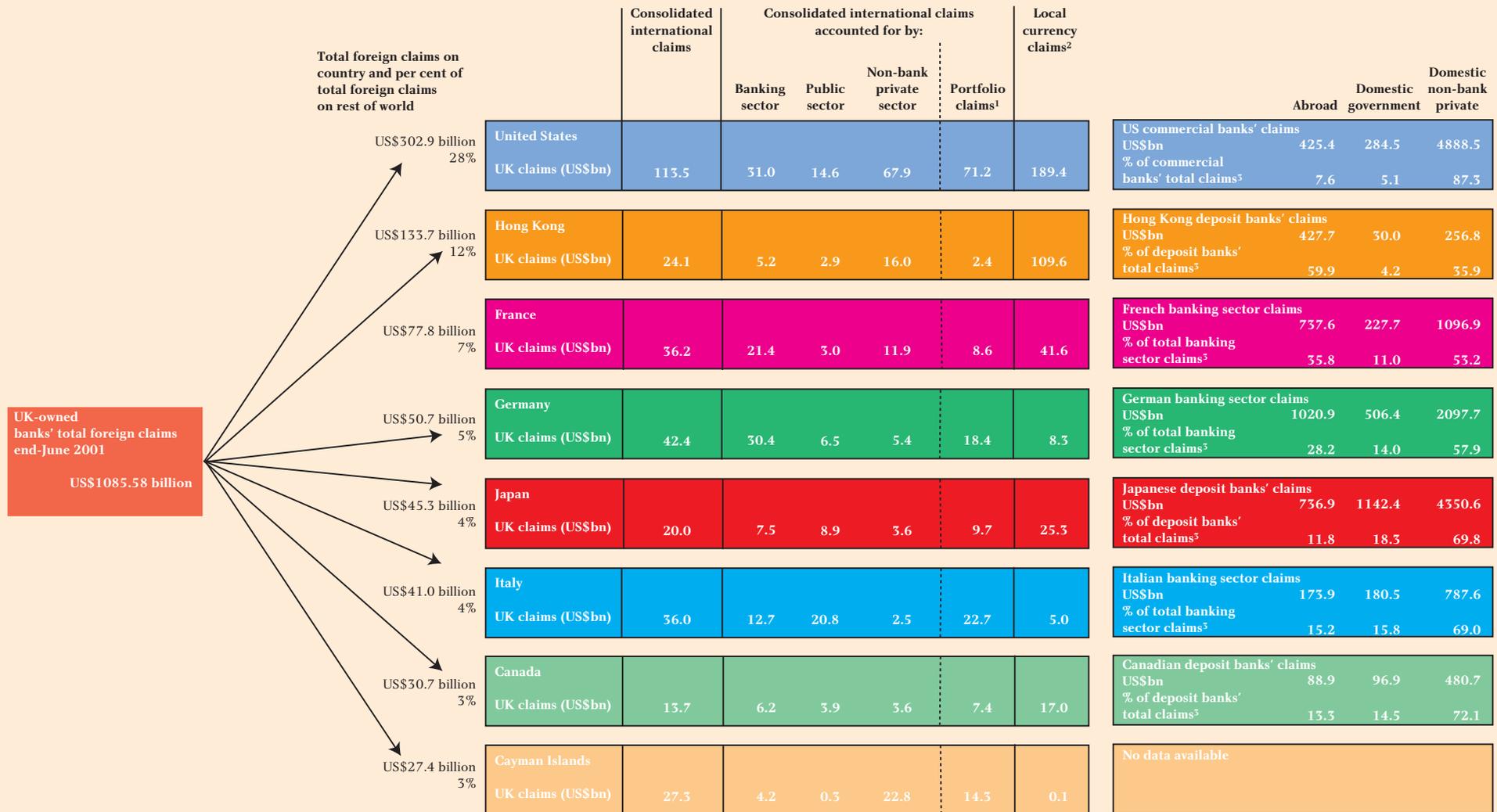
The credit quality in the non-bank private sectors of foreign countries is relevant to the UK financial system because UK-owned banks have direct *and* indirect exposures to them. The indirect claims are, of course, protected by the intermediating banks' capital resources and risk management.

1: The Bank also publishes some supplementary data on off-balance-sheet claims and undrawn commitments.

2: See 'Financial flows via offshore financial centres', by Liz Dixon, page 105 in the June 2001 *Review*.

3: These data are from the IMF 'International Financial Statistics' publication and exclude domestic interbank claims.

Figure A



1: Includes all securities, shares and other equities.

2: Local currency claims of UK-owned banks' offices in these countries on local residents.

3: Total banking sector claims excluding claims on domestic monetary authorities and domestically-located banks.

There are signs that the adverse trend in US banks' credit quality identified in Section II is being mirrored in the quality of UK-owned banks' assets in the United States. UK banks' non-performing loans (as indicated by 14 or more days overdue) increased sharply in the first half of 2001, to the highest level since the series began in 1983⁷⁹ (Chart 189). UK banks' interim results for 2001 H1 revealed a mixed picture on this front, although in some cases non-performing US loans were up significantly and downgrades of US companies affected investment portfolios. To date, however, UK banks' losses remain modest.

UK-owned banks' exposures to EMEs fell slightly in Q2 (in common with BIS-area banks as a whole; see Section V), and they remain well down on their peak in 1997. However, 'risk-adjusted' exposures⁸⁰ to some countries have increased significantly, in particular to Argentina and to a lesser extent Brazil (Chart 190), which together account for 20 per cent of UK-owned banks' total exposures to EMEs. As Section V suggests, this reflects the continued weakness of Argentine public finances and market speculation about a potential default.

UK-owned banks' exposures to Hong Kong are exceeded only by those to the United States and Western Europe, reflecting the importance of local currency claims (Box 10). This indicates UK banks' involvement in the local economy, in particular the property market, as much as Hong Kong's role as an offshore financial centre. But despite the weakness of house prices and increased incidence of negative equity in the Hong Kong mortgage market, UK banks report that the asset quality of secured loan books, as measured by arrears and bad debt provisions, has generally remained satisfactory. In spite of strong competition, lending margins are said to have held up over the past six months.

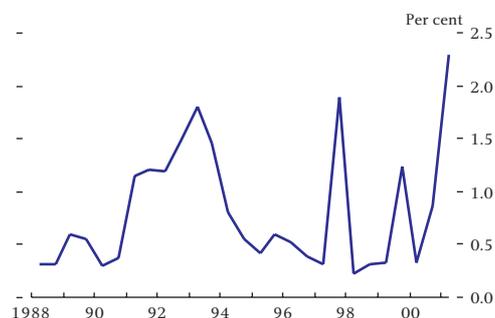
Domestic exposures

The domestic sectoral imbalances discussed in Section VII are reflected in UK banks' lending business. Whereas growth in corporate exposures has moderated (Chart 161, Section VII), growth in lending to households has increased (Chart 191). Section VII suggests that the risk on *retail exposures* has increased somewhat over the past six months, given the continued rise in households' capital gearing and the potential for shocks to household incomes or asset prices (especially house prices) if economic conditions were to deteriorate. In particular, consumer credit – on which the risk of default is generally regarded as greater than on secured debt – has continued to grow rapidly.

79: These data cover lending to banks and the public sector as well as private sector lending.

80: Calculated using the method described in Buckle et al (2000), 'A possible international ranking for UK financial stability', *Financial Stability Review*, June.

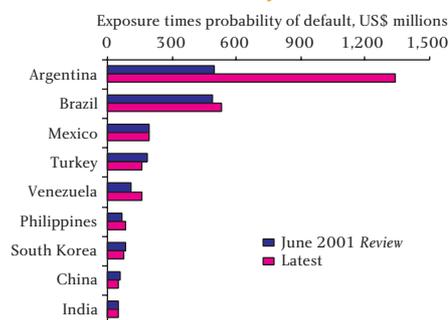
Chart 189:
UK-owned banks' US overdue loans^(a)



Source: Bank of England.

(a) Loans more than 14 days overdue as a proportion of all loans to the US.

Chart 190:
UK-owned banks' estimated expected default loss on EME exposures^{(a)(b)}

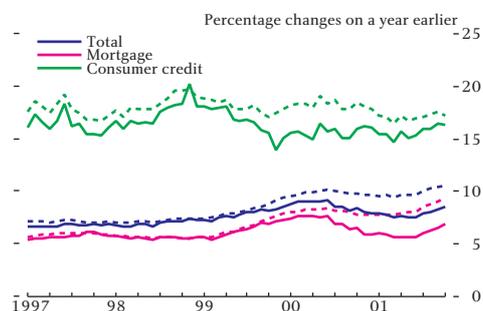


Sources: Bloomberg, Reuters, JP Morgan Chase & Co and Bank calculations.

(a) Expected loss rate proxied using simple yield spread model.

(b) Spreads for 'latest': 28 November 2001; for 'June 2001 Review': 12 June 2001.

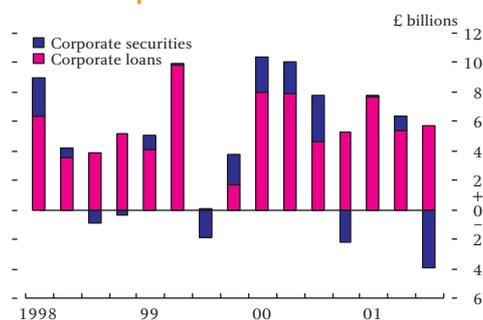
Chart 191:
Growth of lending to households^(a)



Source: Bank of England.

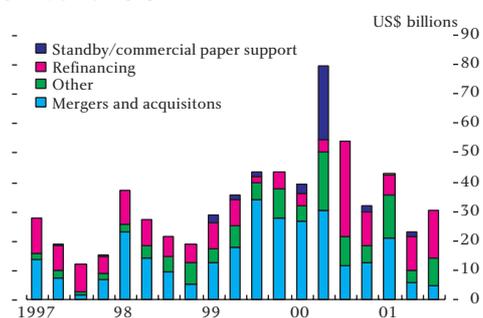
(a) Dashed lines indicate rates excluding the effect of securitisations.

Chart 192:
Bank and building society quarterly asset flows to corporates



Source: Bank of England.

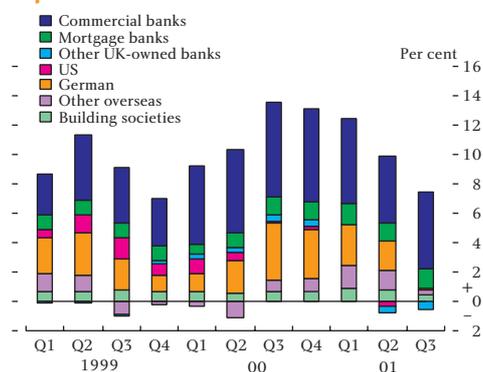
Chart 193:
Sterling syndicated loans to UK borrowers^(a)



Source: Dealogic.

(a) Where use of funds is specified.

Chart 194:
Contributions to growth of lending to corporates^(a)



Source: Bank of England.

(a) Annual growth.

Banks' and building societies' exposures grew at over 16 per cent in the year to October, a slightly higher annual rate than six months previously (Chart 191).

However, as noted above, household income gearing remains low. And although house prices could be vulnerable in some areas such as London (Section VII), lenders have some protection against losses on their mortgage portfolios given the general decline in first-time buyer loan-to-value (LTV) ratios since the mid-1990s. Similarly, increased penetration of mortgage payment protection policies since 1995 (Section VII) will also tend to reduce the risks to lenders should borrowers have difficulty servicing loans. On the other hand, whilst the risk of significant losses on banks' mortgage portfolios may be relatively small, it is possible that lenders are more exposed to any losses that do arise than was the case in the early 1990s housing market recession. Since then, lenders have increasingly chosen to self-insure higher-LTV lending (or rely on their own underwriting standards) rather than purchase mortgage indemnity insurance. The value of mortgage indemnity premia has fallen by over 80 per cent since 1994.

Contacts with the major UK banks suggest that the performance of both their mortgage and consumer loan portfolios has remained good so far. Although competition is an influence on margins, banks generally – though not universally – report that they are increasingly pricing to take account of risk, and remain confident of their ability, if necessary, to tighten lending criteria (for example by adjusting credit score cut-offs) ahead of any material deterioration in asset quality. Any unexpected downturn in market conditions might in itself automatically tend to reduce credit availability somewhat, since indicators of an associated deterioration in potential borrowers' financial position would adversely affect credit scores.

Risks to banks' *corporate portfolios* are currently more apparent. The slowdown in the headline growth of banks' exposures to companies in recent months has been due to a reduction in holdings of corporate securities rather than lower growth of advances (Chart 192) and may simply reflect changes in some banks' trading positions in these assets. But bankers do suggest that loan demand has weakened in the large (wholesale) corporate loan market, reflecting reduced capital spending and M&A activity (Chart 193); and spreads in this sector of the market have widened, in part reflecting conditions in the capital markets and also less intense competition from overseas banks. Certainly, overseas banks' UK operations, rather than the big UK-owned lenders, have largely accounted for the slowdown in the growth of the UK banking sector's corporate exposures over the past few months (Chart 194). In contrast to the wholesale loan markets, however, bank contacts report that lending in the

mid-corporate market, where competition for business is strong, remains relatively buoyant.

As emphasised elsewhere, risks vary considerably across business sectors given the pattern of shocks to the economy. Among the sectors highlighted in Section VII are manufacturing, TMT, and commercial property. Banks' lending to manufacturers – which accounts for a significant part of their corporate exposures (Chart 195) – has continued to contract, falling by 3.5 per cent in the year to Q3. But within manufacturing, lending to the electrical, medical and optical sub-sector – which includes suppliers of telecoms equipment, and which accounts for nearly £9 billion in loans outstanding – grew strongly, by over 35 per cent in the year to Q3. This rapid growth contrasts with a fall in total loan facilities available to the sub-sector over this period. Lending to the transport, storage and communications sector, which includes providers of telecoms services and accounts for £23 billion of loans, also grew strongly (by almost 15 per cent). The four clearing banks' participation in syndicated lending to the telecoms industry worldwide gave them initial exposure to nearly £30 billion of loans still outstanding in October, though they will have sold some of this down. Many firms still have heavy debt burdens and will face significant refinancing requirements over the coming year.

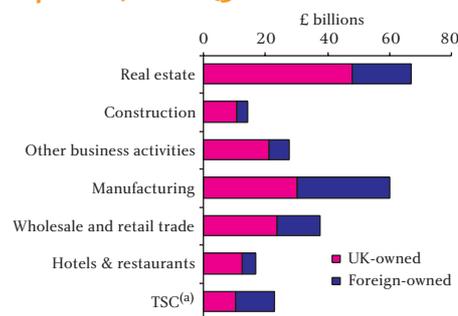
Chart 195 also shows the importance of lending to the property sector which, since being highlighted in the June *Review*, has continued to account for the largest part of growth in UK banks' corporate exposures over recent months (Chart 196). Lending to property companies by the major UK-owned banks remains strong, growing by around 30 per cent in the year to 2001 Q3; together with the German banks, they account for most of the growth in total bank lending to this sector (Chart 197). Commercial property now accounts for 7 per cent and 3.5 per cent respectively of the commercial and mortgage banks' UK loans. According to a recent survey carried out by De Montfort University⁸¹, the incidence of residual debt lending⁸² has increased, leaving lenders potentially more vulnerable to a sharp fall in capital values. However, the survey suggests that most lenders are managing this risk prudently. Market contacts and discussions at the Bank's Property Forum indicate a continued wariness about lending for speculative development, and a generally more cautious approach to lending since June.

The terrorist attacks of 11 September have generated additional concerns over those sectors most affected, including airlines (see Sections II and VII, and Box 1). UK banks have been

81: 'Residual debt lending', De Montfort University, September 2001.

82: Defined as either the proportion of the original loan left outstanding at the end of the loan period, or as the proportion of the loan outstanding at the end of a major occupational tenancy.

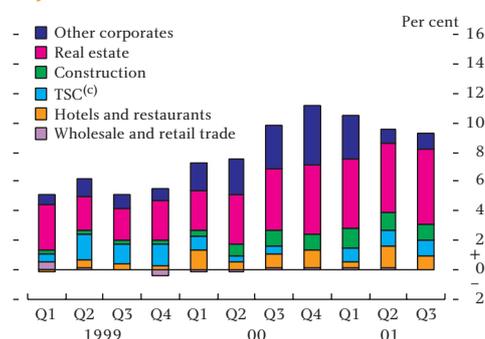
Chart 195:
UK-resident banks' stock of loans to corporates, 2001 Q3



Source: Bank of England.

(a) Transport, storage and communication. This includes the provision of telecoms services.

Chart 196:
Contributions to growth of bank loans to corporates^{(a)(b)}



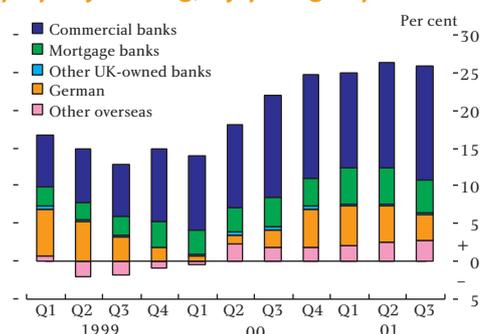
Source: Bank of England.

(a) UK-resident banks.

(b) Annual growth.

(c) Transport, storage and communication.

Chart 197:
Contributions to growth of commercial property lending, by peer group^(a)



Source: Bank of England.

(a) Annual growth.

involved in syndicated lending to the airline industry⁸³: of publicly announced loans still outstanding on 1 November, the six largest UK-owned banks originally committed \$9.1 billion, about 7.8 per cent of the total. This compares with their Tier 1 capital of around £80 billion. They may have sold down some of this or hedged it, for example through the credit derivatives market. Much of UK banks' business with the airline industry is in any case provided through leasing operations, and indications are that deals are structured with low residual debt risk and often associated with export-credit guarantees.

The terrorist attacks may also affect businesses dependent on tourism, in some cases reinforcing existing problems following the Foot and Mouth epidemic. At the end of September, banks had almost £17 billion of loans outstanding to the hotel and restaurant sector (Chart 195). These exposures grew strongly in the year to Q3, by over 15 per cent, up from 6 per cent in the year to Q1.

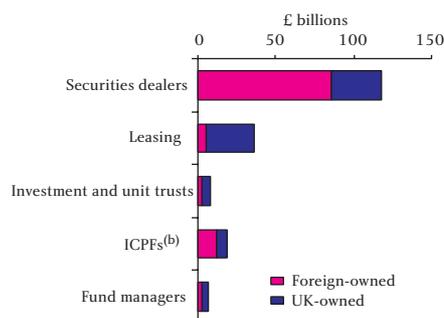
As measured by arrears and write-offs, corporate portfolios continue to perform well, although UK bankers have noticed some indications of impending problems (for example, turn-around referrals and downgrades) and expect these to be reflected in some deterioration in asset quality in the months ahead. They expect to respond in some cases by tightening terms and conditions, such as collateral requirements and covenants, while supporting customers whose business is fundamentally sound.

Market and counterparty risk

As measured by both trading book capital requirements and published VaR figures⁸⁴, the direct exposure to market risk of the major UK banks as a *group* is limited. Increased volatility may, nevertheless, give rise to increased counterparty exposures as the market value of off-balance-sheet contracts changes.

In addition, UK-owned banks have substantial on-balance-sheet exposures, both to other banks and to non-bank financial companies. The distribution of exposures to UK financial companies is shown in Chart 198. The major UK-owned banks' lending to this sector has accelerated since 2001 Q1, but this has been more than offset by a sharp decline in overseas banks' lending (Chart 199) so that total lending to the financial sector has slowed. Securities dealers have accounted for most of the decline (Chart 200), although this may to some extent reflect increased use of the London Clearing House's (LCH) Repoclear service (included in 'Other activities'), launched in August 1999, rather than a weakening in underlying business. (See Section IX on LCH.)

Chart 198:
UK-resident banks' loans to OFCs,
2001 Q3^(a)



Source: Bank of England.

(a) Loans include repo and acceptances, but not securities.

(b) Insurance companies and pension funds.

83: Figures are for airlines and airports.

84: See chart 166 (p.93) in the June *Review*.

Section VI discusses the repercussions of the events of 11 September on the insurance industry. UK-owned banks' on-balance-sheet exposures to insurers are relatively small – ignoring any secondary market transactions, their syndicated loans and facilities to the industry worldwide total about \$12 billion, or about 3.5 per cent of their syndicated loans to all borrowers. Chart 198 indicates that loans to *UK-resident* insurers also make up a relatively small share of banks' exposures to the financial sector. Bankers suggest that such exposures largely reflect short-term facilities drawn by insurers for liquidity purposes, typically to finance pay-outs ahead of receiving reinsurance income. Most lenders seem to be relaxed about their current exposures, although they expect lending to rise significantly over the next few months in the aftermath of 11 September and are mindful of the increased uncertainty concerning future insurance losses associated with terrorist attacks. Bankers have also noted that problems in the insurance industry may conceivably cause insurers to withdraw cover on some transactions, for example securitisations or residual finance on property deals. If this were to occur, certain transactions may not go through, or alternatively the banking sector itself may carry more risk.

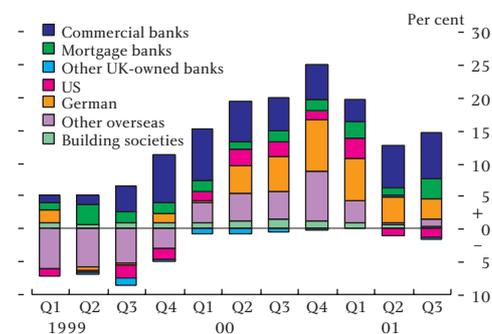
The UK insurance sector

The terrorist attacks on 11 September

The direct effects on the UK insurance industry of the attacks are difficult to determine in the short term. The bulk of the insured losses arising from the attacks fall on a relatively small group of insurers and reinsurers, of which the Lloyd's market is the main UK-based entity (Chart 119, Section VI). Lloyd's has estimated that its net loss will be £1.9 billion (US\$2.7 billion), a little over 15 per cent of its capacity. Royal Sun Alliance – the second largest UK exposure announced so far – has estimated that its net loss will be £200 million (US\$290 million). Net losses declared by a range of other UK insurance firms may bring the estimated total to £2.5 billion (about US\$3.5 billion)⁸⁵. Of course, many members of the London Market are part of international insurance and reinsurance groups, and many loss estimates have been made at group level, with the direct impact on the UK industry unclear.

Given that gross claims will be higher than the net position – Lloyd's has estimated its gross loss at £5.7 billion (US\$8 billion) – the strength of the reinsurance market matters. Following difficulties in the late 1980s and early 1990s, Lloyd's instituted mechanisms to help identify potential 'spirals' (where a complex chain of reinsurance contracts can disguise the fact that the underlying risks are concentrated in a small number of companies). These mechanisms include an automated

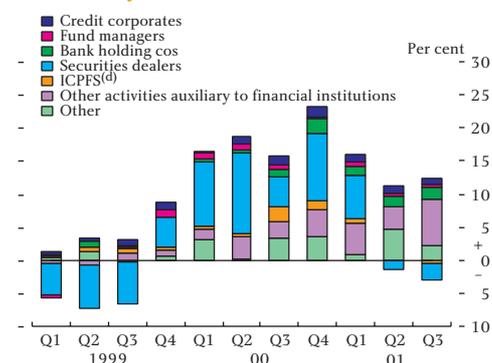
Chart 199:
Contributions to growth of lending to OFCs^(a)



Source: Bank of England.

(a) Annual growth.

Chart 200:
Contributions to growth of banks' lending to OFCs, by sub-sector^{(a)(b)(c)}



Source: Bank of England.

(a) Annual growth.

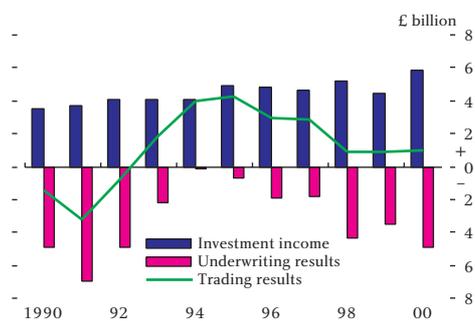
(b) UK-resident banks.

(c) Loans include repo and acceptances, but not securities.

(d) Insurance companies and pension funds.

⁸⁵: Losses published by insurers may include those relating to business conducted at Lloyd's, and so may also be counted within Lloyd's own estimated net loss figure.

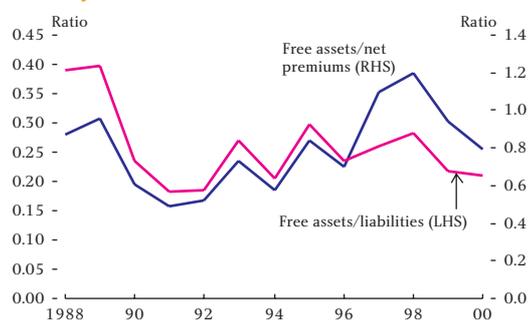
Chart 201:
General insurers' underwriting and net investment income^(a)



Source: ABI.

(a) UK-resident general insurers' worldwide business.

Chart 202:
Free-asset ratio for UK general insurance industry^{(a)(b)}

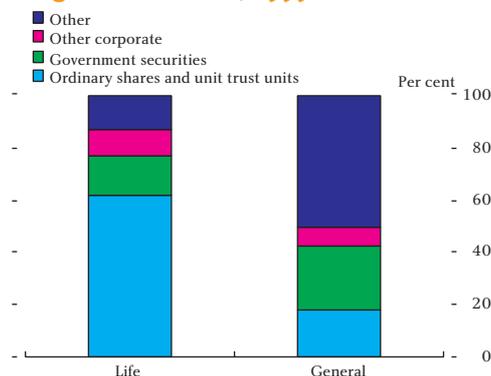


Sources: Standard & Poor's and Bank calculations.

(a) UK-resident general insurers.

(b) Annual data.

Chart 203:
Distribution of investments held by life and general insurers, 1999^(a)



Source: ONS Financial Statistics, November 2001.

(a) 'Other' includes short-term assets (such as cash and certificates of deposit), loans and mortgages, rents and other assets.

transactions-monitoring system, designed to allow Lloyd's to analyse where risks are held. As a result, there is less concern in the market of a spiral developing within Lloyd's. Some pressure has been put on liquidity generally, since collateral has to be provided under US regulatory rules to cover expected gross claims. The US authorities have allowed Lloyd's pledged assets to build up by the end of March 2002.

Events in the United States occurred after several years of increasing losses on UK general insurers' underwriting business (Chart 201)⁸⁶. But premiums are now expected to increase, on account of reduced capacity and increased demand, particularly for property and casualty insurance. As elsewhere, this is attracting capital into the UK industry (see Section VI). It might also encourage greater self-insurance.

The net effect on capital will be important for general insurers' financial strength. One key indicator, the free asset ratio⁸⁷, has been declining since 1998, whether measured in relation to net premiums or expected future liabilities (Chart 202). Capital increases might help to reverse that.

Life insurance developments

The sharp fall in equity markets that followed the attacks on 11 September had a significant effect on insurance companies, which hold around a fifth of total UK-quoted equity. But because of the different pattern of their investments, the impact was greater on UK life insurers than on general insurers. Life companies invested over 60 per cent of their £940 billion portfolio in equity markets in 1999, the latest year for which ONS data are available, compared with less than 20 per cent of general insurers' £100 billion (Chart 203). This is because some life insurance products include a substantial element of long-term saving, and are designed to compete with similar, equity-based savings products. But these figures refer to end-1999 data – since then many companies are thought to have reduced their proportion of assets held in equities.

The short-term fall in equity prices came on top of the decline in equities since the beginning of 2000, and led the FSA on 24 September temporarily to suspend part of the so-called resilience test⁸⁸. This followed other modifications and simplifications to the test set out in a letter to actuaries on 10 September. The resilience test requires life insurance companies to stress test their assets and liabilities against

86: Underwriting has traditionally been a loss-making activity, counterbalanced by profits on investment activities.

87: Free assets are here defined as assets net of a prudent estimate of expected future liabilities.

88: Between 24 September and 4 December, the FSA suspended the ongoing assumption of a 10 per cent fall in equity markets from the resilience test. Company actuaries were instead given discretion over the assumption used.

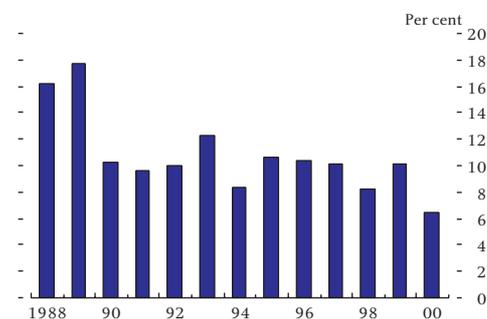
specific scenarios and investment conditions. A poor test result can lead to the addition of a 'resilience provision' to a company's on-balance-sheet liabilities. One unintended consequence is that, in an effort to reduce the effect of the test on liabilities, a life insurer might reduce its exposure to equities in the precise circumstances – rapidly declining asset values – most likely to risk destabilising equity markets. The changes of 10 September remain in force, but the FSA will be consulting on new methods of stress testing in 2002.

The decline in equity prices after 11 September was relatively short-lived: the fall since the beginning of the year has been more significant for life insurers. As the duration of life insurers' liabilities is often longer than that of their assets, and fixed-interest assets are not always held to match fixed-interest liabilities, the fall in long-maturity bond yields since the previous *Review* (by 60 basis points for 30-year gilts), combined with the fall in equity prices, may have caused companies' solvency ratios to decline.

The life insurance industry may face some longer-term challenges beyond those created by fluctuations in asset prices. Its free-asset ratio has been falling for several years, recently declining to about 6.5 per cent (Chart 204). Pressure on solvency margins has come from structural changes, such as improvements in mortality which adversely affect annuity business, and lower nominal interest rates than expected a few years ago. These have been exacerbated by a period of payouts to savers which assumed continued strong growth in the equity market and, *ex post*, had the effect of reducing companies' available capital. The cost of providing guaranteed-annuity options once expected interest rates fall and the need to make adequate provision for them has been demonstrated by the difficulties facing Equitable Life. The article by David Rule in this *Review* includes a discussion of guaranteed returns/annuity rates, and some strategies adopted by some European life insurers to manage the resulting risks.

There do not appear to be immediate issues for financial stability on account of the pressures on the UK general insurance sector arising from the events of 11 September, although the overall impact on the UK industry is currently unclear. The challenges facing life insurance companies relate less to the attacks on the US than to developments in asset prices.

Chart 204:
Free-asset ratio for UK life insurance industry^{(a)(b)}



Sources: Standard & Poor's and Bank calculations.

(a) UK-resident life insurers.

(b) Individual company ratios of net assets admitted for regulatory purposes (after deductions for reserves for liabilities and the required margin of solvency) to gross admissible assets. These company level ratios are then weighted by total assets to obtain the industry ratio.

IX Developments in the financial infrastructure

This section looks at the progress of some key initiatives designed to increase the resilience of the financial system by improving the soundness of the supporting infrastructure. Developments are organised below according to whether they are related primarily to global markets (in London, New York and elsewhere), emerging market economies, or the UK domestic financial system. Some additional developments are listed in Box 11.

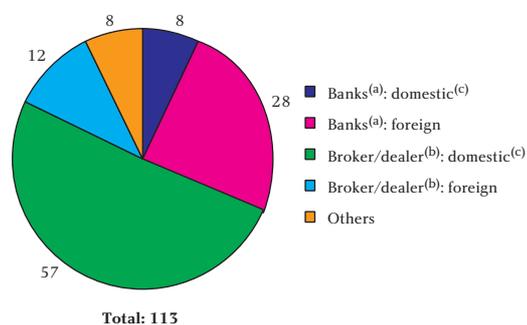
International financial system: global markets and systems

Central counterparty clearing

The June Review⁸⁹ described the importance of central counterparties (CCPs) in facilitating multilateral netting of exposures and of settlement obligations. In principle, the establishment of a CCP allows counterparty risk to be transferred to an entity that can benefit from economies of scale in monitoring and controlling it, while multilateral netting allows users to economise on risk capital. Consolidation of CCPs can offer further liquidity gains and reductions in demand for collateral, as well as in overheads. Partly for these reasons, the principal CCPs are growing in size and importance. For example, in the first eleven months of 2001, the London Clearing House (LCH) cleared LIFFE contracts with a notional value of over £90 trillion, against £61 trillion (itself a record) in the whole of 2000⁹⁰. Its RepoClear service cleared trades worth €15.8 trillion over the same period, compared with €2.8 trillion for 2000 and €367 billion for 1999. And, as at end-November 2001, LCH's SwapClear service had cleared, in total, nearly 22,000 trades (with a notional principal of over US\$1.25 trillion) – a growth of nearly 18,000 trades since March. (Chart 205 provides an overview of LCH's membership as at end-November 2001).

Recent additions to LCH's activities include the clearing, announced on 29 August 2001, of two Intercontinental Exchange (ICE) contracts from early 2002. ICE, the US-based over-the-counter (OTC) commodities exchange, merged in June 2001 with the International Petroleum Exchange, facilitating cross-margining between OTC and exchange-traded energy contracts through LCH. In the twelve months to October 2001, the total notional value of transactions traded on ICE (not simply those currently intended to clear through LCH) was over US\$400 billion.

Chart 205:
Clearing members of London Clearing House



Source: London Clearing House.

(a) Deposit-taking bank institutions.

(b) Includes broker/dealers wholly owned by banks.

(c) Includes firms/institutions registered in the United Kingdom though ultimately owned by a foreign registered parent.

89: *Financial Stability Review*, June 2001, p. 98. Also see Hills, B, Rule, D, Parkinson, S and Young, C (1999) 'Central counterparty clearing houses and financial stability', *Bank of England Financial Stability Review*, June.

90: Previous years: £50 trillion in 1999; £56 trillion in 1998; and £45 trillion in 1997.

The risk implications of expansion in a CCP's business will depend in part on whether expansion diversifies or concentrates its exposure to a counterparty default or adverse price movements. This in turn depends, *inter alia*, on the extent to which new business flows through existing clearing members, and on any correlations between prices in new and currently-cleared markets. The failure of a CCP would have severe effects on the markets it serves, and it is vital that each CCP is able to assess and control the impact of expansion on its risk profile. Regulators and central banks co-operate in assessing how effectively CCPs do this. In the United Kingdom, for example, the Bank of England and the Financial Services Authority (FSA) have worked together closely on the oversight of LCH, paying particular attention to its risk management.

CPSS/IOSCO recommendations for securities settlement systems

The design of the systems which support post-trade/settlement processes is a key determinant of the level of risk in underlying markets. Recommendations for the design and operation of securities settlement systems, developed by the Basel Committee on Payment and Settlement Systems (CPSS) and the International Organisation of Securities Commissions (IOSCO), were published on 13 November 2001⁹¹. The recommendations encompass the legal framework for securities settlement, risk management, access, governance, efficiency, transparency, and regulation and oversight. They are intended to promote the stability of the financial infrastructure by encouraging system operators and users, and their regulatory/oversight authorities, to address, in the design of such systems, a range of risk-related issues. Market participants and risk managers should take account of the recommendations when assessing counterparty and system risk.

ISDA Credit Support Protocol

On 1 August, the International Swaps and Derivatives Association (ISDA) made its 2001 Credit Support Protocol available on the internet⁹². It expands on previous ISDA protocols and reflects an effort among the ISDA membership to tighten the timeframes relating to collateral transfers and dispute resolution. As such, it should improve the clarity of the legal framework supporting these markets. The 2001 Protocol, which is open to both members and non-members of ISDA, offers institutions the ability to amend their credit support documentation for existing transactions multilaterally, without having to re-negotiate with each of their counterparties. Effective documentation should help limit legal risk. Institutions can subscribe to the protocol until 28 February 2002.

91: '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', Bank for International Settlements and International Organisation of Securities Commissions, November 2001 (www.bis.org and www.iosco.org).

92: www.isda.org/protocol/index.html.

Fair value accounting

A number of accounting standard-setting bodies have taken steps to extend the application of fair value accounting for financial instruments. In particular, International Accounting Standard (IAS) 39 – requiring many kinds of financial assets to be stated at fair value – became effective from 1 January 2001; a short-term project to improve IAS 39 was subsequently announced by the International Accounting Standards Board in July. Financial Reporting Standard 17⁹³, the new UK pensions standard, also contains a fair value element.

In the United States, the Emerging Issues Task Force (EITF) 99-20 accounting rule for investors in credit-sensitive asset-backed and mortgage-backed securities represents a move towards greater use of mark-to-market accounting in financial reporting. The rule, which became effective on 1 April 2001, requires companies to write down the value of retained interests from securitisations if they become impaired or deteriorate in quality. EITF 99-20 has caused banks and others to value securitised and other credit-sensitive assets (including collateralised debt obligations⁹⁴) more conservatively, which should help over time to improve the resilience of the banking system to credit shocks. Institutions may, however, also react to EITF 99-20 by selling securities if they become impaired (because a company recording an impairment in one quarter may have to take future charges if the securities continue to deteriorate). The impact of this on market dynamics remains to be seen. Debate on the soundness of fair value accounting more generally looks set to continue for some time.

US regulatory initiatives

US banking regulators have announced new capital regulation for securitisations, to take effect on 1 January 2002. The new rule is intended to ensure that, ordinarily, an originating bank maintains regulatory capital equal to the ‘face amount’ of any residual interests (subordinated assets that expose the holder to concentrated levels of credit and prepayment risk) retained on its balance sheet regardless of whether such amount exceeds the existing regulatory capital charge for the assets securitised. It also permits US banks, under certain conditions, to use their own internal ratings in allocating capital for direct credit substitutes (such as guarantees) extended to asset-backed commercial paper (CP) programmes.

Anticipating the new Basel Capital Accord, the rule is effectively the Basel Committee’s proposed treatment of securitisation under its standardised approach. The US regulatory agencies recognise that the manner in which institutions transfer or

93: See *Financial Stability Review*, June 2001, p. 102.

94: Also see Rule, D (2001) ‘The credit derivatives market: its development and possible implications for financial stability’, *Bank of England Financial Stability Review*, June.

retain risk via asset securitisation is evolving constantly, and intend to apply the rule to the substance, rather than the form, of a securitisation transaction. Regulatory capital will be assessed consistently based on the risks inherent in a position within a securitisation, regardless of any measures taken to obscure the position's actual risk.

Separately, from end-June 2001, US banks and bank holding companies began to report their direct exposures, as well as provision of liquidity facilities, to asset-backed CP 'conduits'. These financing vehicles typically issue CP in order to finance high-quality bonds and are often supported with capital and/or liquidity guarantees by a sponsoring bank. These supporting provisions, in addition to constraints on the investment manager, normally secure prime ratings from credit rating agencies for the issued CP.

One reason why banks have created CP conduits is to relocate assets from their balance sheet in order to finance those assets at yields lower than their own financing rate. A question that has arisen is whether banks are providing liquidity facilities to their own CP conduits which include some elements of credit protection, and for which banks are not setting aside a sufficient amount of capital. For that reason, enhanced monitoring of bank exposures to CP conduits is appropriate⁹⁵.

International financial system: International Monetary Fund (IMF) initiatives

A number of recent IMF-led developments are relevant to risks in global capital markets and especially to the increased participation of emerging market economies. Developments include the dissemination and adoption of internationally accepted standards and codes of good practice which should contribute to the resilience of the world financial system, not least by enabling market participants (and policy makers) to compare information on country practices against agreed benchmarks.

Reports on the Observance of Standards and Codes (ROSCs) and Financial Sector Assessment Programmes (FSAPs)

Since the June Review⁹⁶, there has been a significant rise in the number of ROSCs completed and published (Table 14). In addition, the IMF has started to publish quarterly reports on the Assessments of Standards and Codes⁹⁷ and at least one private sector group has set up a subscription-based internet database which collects, summarises and disseminates the results of assessments of countries' observance of standards and codes to

95: Also see Rule, D 'Risk transfer between banks, insurance companies and capital markets: an overview' in this Review.

96: *Financial Stability Review*, June 2001, pp. 95–96.

97: See www.imf.org/external/pubs/ft/stand/q/2001/eng/o62901.htm.

Table 14:
ROSCs and FSAPs as at
30 September 2001

ROSCs completed (no. of countries)	169 ^(a) (57)
ROSCs published (no. of countries)	109 ^(b) (36)
FSAPs completed	22
FSAPs in pipeline	40
FSSAs ^(c) published	5

Source: IMF.

(a) Up from 116 at end-May.

(b) Up from 85 at end-May.

(c) Financial System Stability Assessments provide an integrated assessment of the strengths and vulnerabilities of countries' financial sectors derived from the FSAP process.

market participants⁹⁸. The momentum of the FSAP process is also increasing (Table 14); preparations are under way for assessment of the United Kingdom in 2002.

Financial soundness indicators

As a complement to both the FSAP process and its work on assessing countries' external vulnerability, the IMF has developed a set of financial soundness indicators (FSIs – previously referred to as macroprudential indicators). In June 2001, the IMF's Executive Board endorsed a 'core' and an 'encouraged' set of FSIs. The core set focus on the banking sector, while the encouraged set also includes indicators for the corporate, household and real estate sectors⁹⁹. The IMF will support compilation efforts by national authorities and is encouraging countries to publish the indicators on a regular basis.

Special Data Dissemination Standard (SDDS)

By end-September 2001, the number of subscribing countries had increased to 49. All publish detailed information on international reserves and foreign currency liquidity on a monthly basis with a maximum lag of one month. A number of bond prospectuses – including issues by Argentina, Germany, Indonesia, Malaysia and the Philippines – now note that the issuer subscribes to the SDDS.

Information about subscribers' data dissemination practices is posted on the Dissemination Standards Bulletin Board¹⁰⁰ and subscribers are required to maintain an internet website, referred to as a national summary data page, which contains the actual data and to which the bulletin board is electronically linked. Subscribers also undertake to pursue good practice on the integrity and quality of the data and, in July 2001, the IMF's Executive Board endorsed a Data Quality Assessment Framework¹⁰¹ addressing the quality of data in addition to its frequency, timeliness and coverage.

Reserve management guidelines

In the context of encouraging countries to monitor and manage the currency composition and maturity of external liabilities and assets, the IMF agreed (in September 2001) a set of basic principles¹⁰² for countries to draw upon in formulating sound reserve management policies and practices. These complement the public debt management guidelines issued in March¹⁰³; taken together, they represent an important initiative, given the

98: See www.estandardsforum.com.

99: See www.imf.org/external/np/mae/fsi/2001/eng/pp.htm.

100: See dsbb.imf.org.

101: See www.imf.org/external/np/sta/dsbb/2001/supp.htm.

102: See www.imf.org/external/np/mae/ferm/eng/index.htm.

103: See *Financial Stability Review*, June 2001, p. 96.

problems in this area revealed by the 1997/8 emerging market crisis. The reserve management guidelines note the importance of careful co-ordination between reserve management, the monetary authorities and, where relevant, external debt managers. The focus is on prudent risk management, transparency and accountability. It is envisaged that the guidelines will serve as a framework for technical assistance, and as a background for discussion in the context of Fund surveillance.

Guidelines on investor relations programmes

For some time, a number of investors and their representative bodies (eg, the Institute of International Finance), as well as officials, have suggested that, for countries dependent on private capital flows, establishing a regular dialogue between a country's authorities and major market participants could contribute to the stability of international financial flows and even help to prevent crises. A working group of the IMF's Capital Markets Consultative Group has now produced guidelines to encourage the development of such programmes¹⁰⁴. These are designed to improve information flow between debtors and creditors in order to promote transparency and reduce the incidence of information shocks to both sides of the market. IMF staff will work with members to establish or strengthen programmes, using these guidelines, and will report on progress in Article IV consultations.

United Kingdom and sterling markets

Overnight sterling deposit facility

On 27 June 2001, the Bank of England introduced an overnight deposit facility, available to counterparties in its daily sterling open market operations (OMOs). The new facility supplements the Bank's OMOs and complements the existing facility under which the Bank already lends overnight. It thus puts end-of-day operations on a symmetrical basis. The purpose of the facility is to moderate overnight interest rate volatility. This will aid banks' liquidity management in normal market conditions. In addition, the new facility enhances the means available to the Bank to intermediate between firms with liquidity shortages and surpluses in rare circumstances where market mechanisms are impaired (eg, because of infrastructure or confidence problems).

Oversight of payment systems

The Bank of England's monitoring of conditions in core money and credit markets is complemented by its oversight of payment and related systems, which has become an important aspect of its financial stability-related activities¹⁰⁵. This reflects rising turnover in payment systems, increasing concentration of high-value

¹⁰⁴: See www.imf.org/external/np/cm/cg/2001/eng/061501.htm.

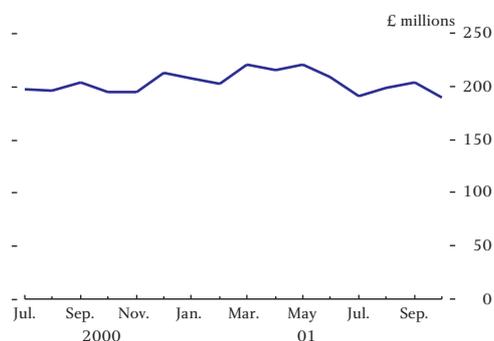
¹⁰⁵: In November 2000, the Bank of England issued a paper on its oversight of payment systems which is reproduced in the December 2000 *Review*.

payments, and the emergence of new systems and payment instruments. The Bank's oversight focuses on key design and operational issues such as how effectively a system's architecture and rules minimise the disruptive effects of a member's default, whether the system's rules are clear, comprehensive and enforceable, and whether operational risk controls are adequate. Work in the clearing companies is proceeding on this front. Recently, there have been a number of structural developments in the payments and settlements area relevant to system risk.

Removal of intraday settlement bank exposures in CREST

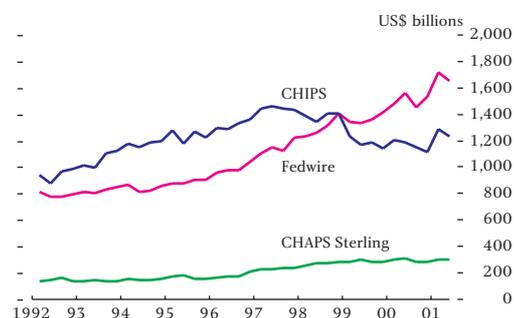
A key oversight concern is to identify and, ideally, eliminate credit exposures arising as an incidental by-product of the payments mechanism. In 1996, this risk was resolved in the high-value CHAPS system via the introduction of Real-Time Gross Settlement (RTGS). An equivalent step was completed on 26 November 2001 – in the CREST gilt and equity settlement system – with the introduction of real-time settlement between CREST settlement banks across accounts at the Bank of England (frequently, but inaccurately, referred to as the introduction of Delivery versus Payment (DvP) in CREST). This replaced end-of-day settlement of interbank obligations on a multilateral net basis, eliminating the huge intraday exposures between settlement banks which, if they had ever crystallised, could have destabilised the UK financial system. Chart 206 illustrates the average daily sums settling through CREST, and provides some indication of the values which were potentially at risk. (Legal and technical work is under way to allow the integration into CREST of money market instruments, such as Treasury bills, bank bills and certificates of deposit – to which real-time settlement between CREST settlement banks across accounts at the Bank could then be extended.)

Chart 206:
CREST average daily cash totals



Source: CRESTCo.

Chart 207:
CHIPS, Fedwire and CHAPS Sterling transactions^(a)



Sources: New York Clearing House, Board of Governors of the Federal Reserve System and APACS.

(a) Quarterly, average daily value.

As part of the new system, settlement banks need access to sufficient liquidity to finance their customers' transactions during the day and, therefore, will need to manage their liquidity carefully.

NewCHAPS

On 27 August 2001, the Bank of England and the CHAPS Clearing Company completed a project to upgrade the UK RTGS payment systems, CHAPS Sterling (Chart 207) and CHAPS Euro. NewCHAPS Euro commenced live operations on 27 August 2001, with NewCHAPS Sterling being switched on the following day (after the UK bank holiday). The upgrade includes a rationalisation of the technical platform for CHAPS Sterling members, and the establishment of a central scheduling facility at the Bank, providing a longer-term opportunity for more efficient use of liquidity, which has the potential to reduce liquidity risk significantly, including the risk of gridlock. One benefit of the migration to the single platform was simplification of the development work for 'DvP', discussed above.

The CHAPS systems' designation in May 2000 under the Settlement Finality Directive (SFD) – by the Bank in its capacity as the designating authority for UK payment systems – has been reviewed in the context of these changes and is unaffected.

CREST designation under the SFD

On 17 August 2001, the FSA designated CREST for the purposes of the SFD, following consultation with the Bank of England about the embedded payment system. (The designation was subsequently amended on 26 November in connection with the introduction of 'DvP', to encompass the necessary rule changes.) One key objective is to improve stability in the event of a CREST member default, by providing clear protection for default rules from the insolvency laws applying to EU members. Designation therefore reinforces the protection provided by Part VII of the Companies Act 1989 in the event of a participant's insolvency.

Changes to pension fund/insurance company regulation

Two developments relevant to the soundness of the pensions and insurance sectors are noteworthy: continued reform of the Minimum Funding Requirement (MFR), discussed below; and a set of changes to the resilience test applied to insurance companies, discussed in Section VIII. Both the MFR and the resilience test are, arguably, examples of protective measures which had unintended and unwanted side-effects on market efficiency and, potentially, stability. For the same reasons, the behavioural effect of the changes needs careful monitoring. In principle, however, both developments should improve asset allocation and risk management in these sectors.

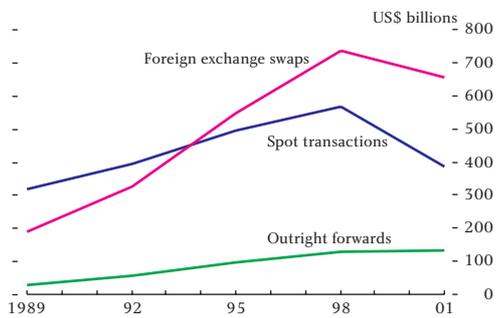
Reform of the MFR

The MFR took effect in 1997 to provide protection for pensioners in defined-benefit schemes by setting a benchmark for the acceptable valuation of a scheme's assets in relation to its liabilities. But it has been criticised for inducing pension funds to weight their portfolios more towards lower-risk assets than might be warranted by longer-term considerations, given the time horizon of pension funds' obligations. Critics argue that this has reduced the efficiency of the pension fund industry in meeting long-term liabilities, and adversely affected gilt market liquidity, which is a key medium for risk management by financial intermediaries.

The June *Review* reported the Government's intention, announced in March 2001, to abolish the MFR. Plans to replace it with a long-term scheme-specific funding standard have been broadly welcomed. On 18 September 2001, the Government published draft regulations aimed at: extending the deficit correction periods in which underfunded schemes must reach 90 per cent and 100 per cent of the MFR funding level; removing the requirement for annual certifications of schemes that are fully funded; and introducing stricter conditions on voluntary

Chart 208:

Global foreign exchange market turnover^{(a)(b)}



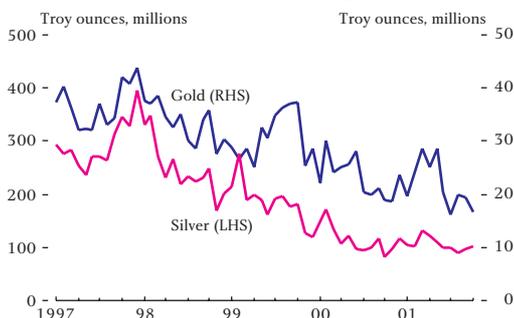
Source: BIS Triennial Survey.

(a) Average daily value in April, every three years.

(b) Adjusted for local and cross-border double-counting.

Chart 209:

London bullion market clearing turnover^{(a)(b)}



Source: London Bullion Market Association.

(a) Monthly, average daily number of troy ounces transferred.

(b) Turnover value for October 2001: gold US\$4.7 billion; silver US\$0.45 billion.

wind-up. The Government hopes to implement the new rules by spring 2002. Proponents argue that, by allowing funds longer to make good any deficit and by removing the requirement for annual re-certification, funds' concerns about the potential volatility induced by the MFR may diminish.

Building societies permitted to use credit derivatives for risk mitigation

Since 1 July 2001, building societies have been able to use credit derivatives for risk mitigation. The FSA's existing policy on credit derivatives will apply and, initially, use of credit derivatives is restricted to societies with adequate financial risk management capabilities (as assessed by the FSA). This measure puts the larger societies on a more level playing field with banks' access to risk mitigation techniques.

Non-Investment Products Code

A new 'Non-Investment Products' (NIPs) Code was published on 31 August 2001 and became operational from 1 December¹⁰⁶ – following the implementation of the Financial Services and Markets Act (FSMA) 2000. The NIPs Code relates to the trading of instruments that do not qualify as 'investments' under the FSMA and succeeds the London Code of Conduct as it related to such instruments in the sterling and foreign currency wholesale deposit markets, spot and forward foreign exchange markets (Chart 208) and bullion spot and forward markets (Chart 209). A new Inter-Professionals Code covers products that are 'investments' under the FSMA.

The NIPs Code, which was prepared by a group of market practitioners, provides guidance on what constitutes good practice in those markets. It contains a set of general principles that practitioners have agreed are helpful in avoiding confusion and in maintaining the necessary trust in the market. As such, it should help to underpin the stability of these markets. It has no statutory basis (except where it refers to existing legal agreements), and neither the Bank nor the FSA has a role in its enforcement.

¹⁰⁶: The Bank played a role in facilitating the production of the Code, which is available at www.bankofengland.co.uk/markets/nips.htm.

Box 11: Other developments in the financial infrastructure

Initiative	Progress	Stability significance
EU draft Prospectus Directive	Proposed 30 May 2001. Aims to facilitate pan-European capital raising. However, there are widespread concerns about the current drafting.	More efficient capital markets are, <i>prima facie</i> , more stable/efficient.
New Basel Capital Accord: operational risk	Revised timetable issued 25 June 2001. The draft Accord (now expected to be finalised during 2002 for implementation in 2005) proposes, <i>inter alia</i> , an explicit regulatory capital charge for operational risk.	Focuses attention on identification, measurement and control of operational risk. Intended to ensure appropriate capital charge is applied.
Designation under the Settlement Finality Directive	European Commission list of designated systems updated 11 July 2001. Austria's securities settlement system, Denmark's three payment systems and two securities settlement systems, and France's, Italy's and Norway's high-value payment systems and major securities settlement systems have been added to the list since December 2000 (in addition to CREST).	Promotes stability in the event of the default of a system member, by providing clear protection for default rules from the insolvency laws applying to EU members.
Assessments of offshore financial centres (OFCs)	First assessment published July 2001. The IMF has extended financial sector work to include OFCs through a voluntary programme of assessments and technical assistance.	Induces strengthened financial supervision of OFCs, whose linkages with other financial centres create the potential for their activities to affect financial stability elsewhere ¹ .
Proposed UK competition regime for payment systems	Published 3 August 2001. The Government's 'Response to Consultation' proposes new powers for the Office of Fair Trading (OFT) to deal with competition issues in payment systems.	The OFT, <i>inter alia</i> , to have regard to financial stability and to consult the Bank of England on decisions that could affect the smooth running of payment systems or impede financial stability.
Continuous Linked Settlement Bank	Revised timetable issued September 2001. The initiative to reduce settlement risk in the foreign exchange markets, through 'payment versus payment', is now expected to go live in 2002 Q2 following delays.	Elimination of principal ('Herstatt') risk between counterparties for eligible foreign exchange transactions.
Planned Euronext takeover of LIFFE	Announced 29 October 2001. LIFFE has recommended Euronext as its preferred bidder for the exchange. It is intended that Euronext will eventually allow users a choice of clearing house.	Implications for clearing by LCH and Clearnet; potential cross-border legal risks.
RTGSplus	Launched 5 November 2001. Germany's new high-value euro payment system incorporates both RTGS and liquidity-saving payment streams.	Intended to improve efficiency of liquidity management and so potentially reduce liquidity risk ² .
Electronic Transfer of Title (ETT) for deliveries through CREST	Effective 26 November 2001. The 1995 Uncertificated Securities Regulations have been re-enacted with modifications introducing ETT – thus removing the short lag between settlement through CREST and registration on the issuer's register.	Conveys immediate full legal title to securities (gilts and equities).

1: See Dixon, L (2001) 'Financial flows via offshore financial centres', *Bank of England Financial Stability Review*, June.

2: See McAndrews, J and Trundle, J 'New payment system designs: causes and consequences' in this *Review*.

Banks and systemic risk: conference summary

Glenn Hoggarth, Financial Industry and Regulation Division, Bank of England

Last spring the Bank of England hosted a conference on Banks and Systemic Risk. Over the past decade a number of countries – both developed and emerging-market – have faced banking crises. The conference covered the theory and evidence of the relationship between banks and systemic risk and the actions by the authorities and financial markets that might mitigate against such risk. Speakers and participants included a wide range of international academics, practitioners and policy makers.

ON 23–25 MAY 2001 the Bank of England hosted a conference on Banks and Systemic Risk, organised in co-operation with the UK Financial Services Authority, the Board of Governors of the Federal Reserve System, the Federal Reserve Bank of New York and the United States Office of the Comptroller of the Currency.

The conference covered three broad topics – the theory and evidence on the relationship between banks and systemic risk, capital requirements and crisis prevention, and market discipline and signals of bank fragility.

Banks and systemic risk: theory and evidence

The first issue was what costs, in theory and in practice, banking crises impose on the economy as a whole.

Viral Acharya ('A theory of systemic risk and design of prudential bank regulation') focused on the need to examine the efficacy of bank regulation in a theoretical framework that formalised the objective of minimising systemic as well as individual failure risk. His model reflected the hypothesis that banks may believe they are more likely to be bailed out if they fail at the same time as other banks, rather than singly, and may therefore choose to take risks correlated with those of other banks, thereby increasing the risks for the system as a whole. His model suggests that supervision focused only on *individual* banks may miss the threat of systemic risk arising from a high correlation in bank exposures.

A paper by Glenn Hoggarth, Ricardo Reis and Victoria Saporta ('Costs of banking system instability: some empirical evidence') reviewed empirical estimates of fiscal costs incurred in resolving banking crises, and also produced estimates of output losses during 47 crises in 37 countries. They found that the cumulative decline in output (relative to trend) during banking crises is, on average, indeed large – amounting to around 15–20 per cent of annual GDP. On some measures the falls in output were larger in developed countries than in emerging markets¹. This is surprising because one of the factors that might affect the overall cost is the extent and sophistication of financial markets and their ability to act as substitutes for bank finance. Indeed, a paper by Steven Ongena, David Smith and Dag Michalsen ('Firms and their distressed banks: lessons from the Norwegian banking crisis (1988–91)') suggested that the costs of the Norwegian banking crisis ten years ago were relatively low because large companies were able to switch from bank loan to equity finance.

Potential systemic risks in the financial system vary not only across countries but also through time as the external environment faced by banks changes and banking activities evolve. One of the marked trends in banking in recent years has been that of consolidation – across financial sectors and countries as well as amongst domestic banks. A paper by Gianni De Nicolò and Myron Kwast ('Systemic risk and financial consolidation: are they related?') investigated the link between consolidation of the

1: For a survey of recent empirical studies on the costs of banking crises see the article by Glenn Hoggarth and Victoria Saporta in the previous *Financial Stability Review* (June 2001).

banking sector and systemic risk. They found that the correlation in equity returns across large banks in the United States rose during the 1990s. This, they suggest, implies an increase in bank interdependencies and thus potentially systemic risk, and also that at least part of the increase was attributable to an intensification of merger activity.

Capital requirements and crisis prevention

Given that a key goal of central banks and regulatory agencies is to avoid instability in the banking sector, the amount of capital held by banks, together with their profitability, is an important cushion in the face of adverse shocks. Since the introduction of the 1988 Basel Accord, internationally agreed minimum capital requirements have played a central role in the regulation of banks. The requirements were originally designed for internationally active banks in the G10, but have since been adopted in over 100 countries worldwide. One concern, however, has been whether a by-product of minimum capital requirements might be a reduction in lending in some circumstances. Maria Chiuri, Giovanni Ferri and Giovanni Majnoni ('The macroeconomic impact of bank capital requirements in emerging economies: past evidence to assess the future') evaluated the impact of the Basel standard on the deposit and lending activity of banks in emerging market economies. They found that the introduction of minimum capital requirements reduced the supply of loans over a number of years, particularly by weakly capitalised banks. The adverse effect on lending was somewhat smaller for foreign-owned banks.

The current Basel Accord is being substantially revised with the aim of introducing a regime that more closely reflects the actual riskiness of different loans². Several papers focused on issues for policy makers in setting the requirements and whether the proposals do, in fact, reflect the riskiness of different portions of a bank's loan book. Ed Altman and Anthony Saunders ('Credit ratings and the BIS reform agenda') looked at the so-called 'standardised approach' based on external ratings and also the internal ratings-based (IRB) approach, using banks' own credit ratings, which is much more finely tuned. They used simulated portfolios and data on default rates and losses given default, drawn from the bond market in the United States, to analyse the

appropriateness of the proposed risk weights. They questioned the size of the relative risk weights on the standardised approach, particularly at the lower end of the credit quality spectrum.

Mark Carey ('A policy maker's guide to choosing absolute capital requirements under an IRB approach') gave an overview of the choices that policy makers faced in determining the *level* of risk-based capital requirements for corporate loans. The contentious issues were, he suggested, the failure rate that the authorities will tolerate, the severity of the economic downturn against which capital should provide protection, and the time horizon over which potential losses should be calculated. Using a model based on losses from bond defaults, he found that a 10 per cent capital requirement for loans is consistent with an average failure rate of one bank in 200 (0.5 per cent) during a recession of the scale experienced in the United States in 1989–91.

The Basel Committee has decided that the final calibration will be set to deliver on average the same amount of minimum capital across the G10 as the current Accord. Patricia Jackson, William Perraudin and Victoria Saporta ('Regulatory and 'economic' solvency standards for internationally active banks') found, using a credit risk model based on losses from downgrades as well as defaults, that the current (1988) Accord delivers solvency standards of around 99.9 per cent and 99 per cent respectively for banks with a high and lower credit quality (the difference was between a portfolio with an average weighted rating around BBB and one with an average rating around BB). Using banks' own Tier 1 ratios and credit ratings, it is possible to show that these regulatory minima are unlikely to be a binding constraint. Banks are targeting higher solvency standards, probably because of concerns about access to core capital and credit markets. At the same time, this raised the question of whether the authorities should set a higher minimum capital level for large banks because of their importance for the overall functioning of the financial system.

In some countries, particularly in Europe, banking business is increasingly combined with non-bank activities, such as insurance. In the light of this development, one issue facing (bank and non-bank)

2: See Basel Committee on Banking Supervision (2001) 'Proposals for a new Basel Capital Accord', January, and 'Update on the new Basel Capital Accord', June, Bank for International Settlements (BIS).

regulators is how capital requirements should be set for the combined group. Ben Gully, William Perraudin and Victoria Saporta ('Risk and economic capital for combined banking and insurance activities') put forward one way of developing a common approach to measuring risk for general insurance and banking business. They found that in many cases the combination of two types of activities would reduce overall risk.

Paul Kupiec and David Nickerson ('Assessing systemic risk exposure under alternative approaches for capital adequacy') suggested that the traditional approach of comparing the risks of non-banks with those of banks – by assessing their capital adequacy using existing risk measurement techniques – may be inappropriate, as the appropriate level of capital should also depend on the characteristics of the liabilities being protected. But they cautioned against using regulatory capital requirements alone to reduce systemic risk, recommending that an improvement in the transparency of financial institutions is also necessary.

Market discipline and signals of bank fragility

Although the authorities are working to fine-tune the regulation of banks, there is, indeed, a growing view that enhancing market discipline should be an important element in the financial stability armoury.

Andrew Crockett, in a keynote speech ('Market discipline and financial stability'), argued that there are four prerequisites for market discipline on banks to be effective – the market must have sufficient information, the ability to process it, the right incentives to process it, and the mechanisms to enable it to exercise effective discipline. He noted that questions could be raised about the current situation in relation to each of these prerequisites, posing important policy challenges for the authorities³.

There is, therefore, considerable interest in how successful the market is at assessing bank risk and whether market indicators do, in fact, reflect relative riskiness. Several papers addressed these issues. Paola Bongini, Luc Laeven and Giovanni Majnoni ('How good is the market at assessing bank fragility? A horse race between different indicators') compared

the forecasting ability of traditional early warning indicators of bank fragility (CAMEL type balance sheet measures) with market indicators (default probabilities estimated from equity data using a Merton model and credit ratings)⁴. The indicator models were compared for banks active in the south-east Asian countries during the recent crisis. They concluded that during that episode information based on stock prices or on judgmental assessments of credit rating agencies did not outperform backward-looking information contained in balance sheet data.

For developed economies there was more positive evidence on the ability of the market to assess riskiness. Using data from the United States, John Krainer and Jose A Lopez ('Incorporating equity market information into supervisory monitoring models') found that equity market variables could predict downgrades in supervisory ratings. And Doug Evanoff and Larry Wall ('Measures of the riskiness of banking organisations: subordinated debt yields, risk-based capital and exam results') found that subordinated debt spreads were better than reported capital ratios at predicting banking problems. Andrea Sironi ('Testing for market discipline in the European banking industry: evidence from subordinated debt issues') considered the information content of subordinated debt spreads for European banks. He examined new debt issues to assess whether investors were discriminating amongst banks according to credit quality, and used credit ratings and published accounting data as a measure of bank riskiness. His results supported the hypothesis that holders of subordinated debt rationally discriminate between the risk profiles of private sector banks. He also found evidence that the risk sensitivity of spreads increased during the 1990s, perhaps reflecting a reduction in the perceived public sector safety net.

Steve Swidler and James Wilcox ('Information about bank risk from option prices') looked at how a particular market indicator (the expected volatility of a bank's share price implied by the prices of options on the shares) varies with other market indicators – changes in the share price and subordinated debt yields. They concluded that the implied volatilities do contain additional information.

3: This speech was reproduced in the previous *Financial Stability Review* (June 2001).

4: CAMEL stands for capital, asset quality, management, earnings and liquidity.

So there seem to be different views over which particular market data are most useful in assessing bank risk. That said, for developed economies at least, there is evidence that market data of one type or another do provide information over and above balance sheet data on bank risk.

Most of the conference papers are available from the Bank's website⁵ and will be reproduced in a forthcoming special edition of the *Journal of Banking and Finance*.

5: www.bankofengland.co.uk/financialstability/conferencemayo1.html

New payment system designs: causes and consequences

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Payment system design is changing. This article discusses these changes, the pros and cons of different designs and issues raised by the evolution of a variety of so-called ‘hybrid’ systems. It suggests that there are many common elements in these developments and that outcomes combining lower settlement risk with lower liquidity costs may be possible. But in the end some trade-off may still need to be made between different objectives.

Over the past decade the most popular design for high-value payment systems has changed, reflecting market needs and the concerns of central banks for systemic stability. Before 1990 most systems were designed on a deferred net settlement (DNS) basis but since then almost all major countries have moved to Real-Time Gross Settlement (RTGS) systems for high-value payments. They are now used widely around the world. More recently, however, hybrid systems, which seek to be liquidity-efficient, have been introduced in a small number of developed countries. This reflects attempts to achieve combinations of safety and efficiency that are acceptable both to central banks and to system participants.

This article reviews the main elements of system design and discusses the causes and consequences of the evolution of hybrid systems. It discusses in particular the importance of the status of queued payment messages in hybrid systems and the potential value of queues in offering a signalling mechanism of banks’ willingness to pay each other. This can provide incentives for banks to submit payments promptly. The article also draws attention to the different incentives to monitor credit-worthiness in different systems. It suggests that participants’ preferred choice of system will depend particularly on:

- the ease and cost of obtaining intraday credit
- the number and size of participants in the system

- the variability of daily payment flows
- the direct costs of participation.

Central banks will continue to focus on whether proposed designs ensure that risks are controlled effectively.

Deferred net settlement systems

In a DNS system, participant banks send each other payment messages during the day and settle the net amounts due at a subsequent specified time, typically at the end of the day. The settlement may occur on a bilateral net basis where each bank pays, or is paid by, each other bank. Alternatively settlement may be on a multilateral net basis where those in overall debit to all other participants pay the net amount due to a settlement agent and the settlement agent pays the banks which, overall, are in net credit. The settlement agent itself needs to be financially and operationally robust as it plays a pivotal role in the system. Often the settlement agent is the central bank. These systems are economical on liquidity use but involve the participant banks implicitly granting each other credit during the day. Should the sending bank fail after transmitting a payment order but before settlement is final, the receiving bank would not receive the funds it expected at the end of day. A failure to settle by one bank in a DNS system could have repercussions on the other banks’ ability to settle, potentially compounding the adverse effects of the first settlement failure.

¹: The authors are very grateful to Erin Campbell, Market Infrastructure Division, who is the author of the annex and who commented on and contributed significantly to the main article. The views expressed are those of the authors and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System.

Most systems, in G10 countries and elsewhere, were DNS systems until the 1980s. Typically they had few or no risk controls to limit the exposures that could occur during the day. As the values of flows through these systems increased, and as awareness spread of the potential consequences of a default by a participant, central banks called for the tightening of risk controls. The current high levels of turnover in G10 payment systems relative to GDP is shown in Table 1. The Bank of England and the Federal Reserve, among others, drew attention to these risks in the 1980s, and, in 1990, the Lamfalussy Report set out standards for the operation of cross-border interbank netting systems².

Table 1:
Large value payment systems in relation to GDP (1999)

Country	System	Annual payments turnover/GDP
Belgium	ELLIPS	83
Canada	LVTS	23
France	TBF and PNS	56
Germany	EAF and ELS	31
Italy	BI-REL	28
Japan	BOJ-NET	70
Netherlands	TOP	42
Sweden	K-RIX	51
Switzerland	SIC	111
United Kingdom	CHAPS Sterling and Euro	75
United States	CHIPS and Fedwire	69

Source: BIS and IFS.

Although the Lamfalussy Report was aimed specifically at cross-border systems, in practice it was applied also to domestic systems. It made six recommendations for DNS systems, including a requirement that the system should be able to withstand the failure of the largest net debtor. A protected system could settle in the event of a participant's failure to pay, for example because it held sufficient cash or other suitable collateral provided by the participants. Non-cash collateral would need to be capable of being liquidated quickly so as to obtain funds to complete the settlement. These minimum standards were very influential and have been adopted widely in developed countries. It remains the case, however, that the majority of payment systems around the world are 'unprotected' DNS systems. This is the case in developed countries for many retail systems but is also true of many

emerging markets where there is no separate high-value system³. As the values going through such systems grow, and as more firms join foreign systems, the weaknesses become an increasing source of concern. Moreover even protected DNS systems complying with the Lamfalussy standards do not avoid all settlement risk. Losses may be shared amongst survivors only up to a limit and the system may still be vulnerable to the failure of more than one participant.

As this discussion indicates, a key feature of DNS systems is that participants must be willing to extend credit to each other. They therefore need to set minimum levels of creditworthiness for their counterparties and to have a means of monitoring each other for changes in credit standing. As a result participants in such systems generally have to meet stringent criteria. Although other institutions may participate on an indirect basis, the limited ability to participate directly in DNS systems may restrict competition between participants.

The risks associated with DNS systems, even those with some risk protection, encouraged the adoption of RTGS, especially for systems dealing with high-value payments.

RTGS systems

An RTGS system eliminates interbank credit risk in the settlement process by providing immediate finality for payments between direct participants. Payments are processed on a transaction by transaction basis and involve a simultaneous debit of the paying bank and credit of the receiving bank in the books of the settlement agent, typically the central bank. If a bank sends a payment order but does not have sufficient funds to complete the transaction, it would not be processed. In some RTGS systems the rejected payment message is returned to the sender for subsequent resubmission. In other RTGS systems it is stored in a central queue until there are sufficient funds on the account for it to be executed. Should there be insufficient funds on the account at the end of the business day the payment would be cancelled⁴.

2: See Board of Governors of the Federal Reserve System (1984), Bank of England (1989) and BIS (1990).

3: See the survey in Fry et al (1999) pp. 112–114.

4: A fuller description of RTGS systems can be found in *Real-time Gross Settlement Systems*, BIS (1997).

In the 1990s, all EU and G10 countries (with one exception⁵) that did not already have RTGS systems introduced them. RTGS is now the standard approach for high-value systems used by any country undertaking payment system reform. There are around 70 RTGS systems in operation or planned around the world.

To function effectively, however, an RTGS system requires an adequate supply of intraday liquidity. Each individual bank typically has to make daily payments that are much greater than the amount of liquid funds (such as balances at the central bank) it would typically hold overnight. In most countries the central bank offers to supply banks with the additional intraday liquidity that they need. This credit is usually made available against collateral provided to the central bank (which mitigates the central bank's counterparty risk) and without interest charges. In the United States, however, the Federal Reserve Banks supply intraday liquidity on an uncollateralised basis and impose an interest charge depending on the duration and size of the intraday credit⁶.

Liquidity costs

It is clear that explicit interest charges make intraday central bank credit costly and that banks would wish to economise on its use. Even where credit is free but collateralised there may still be an opportunity cost associated with the provision of collateral. In some countries, currently including the United Kingdom, central banks accept as collateral securities that banks (or at least most banks) need to hold for prudential requirements. In such circumstances, and if there is no remunerative way of using the securities intraday, for example because there is no intraday securities market, there would appear to be no opportunity cost. Banks, however, contest this. This may be because operational practicalities in using collateral intraday for payment purposes limit a bank's flexibility to trade the securities concerned (eg if substitution of securities is difficult or if the timing of the settlement of intraday repos prevents securities being used for an overnight transaction). Some banks' internal charging arrangements may also make collateral appear costly to payment managers, even where this does not reflect the true cost to the firm.

More significantly, there may be an opportunity cost for some banks in holding a portfolio that is different from the one that they would otherwise have chosen. This will certainly be the case in countries where there is no prudential requirement to hold the type and amount of securities used in payment systems. At the same time, central banks have an interest in maintaining the quality of the securities accepted as collateral to contain the risks they take. For all of these reasons, intraday credit may be costly for some banks. In any event, many banks seem to regard provision of collateral as being costly and want to minimise its use.

The desire to achieve the credit risk reducing properties of RTGS systems as well as the liquidity efficiency of DNS systems has encouraged the evolution of hybrid payment systems over the past couple of years.

Hybrid systems

To date two main types of hybrid system have emerged. The principal features of three such systems are summarised in Table 2 and further details are given in the Annex. One type is called continuous net settlement (CNS) and has evolved from DNS. Examples include the French and American systems, Paris Net Settlement (PNS) system and the New Clearing House Interbank Payment System (NewCHIPS), respectively. In such systems participants pay an amount of money into an account and all payment orders are entered at the beginning of the day into a queue. A computer algorithm searches for those that are 'largely' offsetting – ie they must not generate a net debit greater than the balance on the settlement account. If a group of payments is found that complies with this and certain other criteria, they are released and considered final. The algorithm runs frequently throughout the day and – in contrast with a DNS system – allows some, perhaps many, payments to be released and settled effectively in real-time.

Systems differ in how they settle any remaining payment orders. The PNS system, for example, requires participants to top up their account balances if the unsettled queue becomes too big. The intention is to

5: Canada's Large Value Transfer System uses a different approach to give participants an unconditional claim on the central bank. The Bank of Canada guarantees the settlement of LVTS, which in other respects is a protected DNS system.

6: The average per-minute overdraft is multiplied by the effective daily rate charged for overdrafts (currently 15 basis points) and then the value of the institution's deductible (derived from the level of overdraft that may be incurred without a fee) is subtracted to arrive at a daily charge. The daily charges are summed over two weeks and if they are less than \$25, the fee is waived.

try to ensure that all payments are settled before the end of day. The NewCHIPS has an end of day process in which debtors should fund remaining net positions and it relies on the possibility of executing any payments that have not been settled in NewCHIPS through the parallel RTGS system (Fedwire).

Table 2:
Features of three hybrid payment systems

Payment system	NewCHIPS	PNS	RTGSplus ^(a)
Zero minimum balance	✓	✓	✓
Bilateral limits		✓	✓
Multilateral limits	✓ ^(b)		✓ ^(c)
Prefunding requirement	✓	✓	
FIFO settlement		✓ ^(d)	
Bypass FIFO	✓		
Gross Settlement	✓	✓	✓
Bilateral offsetting			✓
Multilateral offsetting			✓
Bilateral netting	✓	✓	
Multilateral netting	✓	✓ ^(d)	

(a) Reflects treatment of limit payments.

(b) Set at two times prefunding requirement.

(c) Set by payer to limit flow of liquidity to a group of payees.

(d) FIFO normally except in multilateral netting process.

The second type of hybrid system, illustrated by the RTGSplus system in Germany, seeks to incorporate a queuing facility into an RTGS system (a 'queue-augmented RTGS' system). Although some standard RTGS systems have queues to control the release of payments, the distinct feature of a queue-augmented system is that it looks to settle simultaneously payments that have been posted in the queue and that are broadly offsetting. The queue can work simply on a first-in-first-out (FIFO) basis where the priority given to payments depends only on when they arrive. A basic bilateral offsetting process looks only at mutual payments between a pair of participants. Alternatively, more sophisticated schemes can include an algorithm that searches the queue multilaterally for wider sets of payments, which are largely offsetting. Such an algorithm could also be written to override the time order of the FIFO system or to do so within categories of payments that have been accorded the same priority. This offsetting process involves simultaneous gross settlement, that is the individual payments are executed simultaneously in frequent batches. In legal terms settlement is gross (ie the individual obligations are not replaced by a net obligation) but it has the economic effect of netting payments because the offsetting gross payments are self-collateralising.

The two approaches would come to resemble each other the greater the proportion of transactions that

are settled in the optimisation process – whether it involves netting or offsetting. The practical differences would be in the detailed design of the algorithm – how it selects which payments to settle. The choice of design will depend on the likely pattern of payments in the system and the needs of participants, for example, in terms of promptness of settlement. Both approaches could require similarly low levels of funds to achieve final settlement of all payments.

Both types of hybrid system need an associated RTGS system. In the case of a queue-augmented system, the system itself offers standard RTGS payment services, which may, for example, be used for high priority payments. In the case of the CNS system, an RTGS system will be necessary to provide the initial 'pump priming' provision of funds and to enable further payments to be made during the day or to execute uncompleted payments at the end of the day.

The choice between these alternative designs will depend on a number of factors, including the cost of building and operating them. For central banks, key factors will be how well the design contains settlement risk and whether the incentives the design creates for participants encourage a smooth flow of payments.

Settlement risk in payment systems

Settlement risk – the credit risk arising from the fact that payments made in the system may not be unconditional or irrevocable – is inherent in DNS systems. Only when settlement is complete can all payments become final (ie unconditional and irrevocable) between the direct participants in the system and the settlement risk ceases. A key aspect of DNS systems therefore is that the completion of an individual payment is dependent on the completion of all others during the same settlement period. That interdependence is at the root of the settlement risk in a DNS system. Only if all participants subsequently pay their net obligation to the system can settlement be assured. A protected DNS system seeks to mitigate these risks by providing procedures and resources to manage a settlement failure, but it will not guarantee settlement in all circumstances and the interdependence of payments remains.

CNS represents a significant advance on DNS in breaking the connection between the settlement of many payments. Payments that are completed in

batches intraday can be settled with finality, and are not dependent on the subsequent settlement of other payments in the system. The link between the performance of settlement by participants at the end of the day and the settlement of a large group of payments – in practice, in the examples to date, a large majority of the value of a day's payments is settled before the end of the day – is broken. The less the amount left to be settled at the end of the day the less risky is the system, because less value remains at risk of an unwind. Some designs of CNS systems seek to ensure that all payments are settled with finality intraday and none are left to an end-of-day netting process.

RTGS systems, including those with queuing mechanisms, do not give rise to settlement risk. All payments are final as they are made, including those that are made simultaneously in batches in queue-augmented systems.

From a settlement risk perspective alone, there is a clear hierarchy of payment system design: unprotected DNS systems pose the greatest risk as a settlement failure could affect all payments, followed by protected DNS systems, CNS systems and RTGS systems that eliminate the possibility of a settlement failure. The differences between the systems, however, will be an empirical matter depending on the degree to which finality is achieved intraday. A CNS system, for example, may be capable of settling all payments without settlement risk if it completes all its payments in the matching mode and provided, importantly that the basis for the netting or similar process is legally robust.

The ability to settle payments safely – with little or no settlement risk – is a necessary but not a sufficient consideration in deciding whether a particular payment system design is best for a particular context. The way a payment system is used, the type of payments to be settled (in terms of the counterparties, volumes and values) and the incentives created by its design are also relevant considerations⁷. One illustration of the importance of the use of a system is the fact that a participant can face credit risk in a payment system even if the system itself (such as an RTGS system) is free of settlement

risk. For example Bank A may have to make £100 millions of payments today as principal to Bank B, and Bank B may have an equivalent value to pay to Bank A. If Bank A pays first and Bank B fails before making its payment, Bank A bears the credit risk from the imbalance in the execution of payments. In principle an offsetting mechanism could help those banks manage their credit risk by making those payments simultaneously. In practice, many payments are made as agent rather than as principal and banks would not be able to offset the credit risk arising from the third party obligations. Nevertheless, banks still look at payment flows as an indicator of the financial and operational health of their counterparties, and the behaviour of banks in the payment system will depend on the incentives created by the design and operating rules.

The management of payment flows: incentives and behaviour

Banks typically want to manage their intraday liquidity carefully and thus want to see some balance in payment flows to ensure that the costs of providing liquidity to the system are fairly shared amongst the system members and to ensure that their own ability to make urgent payments is not inhibited. Appropriate design and operation of payment systems can help participants manage payment flows better and can provide incentives for collectively beneficial behaviour.

In a one-off 'game' in an RTGS model, for example, and assuming liquidity has a positive cost (whether a direct cost or an opportunity cost), the incentive on each participant would be to wait to be paid by others before making its own payments⁸. Collectively that would be sub-optimal because payments would tend to be made late in the day and there would be a risk that not all payments would be completed before the close of the system. Moreover, although participants would know what payments they had to make themselves, they would be unlikely to know the values of all payments due to them, particularly for their customers. Late payments and uncertainty about the total payment flows would complicate the management of their positions and of their treasury operations. Central banks also prefer to see payments completed reasonably early in the day because it reduces the risks of financial disturbances from

7: There are of course other relevant characteristics of good payment system design, such as low operational risk. For a detailed discussion of necessary characteristics see *Core Principles for Systemically Important Payment System*, BIS (2001).

8: This incentive is explored in Angelini (1998).

uncompleted payments and the risk that operational problems late in the day would disrupt the completion of payment business.

In practice, this 'game' is repeated daily and participants have an incentive to co-operate. One way of doing so is to develop rules of behaviour (whether explicit or implicit). In the United Kingdom, the banks have developed 'throughput' rules, which are agreed practices for paying each other promptly to avoid surprises and to encourage the smooth operation of payment systems. These are operated on an *ex post* basis where participants look to see whether their counterparties did make payments to the system as a whole sufficiently promptly (ie the rules operates on a multilateral basis)⁹. Such throughput rules assure participants that the initial funds held by participants in their accounts will be recirculated quickly intraday. There may also be conventions – implicit rules – where certain types of payments are carried out at particular times. In the US Fedwire system, for example, there are several short bursts of payment activity at predictable times where participants complete substantial volumes of payments¹⁰. This practice reduces the need for participants to draw on intraday credit from the Fed other than for very short periods, thus reducing their costs, and helps banks estimate their likely payment flows for the day.

These methods, however, are relatively imprecise and in practice many banks also operate *ex ante* controls on payment flows to individual counterparties. They set limits on the net payments they will make to individual counterparties and operate internal queues, monitoring flows in real-time and releasing payments steadily in response to incoming payments. As noted above, this is at least as much to conserve liquidity as to contain credit exposures.

The effectiveness of bilateral limits depends on the degree of concentration in the system and the extent to which payment flows are evenly distributed across participants. They can impose constraints by preventing the execution of 'circular' payment flows, for example when Bank A needs to pay Bank B, Bank B needs to pay Bank C, and Bank C needs to pay

Bank A. In addition, depending on how they are set, there is the potential for asymmetric incentives. For example, a large bank may depend heavily on payments from another large bank and so have an incentive to establish prompt payment conventions with it, but the incentives to pay a small bank promptly may be less strong. To avoid this, banks need either a centralised monitoring function that can implement a more sophisticated multilateral throughput rule, ie one that ensures that no bank, big or small, 'free-rides' on the liquidity of others, or an automated approach such as a centralised queue.

The centralised queuing systems of CNS and augmented RTGS systems can help resolve these issues. A queuing system provides good incentives for participants to submit payments early because the greater the number and value of payments in the queue, the greater the probability of settling payments from other participants. Putting payments in the queue can release payments due to that participant from others. If a queue is sufficiently transparent so that a recipient can see intended payments, it will have a stronger incentive to enter payments of its own, and target more precisely the release of payments from other participants' queues. The linked payments do not, however, need to be perfectly offsetting as funds on the settlement account can be used as a buffer.

A centralised queuing procedure therefore has a number of potential advantages. First, the queues can be used to signal the willingness of a participant to pay its counterparties. In a bilateral system, a participant knows that if it is due to receive a payment in a second participant's queue, the payment will be released if it enters a similar payment order to the second participant. In a multilateral process more complicated payment chains may also be released even if there is no direct match of payments between two banks. Second, the queuing facility reduces the amount of liquidity needed to effect the payment. Neither party needs to find separate liquidity to support the payments. Simulations have shown that the effect can be substantial¹¹. Third, it gives smaller banks access to this liquidity management tool if they do not have a sufficiently sophisticated in-house

9: The current UK rules are that 50 per cent of the value of payments must be made by 12.00 and 75 per cent by 14.30 on average over each month.

10: See McAndrews and Rajan (2000).

11: See Koponen and Soramäki (1998).

facility. This enables them to re-use liquidity quickly, sending it back into the system and speeding up the flow of payments for all.

Such approaches have a number of disadvantages. First, the cost of building and operating a more complex system may be high. Second, it may not yield substantial benefits if payment patterns are stable and payment conventions work or if there is a large number of participants and if payment volumes are widely spread. The chance of bilaterally-offsetting payments is much less in a large group, and multilateral algorithms are difficult to implement for systems with a large number of participants. Third, if there is a small number of large participants they may receive most of the benefit and smaller participants may need other ways (such as rules) of ensuring they share the benefits. Fourth, the complexity or uncertainty over the order and timing of settlement may concern some potential participants.

The signalling benefit of approaches using centralised queues is therefore likely to be most useful in a system in which there is significant day-to-day variation in individual banks' receipts. If daily flows are relatively stable in size, timing and counterparty there is less need for a bank to be able to signal its willingness to make payments at a particular time and standardised rules about payment timing may well be sufficient.

An issue for all types of hybrid systems is the status of messages in the queue. The queue indicates to the potential recipient the sender bank's provisional intention of remitting funds to the receiver. But if the receiver treats such information as equivalent to good funds, it can be taking the same risk as it would when crediting customers on the receipt of payment messages in a DNS system. For this reason, most queuing systems typically disclose only the amount of the payment and the beneficiary bank and release the customer details only when the payment is settled. There may, however, be a trade-off in the degree of transparency in the queues between giving sufficient detail to enable participants better to match and offset payments from counterparties, and avoiding the risk that participants treat queued messages as good funds, creating credit risk.

The UK system

In the UK, the domestic high-value payment system, CHAPS Sterling, is an RTGS system. The Bank of

England provides intraday credit without charge against collateral, which is held for prudential purposes by the vast majority of participants. There is therefore seemingly little or no opportunity cost for most participants in obtaining credit. Participants nevertheless remain keen to manage daily liquidity carefully. To date the agreed multilateral throughput rules seem to have been broadly adequate in that payments flow promptly and smoothly. The increasing use of collateral intraday, for example, in supporting delivery versus payment in central bank money in CREST (the UK's securities settlement system), is increasing the attention given to liquidity management. The UK system has always had a gridlock-resolving mechanism called 'circles', which is similar to a multilateral offset algorithm, but it is rarely used, largely because CHAPS rules currently require banks to submit payments only if they have sufficient funds to settle them. The upgraded IT platform for the CHAPS system, called NewCHAPS, which went live in August 2001, has optional centralised queuing facilities available to banks that wish to avoid the costs of developing or upgrading their own in-house facilities. This system would be capable of incorporating offsetting payment techniques if the Bank and participants wished to introduce them.

Conclusions

There are many common elements driving the evolution of the design and operation of wholesale payment systems. Participants and central banks share the desire to reduce or eliminate settlement risk from payment systems by achieving prompt intraday finality, and to contain the amount of liquidity needed to support a payment system by improving the co-ordination of payment flows. The relative weights they give to these objectives may, however, differ. The range of possible solutions has been broadened by changes in technology that permit more sophisticated variants in payment system design to meet specific needs.

New designs involving centralised queues with efficient search algorithms can help achieve the safety and efficiency objectives when liquidity is costly. Both CNS and queue-augmented RTGS systems can enable participants to signal their willingness to pay counterparties if the counterparties are also prepared to pay them, and enable those linked payments to be executed simultaneously without the need for other, more costly, sources of liquidity.

The details of such systems, however, are important; for example the degree of transparency of the queues may affect credit risk. Such systems are most useful if there is substantial variability in the amount and timing of daily payment flows to different counterparties; existing techniques can reduce liquidity needs when payment flows are predictable. Multilateral approaches will maximise the liquidity efficiency for all, although they may be expensive or technologically difficult. Bilateral offsetting systems will work better where there is a small number of

parties making most of the payments, and therefore a greater probability of matching payments, than where there are large numbers of participants and less concentrated payment flows. Such approaches, however, are likely to be needed only where there is a significant cost in the provision of intraday credit and where the values involved are substantial. In countries where one or both of these considerations do not apply, the operational and conceptual simplicity of a standard RTGS system might well mean it remains the preferred choice.

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Annex: Three examples of hybrid systems

France – PNS

PNS is a CNS system that provides real-time irrevocable settlement. It has been operational since 19 April 1999. It evolved out of Systeme Net Protégé (SNP), a protected DNS system secured by collateral, which operated within bilateral and multilateral limits.

PNS operates by settling positions in central bank money throughout the day using netting or optimisation procedures and it is intended for high-value payments less urgent than those handled in Transferts Banque de France (TBF, the French RTGS system). Liquidity may be moved between TBF and PNS at any time but each participant must transfer a minimum of €15 millions to PNS each morning. Banks whose overall net position for the day is negative are required to bring in the necessary liquidity progressively during the day to settle all queued payments, in order that no payments are rejected at the end of the day.

Participants are able to control flows to counterparties by setting bilateral limits. In addition, each participant's settled position vis-à-vis the system as a whole must remain positive. As no bank can be a net debtor to the system as a whole, no default fund is necessary. PNS payments will be settled if they are within bilateral limits and sufficient liquidity is available. Payments that would breach a bilateral limit or which would cause a participant's account balance to become negative are queued. If there is an existing queue, lower value payments (below €1 million) will be given priority to avoid overloading the deferred settlement process. Queued payments may be settled by one of three processes: bilateral optimisation, queue scanning or multilateral partial optimisation. The first two are continuous and follow the FIFO principle whereas the third departs from FIFO to settle as many payments as possible. The bilateral limits apply whichever process is used.

Bilateral optimisation is triggered whenever a payment is added to the queue. The system examines all the queued transactions between the paying participant and each other participant, and attempts to process the largest number of transactions simultaneously, consistent with FIFO and the bilateral limits. Queue scanning occurs after each settled payment and each successful bilateral optimisation. Once an account has been credited, the system

checks whether any queued transactions on that account can then be settled.

Multilateral partial optimisation is carried out whenever the system operator notices gridlock. This mechanism involves a number of passes over the data, each pass resulting in some payments being dropped. First, individual payments, which would cause bilateral positions to exceed bilateral limits, are dropped. Second, the queue of the participant with the largest virtual debit balance is examined and transactions are removed until the participant's position becomes positive. If there are several transactions that could be removed to achieve this, then the most recent are removed. This second operation is repeated until no debit balances remain and the remaining transfers are settled simultaneously.

Germany – RTGSplus

RTGSplus was introduced on 5 November 2001. It replaced Germany's two large value payment systems, Euro Link System (ELS) and Euro Access Frankfurt (EAF), incorporating features of both. ELS was an RTGS system and the German component of TARGET (Trans-european Automated Real-time Gross settlement Express Transfer system), while EAF was a CNS system in which payments were settled through a matching mechanism supported by some pre-funded balances. RTGSplus processes the payments of both systems and offers participants a number of controls to manage their payments.

RTGSplus payments are made against balances held on dedicated settlement accounts. Liquidity may be transferred through TARGET to and from an RTGSplus account throughout the day. Participants without access to TARGET can use correspondent arrangements. Surplus funds are returned to a designated account at the end of the day.

RTGSplus payments can be either express or limit payments. Express payments are individual RTGS payments, settled on a FIFO basis, using any of the liquidity available to the paying bank. Limit payments are settled on a bypass-FIFO basis and may access only a part of the liquidity on the settlement account.

Banks can manage their payments by choosing which payments to put through the express route and reserving liquidity for those payments, by setting bilateral and multilateral limits for limit payments,

and by reordering or revoking payments. Multilateral limits apply to counterparties for which there is no bilateral limit in place. Participants can monitor both the balance in their settlement account and detailed information on incoming and outgoing payment queues.

Incoming payments will be settled in real time if there are sufficient funds and any limits in place are met. If a payment fails to settle, it will be queued. The two types of payments are queued separately and the express payments queue takes priority. Queued express payments are checked to establish whether they can be settled whenever the settlement account is credited, when the order of payments is changed, on revoking an express payment or on changing the payment type. If a participant's express payments are queued, its limit payments cannot settle. An algorithm runs continuously to find queued limit payments that can settle. It searches for bilateral or multilateral offsets first using FIFO but then bypassing FIFO to allow subsequent payments to settle ahead of queued payments to maximise settlement subject to any limits in place. Any payments still in the queue at the end of the day are rejected.

US – NewCHIPS

CHIPS was converted to a CNS system on 22 January 2001. It continuously matches, nets and settles queued payments. Previously CHIPS was a protected DNS system operating with net sender debit caps and net bilateral credit limits. It also had a collateral pool, which could accommodate the end of day failure of the two largest net debtors.

Under the new system, at the start of the day, participants must pre-fund their account with an amount called the 'initial balance requirement'. This requirement is set using a formula based on recent transaction history. It is recalculated weekly. Participants prefund their CHIPS settlement account at the Federal Reserve Bank of New York through Fedwire. If the participant is not a member of Fedwire it must have arrangements with a member to provide the initial balance requirement. Funds cannot be added or withdrawn during the day and surplus funds are returned through Fedwire at the end of the CHIPS business day.

Priority payments may be flagged to be considered first for release. It is also possible to delete unreleased payments from the queue until the system closes for the receipt of new payments (at 17.00 Eastern Time). Constraints are placed on participants' intraday positions such that the minimum position during the processing day cannot be less than zero and the maximum position cannot be more than twice the initial balance requirement.

Payments may be settled individually, netted bilaterally or netted multilaterally. The algorithm searches the queues for individual payments, or batches, whose settlement can be accommodated within the constraints, including that of the available balances. Although consideration is given to the order in which the payments arrived, the algorithm selects payments to be released on a best-fit basis. It will bypass payments in the queue that are not likely to be part of a batch that can be released.

Once the system is closed for new payments, the maximum position control is removed and the algorithm is run to match, net and set off as many of the remaining unsettled payments as possible. A closing position is then calculated for each participant comprising the multilateral net position for the remaining payments plus its current balance. Banks with negative closing positions are required to fund their 'final prefunding requirement' via Fedwire within 30 minutes of the notification of this position. Once all the transfers are made, all remaining payments are released and settled and CHIPS sends credits via Fedwire to banks with a positive closing position. If one or more of the debtor banks do not provide their final pre-funding requirement in full, the algorithm runs to release and settle as many of the remaining payments as possible. Any payments still remaining in the queue are rejected by the system, the affected sending banks are notified, and CHIPS credits banks with a positive closing position via Fedwire. The unsettled payments would normally be redirected by the banks via correspondents or through Fedwire that business day.

Risk transfer between banks, insurance companies and capital markets:

an overview

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Interlinkages between the banking and insurance industries are increasing. The most visible sign is the merger of banks and (in most cases, life) insurance companies to form bancassurance groups. But at least as important for the efficiency and robustness of the international financial system are linkages through the growing markets for risk transfer. Banks are shedding credit risk to insurance companies, amongst others; and life insurance companies are using capital markets and banks to hedge some of the significant market risks arising from their portfolios of retail savings products. This article describes these interactions, which are effected primarily through securitisations and derivatives. In principle, firms can use risk-transfer markets to disperse risks, making them less vulnerable to particular regional, sectoral or market shocks. Greater inter-dependence, however, raises challenges for market participants and the authorities: in tracking the distribution of risks in the economy, managing associated counterparty exposures, and ensuring that regulatory, accounting and tax differences do not distort behaviour in undesirable ways.

BANKS' AND INSURANCE COMPANIES are exposed to various credit, market and insurance risks in the course of their business. Broadly, they can manage these risks in three ways:

- Arrange for another entity to take on the risk at the outset. For example, a bank might arrange a bond issue for a corporate customer rather than lending itself; or an insurance company might arrange for a customer to 'self-insure' by establishing a captive insurance company rather than buy insurance cover.
- Retain risks on their balance sheets and seek to control them through careful monitoring, pricing and diversification.
- Hold the risk only temporarily before selling it into a secondary market, hedging it with another offsetting transaction or repackaging it in order to sell/hedge it.

This article concentrates on the third 'risk transfer' approach. After reviewing some longer-standing interactions between the banking and insurance industries, it maps recent developments in the ways they transfer credit, market and insurance risks – particularly to each other. The focus is international markets. The article is primarily descriptive but the final section identifies some issues and questions.

Background

Insurers and banks have always had mutual exposures in a number of areas. (The activities of different types of insurance companies are described in Box 1.)

- Insurance companies are significant investors in bank capital instruments, such as equities and subordinated debt. This gives them a leveraged exposure to the risks taken by banks.
- Insurance companies cover banks and their customers against the usual range of insurance

1: For convenience, this article refers to 'banks' in a loose way that includes other major financial intermediaries, such as the large US securities firms.

Box 1: Types of insurance company

Life insurers provide insurance cover against death, sickness and disability: often embedded in long or medium-term savings products, such as pensions. The insurer receives either a large single payment or a series of regular payments and invests the funds either to yield a regular income to the policyholder or a capital gain at some future date. The investment risk may be retained by the policyholder but often the insurance company will provide either a fixed return (eg guaranteed investment contracts (GICs) in the United States), a smoothed return (eg with-profits policies in the United Kingdom) or a minimum return. The balance sheets of life insurance companies are typically large, reflecting the intermediation of household savings into investments. For example, UK life insurance companies had investment funds of over £900 billions at end-2000 compared to less than £100 billions for general insurance companies.

General insurers (also known as Property and Casualty or P&C insurers) provide insurance cover against property and liability risks, sub-divided into categories such as property, motor, aviation, marine, fire, personal accident and legal liability. In most cases, policies are renewed annually with the insured bearing an initial share (the deductible or retention).

General insurers typically have smaller balance sheets than life insurers because they do not usually intermediate between savings and investments. Their

profitability depends on their underwriting performance (whether premiums received exceed claims paid) and their investment return on funds held during the period after premiums are received and before claims are paid (sometimes called the 'float').

Reinsurers take on a proportion of the risks covered by general and, to a lesser extent, life insurers. Under *treaty* reinsurance, an insurer commits to ceding and a reinsurer to accepting a share of risks on new business over an agreed period. Under *facultative* reinsurance, insurers and reinsurers agree cover for particular exposures. Reinsurance policies can be either be proportional ('quota share') – the reinsurer and insurer agree to share fixed percentages of premiums and claims – or non-proportional. Non-proportional or 'excess of loss' cover requires the reinsurer to pay any losses in excess of a pre-determined retention up to a certain limit. The retention may be set by individual risk (eg insurance of a particular building), as the sum of all losses resulting from a catastrophic event or as the sum of all losses in a particular period ('stop loss cover'). Some reinsurers retain the majority of their risk, others reinsure themselves through the so-called retrocession market.

Table A shows the largest life insurance, general insurance and reinsurance companies worldwide by revenue at the end of 2000.

Table A:
Largest life insurers, general insurers and reinsurers globally by revenue at end-2000

Life insurers	Revenue (US\$ billion)	General Insurers	Revenue (US\$ billion)	Reinsurers	Revenue (US\$ billion)
AXA	93	Allianz	71	Munich Re	14
ING Group	71	State Farm	48	Swiss Re	13
Nippon Life	68	AIG	46	Berkshire Hathaway	9
CGNU	62	Munich Re	40	Employers Re	7
Generali	53	Zurich	37	Gerling	4

Source: *Insurance*, City Business Series 2001, International Financial Services London (2001).

risks. Insurance also underpins bank lending by protecting customers against risks that might otherwise leave them unable to repay their debts. In some cases, the availability of insurance can determine whether companies can do business (eg airlines and construction), with direct consequences for bank credit risk.

- Some insurance companies have for many decades provided companies with trade credit insurance. Banks often finance these 'receivables', supported by the insurance.
- Banks provide insurance companies with liquidity facilities to enable them to pay claims, and with letters of credit, which may be required by regulators or customers to evidence ability to pay future claims.

More recently – perhaps since the 1980s – banking and insurance industries have borrowed from each other as part of a broader process of convergence. Traditionally, insurers wrote policies covering specific risks, renewable (and so repriced) annually. Banks, by contrast, have tended to take on a bundle of risks attached to term lending. These include interest rate, currency, credit, funding, prepayment and legal risks; and, within credit risk, the different risks that affect a borrower's willingness and ability to pay eg business, operational, political risk etc.

Over the past two decades, however, banks have increasingly been unbundling their lending risks. The use of interest rates and currency derivatives for that purpose is familiar. Some banks also buy, for example, political risk insurance cover against emerging market economy exposures². More generally, the techniques developed in recent years to split credit risk into tranches have been broadly akin to the layering of insurance and reinsurance; and in pricing terms, the spread over risk-free interest rates on a corporate bond and the premium paid on a credit derivative can be compared to the credit reinsurance 'rate-on-line' (the premium divided by the maximum loss).

On the insurance side, packages are now available to cover all or most of a corporate customer's potential liabilities and losses, sometimes for terms beyond a year³. And so-called financial or *finite risk reinsurance*, with its origins in the 1970s, Lloyd's 'time and distance' policies, has combined a degree of risk transfer with what amounts to a form of revolving loan and/or investment facility to insurers (see Box 2). In economic terms, the reinsurer provides liquidity insurance, a core commercial banking activity.

The formation of so-called *bancassurance* groups (eg Allianz/Dresdner, Citicorp/Travellers, Lloyds/Scottish Widows), via the merger of a bank and an insurance company (typically a life company), is another manifestation of the banking and insurance links. Many of these deals seem to have been motivated by the aim of securing efficiency gains in the distribution of short and long-term retail savings products. But they also produce combined portfolios carrying a mixture of insurance and banking exposures, which is likely to alter their diversification/concentration characteristics and so be relevant to financial system stability and efficiency⁴. Bank/insurance company mergers are not, however, essential to achieve this type of risk diversification.

New risk transfer techniques

The past decade has seen a growing range of new techniques and markets for transferring risk. They include:

- *Loan trading*: Markets for trading of individual loans are well established, particularly in the United States but also, to a lesser extent, in other countries including the United Kingdom. Institutional investors and specialist loan funds have, in recent years, taken up around half of many syndicated loans in the United States. Much of the secondary trading was initially in distressed debt (trading at less than par) but the 1990s saw growth in par debt trading⁵.

2: Political risk insurance typically covers banks against the risk of currency non-convertibility, nationalisation, expropriation etc. It does not cover the credit risk of borrower default. Some regulators require banks to hold provisions against country risk but allow offsets if they purchase political risk insurance.

3: See, for example, *Integrating Corporate Risk Management*, Swiss Re New Markets, 2000.

4: See *Risk Management Practices and Regulatory Capital: Cross Sectoral Comparisons*, Joint Forum 2001, available at www.bis.org.

5: For more on this see, for example, Section I of the *Financial Stability Conjecture and Outlook* in the June 2001 *Review*.

Box 2: Finite risk reinsurance

Finite risk reinsurance combines risk transfer with a form of 'banking' facility¹. In one variant, an insurance company will agree to pay premiums to a reinsurer over a period of years. If losses under the policy arise early in the period, the reinsurer will meet the claim up to a limit but recoup some proportion through higher premiums in the remaining years. The two companies may agree that, if losses are lower than expected, they will share any additional investment returns on the premiums, which accumulate in a so-called 'experience' fund. Indeed, premiums may be loaded in order to incorporate an element of investment in the transaction, with the reinsurer quoting an expected rate of return.

Finite policies may also be 'retrospective', relating to closed portfolios of outstanding policies expected to give rise to further losses. For example, a general insurance company may have large reserves held against expected future claims under policies from prior years that cover corporate asbestosis liabilities. Insurance companies are required to hold reserves against the face value of expected claims even if they

are expected to arise some way in the future. They can, however, transfer the liability to a reinsurer using a so-called 'loss portfolio transfer' or 'run-off' policy. Because the reinsurer can take account of the timing of claims and discount them back at the rate of return it anticipates on its investment portfolio, the insurance company may not need to transfer the entire amount of its reserves. The reinsurer takes on the risks that claims arise sooner, or its investment returns are lower, than expected.

Differences in accounting treatment are said to make finite reinsurance attractive to insurers. Under US Generally Accepted Accounting Principles (US GAAP), an insurer can offset a reinsurance recovery against an underwriting loss in its profit and loss account even if it is committed to 'repaying' a part of the money through higher premiums in future years. Many reinsurers, however, are located offshore, where accounting standards allow them to show the net present value of the loss taking account of the higher future income.

1: See, for example, *Modern ART Practice* Gerling Global Financial Products, Reactions Publishing Group, 2000 or *Integrating Corporate Risk Management* Swiss Re 2000 for more detailed descriptions.

- **Portfolio securitisation:** This typically involves the transfer of assets from the originator to a vehicle company, which then issues securities to investors backed by the cashflows on the transferred assets. The transaction is intended to remove risk from the balance sheet of the originator while ensuring that investors are exposed to the transferred assets only. Asset-backed securities (ABSs) typically shift credit risk⁶ on pools of relatively homogenous assets such as residential mortgage loans, credit cards or car loans. Transfers of credit risk on diversified corporate bond or loan portfolios are known as collateralised debt obligations (CDOs). Vehicles may finance themselves in the bond or short-term asset-backed commercial paper (ABCP) markets.
- **Derivatives:** These are transactions to exchange future payments contingent upon the future behaviour of a well-defined variable. The most actively-traded derivatives are based on interest rates, exchange rates, commodity prices, bond prices and equity indices. Mostly, they have short maturities. But life insurers have in the past few years been entering into some very long maturity contracts, largely to hedge interest rate risks embedded in their portfolios.

As noted above, derivatives have also developed linked to 'events', such as credit events affecting particular companies or sovereign states (credit default swaps)⁷, weather and natural disasters (eg catastrophe swaps). In addition, derivatives can also

6: Other risks may also be transferred, such as prepayment risk on mortgages. But ABSs are typically floating rate instruments with any interest rate risk hedged through a swap between the issuing vehicle and a bank.

7: On credit default swaps, collateralised debt obligations and portfolio credit default swaps, see my article in the June 2001 *Review* 'The Credit Derivative Market: its Development and Possible Implications for Financial Stability'.

Table 1:

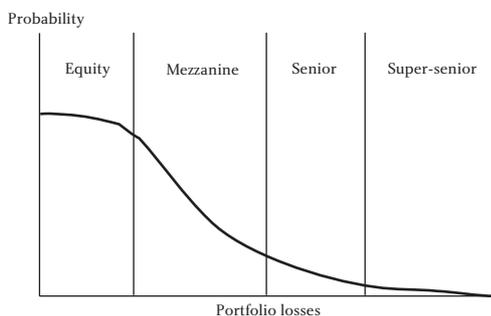
Risk transfers amongst banks, insurance companies and capital markets

Risk type Direction of risk transfer	Credit risk	Market risk	Insurance risk
Banks to insurance companies	Bank equities and bonds. Trade credit insurance. ABSs, CDOs, portfolio CDSs; financial guaranties; residual value insurance; other forms of credit insurance and surety bonds.	Bank equities and bonds. Insurance companies writing options and buying bonds with embedded options (eg callable bonds).	Insurance on bank property, legal liability etc. Insurance provided to borrowers to facilitate loans. Newly introduced insurance for eg operational, political risk.
Insurance companies to banks and other capital market investors	Letters of credit. Liquidity facilities.	Hedging of embedded options in portfolios of life insurance and pension products.	Catastrophe bonds.

be used to put together more complex structured instruments. For example, credit default swaps (CDSs) on different companies can be combined to form portfolio CDSs or they can be embedded in bonds to create credit-linked notes. Banks and insurance companies can use derivatives to hedge risks in their underlying businesses or to take trading positions. In effect, this transfers the risk to the derivative counterparty, although the bank/insurer may be left with counterparty credit risk and perhaps some form of ‘basis’ risk if the derivative is not a perfect hedge.

Banks use ABSs, portfolio corporate loan securitisations (CLOs) and portfolio CDS (also called *synthetic* securitisation) to pool single assets in portfolios on which the risk and return can then be split into different tranches. Bundling assets into portfolios is intended to reduce the variance of the returns and therefore the risk to investors. Tranching allows different investors to choose varying risk/return combinations depending on their preferences (Chart 1). The pricing of the tranches varies accordingly.

Chart 1:
Tranching of risk by cumulative default probability



Source: Bank of England

- *Alternative risk transfer (ART)*: ART is a catch-all term for a range of less conventional ways – some developed in the 1980s, others more recently – in which general insurance companies can take on and shed risk. It embraces insurance of new types of risk, such as credit portfolios or weather; different ways of organising insurance cover for large corporate customers, such as multi-year policies and the use of captive insurance companies; alternative ways of shedding risk, such as catastrophe bonds, with yields linked to the occurrence of earthquakes or windstorms; and, as noted above, finite risk reinsurance, effectively a form of banking facility provided by reinsurers to insurers (Box 2). ART also includes the unbundling of capital market transactions into the parts which can be sold into (liquid) securities markets and any remaining risks, for which the cost of insurance might be lower, such as an issuer’s potential environmental liabilities or the residual value of an asset. The idea is that insurance markets can complement traded securities markets in pricing less liquid or readily quantifiable risks.

These instruments and techniques are being used increasingly to shift credit, market and insurance risks amongst banks, insurance companies, reinsurers and other capital market investors, such as pension funds and mutual funds. Table 1 shows some of the instruments used, with the newer ones in orange.

Motivations

What drives the risk transfers described in this article? Part of the explanation – for both the direction and form of some transfers – lies in differences in the regulatory, accounting and tax treatments of different types of financial intermediary

Box 3: Differences between derivatives and insurance contracts

Derivatives

The main derivatives used to transfer credit risk are credit default swaps (CDS) and total return swaps. In principle, derivatives are ‘complete’ contracts: they set out each party’s rights and obligations in all relevant states of the world. Any delay in due payment beyond a short grace period is an event of default. Following default by either counterparty, derivatives are closed out at market value with one party having a claim on the other. Derivatives are usually based on standard definitions (eg those developed by the International Swaps and Derivatives Association¹) to facilitate hedging of positions. This encourages trading. Often counterparties will have collateral management agreements (CMAs) as part of their contract that allow for credit exposures based on market values to be collateralised with securities or cash if they exceed certain thresholds.

Insurance

Typical general insurance policies differ from derivatives in the following main respects:

- Derivatives specify payments that are either fixed or linked to independent prices or indices. By contrast, insurance policies indemnify the insured against its particular losses following an insurance event (usually up to a limit and with a retention/excess). The insured is required to have an economic exposure to the event (‘insurable interest’) for the transaction to be a valid contract of insurance under English law.
- Insurance policies are designed to protect the insurer against the possibility that the insured will have access to better information about the risk. So the insured will have a duty to disclose all relevant information to the insurer (‘utmost good faith’) or the insurance may be invalidated. The protection buyer has no similar duties under a derivatives contract.
- For similar reasons, insurance will typically give the insurer the right to delay settlement while it investigates the validity and size of a claim (loss adjustment).

- Insurance is not a traded instrument nor is it marked-to-market nor subject to events of default and close out at market value in the same way as derivatives. Consistent with the fact that policies are not marked-to-market, counterparty credit exposures are not usually collateralised.

These differences suggest that derivatives contracts are more suitable for risk transfer where information about the risk is public or the protection buyer’s exposure to loss is reasonably well correlated with an independent index or price. Insurance might be used where the insured has private information about the risk and its exposure to loss is not easily linked to an independent variable. Credit risk does not fall neatly into one of these categories. For example, protection sellers may be concerned about their exposures from credit derivatives if they believe that a lender has access to better information to assess the risk. Equally a protection buyer may want an unconditional risk transfer rather than insurance that is subject to loss adjustment.

Credit insurance policies can be written as unconditional guarantees. For example, if the insurer waives its right to avoid the cover following misrepresentation or failure to disclose relevant information by the insured. But they can also resemble standard insurance policies. The monolines (Box 5) provide financial guarantee insurance to bondholders, usually represented by a trustee, and have recourse to the issuer following a claim. In the reverse of the normal insurance relationship, the monolines seek to understand the risk on the underlying bonds better than the insured. This is one reason why monoline financial guarantee insurance can be an irrevocable and unconditional guarantee of interest and principal payment, even in cases of fraud. Monolines do not contest claims in the way of typical insurance but nor will they pay the market value of the insured’s losses immediately in the way of derivatives (acceleration). Rather they pay interest and principal on the original schedule.

1: See www.isda.org.

and of different types of contract. To take four examples:

- Under the 1988 Basel Capital Accord, banks that regard regulatory capital requirements as a potential constraint on their balance sheet have an incentive to transfer risk on high-quality loans, for which the economic capital allocation is less than the 8 per cent across-the-board minimum regulatory requirement. Banks have used CDOs and ABCP programmes to transfer risk on such loans, often to insurance companies, which assess technical reserves against expected losses, and capital requirements against unexpected losses, in different ways from banks.
- The 1988 Accord also produces an incentive for banks to take credit risk via undrawn but committed liquidity lines (zero per cent weight for under-364 day facilities) rather than drawn loans carried on-balance sheet (100 per cent). This is an important element in the ABCP market's rapid growth, as described below.
- Differences in accounting treatment between insurance and reinsurance companies have been a significant spur to 'finite risk reinsurance' (Box 2).
- Insurance regulations in some countries may prevent companies shedding interest rate risk or taking on credit risk using derivatives; they can, however, enter into insurance or reinsurance policies with similar economic effects (Boxes 3 and 6).

While such regulatory incentives are important, a big part of the explanation for increasing cross-sectoral risk transfers is economic. Firms with a comparative advantage in *arranging* financial services of particular kinds may not necessarily have a comparative advantage in *bearing and managing the resulting risks*. Risk transfer markets enable them to cap risk from their underlying businesses, to diversify across other types of exposure and, perhaps, to price risk more efficiently.

For example, those taking on risk may be able to bear it at a lower cost because of diversification effects, or a closer resulting match of their liabilities and assets, perhaps reflecting their having a different holding period from the risk transferors. Broadening the distribution of risks, such as the credit risk on bank-originated loan portfolios or the market risk on long-term savings products, may reduce their market

prices and therefore the costs of the underlying financial products to companies and households. In that event, more efficient use of resources should benefit the economy as a whole. So the big questions are: what is the nature and scale of these new types of transfer? Are they promoting greater economic efficiency? And what impact do they have on systemic stability?

Notwithstanding the rapid, and sometimes complex, developments of the past few years, the scale of the resulting inter-sectoral risk transfer probably remains small in relation to the balance sheets of the banking and insurance industries. Most insurers still have a much larger exposure to credit and market risk from their traditional bond and equity investments. Those risks are, though, familiar and this article therefore concentrates on more recent developments.

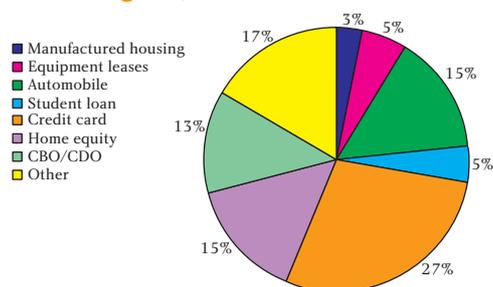
The following sections look in more detail at the transfer of, first, credit risk, and then of market and insurance risks respectively.

Credit risk: transfers from banks to insurance companies

Banks have shed credit risk to insurance companies primarily through the securitisation of credit portfolios and through portfolio CDSs. Broadly, credit portfolios are originated in four main ways:

- *Off the balance sheets of banks' corporate customers.* Large companies often provide short-term trade credit to a wide range of customers. Rather than providing working capital themselves, banks may arrange for companies to sell portfolios of these trade 'receivables' to an ABCP programme (Box 4).
- *Off commercial banks' balance sheets.* As noted in the introduction, since the mid-1980s commercial banks have been able to securitise residential mortgage loans through ABSs. These markets have since expanded to include a wide range of asset types, including credit card receivables, car loans, commercial property loans, non-performing loans etc (Chart 2). Banks may securitise such portfolios as term ABSs or through ABCP programmes. Often ABCP programmes are used to 'warehouse' assets until a bank has critical mass for an ABS issue. Over the past couple of years, especially in Europe, banks have also transferred credit risk on corporate loan portfolios using collateralised loan obligations (CLOs). These can be funded transactions, similar

Chart 2:
US dollar-denominated asset-backed securities
outstanding – Q2 2001



Source: Bond Market Association.

to securitisations. Increasingly, however, portfolio CDSs are used to transfer risk on, at least, the most senior (least risky) tranches.

- *Assembled by investment managers.* Collateralised bond obligations (CBOs) are backed by portfolios of bonds or loans purchased in the secondary markets by an investment manager. In effect, the manager uses the CDO structure to gain leverage for a fixed income fund.
- *Manufactured by investment banks.* Perhaps the most rapidly-growing portfolio structure is the ‘trading desk’ CDO in which an investment bank constructs a portfolio to meet the needs of a customer. It can be structured either as a portfolio CDS between the bank (the protection buyer) and its customer (the protection seller) or as a credit-linked note issued by the bank.

In 2001 investment banks have typically constructed CDOs and portfolio CDSs referenced

to portfolios of investment grade rather than sub-investment grade companies, capturing part of the widening spreads over swap rates on investment grade corporate bonds. These transactions are usually more leveraged to take advantage of the lower credit risk. Insurance companies (and others) are said to be more wary of sub-investment grade credit risk following losses on junior tranches of high-yield CDOs issued in 1997 and 1998. Particularly in Europe, there is also a wider sectoral spread of reference credits at investment grade; the sub-investment grade market has a preponderance of telecom issuers.

Table 2 provides some estimates of the scale of debt outstanding in these different portfolio credit risk transfer markets. Banks, pension funds, mutual funds, prime money market mutual funds, and private investment funds are all important investors. But insurance companies are one of the main takers – directly or indirectly – of credit risk, especially corporate credit risk, through different instruments as outlined below.

Asset-backed securities

Many general and, especially, life insurers are significant investors in (typically floating rate) ABSs, particularly in the large US dollar markets, alongside fixed-rate government and corporate bonds, equities and other asset classes. Although risk appetites vary, insurance companies will often purchase the lower-rated, investment grade tranches (single-A or triple-B) of ABSs in order to capture the higher spread relative to corporate bonds of equivalent rating. Pension funds, by contrast, are generally more likely to purchase the more senior tranches⁸.

Table 2:
Size of portfolio credit risk transfer markets

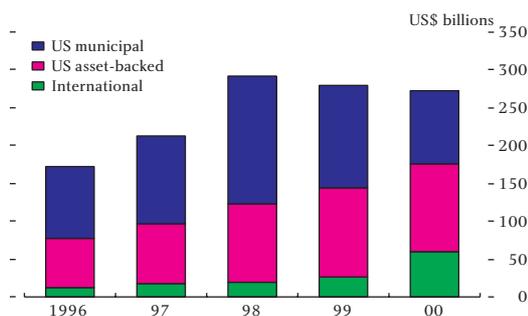
	1995	2001
Asset-backed securities^(a)	US\$ 315 billion (US only)	US\$ 1,048 billion (US only)
Asset-backed commercial paper^(b)	US\$ 100 billion €1 billion	US\$ 645 billion €30 billion
Collateralised debt obligations^(c)	US\$ 1 billion (global)	US\$ 300-400 billion (global)
<i>Memo:</i>		
<i>US bank lending^(d)</i>	US\$ 4,300 billion	US\$ 6,400 billion
<i>Euro area bank lending^(e)</i>	€9,900 billion (1997 data)	€13,300 billion

a: Source: Bond Market Association. (Excludes mortgage-backed securities issued or backed by US Agencies eg Fannie Mae and Freddie Mac).
b: Source: Federal Reserve Bank of New York and Bond Market Association.
c: Source: Bond Market Association, Dealogic and Bank of England estimates.
d: Source: Federal Deposit Insurance Corporation.
e: Source: European Central Bank.

8: See, for example, European Securitisation Forum ‘European Securitisation: a resource guide’ (2001) (www.europeansecuritisation.com).

One distinctive type of insurance industry involvement is the monolines' financial guarantee and surety bond cover of the lower investment-grade tranches of ABSs (Box 5 provides general background on monolines). With the growth of auto loan, credit card and home equity loan securitisation in the US dollar market, and the development of securitisation markets in Europe⁹, such ABS 'wraps' are becoming a larger part of monolines' portfolios (Chart 3).

Chart 3:
Monolines: new insurance written

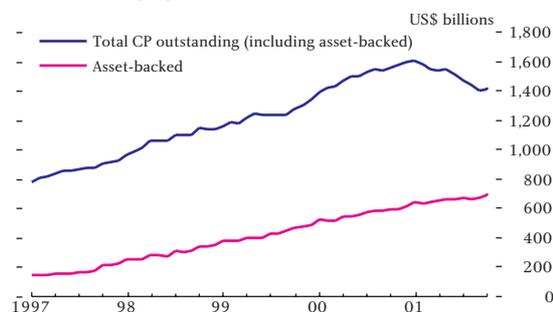


Source: Association of Financial Guaranty Insurers.

Asset-backed commercial paper

The ABCP market has grown rapidly over the last decade (Chart 4). Most ABCP programmes are designed primarily for funding or balance sheet purposes rather than to transfer credit risk to the commercial paper investors. In order to obtain a prime rating, rating agencies usually require a bank liquidity line to back 100 per cent of the outstanding paper, so that the vehicle can borrow from the banks to repay investors if it is unable to roll over its paper. Often the bank or banks providing the liquidity line bear the largest share of any credit risk and, as the sponsoring bank usually has the biggest part of the facility, the extent of any genuine credit risk transfer can sometimes be small¹⁰. The alternative is that a third party agrees to provide credit enhancement by taking on an exposure to some proportion of potential credit losses, whether these fall on the investors or the banks.

Chart 4:
Growth of US dollar-denominated asset-backed commercial paper market



Source: Board of Governors of the Federal Reserve System.

There are several ways of achieving this. Credit enhancement to cover an initial layer of losses is often provided by the ABCP vehicle purchasing assets at less than their fair value (over-collateralisation) or using a bank letter of credit or loss reserve. Increasingly, though, the monoline insurers and a few general insurers are themselves taking on the risk that losses will exceed this initial level of cover. For example, of the 172 ABCP programmes described by Fitch in its August 2001 *ABCP Scorecard*, 30 had so-called programme-wide credit enhancement (Box 4) from an insurance company – usually in the form of an unconditional surety bond. Of these, 26 involved monolines and four involved other insurance companies.

The monolines are also involved further up the chain (see Diagram 1). One way of 'manufacturing' highly-rated securities for ABCP vehicles is for a monoline to guarantee an ABS or CDO tranche in order to improve its rating from, say, triple-B or single-A to triple-A. A monoline financial guarantee can also be a convenient way for ABCP vehicles to reduce concentrated exposures to particular obligors¹¹.

Collateralised debt obligations and portfolio credit default swaps

Three features of CDOs and portfolio CDSs make them a particularly effective means of corporate credit risk transfer to the insurance industry:

9: For example, the recent 'whole business' securitisations by utilities (eg Welsh Water) and other business (eg public houses) in the United Kingdom, which transfer all the cashflows from an enterprise.

10: The covenants on liquidity facilities typically give the banks few 'outs'. Usually the bank is not required to lend if the issuing vehicle is insolvent but this is unlikely given the limited nature of its activities. Often the bank is also not required to lend if the value of the assets in the portfolio falls below that of the outstanding commercial paper. But this is usually unlikely given the short maturity of commercial paper and the typical requirement that the value of assets should exceed that of commercial paper by a margin at the time of issue. In effect, the banks would be likely to take on the credit risk on the asset portfolio before its value could fall sufficiently to expose investors to loss. Banks are, however, protected by any credit enhancement once they have financed the assets.

11: The US Securities and Exchange Commission puts investment restrictions on US money market mutual funds that limit their ability to invest in ABCP programmes with concentrations of more than ten per cent of total assets.

Box 4: Types of ABCP programmes

Multi-seller

The original ABCP programme, established by Citibank in 1983, was a multi-seller vehicle and over 60 per cent of ABCP is still issued through such programmes. Typically multi-seller programmes are established by commercial banks to meet the financing needs of their corporate customers by combining their assets into diverse portfolios. These assets are most often trade credit receivables but can be loans or securities. Each seller's assets may be credit enhanced before sale to the vehicle; for example, by buying the assets at less than their fair value (pool-specific credit enhancement). In addition, multi-seller vehicles usually also have so-called 'programme-wide' credit enhancement (eg a bank letter of credit or insurance company surety bond) to cover any further losses across the portfolio.

Single seller

Very large companies – or groups of companies – may justify their own 'single seller' programme. They issue just under 10 per cent of ABCP.

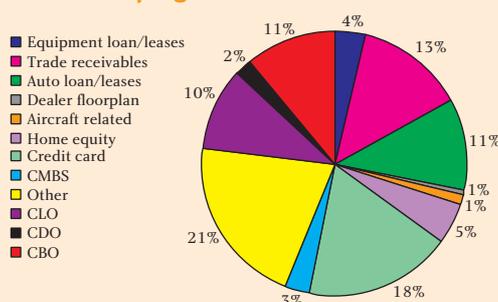
Securities and loan arbitrage

Securities arbitrage programmes were established to finance highly-rated tranches of ABSs as an alternative to banks holding them on balance sheet. Recently such programmes have also bought senior tranches of CDOs. The rating agencies set restrictions on the ratings and types of securities that any such vehicles can hold. Loan arbitrage programmes are similarly a means for banks to avoid regulatory capital requirements on loans to highly-rated companies. These types of programme issue around 15 per cent of outstanding ABCP.

Increasingly, the distinction between multi-seller and arbitrage programmes is blurring, with banks using vehicles for either purpose. The largest ABCP administrators are large commercial banks. ABCP vehicles are significant investors in senior ABS and CDO tranches. In this way, ABCP is used to finance a

very wide range of assets, either directly or indirectly via purchases of tranches in securitised portfolios (Chart A).

Chart A:
Diversification by asset type of the 15 largest Fitch-rated ABCP programmes

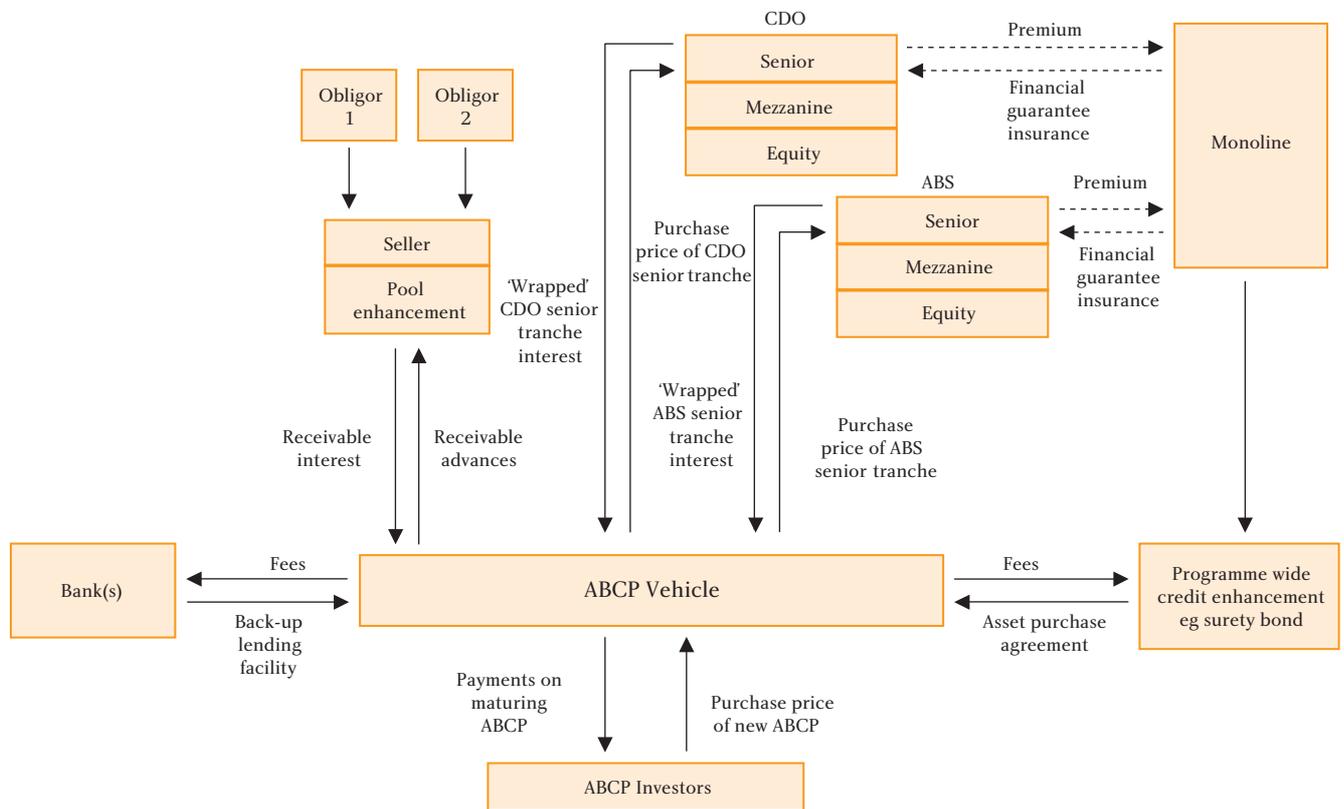


Source: Fitch Ratings.

Structured investment vehicles (SIVs)

SIVs are leveraged investment companies that finance bond portfolios by issuing prime ABCP, medium term notes and capital notes or equity. They set out to capture the spread between their longer-term, average AA-rated assets and shorter-term, AAA-rated liabilities. Derivatives are used to hedge interest and foreign exchange rate risks. Typically, they buy senior ABS and CDO tranches and hold them until maturity. Unlike securities arbitrage programmes, CP issued by SIVs is only partly backed by a bank liquidity line. Rather liquidity risk is managed by limiting mismatches between maturing assets and liabilities, and by holding marketable assets. Senior creditors and/or rating agencies require SIVs to meet a range of requirements related to portfolio credit ratings, liquidity, diversification, capital adequacy (in relation to the daily mark-to-market value of assets) and market risk. The SIV manager must remedy any breaches rapidly or will be obliged to de-leverage by selling assets in order to repay CP and medium term notes. SIVs currently issue about 5 per cent of outstanding ABCP.

Diagram 1: Monoline involvement in the ABCP market



Source: Bank of England.

- The portfolios are usually diversified across regions and industry sectors, limiting exposure to 'event' risk on particular corporate names, especially for holders of senior tranches. Insurers are more familiar with statistical analysis of portfolios than credit risk analysis of individual companies – although some have come to the view that these approaches are complementary, with both needed.
- Since they split the risk on the portfolio into tranches of increasing seniority (Chart 1), different types of insurance company can choose their risk and return trade-off.
- Credit risk can be transferred in either funded or unfunded form, via insurance or derivatives. This allows insurance companies to take risk in a form

Table 3:
Insurance companies and portfolio credit risk transfer instruments

	ABCP	ABS	'Trading desk' CDO	CLO ('balance sheet')	CBO ('arbitrage')
Monolines	Programme-wide credit enhancement. Financial guarantee of securities purchased by ABCP programmes.	Financial guarantee of senior tranches (usually triple-B – double-A rated).	Super-senior portfolio credit default swaps.	Super-senior portfolio credit default swaps.	Financial guarantee of senior tranches.
Reinsurers		Investment in portfolio tranches.	Sell protection (unfunded) on super senior, senior, mezzanine and equity tranches, depending on risk appetite.		
General/P&C insurers	Programme-wide credit enhancement (limited).	Investment in portfolio tranches.	Sell protection (unfunded) on super senior, senior, mezzanine and equity tranches, depending on risk appetite.		
Life insurers	Investment (estimated to hold 5 per cent of outstanding ABCP).	Investment in portfolio tranches (typically triple-B – single-A rated)	Investment (funded) in portfolio tranches: senior, mezzanine or equity.	Investment (funded) in portfolio tranches: senior or mezzanine.	Investment (funded) in portfolio tranches: senior, mezzanine or equity.

Box 5: Monoline bond insurers and reinsurers

The monoline bond insurance sector¹ developed in the 1970s with the establishment of a couple of AAA-rated companies to provide investors in US municipal bonds with a guarantee of timely payment of interest and principal on the original schedule in the event of issuer default (but not accelerated payment).

In 1989 New York State amended its insurance law (Article 69) to require all bond credit insurance to be done through monolines – separately capitalised insurance companies restricted to that line of business. Other US states adopted similar laws subsequently.

The motivation was partly to separate wholesale bond credit insurance from retail insurance products: for example, the monolines were excluded from the fund to protect policyholders against insurance company failure. Article 69 defines financial guarantee insurance and sets single and aggregate risk limits, risk-based capital requirements and mandatory contingency reserves.

The monolines diversified from the US municipal market into ABS in the 1980s and CDOs in the 1990s. In 2000 about 63 per cent (some US\$172 billions) of the gross par value insured by the monolines related to obligations other than US municipal bonds². Apart from some project and public sector financing outside the United States (including in the United Kingdom), these obligations were principally mortgage-backed securities, other ABSs, CDOs, portfolio CDS and ABCP.

In addition to regulatory requirements, monolines are scrutinised by the rating agencies. Preservation of the triple-A ratings is vital to their business. The rating agencies assess and apply a ‘shadow’ rating and

capital charge to virtually every transaction that they do. These capital charges rise at an increasing rate as the rating of the obligor falls.

Rating agency and regulatory requirements give the AAA-rated monolines strong disincentives to insure sub-investment grade risk or large exposures to single companies that expose them to ‘event’ risk. Structured finance is attractive to them because the risk is on asset portfolios and is typically tranching. ABSs, CDOs and ABCP insured by monolines typically have one or more levels of credit enhancement ahead of the insurance policy. One way of thinking about their business is that they write put options that are some way out-of-the-money to protect investors against extreme market events. Another is that they will only take positions that leave them exposed if losses on a portfolio are sufficiently high to reach near the ‘tail’ of an ex ante distribution of potential loss outcomes, beyond the ‘expected’ loss.

Monolines are relatively highly leveraged. Their statutory capital combined with unearned premium reserves amounted to about 1.4 per cent of the gross par value of debt guaranteed at the end of 2000². The companies disclose that they reinsure between 10 and 20 per cent of their business. This is partly through treaties to share premiums and losses on new business, partly through specific reinsurance of particular risks, and partly through ‘stop loss’ agreements that transfer a finite amount of losses to reinsurers if cumulative losses exceed a given threshold in any one year. They use the large, diversified global reinsurers but also a small number of specialist monoline reinsurers³. In addition, the monolines have so-called ‘depression’ lines of credit from banks that they can draw down if cumulative losses exceed a certain threshold.

1: The main AAA-rated monoline bond insurers are Ambac Assurance Corporation, Financial Guaranty Insurance Company (a subsidiary of GE Capital Corporation), Financial Security Assurance Inc (a subsidiary of the bank Dexia) and MBIA Insurance Corporation.

2: Fitch (2001) Who wants to be a bond insurer? – *Financial Guaranties Special Report* 3 May 2001.

3: The monoline reinsurers include ACE Guaranty Re, AXA Re Finance, Enhance Reinsurance and XL Financial Insurance.

that suits their balance sheet – either on the asset or liabilities side – and meets any regulatory restrictions on their activities.

Using this flexibility, different types of insurer have used CDOs and portfolio CDSs to take on credit risk at varying levels of seniority and in differing forms (Table 3).

Life insurance companies

A number of the larger life insurers in different countries have begun to allocate a proportion of their assets to CDOs as part of a diversified portfolio. In some cases, they may put them in the 'alternative investments' bracket, alongside, for example, stakes in 'funds of hedge funds'. Such insurers typically invest in equity or mezzanine tranches, either of managed CBO funds where they are or have chosen the asset manager; or in CDOs of static portfolios where they have had a veto over the corporate names included by an investment bank. In consequence, a number of large European and US life insurers and their asset managers have developed quite significant credit risk analysis operations in the past few years.

Life insurers might also invest in the equity tranches of CDOs in a search for high-yielding investments. In Japan and a number of European countries (including Denmark, Germany, Netherlands and United Kingdom), companies face variants of the problem that they have in the past guaranteed minimum nominal returns to savers (whether contractually or implicitly) which exceed the nominal yields currently available on risk-free assets. Some are said to have responded by seeking to take more credit risk in order to increase the yield on their assets. Market contacts suggest that, in particular, the German and Japanese life insurance sectors have been significant investors in CDO equity, often structured as 'principal-protected' notes: the income on the notes is at risk if there are credit losses on the portfolio but the principal repayment at maturity is not. The principal may be protected either by having the vehicle that issues the CDOs purchase highly-rated securities expected to accrue sufficient value over the life of the transaction, or by combining the equity tranche with a more senior tranche on which the cashflows are set aside¹². If protected, these notes can apparently be treated as bonds rather than equities

for the purpose of meeting regulatory restrictions on asset allocation in some countries.

Monolines

Monolines will typically take credit risk on the most senior tranches of CDOs and synthetic CDSs only. Sometimes a transaction will involve financing as well as risk transfer, with a monoline providing a financial guarantee 'wrap' (see Box 5). More typically, however, the bank or investment bank buying protection does not need funding. In this case, it buys credit protection directly from the monoline, usually in the form of a portfolio CDS.

In recent years, a number of CLOs have included so-called 'super-senior' tranches, with a AAA-rated senior tranche ranking lower in the capital structure. These transactions can be large, with the super-senior tranche sometimes exceeding US\$1 billion. Participating at the super-senior level does not expose the monolines to idiosyncratic credit risk on companies within the portfolio. To a greater extent than with their involvement in the ABS and ABCP markets, the monolines are, in economic effect if not legal form, writing options that are far out-of-the-money and should be exercisable only in extreme market circumstances. The premium is typically just a few basis points.

General insurance and reinsurance companies

General insurers may use more standard insurance contracts to take on particular variants of credit risk (Box 3). For example, insurance has been used to protect aerospace companies (eg British Aerospace and Saab) against falling revenue from aircraft leases. The British Aerospace transaction put a floor on the income from leases of the company's six hundred regional jet aircraft over 15 years¹³. Similar insurance has been provided on residual values of pools of leased automobiles and on property.

Many of the large, international general insurers and reinsurers have, however, also been active in the CDO and portfolio CDS markets. Their strategies vary. In general they prefer to take unfunded risk because, at least relative to life insurers, they do not have very large asset portfolios as they do not typically intermediate household savings. Less active general insurers may enter into credit transactions with banks

12: See Section IV of the *Financial Stability Conjecture and Outlook*, this Review.

13: See 'Modern ART Practice', Gerling Global Financial Products, Reactions Publishing Group (2000).

Box 6: Bermuda as an insurance centre

Bermuda has grown to be one of the main global insurance centres, focusing on reinsurance and insurance services for large companies. Since the 1970s it has been a location for captive insurance companies established by large companies or industry groups. In the mid-1980s a number of large US companies established two vehicles – ACE and XL – to self-insure their exposure to legal liability risk, which had become virtually uninsurable following asbestosis claims. A second wave of new companies was founded in the early 1990s, specialising in catastrophe excess-of-loss reinsurance, where global capacity had become tight following a series of natural disasters, including Hurricane Andrew. Since the mid-1990s, ACE, XL and some other Bermudan companies have become independent and grown through acquisition into large, diversified global insurance and reinsurance companies. Some are important participants in credit risk transfer markets. Following the terrorist attacks on the United States on 11 September, a series of new insurance ventures with quite substantial capital have been announced in Bermuda, anticipating opportunities following increases in insurance prices.

One of the attractions of Bermuda remains the absence of corporate income or profits taxation. But this is often not the crucial factor and, indeed, some insurance subsidiaries of US companies have opted to be taxed as US companies.

Bermuda has a flexible legal and regulatory regime: for example, some companies have obtained specific legal protection for their activities through private acts of the Bermudian Parliament. Regulatory requirements (eg solvency margins) differ between five classes of insurance company, depending on the nature and scale of their activities: single parent captives; multi-owner captives; commercial insurers/reinsurers; property catastrophe and excess liability insurers/reinsurers and life and health insurers.

Unlike insurance companies in some other jurisdictions (including the European Union), Bermudian companies are permitted to take on additional risk using derivatives.

Some investment banks own insurance companies in Bermuda – known as ‘transformers’ – to intermediate between insurance and derivatives/capital markets. For example, they may reinsure an insurer against catastrophe risk backed by issuance of catastrophe bonds; or sell protection using credit default swaps backed by reinsurance¹.

Recent legislation (Segregated Accounts Companies Act 2000) permits the creation of ‘protected cells’ within companies on which the assets are protected from the liabilities of other cells. These can be used, for example, to set up captives, special purpose vehicles and ‘transformers’ at low cost.

¹: See my article in the June 2001 *Review* for a more detailed explanation.

using insurance rather than derivative contracts, or via ‘transformer’ vehicles which convert derivative transactions into insurance (Box 6). Some of the larger general insurers have established ‘financial products’ subsidiaries, partly to give them greater flexibility to take on credit risk using derivatives. These subsidiaries are sometimes banks; or they may be based in jurisdictions where there are fewer restrictions on the types of contract which insurers can write (eg Bermuda, Box 6).

Some AAA-rated insurance companies do similar business to the monolines, selling protection on super-senior tranches of CDOs. A few other companies have established AAA-rated monoline

insurance (eg XL Capital Assurance) or reinsurance (eg ACE Guaranty Re, AXA Re Finance and XL Financial Assurance) subsidiaries for similar purposes. Some of the reinsurance subsidiaries also have other activities, such as selling protection on single name credit default swaps.

Further down the capital structure, a number of companies participate at different levels of seniority depending on their risk appetite and judgment about relative risk and return. Again, some have established specialist subsidiaries with ratings broadly equivalent to those of the risks that the company is taking, eg a double-A rated subsidiary company will underwrite double-A rated tranches.

More junior tranches, bearing significant credit risk, are more likely to be taken onto the balance sheets of a parent company. This allows the risk to be diversified across the company's other business lines whereas a specialist monoline subsidiary would need to hold substantial capital in order to retain an investment grade rating while taking sub-investment grade risks.

At the root of most general insurance companies' appetite for credit risk is a belief that it will be uncorrelated with much of their property and casualty business. Some, however, have sought to develop expertise in pricing risk to identify under-valued tranches, whether based on comparison with prices of comparable instruments or more fundamental analysis of expected cashflows. A number of specialist ('financial products' or 'financial solutions') units within large general insurers and reinsurers have moved beyond underwriting CDO tranches brought to them by investment banks to actively seeking out particular credit risk portfolios. This might mean taking the initiative to ask an investment bank to put together a particular portfolio in which the insurer wants to take an equity or mezzanine position; or looking to work with particular asset managers to establish a CBO. Some of these insurers have developed credit risk models to evaluate the performance of different tranches under a range of scenarios for the level and timing of defaults and default correlations across the portfolio; and to take positions based on any perceived pricing anomalies.

A form of 'reinsurance' market also exists for insurers to buy credit protection against particular names in a portfolio or against a part of the tranche of risk they have taken in a CDO or portfolio CDS. For example, an insurer that has taken on a mezzanine tranche exposing it to the first 3-8 per cent of credit losses on the portfolio might, in turn, be able to buy cover against its exposure to potential losses relating to a particular company in the portfolio or, alternatively, against, say, a 6-8 per cent tranche.

Finally, an alternative approach to credit risk transfer, offered by some reinsurers, is so-called *contingent capital*. This involves an insurer/reinsurer agreeing to subscribe for shares (they might be preference or ordinary) in a bank at a pre-determined price following a credit risk-related trigger – for example, if annual loan losses in the bank's portfolio exceed a threshold. Rather than agreeing to compensate the

bank following credit losses, the insurer or reinsurer commits to putting in capital that will be at risk to any further losses. So far, few contingent capital transactions appear to have been done.

Market risk: two way transfers

Whereas the net flow of credit risk transfer has been from banks to insurance companies in recent years, transfers of market risk have often been in the other direction.

Market risk transfers from banks to insurers

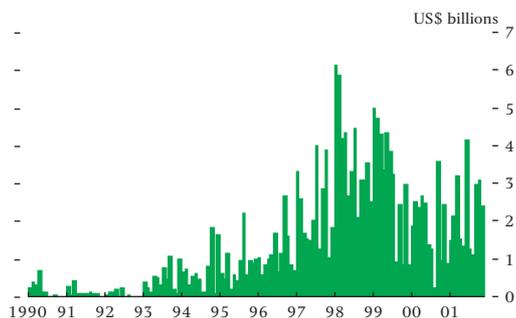
Some of the large *general insurers* and *reinsurers* have apparently nevertheless written out-of-the-money options on equity indices – in other words, taking short positions in equity market volatility – although it is unclear how much of this business has been done or remains outstanding. The more liquid markets in equity, interest rate and foreign exchange rate risk – in particular, option markets – may leave less room for profit than in credit protection markets.

Another area in which such general insurers/reinsurers are said to have provided protection against downside market risk is principal guarantees given to investors in managed equity funds and, more recently, funds of hedge funds. Some banks offer such principal protection to clients. They hedge themselves in different ways, one route being to enter into a put option or insurance policy with a large insurer or reinsurer.

Life insurers in some countries have also been willing to write options, typically on interest rates and foreign exchange rates. As with their involvement in credit markets described above, they are more likely to take the risk in a funded form in their large asset portfolios – for example, by purchasing a bond or medium-term note with an embedded call option. They are also more likely to write options that are close to the money in order to capture the premium in the form of a higher interest rate on the bond. Issuance of euro-denominated callable bonds by banks and securities dealers was particularly high in 1998-99 (Chart 5), perhaps partly reflecting demand by European life insurance companies.

In the same vein, German life insurers are said to have taken on similar risks in the form of promissory notes or *Schuldscheine*, issued by banks, which are only semi-tradable and have therefore been accounted for on an accruals basis rather than at market value.

Chart 5:
Euro-denominated^(a) callable bond issuance by banks



Source: Dealogic

(a) Euro area national currencies before 1999.

For banks, issuance of callable bonds – either themselves or by customers willing to sell them an over-the-counter (OTC) option matching the embedded option – is one way to obtain a long position in long-dated interest rate volatility. It can therefore enable them to cover any short positions incurred by writing long-dated interest rate options, eg for life insurance companies, discussed next.

Market risk transfers from insurers to banks/ capital markets

As described in the section on inter-sectoral credit risk transfers, a large part of the business of life insurance companies is to offer long-term savings products linked to insurance policies, such as pensions and life insurance. These products typically involve the following cashflows:

- The policyholder making an initial lump-sum payment and/or a series of regular payments to the company over the life of the product.
- The company making a payment to the policyholder at the maturity of the product (or earlier but deducting a penalty).
- In some cases, the policyholder having an option to convert this payment into an annuity on which the company will make regular payments until his or her death.

Guaranteed returns and/or annuity rates

In many countries, companies protect policyholders from some or all of the market risk on their products by guaranteeing returns. The guarantees may relate to the payment that the policyholder will receive at maturity and/or the rate of return on any annuity. In effect, options are embedded in the products.

Sometimes they are complex and often they have very long maturities so that, when aggregated, the portfolio risks can be challenging to measure and manage. The value of guaranteed annuities also depends crucially on how long policyholders live, exposing companies to longevity risk.

This practice of guaranteeing savings returns is common across the industrialised world, although the varieties of long-term saving product offered, and therefore the resulting portfolio characteristics, vary from country to country. In a number of European countries (eg Belgium, Denmark and Germany), life companies offered minimum guaranteed returns to policyholders of between 4 and 5 per cent in the early-1990s. Some such guarantees were fixed by regulation. As a general matter, the guaranteed rates have declined in line with lower long-term interest rates, but often for new business only. Japanese life insurers similarly committed to pay minimum guaranteed rates of return on long-term policies in the past, which now substantially exceed the very low nominal yen interest rates. In the United States, life insurers offer investment products with fixed or guaranteed minimum returns (guaranteed investment contracts or GICs) but they are usually for shorter maturities eg two to ten years.

Some life insurance products also offer policyholders guarantees, either explicit or implicit, related to equity returns. They might, for example, offer a share of returns in an equity index combined with a guaranteed return of principal at maturity. In some European countries (eg France), equity-linked retail products can be quite complex.

Risk management and hedging techniques

A pre-condition for effective management of the risks embedded in these portfolios is to recognise and monitor them. That can be complicated – for example, where policyholders have an option to surrender their policies early, or where the life company is holding long-term bonds on which the issuer has a call option (eg mortgage-backed securities). Both add risk: when interest rates fall, pre-payment risk on the bonds increases, whereas surrender rates on the underlying savings products should, in theory, decline as the value of the guaranteed return increases. While companies might be able to influence surrender rates by adjusting penalties (in effect, changing the price of the option),

surrenders are thought to be highly unpredictable in many markets.

Even where the risks can be measured with sufficient precision, hedging may be difficult if the embedded option is 'complex', in the sense of there not being a corresponding OTC market. In those circumstances, it might be necessary to unbundle the complex option into simpler components, for which OTC markets do provide hedging opportunities.

A variety of OTC derivative markets are used by life companies and pension plan providers, both to cover embedded optionality in their liability portfolios and to manage risk in their asset portfolios. For example, *equity-linked* products are typically hedged by purchases of equity index futures and options. These flows can be large in relation to the size of the equity derivatives market. Some life companies also use derivatives extensively as part of their investment strategy to manage the risk and return on their portfolios. Exposure to equity market volatility might be reduced, for example, by entering into equity index 'collars' in which they give up the benefit of a possible large increase in an equity index in return for protection if it falls significantly.

Various approaches seem to be employed in managing *interest rate*-related risks. For example, some life companies aim to eliminate exposure to interest rate risk by so far as possible matching liabilities with asset portfolios comprised largely (or completely) of bonds. This is, for example, a feature of the US market, where a large range of US dollar-denominated corporate and other bonds exist that can be held against a life fund's liabilities.

In Europe especially, some groups have sought to shed the risk from guaranteed returns via the derivatives markets. The closest hedge is to buy an option ('swaption'), exercisable at a future date, to enter into an interest rate swap in which the company would receive a fixed rate equal or near to the guaranteed minimum return on its portfolio of policies and pay a variable market rate for a defined period.

In the late 1990s, UK life insurance companies bought a large amount (perhaps over £10 billions) of sterling swaptions, typically with the right to enter into a long maturity (say, 15-year) swap a long time

into the future (say, 15 years)¹⁴. These might be an effective hedge for deferred annuities on which companies had guaranteed a minimum return; or for reinvestment risk where a company had purchased medium-maturity fixed rate bonds to back, say, a 30-year investment product carrying a guaranteed minimum return.

In Continental Europe, as discussed above, some life companies appear to have responded to the fall in long-term interest rates over the past few years by taking on more credit or interest rate risk in order to maintain yields on their assets. More recently, some guaranteed-return pension providers, including Danish funds, are said to have been significant buyers of euro swaptions.

Companies may enter into swaptions directly with investment banks. Where they act as principals, the banks may want to find an offsetting position in order to hedge their market risk. The markets in long-maturity volatility are, however, not liquid. Prices of long-dated interest rate options are heavily influenced by supply/demand balances, as evidenced by variations in derived long-dated implied volatilities across different currencies and over time. For example, as Chart 6 shows, long-dated sterling interest rate volatility spiked up sharply in 1999, when UK life companies are thought to have been heavy buyers of swaptions. And more recently, possibly reflecting Continental fund swaption purchases, long-dated euro volatility has risen.

Chart 6:
Implied volatility from 15 year/15 year swaptions in selected currencies



Source: Deutsche Bank.

Banks nevertheless have a variety of hedging strategies potentially available to them. One is to find

14: See, for example, Risk Magazine (1999) 'Sterling Swaptions under New Scrutiny', December and 'Sterling Swaptions: Volatility by the Pound', September.

an offsetting position through the flows they intermediate. For example, in 1996/98 some hedge funds (eg Long Term Capital Management) were large speculators in long-dated interest rate markets. But market contacts suggest that neither hedge funds nor proprietary trading desks are taking significant positions in these markets at present. Alternatively they might issue – or arrange for a customer to issue – bonds with embedded interest rate options, as described above.

A second route is for banks to delta-hedge their position dynamically, by entering into/closing out long-dated swaps or buying/selling long-dated government bonds as underlying interest rates change¹⁵. If the swaption is nearly at-the-money, the rate of change in the delta (gamma) is high, giving rise to potentially large flows in the underlying markets.

A third hedging strategy – perhaps used by some banks hedging sterling swaptions in the late-1990s – is to buy swaptions in another currency, taking the risk that interest rates might differ and on the exchange rate. The exchange rate risk can, in theory, be removed by purchasing so-called ‘quanto’ swaptions that give the right to exchange fixed for floating rate cashflows in one currency but with payments made in another at a fixed exchange rate.

As well as market risk, banks can also face substantial counterparty credit risks on such long-dated OTC derivatives. One way to address them is for the bank to arrange for a customer to issue a bond to the life insurer that includes an embedded swaption, perhaps with the bank selling the customer a matching (‘back-to-back’) swaption. If the customer is highly creditworthy, counterparty risk is reduced for bank and insurer. Some insurers might also face regulatory restrictions on entering into derivatives but not on purchasing bonds. For example, in 1998, the European Bank for Reconstruction and Development and the European Investment Bank both issued £530 million 40-year notes with complex interest payments and principal amortisation schedules linked to swap rates and mortality rates. Reportedly the bonds were purchased by a UK life insurance company as a hedge for its guaranteed annuity book.

Reinsurance companies also offer policies to life insurance companies as an alternative way of hedging

guaranteed returns and annuities. These might include surrender and mortality rates among triggers as well as interest rates. According to insurers, however, capacity for reinsuring longevity risk is limited because of its very long duration and the limited range of offsetting risks that reinsurers might add to their portfolio.

Insurance risks: transfers to capital markets

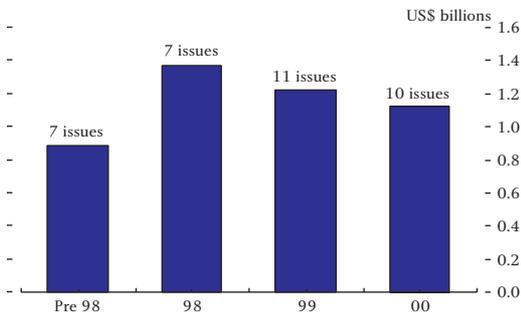
Insurance risks are defined broadly as those fortuitous, non-financial risks for which insurance companies typically offer cover, eg accident, natural disaster, death or illness, third party liability etc. Insurance companies have, over the past few years, begun to securitise insurance risks, principally related to natural catastrophes, and so transfer them to capital market investors.

The main instrument has been catastrophe bonds. Following a defined natural catastrophe, typically an earthquake or windstorm, the maturity of most of these bonds extends to allow for a ‘loss development period’, during which the amount of losses falling on the bondholders is determined. Interest and principal are then reduced accordingly, so that, in design, they are broadly analogous to credit-linked notes. Catastrophe bonds are issued for the benefit of general insurers or reinsurers as an alternative to purchasing excess-of-loss reinsurance. Typically they are issued via vehicle companies that invest the proceeds in high-quality securities for the benefit of the noteholders or (following a triggering event) the insurance company.

Unlike reinsurance, cashflows on most recent catastrophe bonds have been linked to external indices of either industry insurance losses following a disaster or direct measures of its severity (so-called ‘parametric’ triggers, like indices of the magnitude of an earthquake) rather than the consequent insurance losses to the particular issuer. This gives greater certainty to investors but exposes the insurer to the risk that its losses are imperfectly correlated with the index. A number of insurance and reinsurance companies have issued catastrophe bonds but the overall transfer of risk has been relatively small in relation to the size of the catastrophe reinsurance market (Chart 7).

15: See ‘Over-the-Counter Interest Rate Options’ Richhild Moessner, *Bank of England Quarterly Bulletin*, Summer 2001.

Chart 7:
Global issuance of catastrophe bonds



Source: Lane Financial.

Catastrophe bonds have been arranged and distributed by both investment banks and insurance brokers. With the exception of perhaps a score of investors in Europe and Asia, the main investors are said to have been US institutions, including a significant number of insurance and reinsurance companies – another indicator that the extent of risk redistribution has been limited so far.

According to market participants, the relative cost of bond issuance has been higher than reinsurance, although this balance may change as the technique becomes established (reducing legal costs), as investors obtain any necessary authorisations from trustees and regulators to purchase the bonds, and if reinsurance rates increase (as some expect following the terrorist attacks on the United States on 11 September).

Other types of insurance risk have also been securitised on a limited scale, including some risks associated with life insurance. For example, growing life insurance companies can have negative cashflow because the cost of obtaining new customers (marketing, sales commissions etc) exceeds policy contributions and investment income in the early years (so-called ‘new business strain’). Securitising future revenues from life insurance or pensions policies already in force is one way to finance growth. This is principally a financing transaction, although investors are exposed to the risks of higher-than-expected policyholder surrender and mortality rates.

Issues and questions

This broad-brush picture of the various risk transfers between the banking and insurance sectors suggests

growing interdependence. Banks are shedding credit and some market risk to insurance companies, while life insurance companies, in particular, are beginning to use capital markets to hedge the significant market risks embedded in their portfolios of retail savings products. By contrast, transfers of insurance risk (eg via catastrophe bonds) outside the insurance sector seem so far to have remained small.

From the perspective of financial stability, markets for risk transfer are, in principle, beneficial because they allow greater dispersion of risk. On the face of it, financial institutions need not be disproportionately exposed to particular credit, market or insurance risks as an unwanted by-product of providing to customers the services in which they have a comparative advantage. They can, in consequence, make themselves less vulnerable than otherwise to particular regional, sectoral or market shocks. The bundling and unbundling, slicing and dicing of risks made possible by financial engineering aids this process. It makes it easier for institutions to take a share of the risk in a portfolio with the degree of leverage that suits their appetite for risk and return.

Tracking credit risk in the system

But it is important to track whether or not concentrations of risk might decline in some places only to re-emerge in others. Unfunded risk transfer is, for example, more difficult to monitor from the available published statistics, potentially making any new concentrations less transparent. In contrast, data on banking flows and public bond issuance are available: for example, the BIS banking statistics on cross-border banking claims and a number of commercial databases of securities issuance. If flows of risk are not accompanied by flows of funds (eg insurance or derivatives), they become harder to track, in aggregate, from such public data sources¹⁶.

Micro-monitoring of risk transfers should, nevertheless, be possible for individual firms and regulators, albeit perhaps without the benefit of the context provided by a broader macroprudential picture. This article has tentatively suggested where certain types of risk might lie:

- Life insurance companies in some Continental European countries and perhaps Japan have taken on more credit risk in recent years, including

¹⁶: See, for example, Box 2 in ‘Financial flows via offshore financial centres as part of the international financial system’, Liz Dixon, June 2001 *Review*.

investments in the more leveraged, junior tranches of CDOs. In some cases, this seems to have reflected a search for higher risk/return investments, perhaps also manifested in demand for bonds with embedded (written) interest rate options, implying exposure to any rise in volatility.

- The monoline credit insurers are involved in a range of portfolio credit risk transfer markets (eg ABS, CDO, portfolio CDS and ABCP). In each case, they offer unfunded 'out-of-the-money' credit protection that would lead them to be exposed only in relatively extreme credit conditions, at or towards the tail of the *ex ante* distribution of possible loss outcomes.
- Large international general insurance and reinsurance companies have also taken on credit and, in some cases, market risk through risk transfer markets. It is impossible to make general statements about their strategies. Different companies make different risk/return trade offs. But most seem to prefer to take unfunded risk.

At the level of individual firms, it is, of course, for management, creditors and regulators to assess whether taking on additional credit risk (sometimes leveraged) through these markets is appropriate in the context of each company's balance sheet and capital adequacy.

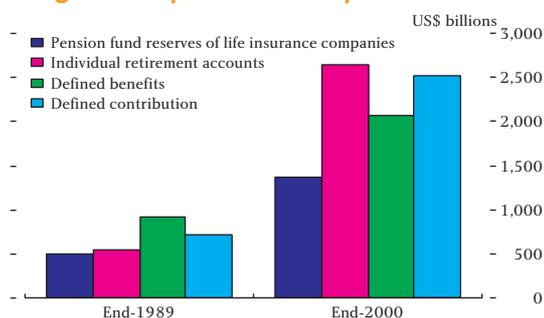
Tracking market risk in the system: who bears the risk on long-term household savings?

Broadly similar issues arise with exposures to market risk on household long-term savings products. *Life insurance companies* in several countries have assumed some of this risk by not matching the maturity and risk/return characteristics of their investments fully to those of their guaranteed liabilities. Some are beginning to use derivatives (eg swaptions) to reduce these mismatches. As intermediaries for such transactions, *banks* will typically seek to hedge their positions, but long-dated derivatives markets are illiquid. That potentially makes these transactions difficult to price and hedge unless, perhaps, the banks concerned have a large and varied customer base giving them access to, or the ability to arrange, offsetting transactions. *Reinsurers* offer policies with similar economic effects and may be more likely to retain the risk. *Companies* bear some risk through

defined benefit pension schemes or by issuing long-dated, fixed-rate bonds to households or intermediaries. *Governments* also issue long-dated bonds¹⁷ or they may take on the risk directly through different forms of state pension and savings arrangements.

In most countries, however, life insurers, companies and governments are seeking to reduce the extent of such risk-bearing, leaving *households* to shoulder more themselves. For example, in the United States, the value of assets held in defined contribution pensions schemes and individual retirement accounts has grown rapidly since 1989, outstripping growth in defined benefit pension schemes (Chart 8).

Chart 8:
Change in composition of US pensions



Source: Board of Governors of the Federal Reserve System.

For financial stability analysis, it is important to know who bears the risk on long-term household savings given the associated exposures to declines in financial asset prices and to secular shifts in the term structure of interest rates. To the extent that risk is held within the financial sector, market movements might affect stability directly, depending on the financial strength of firms, whether through trading losses at banks or, probably in a longer time-frame, through losses to insurance companies arising from mismatches between assets and liabilities.

As with credit risk, the first lines of defence are firm-level risk management, and regulatory oversight. There may, though, also be broader questions about where market risk on long-term household savings would most desirably lie.

Bank counterparty risk on insurance companies

From a wider financial stability perspective, an important question is the extent that banks and

17: See Bruce Devine and Stephen Senior (2001) 'Public Sector Debt: end-March 2001', *Bank of England Quarterly Bulletin*, Winter.

insurance companies are becoming inter-dependent. To the extent that risk transfer is fully funded through securitisation or embedding derivatives in bonds, it does not expose banks to counterparty risk. Banks may, however, have large and potentially long-dated counterparty exposures arising from unfunded transactions, increasing their need for timely information to assess insurance company creditworthiness¹⁸. Some are introducing collateral management agreements with the more active insurance companies, allowing for the mark-to-market value of exposures to be collateralised. Collateralisation cannot easily eliminate counterparty risk on credit-related transactions, however, because exposures can increase very sharply if the creditworthiness of a reference entity deteriorates quickly. Also, some insurance companies are subject to regulatory restrictions on giving collateral.

Extreme ‘excess-of-loss’ credit protection

In portfolio credit risk transfer markets, potential bank counterparty exposures are greater (typically high nominal value, low risk) at the more senior end of the capital structure, where risk transfer is often unfunded. Reflecting the direction of risk transfer, banks would be more likely to have counterparty exposures to insurance companies in times of increasing credit risk and vice versa. Concentration of risk may be unavoidable here. In some large CDO transactions it may become prohibitively expensive to fund portfolio credit risk transfer beyond a certain point on the loss distribution. Other options are retention of the residual risk or, alternatively, unfunded risk transfer using derivatives, insurance or guarantees. But only the most creditworthy institutions can provide a guarantee that has any value in such extreme credit conditions because of the potential impact on their own ability to pay. Such institutions must either be government-guaranteed (eg the German landesbanks are thought to have done such business), extremely large and well-diversified, and/or highly risk averse overall. Especially with the withdrawal of government guarantees on financial institutions in most developed countries, they are in the future likely to be fewer in number.

The monolines are able to sell credit protection against extreme events partly because of their risk-averse underwriting policies, which helps them to preserve a triple-A rating. But, equally, the capital requirements applied to them by the rating agencies in order to maintain the triple-A rating seem to limit to investment grade the exposures that they are able to take economically.

Buyers of unfunded protection against more extreme credit losses on portfolios make their own judgment about whether the protection seller will be able to perform in such circumstances, taking account of the other likely calls on their capital and liquidity from other business they have written. In the case of the monolines, the rating agencies address such questions through stress tests based on either the 1930s Depression or factor models and Monte Carlo-type simulations¹⁹; some of the monolines themselves also have portfolio credit risk models. Financial stability authorities have an interest in understanding those institutions that might be seriously exposed in circumstances of extremely high credit losses, and hence incipient if not actual financial instability, especially if a wide range of other market participants expected to rely on them.

Behavioural consequences of external ratings-based regimes

Some types of investor seek credit protection against extreme credit events not just because it is valuable to them but also because they face regulatory or other incentives to purchase assets having at least a specified minimum rating. One important example is US money-market mutual funds, which are subject to limits on their holdings of commercial paper rated below A1/P1. In the ABCP market, this in turn creates pressure for ABCP vehicles to hold double-A or triple-A rated²⁰ securities in order to meet rating agency requirements for an A1/P1 rating of their commercial paper (Box 4). Another example is the regulatory regime for the asset portfolios held by US insurance companies, which applies differential capital weightings according to the rating of the securities.

18: The recommendations of the Counterparty Risk Management Policy Group *Improving Counterparty Risk Management Practices*, June 1999 are relevant in this context.

19: See for example, the rating agency publications available from Association of Financial Guaranty Insurers (www.agfi.org).

20: Often on the basis of a monoline ‘wrap’ (Box 5).

One question about such external ratings-based regulatory regimes is whether they encourage investors to buy securities based on the rating rather than making their own credit assessment, including evaluating any credit enhancement. Ratings are simply credit *opinions*. Indeed, 'hard-wiring' regulatory regimes to external ratings may make it more difficult for the rating agencies to form objective opinions because their actions might have significant, unintended, behavioural consequences. In framing a revised capital regime for banks' investments in securitised assets, the Basel Committee on Banking Supervision is giving careful consideration to the behavioural consequences of any approach based on external ratings only²¹. It is seeking to achieve neutrality of treatment for the same assets, whether banks hold them directly or indirectly through tranches of a securitised portfolio.

Regulatory arbitrage

The proposed changes to the Basel Accord will address two key areas in which regulatory capital requirements for credit risk have been out of line with economic capital – the minimum 8 per cent capital requirement on lending to high-quality companies and the 0 per cent capital requirement for undrawn commitments of under one year. The first has encouraged banks to shed high-quality assets using, for example, CDOs; while the second has led banks to finance assets through ABCP programmes, providing liquidity lines that often function as credit enhancement.

It is clear, however, that risk transfer between banks and insurance companies is not simply a product of regulatory differences. Furthermore, it is not *necessarily* a sign of bad regulatory design that institutions have regulatory incentives for risk transfer: in other words, that they are not subject to identical capital and other regulatory requirements for every instrument and transaction type. Regulation of different types of financial institution may have different objectives and a redistribution of risk may be entirely consistent with these. But it is clearly important to monitor risk transfers carefully as an indicator of possible regulatory differences. The recent report *Risk Management Practices and Regulatory Capital: Cross Sectoral Comparisons* by the Joint Forum

of international banking, securities and insurance regulators is a welcome contribution to this type of analysis²². It will also be important to understand not just how the new Basel proposals will change capital requirements on banks' existing portfolios, but also the incentives they will give banks to alter those portfolios.

To what extent might credit risk return to the banking sector?

This question can be answered at different levels. A first is whether the techniques used to transfer credit risk leave banks with residual risks, whether contractual or implicit. The clearest example is the ABCP market, in which most banks recognise that a large number of the liquidity lines that they provide to ABCP vehicles expose them to some or all of the credit risk on the asset portfolios.

Where banks have genuinely transferred credit risk, a second question is whether the appetite of the risk takers will be sustained. Some have questioned to what extent the involvement of general insurers and reinsurers in credit risk markets is a secular trend or a temporary phenomenon, reflecting the low returns in many insurance markets in the late-1990s. Another possibility is that general insurers, reinsurers and life insurers might reduce their asset allocation to credit risk if losses were to increase materially during the current economic slowdown after a period of uninterrupted economic growth in which losses were low. It is too early to tell on both questions. For general insurers and reinsurers, a key issue will be whether credit risk adds to the diversification of risk across their overall portfolio in the way expected.

At a third, and perhaps deeper, level the extent that the banking system can change from being the 'originator and holder' to 'originator and distributor' of credit risk may be limited by the close link between credit and provision of liquidity. Credit risk is being transferred from banks to insurance companies and other capital market investors. But if credit losses crystallise in stressed market conditions, insurance companies may need to have recourse to the banking system in order to meet their obligations under credit risk transfer instruments, which typically require more prompt settlement than insurance claims. And

21: *Working Paper on the Treatment of Asset Securitizations*, 5 October 2001 (www.bis.org).

22: Available at www.bis.org.

in precisely those circumstances, corporate customers or ABCP conduits might need to draw down committed credit lines from banks. At this fundamental level, the banking system is likely to remain the final source of liquidity, and therefore contingent taker of the associated credit risk, for as long as bank liabilities (deposits) are regarded as uniquely liquid.

Analysing corporate and household sector balance sheets

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One of the Bank of England's current objectives is to develop a more quantitative framework for the calibration and analysis of risks to financial stability in the UK. This paper reports on one possible approach to assessing risks in the UK corporate and household sectors, which together account for about half of the UK banking sector's total exposures. The approach links these exposures to key macroeconomic factors, but it also takes into account microeconomic influences arising from the distribution of debt among individual companies and households. The article also shows how the framework can be used in regular surveillance, in the generation of projections and analysis of the risks to those projections, and in the exploration of stress-testing scenarios.

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accounts for about half of the UK-owned banking sector's balance sheet. Assessing the risk in this business is, therefore, a key ingredient in the Bank's financial stability analysis, the more so because private sector debt in the UK has risen in recent years to historically high levels relative to income.

An assessment of the degree of risk calls for forward-looking analysis. This article suggests that this can be approached in two steps. The first is to relate the aggregate balance sheets and risks of default in the corporate and household sectors to a model of the macroeconomy. The second is to incorporate information on the distribution of indebtedness across different borrowers. This overall approach can be used to generate projections for the amount of 'debt at risk' in the two sectors and to assess how it would be affected by different macroeconomic conditions. Of course, the output of this approach cannot be interpreted mechanistically, but needs to be looked at alongside other sources of information, including market intelligence and business surveys.

The article describes briefly the model that has been developed; illustrates how it can generate projections for balance sheet variables and debt at risk; reports a preliminary exploration of the use of stochastic

methods to gauge uncertainty for the evolution of key variables; and outlines how the model can be employed to evaluate the sensitivity of financial indicators to unexpected events ('stress testing'). The techniques discussed for assessing the probability distribution of risk are preliminary and other approaches may turn out to be preferable.

The work reported is part of a broader programme underway in the Bank to supplement qualitative with quantitative assessments of the strength and potential vulnerabilities of the financial system, as reflected in the fourth of the Bank's 2000-01 objectives (Bank of England *Annual Report, 2001*).

Analysing corporate and household sector loan risk

For a lending banker, the expected loss on a loan reflects the product of the probability of default and the expected loss in the event of default. The latter so-called 'loss-given-default' represents what cannot be recovered from the borrower because of a deficiency in net assets, taking account of realisable collateral held against the loan.

A cruder way of measuring the riskiness of a portfolio is the 'debt at risk' over a particular period. This is defined as the sum of all loans outstanding, weighted by the probability that each borrower will default

within that period, but not including any estimate of loss-given-default¹.

The same concept may, alternatively, be expressed as the product of three components: the average failure rate for a portfolio of loans (ie the number of failed loans as a proportion of the number of loans), the total amount of loans in the portfolio, and the concentration of debt among risky borrowers. This is important in analysing debt at risk in individual sectors where information is only available on the average failure rate (eg the corporate liquidations rate) and not on the value of the failing loans².

An advantage of this formulation is that it shows how debt at risk is determined by both aggregate factors and the distribution of debt among individual borrowers, and so enables the effect of the latter to be analysed. Empirical evidence³, including recent work at the Bank of England⁴, has shown that the main explanations of *corporate* failure in the UK include cyclically low output, low profitability (as represented inversely by real unit labour costs), high levels of indebtedness and high real interest rates. Similarly, for the *household* sector, while factors specific to individual borrowers, such as marital breakdown, can lead to default, debt failure is strongly related to the overall state of the economy, eg high real and nominal interest rates and indebtedness as well as high and rising unemployment (see Brookes *et al* 1992, King 1994).

This suggests that explanations and predictions of aggregate failure rates need to be worked out consistently with analyses of the development of the overall economy. The Bank of England medium-term macroeconometric model (MTMM) provides one suitable framework for this purpose (Bank of England 2000). A set of relationships has been added to that model to facilitate analysis and forecasting of corporate and household balance sheets and probabilities of default (see Annex). For the most part, the added relationships are identities that specify the financial implications of the income and expenditure

functions already included in the model. Some behavioural relationships have been added, but these are intentionally simple. In particular, feedback mechanisms by which companies and households might attempt to adjust their balance sheets have not been incorporated, although some degree of balance sheet control in the household sector is already included within the model through the dependence of consumption on wealth. New adjustment mechanisms have not been added, so that the projections derived from the model may draw attention to possible underlying strengths or strains in sectoral balance sheets. Since any adjustments would tend to improve balance sheets, projections made without an explicit adjustment mechanism are more likely to be over-pessimistic than over-optimistic.

The projections reported below of a selection of financial variables and the amount of debt at risk are derived from the broad macroeconomic assumptions in the August 2001 *Inflation Report*, including interest rates constant at the then level of 5 per cent. They are deliberately, therefore, not up-to-date projections as they ignore the news about the macroeconomic environment since August and, of course, changes in interest rates here and overseas. They are, instead, designed to illustrate a number of techniques and the kind of forward-looking analysis they facilitate.

Companies

As an identity, corporate indebtedness increases to reflect the amount by which investment spending exceeds the funds available from retained profits (profits not paid out as interest, tax or dividends) or new equity issues. Nominal investment spending and profits are determined implicitly and taxes explicitly within the MTMM, but additional equations for dividend and interest payments are required to derive corporate saving, namely the amount of profit retained to finance investment. While interest payments are implied by the relationship between interest rates and the outstanding stock of debt, companies have considerable discretion as to how

1: That is, $DAR_t = \sum p_{it} D_{it}$ where p_{it} is the probability that borrower i defaults at date t and D_{it} is the amount of debt outstanding to borrower i at that date. The debt at risk is here defined *ex ante*, ie looking forward over the uncertain future. Looking backwards, failure either occurred at date t or it did not, so that p_{it} is either one or zero. In that case, the *ex post* debt at risk at any date is the total amount of debt owed by those who failed.

2: Specifically, $DAR_t = \bar{p}_t D_t I_t$ where \bar{p}_t is the average (unweighted) failure rate in the portfolio, D_t is the total stock of loans outstanding and I_t is an index of the concentration of risk among individual borrowers given by $I_t = \frac{\sum (p_{it} D_{it})}{\bar{p}_t D_t}$

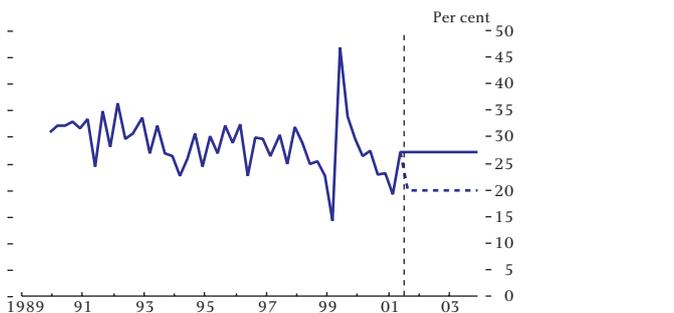
3: For example, Wadhvani (1986), Young (1995). See also Geroski and Gregg (1997) for firm-level evidence for the recession of the early-1990s.

4: This is described in Vlieghe (2001).

much of their profits to pay out to shareholders in the form of dividends⁵. Corporate dividend distributions are modelled here as a simple, fixed proportion of post-interest profits (an alternative assumption would be constant real dividend growth).

To illustrate the sensitivity of projections to different assumptions about company behaviour, two alternative cases are considered, as shown in Chart 1. In the first, the ratio of dividend payments by private non-financial companies (PNFCs) to post-interest profits remains at the level reached in the second quarter of 2001, while in the second case (shown by the dotted line) this ratio is assumed to fall back in the third quarter of 2001 to the level reached in the first quarter. The reason for focusing on this aspect of corporate behaviour is that it falls under the direct control of companies, has a relatively straightforward impact on the balance sheet and feeds into household incomes. Of course, dividends are not the only payments that are uncertain or at the discretion of a company's management. The impact of uncertainty more generally is discussed in the next section.

Chart 1:
Dividend distributions as a share of PNFCs' post-interest profits^(a)



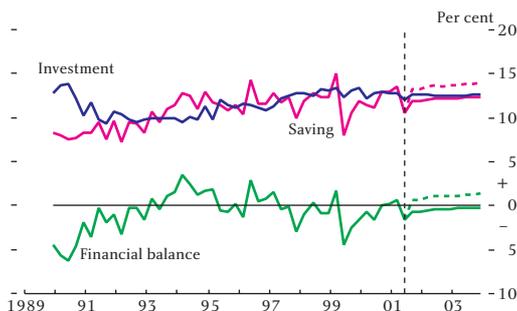
Sources: ONS and Bank calculations.
(a) The solid line after 2001 Q2 represents the high dividend case, and the dashed line represents the low dividend case.

Chart 2 shows saving, investment and the financial balance of PNFCs over the recent past, together with illustrative projections based on the two different assumptions about future dividend policy. The solid lines show the high dividend case while the low dividend case is shown by the dotted lines. In the high dividend projection there was a continuing, but narrowing, financial deficit of around 1/2 per cent of GDP, while in the low dividend case the financial

position of the corporate sector prospectively moved into a surplus of around 1 per cent of GDP by end-2003.

The impact of any financial deficit on indebtedness and the balance sheet depends on how it is financed. By definition, debt accumulates from net borrowing after allowing for net equity issues and other residual finance. Net equity finance and other residual finance are projected on the basis of very simple assumptions (no change from the recent level of new equity finance and zero residual finance), although in practice they are highly volatile. The total market value of equity is assumed to move in proportion to changes in equity prices. In the MTMM, equity prices are in turn assumed to increase in line with nominal GDP. (An alternative for financial stability analysis would be to allow equity prices to be influenced by the mix of debt and equity, but in practice this would be unlikely to improve their predictability, since the volatility of corporate valuations has tended to be very large relative to movements in financing flows.)

Chart 2:
Saving, investment and financial balance of PNFCs as a percentage of GDP^(a)



Sources: ONS and Bank calculations.
(a) The solid lines after 2001 Q2 represent the high dividend case, and the dashed lines represent the low dividend case.

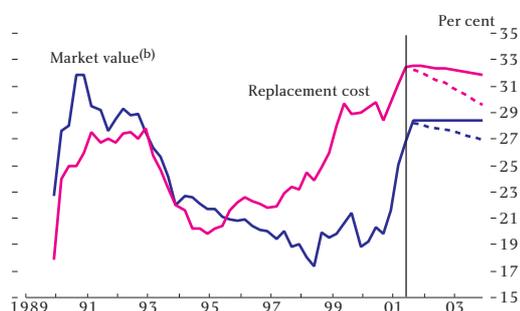
Chart 3 shows the implications of the model for capital gearing, ie the net debt of the PNFC sector as a proportion of its capital stock, measured both at replacement cost and at market value.

The paths of gearing under the different assumptions about dividend behaviour provide one example of the extent to which companies can control their balance sheets. Lower dividend payments (dotted lines) leave firms with more funds to repay debt. Even if companies seek to reduce net borrowing sharply, as in

⁵ See Benito, A and Young, G (2001).

the low dividend case, it takes time for this to affect the stock of debt and the measures of gearing. Furthermore, gearing can change sharply when measured against the market value of companies as a consequence of changes in equity prices. The significantly larger rise in corporate gearing at market prices than at replacement cost during the past year reflects the substantial falls in equity prices over this period. Chart 3 shows that, on the basis of the August 2001 assumptions, both measures of gearing were projected to reach historically high levels by the second half of this year. Moreover, even in the low dividend case both measures were projected to remain close to historically high levels throughout 2002-03.

Chart 3:
PNFC capital gearing^(a)



Sources: ONS and Bank calculations.

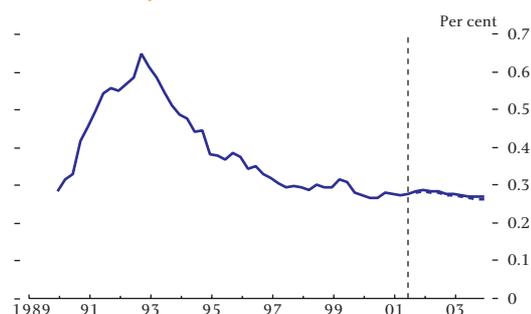
(a) The solid lines after 2001 Q2 represent the high dividend case, and the dashed lines represent the low dividend case.

(b) PNFCs' net debt divided by the sum of the net debt and market value of equity.

The projected level of gearing can be mapped into one for corporate failure. This relationship is modelled using the preferred equation of Vlieghe (2001).⁶ Chart 4 shows the projected evolution of the corporate liquidations rate, taking account of the different paths of the explanatory variables. The projected liquidations rate broadly stabilised at current historically low levels. Moreover, it was hardly affected by the different levels of indebtedness generated by different dividend policies. This suggests that high capital gearing has not in the past been sufficient in itself to provoke widespread corporate failure. In the late 1980s and early 1990s, it was the combination of high gearing, high real and nominal interest rates and the reduction in aggregate demand generally that brought about a high level of liquidations. In the outline projections, by contrast, the corporate liquidations rate remained at around

current levels because the beneficial effects of continued relatively modest real interest rates and further growth in effective demand largely offset the adverse effect of high corporate indebtedness.

Chart 4:
Quarterly corporate liquidations as percentage of the stock of companies^(a)



Sources: DTI and Bank calculations.

(a) The solid line after 2001 Q2 represents the high dividend case, and the dashed line represents the low dividend case.

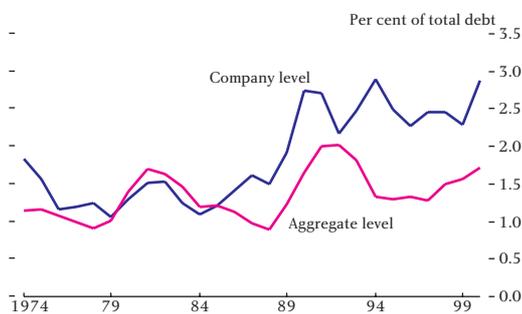
In addition to estimates of the aggregate (unweighted) failure rate and the total amount of debt outstanding, some measure of the distribution of debt is required to derive a measure of the overall debt at risk in the corporate sector. Depending on the circumstances, the debt stock may be skewed toward companies with higher or lower-than-average risk of failure, in which cases a purely aggregate measure would provide a misleadingly reassuring (or concerning) indicator. An index of debt concentration among a set of companies requires an estimate of the probability of failure of individual companies. There are various ways of providing these probability estimates. As a provisional step, the measure employed here is based on cross-section studies using data for quoted companies during the late 1980s/early 1990s. This may not be the best estimate for current circumstances, and work is therefore in progress to examine the performance of this model in tracking company failure. It is employed here solely in order to illustrate how the general technique works in the context of macromodel-based projections.

The cross-sectional measure of the probability that a company fails in a particular year is constructed from information on its financial position, using estimates of the effects of profitability and gearing on the probability of failure reported by Geroski and Gregg

6: Gertjan Vlieghe's work is also discussed in the *Review*, December 2000, p.71.

(1997),⁷ together with values of these variables in company accounts data collected from Thomson Financial Datastream. From this, a company-level predicted probability of failure for each quoted company is produced.⁸ An *ex ante* measure of debt at risk among the set of quoted companies is derived by multiplying the gross debt of each company by its predicted probability of failure, and then summing over all companies. A time series is shown in Chart 5 (as the company-level debt at risk) and compared with a measure that multiplies the total debt stock of these same companies by the unweighted *average* predicted probability of failure. This latter is calculated as the mean of the individual company probabilities of failure, using the Geroski-Gregg measures, and therefore does *not* take account of the distribution of debt.⁹

Chart 5:
Debt at risk among quoted companies^(a)



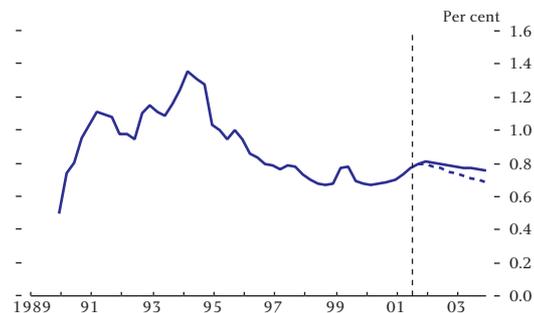
Sources: ONS and Bank calculations.
(a) See text for definitions.

The company-level measure of debt at risk is estimated to be larger than the aggregate measure since the mid-1980s, suggesting that higher-risk companies have carried higher debt since then. That is not entirely surprising, of course, given that the predicted probabilities of default are, among other influences, a positive function of gearing. By contrast, debt seems not to have been concentrated among higher risk companies during the early 1980s. Taken together, this may suggest that the recessions of the early 1980s and early 1990s were rather different in terms of their implications for defaults on debt. That would be consistent with Vlieghe (2001), who argued that the increase in liquidations in the early 1990s was aggravated by the rapid increase in indebtedness

of the late 1980s. It also suggests that debt played a less important role in the recession and increase in liquidations in the early 1980s than it did in the early 1990s.

Quoted company-level information can be incorporated into an estimate of aggregate debt at risk by assuming that the concentration of debt among quoted companies is typical of the company sector as a whole. This is clearly an approximation that will be investigated further in due course. Such an estimate shows that, in the early 1990s, loans worth about 1¼ per cent of GDP could have been considered at risk of default. Chart 6 shows that, using the August assumptions, debt at risk on the same measure was projected to rise a little in the near future in the high dividend case, and to stabilise and then fall in the low dividend case (dotted line). In both scenarios, however, it remained well below 1 per cent of GDP.

Chart 6:
Corporate debt at risk as a percentage of GDP^(a)



Sources: ONS and Bank calculations.
(a) The solid line after 2001 Q2 represents the high dividend case, and the dashed line represents the low dividend case.

Households

There are a number of ways in which the household balance sheet could be modelled, including portfolio allocation models based on the risks and returns associated with different assets (eg Barr and Cuthbertson 1991). As with the analysis of the corporate sector, the approach taken here is deliberately much simpler. The balance sheet is split into its key components, which are then used to show how net lending is financed. On the liabilities side, the main categories are mortgage debt and other

7: These estimates are from the 1991-92 period. Geroski and Gregg also estimate the model for 1988-90. Capital gearing is defined as the ratio of net debt to capital stock at replacement cost; profitability is the ratio of earnings before interest and taxes to company sales.

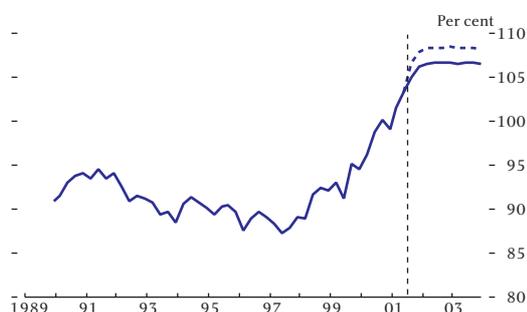
8: Quoted companies had total gross debt outstanding of £244 billion in 1999, accounting for about half of all loans to PNFCs (£493 billion at the end of 1999).

9: The time series of company debt at risk should be treated with caution as it is derived from cross-section data.

borrowing, roughly corresponding to secured and unsecured credit; on the assets side, they are liquid assets, equity directly held and equity held through investments in life assurance and pension funds and other collective schemes. In the model, mortgage debt is set to grow in line with the value of the housing stock, while other credit either grows in line with nominal GDP or is determined by a behavioural relationship in which it grows in line with nominal GDP in the long run. Both of these are independent of households' net lending to other sectors (ie the household sector financial balance), which instead affects the asset side of the balance sheet. Gross lending – net lending plus new borrowing – then gets allocated to financial assets using a simple formula.

As a proportion of household disposable income, total household debt, including both mortgages and consumer credit, has risen to levels well in excess of those prevailing in the early 1990s. A projection based on the August 2001 Inflation Report assumptions showed it rising further in the high-dividend payout case before stabilising (Chart 7). Under the lower-dividend payout rule (dotted line), the ratio of household debt to income still stabilised, but at a higher level than under the high-dividend payout rule, reflecting lower household incomes. This change illustrates the relationship between sectoral flows. Adjustments intended to repair corporate balance sheets can have adverse implications for household incomes. In this example, the bulk of firms' dividend payments accrue to households, whether directly or indirectly.

Chart 7:
Household gross debt in relation to disposable income^(a)



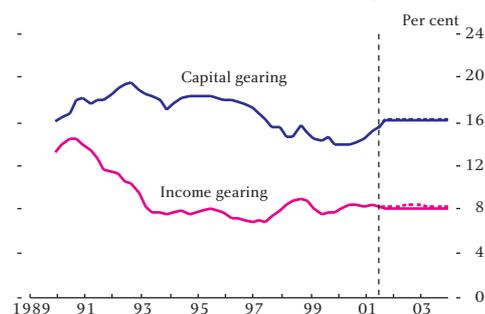
Sources: ONS and Bank calculations.

(a) The solid line after 2001 Q2 represents the high dividend case, and the dashed line represents the low dividend case.

Chart 8 shows, however, that household gross income gearing and capital gearing have recently been lower,

and were projected to remain lower, than in the early 1990s, reflecting much lower official and market interest rates and more highly valued assets. The issue for the financial fragility of the sector is how quickly balance sheets could be adjusted were, for example, asset prices to fall sharply for any reason.

Chart 8:
Household gross income and capital gearing^(a)

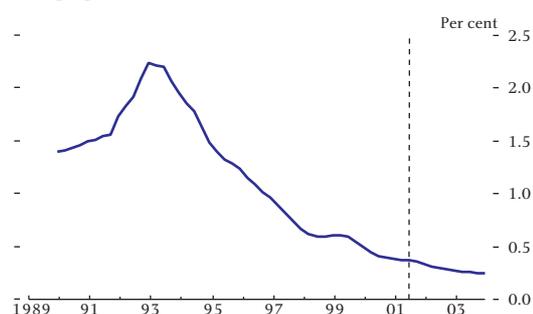


Sources: ONS and Bank calculations.

(a) The solid line after 2001 Q2 represents the high dividend case, and the dashed line represents the low dividend case.

In the model described here, income gearing is one of the main determinants of mortgage arrears (in excess of six months), the other factors being the unemployment rate and the amount of undrawn equity in houses. All of these factors have been benign in recent years, and this helps to explain low mortgage arrears. Chart 9 shows that, together with a forward projection based on the August 2001 assumptions.

Chart 9:
Mortgage arrears^(a)



Sources: Council of Mortgage Lenders and Bank calculations.

(a) Percentage of mortgages in arrears for more than six months.

As with companies, the extent of any household debt problems depends on how debt is distributed. Similar methods can in principle be employed given the availability of suitable data. Possible sources are the British Household Panel Survey and the Family Expenditure Survey. An index of debt concentration,

derived by dividing a household-level measure of debt at risk by an aggregate measure, indicates, provisionally, that debt has been more evenly distributed since the early 1990s. The variation in this index is much smaller than for companies, suggesting in turn that differences in indebtedness may be less important in assessing overall debt at risk for households than companies.

Aggregate risks

The projections described above are generated by assuming that the uncertain factors underlying them take on values close to their most likely outcome. In fact, of course, a wide range of values is possible, and in assessing financial stability conditions the range of alternative (better and worse) feasible outcomes is of critical importance.

In this section, two possible approaches to analysing aggregate risks are outlined. The first quantifies the probability distribution of the entire range of possible outcomes for key variables. This approach might be particularly useful in assessing how financial stability risks develop over time. The second, complementary, approach examines the sensitivity of measures of financial stress to (previously) unanticipated events and evaluates how large the adverse effects might be. The second approach is in effect a 'stress test' of the financial system to unanticipated events (or 'shocks') that are much larger than the normal regular variation (see Blashke et al. 2001).

Deriving probability distributions

Measures of uncertainty for key variables of interest can be derived in various ways. The probability distributions shown in the fan charts for inflation and GDP growth featured in the Bank of England *Inflation Report* derive from estimates calibrated with respect to past forecast errors, adjusted in the light of MPC judgments, to evaluate the risk around the central projection.¹⁰ This approach has the advantage that estimates of uncertainty reflect the historical forecasting record. But where there is no forecasting

record, as in projections of debt at risk, a different approach must be used, at least for the time being.

Subject to a number of caveats outlined below, measures of uncertainty can also be derived from the model used to make the projections (Fair, 1984). Each variable in the model is explained by an equation made up of a predictable or deterministic component and an uncertain or stochastic component.¹¹ In a simultaneous model, such as the MTMM, the deterministic component of each variable is usually related to other variables in the model and its own lagged values. Model projections are typically generated by setting the stochastic components to some fixed value, often zero. But a wide range of values is possible for the stochastic component of each variable at every point of time in the future. Hence, an alternative method of measuring the uncertainty around a particular projection is to allow the stochastic components of the model to take on random values drawn from their historical distribution and to solve the model for the implied values of the variables of interest.¹²

Each solution of the model describes one path that the economy might take, depending on the chosen shocks, underlying equations, policy rules and assumptions regarding expectations formation. By running a large number of such simulations, an estimate of the probability distribution for each variable in the model can be constructed by counting the proportion of times that it takes values within a particular range. Thus the probability that the corporate sector's debt at risk exceeds, say, one per cent of GDP is estimated by counting the proportion of times that this occurs in all the simulated future cases.¹³

When plotted in a chart, the distribution for any given variable will often initially tend to widen out around the central projection as the forecast horizon is extended. This is mainly because of adjustment lags that restrict the range of movement in many variables, so that there is less uncertainty about their values in

10: See Fisher, P and Whitley, J (1998).

11: In principle, predetermined variables (ie those exogenous to the model) can be treated stochastically as well.

12: This approach treats all of the parameters of the model as certain, so that all of the uncertainty in every relationship is loaded into its stochastic component. An alternative approach would be to treat the parameter estimates as uncertain and correspondingly reduce the extent of the uncertainty in the stochastic component. It is unlikely that this alternative approach would produce substantially different estimates of overall model uncertainty.

13: Because the model is estimated on the assumption that individual equations are independent of each other, common shocks are eliminated and covariance between the stochastic components is absent (an important caveat), although in any finite sample non-zero covariances will occur by chance.

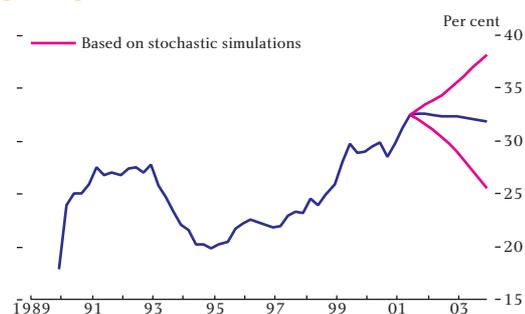
the near rather than in the far future. This is why conditional forecasts about the state of the economy are typically more reliable at short horizons. For variables with a well-defined long-run solution, the variance of the distribution will eventually settle at its unconditional value so that the width of the probability distribution will eventually be constant as the forecast horizon increases. The unconditional variance may be close to that observed historically, although this is not necessary. For example, for variables where there are no stabilising feedbacks in the model (although these may exist in practice) the width of the distribution may continue to increase indefinitely. This is also true for variables that do not have a well-defined long-run solution.

The main caveats with this approach to estimating probability distributions are that it is heavily reliant on the model used, the assumptions under which the model is solved, the range of shocks chosen and their relationship to each other. Unconditional estimates of uncertainty would ideally take into account uncertainty across different models as well as the stochastic elements within a given model. This form of uncertainty cannot easily be addressed in practical applications and the resulting measures of uncertainty are therefore conditional on the chosen model. But the approach enables changes in probability estimates over time to be replicated and monitored, and so, in a financial stability context, can potentially help to generate questions on scenarios which are relevant to risk managers, regulators and the authorities.

In order to illustrate the derivation of a probability distribution from this method, the model equations for consumption, business investment, average earnings, equity prices, company distributions, net equity finance and corporate liquidations are shocked in accordance with the standard errors of their estimated equations. These shocks are assumed to be independent of one another, so that all of the systematic correlation between variables in the model is picked up by its equations rather than its stochastic components. The stochastic simulations allow interest rates to change in response to movements in inflation and cyclical variation in output induced by the shocks, using a simple policy reaction function (the Taylor rule). This assumption is different from that used in the *Inflation Report* projections, which use either a constant interest rate or a market-based interest rate expectation.

The following charts illustrate how this method can be used to produce one possible quantification of the uncertainty surrounding the projections, reported above, of corporate sector gearing and debt at risk. Chart 10 shows gearing at replacement cost varying between 25 and 40 per cent at the end of 2003 on the basis of the conditional distribution generated by stochastic simulation.

Chart 10:
A 95 per cent confidence interval for corporate capital gearing



Sources: ONS and Bank calculations.

This approach can be used to draw probability distributions for any of the other indicators of financial robustness or stress in the company or household sectors.

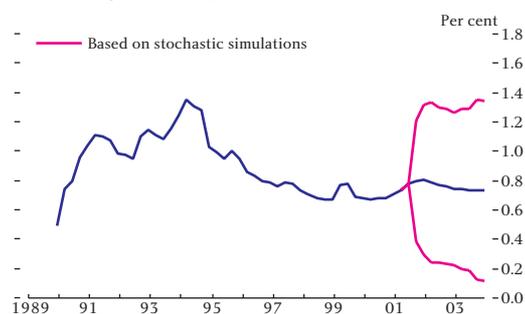
Chart 11 shows the distribution for corporate debt at risk. As constructed, a 95 per cent confidence interval includes a wide range of possible outcomes. The distribution can be used to make other probability statements: for example, it can be employed to assess the chances of corporate debt at risk rising to the levels of the early 1990s. Despite the wide range of the probability distribution, the risk of this occurring was put at less than 5 per cent, using the August 2001 assumptions.

In summary, one interesting way of using the probability information derived by stochastic simulations in financial stability analysis is to assess the chances of extreme events and to track how the probability changes over time. This, of course, assumes that possible future shocks are not substantially different from those prevailing in the historical sample period used in calibration, and that the parameters of the model are well-determined and stable.

Stress testing

Stress testing – a second broad approach to calibrating risk – is used by individual financial

Chart 11:
A 95 per cent confidence interval for corporate debt at risk as a percentage of GDP



Sources: ONS and Bank calculations.

institutions to explore the robustness of their balance sheets. It can also potentially be used to examine the role of particular adverse shocks in generating financial imbalances. From this it is possible in principle to assess how large these shocks would need to be to move measures of financial robustness or stress to levels that might be regarded as problematic. A probability could then be assigned to such events – subjectively or perhaps on the basis of past outcomes. To the extent that this procedure is useful, it can contribute to gauging the robustness or stress of the system as a whole.

The approach is illustrated below by tracing through the possible effects of an unexpected fall in housing demand that results in an unanticipated large fall in residential property prices (interest rates are assumed to be unchanged in contrast to the assumption used in the stochastic exercise described above). The impact of an increase in short-term real interest rates is also shown. These are not intended to be definitive accounts but are chosen merely to provide examples of how the model can be used for stress testing and to describe the main mechanisms involved. As will be seen, the two simulations emphasise different aspects of the transmission mechanism to household and corporate balance sheets. The fall in house prices primarily changes debt at risk for the household sector, working through household balance sheets and spending. In contrast, a rise in real interest rates affects both corporate and household sector financial positions.

The value of the simulation clearly depends on how well the model is thought to capture the transmission of the shocks. As noted earlier, the model is not fully closed; in other words, not all balance sheet imbalances are reconciled. The discussion below

explains which balance sheet adjustments are included and which are not.

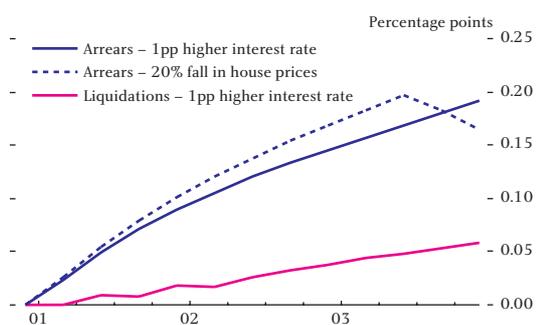
A common view is that periods of severe financial instability arise because the system responds more to shocks when it is already under stress. There are two examples of asymmetrical responses in the model. First, the implications of shocks for financial stress may be more acute if debt or gearing is initially high. This is present in the current formulation of the equation for the company liquidations rate because the change in the rate induced by any of the explanatory variables is larger the greater is its starting level. Second, there may be threshold effects where a particular part of the transmission mechanism becomes more powerful once a certain level of a key indicator is reached. This could be included through incorporating nonlinearities within particular model equations. In addition, financial crises have in the past occurred when several key influences become adverse at the same time. This is also present in the model inasmuch as measures of household and corporate defaults are each dependent on more than one key indicator of financial stress. The simulations describe examples of how these different forms of nonlinearity are included. In practice, financial distress – which is rare and not fully understood – may be much more non-linear than captured in the model.

The first simulation describes an unanticipated fall in demand for housing that results in a fall of 20 per cent in house prices. Housing accounts for around one-half of UK household net worth. So a fall of 20 per cent in house prices, other things being equal, would directly reduce overall household wealth by around 10 per cent. According to the consumption equation in the MTMM, a fall in wealth would lead households to increase their saving (by reducing current consumption) so as to reduce their liabilities in line with the drop in the value of their assets. This fall in current consumption would reduce aggregate demand and lead to second-round effects through lower employment, reduced investment spending etc. The resulting fall in household income, together with the rise in unemployment, would, according to the model equation, lead to an increase in mortgage arrears (Chart 12).

The extent to which the predicted rise in arrears and household debt at risk results in increased losses for UK banks would then depend, *inter alia*, on the extent

of recoveries from any subsequent sales of the property. Moreover, financial problems in the household sector could spread elsewhere. The relationships in the model link behaviour between sectors. For example, lower aggregate demand by households would also reduce PNFC income and raise corporate liquidations, although the size of this effect is relatively small in this particular simulation.

Chart 12:
Corporate liquidations and mortgage arrears
simulation responses to a change in house prices and
interest rates^(a)



Sources: Council of mortgage lenders, DTI and Bank calculations.
(a) Differences from the base case.

This simulation also illustrates how the response of the system to shocks can depend on its initial state. The assumed fall in house prices reduces aggregate demand and household income. In turn, this raises income gearing. But a given income change will have a different effect on income gearing depending on whether gearing is initially low or high. To raise income gearing by 1 percentage point would require a fall in income alone of around 10 per cent if gearing were initially 8 per cent, but a fall in income of around 6 per cent if gearing were close to its early-1990s high of 16 per cent. A second example is from the form of the arrears equation. The log formulation (see Annex) implies that a rise in unemployment would induce a different absolute change in the proportion of arrears, depending on their initial level. In addition to these effects, a fall in house prices would tend to increase both unemployment and income gearing (following the fall in aggregate demand). These changes would imply a greater increase in mortgage arrears than would result from a change in unemployment alone.

The second simulation is a temporary increase of 1 percentage point for three years in short-term interest rates. Crucially, this is not made in response to a shock to the economy and should not, therefore,

be thought of as reflecting how monetary policy operates. The assumed surprise increase is in the short-term real rate. This reduces aggregate demand through three main routes: a temporary appreciation of the real exchange rate; lower net financial wealth; and direct negative effects on household consumption and firms' investment spending. Higher real interest rates and lower income also result in higher income gearing for households and firms. The capital gearing of firms also rises, as they borrow more as a result of a fall in internal funds. Higher capital gearing may lead to a rise in the external finance premium required by lenders (Hall 2001). That gives an added twist to corporate interest rates over and above the rise in official interest rates. If the mechanism were to be present only when capital gearing moved above a threshold level, this would be a further example of a nonlinearity at work. That is assumed in this simulation: both household mortgage arrears and corporate liquidations increase relative to the base projection, but the rise in corporate liquidations is greater than if the external finance premium mechanism were inoperative. Other types of nonlinearity are also present: the changes in income gearing, liquidations and mortgage arrears become more important if their initial levels are high. Moreover, increases in these variables reflect the combined rises in capital gearing and falls in income in both sectors.

These two simulations illustrate how the model can be used to provide some quantitative assessments of the vulnerability of the corporate and household sectors to a range of shocks.

Conclusions

Quantitative measures of financial stability are clearly a desirable extension of purely qualitative assessments. This article reports some of the Bank of England's current work on that front.

Quantifying financial risks in turn requires an underlying model, whether implicit or explicit. A model is inevitably a simplification of a complex world. One of its potential values, however, lies in helping to identify the most important links in the transmission of shocks. Some models (or types of model) are more useful than others depending on the shocks they are able to analyse. The one described here – based on the Bank's main econometric model of the UK economy – has the advantage of linking financial exposures to key macroeconomic variables,

and at the same time it allows for some microeconomic influences. It can in principle be used for regular surveillance in a consistent and systematic way; and to explore stress testing scenarios.

While very much work in progress, the approach described in this article represents a step towards a more quantified analysis of financial risks, and specifically a framework for forward-looking assessment of risks in the UK corporate and household sectors.

A variety of other quantitative techniques are, of course, used for surveillance and analytical purposes at the Bank. And intelligence from meetings with borrowers, lenders, and intermediaries is an invaluable qualitative complement to a model-based approach. Market-based indicators are also used,

because they have the advantage that they are forward-looking and may provide information about probabilities as assessed by financial market participants. However, valuable though they are for surveillance purposes, these other approaches cannot also be used for stress testing.

The emphasis placed in the framework set out here is in illustrating how financial imbalances can arise. Any imbalance must ultimately be resolved. But exactly how and when it is resolved – smoothly or abruptly – is not simply explained and is not addressed by the work reported here. There are in any case advantages in analysing when and how financial stress may build up without trying to model the response. Clearly, however, by omitting such responses, any risks to stability are likely to be over-stated.

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Annex: Equation Listing and Data Sources

This annex lists the variables that have been used in conjunction with the MTMM model in this exercise, together with their equations and data sources. Many of the right hand side variables are from the MTMM and defined in Bank of England (2000).

Household Sector

(H1) Net lending of households (NLH)

$$NLH = PC * (RHPI - C - IH + HSRES)$$

where PC is the consumer expenditure deflator, $RHPI$ is real household post-tax disposable income, C is consumers' expenditure, IH is investment in housing, and $HSRES$ is the residual income component (see H8).
Source: United Kingdom Economic Accounts A41, code RPZT.

(H2) Household mortgage debt (MORTH)

$$MORTH = MORTH(-1) * GHW / GHW(-1)$$

where GHW is gross housing wealth.
Source: United Kingdom Economic Accounts A64, code NNRP (=NNRQ+NNRR+NNRS, long-term loans secured on dwellings).

(H3) Household credit (CREDH)

Two possible equations.

Either

$$\begin{aligned} \Delta \log CREDH = & -0.0311 - 0.0012.RS \\ & + 0.7365(\log GDPM - 11.43 - 0.005.TIME) \\ & - 0.067(\log(CREDH(-1)/GDPL(-1))) \end{aligned}$$

or

$$CREDH = CREDH(-1) * GDPL / GDPL(-1)$$

where $GDPM$ is GDP at constant market prices, RS is the short term interest rate, $GDPL$ is nominal GDP.
Source: United Kingdom Economic Accounts A64, code NNRRG (short term loans by UK MFIs).

(H4) Gross lending of households (GLH)

$$GLH = NLH + \Delta MORTH + \Delta CREDH$$

where NLH is net lending of households (H1), $MORTH$ is household mortgage debt (H2) and $CREDH$ is household credit (H3).
Source: Defined by equation.

(H5) Household liquid assets (SLIQH)

$$\Delta SLIQH = 0.5.GLH$$

where GLH is gross lending of households (H4).
Source: United Kingdom Economic Accounts A64, code NNMP (total currency and deposits).

(H6) Household equity directly held (EQH)

$$EQH = EQH(-1) * EQP / EQP(-1) + 0.25.GLH$$

where EQP is equity prices and GLH is gross lending of households (H4).
Source: United Kingdom Economic Accounts A64, code NNOS (total shares and other equity).

(H7) Household equity indirectly held (PFH)

$$PFH = PFH(-1) * EQP / EQP(-1) + 0.25.GLH$$

where EQP is equity prices and GLH is gross lending of households (H4).
Source: Defined as residual so that $PFH = NWH + CREDH + MORTH - EQH - SLIQH$, where NWH is net financial assets (NZE).

(H8) Household sector residual (HSRES)

$$HSRES = HSRES(-1) * C / C(-1)$$

where C is consumers' expenditure.

Source: Given by identity:

$$HSRES = NLH / PC + C + IH - RHPI$$

(H9) Household capital gearing (CGEARH)

$$CGEARH = 100. \frac{(MORTH + CREDH)}{(EQH + PFH + SLIQH)}$$

where $MORTH$ is household mortgage debt (H2), $CREDH$ is household credit (H3), EQH is household equity held directly (H6), PFH is household equity held indirectly (H7), and $SLIQH$ is household liquid assets (H5).
Source: Defined by equation.

(H10) Household capital gearing including housing (CGEARHH)

$$CGEARHH = 100. \frac{(MORTH + CREDH)}{(EQH + PFH + SLIQH + GHW)}$$

where *MORTH* is household mortgage debt (H2), *CREDH* is household credit (H3), *EQH* is household equity held directly (H6), *PFH* is household equity held indirectly (H7), and *SLIQH* is household liquid assets (H5) and *GHW* is gross housing wealth.

Source: Defined by equation.

(H11) Household net financial wealth (NWH)

$$NWH = SLIQH + EQH + PFH - MORTH - CREDH$$

where *SLIQH* is household liquid assets (H5), *EQH* is household equity held directly (H6), *PFH* is household equity held indirectly (H7), *MORTH* is household mortgage debt (H2), *CREDH* is household credit (H3).

Source: Defined by equation.

(H12) Household debt to income ratio (DEBTH)

$$DEBTH = 25. (MORTH + CREDH) / (PC * RHPI)$$

where *MORTH* is household mortgage debt (H2), *CREDH* is household credit (H3), *PC* is the consumers' expenditure deflator and *RHPI* is real household post-tax disposable income.

Source: Defined by equation.

(H13) Interest paid by households (INTHOUT)

$$INTHOUT = .0025. (RS + PREMHI) * (CREDH + MORTH)$$

where *RS* is the short-term interest rate, *PREMHI* is the average premium paid on household debt (exogenous), *CREDH* is household credit (H3), and *MORTH* is household mortgage debt (H2).

Source: United Kingdom National Accounts, A37, ROYU

(H14) Interest received by households (INTHIN)

$$INTHIN = .0025. (RS + PREMHI) * (SLIQH)$$

where *RS* is the short-term interest rate, *PREMHI* is the average premium received on household deposits (exogenous), and *SLIQH* is household liquid assets (H5).

Source: United Kingdom National Accounts, A37, ROYM

(H15) Interest gearing of households (IHGEAR)

$$IHGEAR = INTHOUT / (PC * RHPI)$$

where *INTHOUT* is interest paid by households (H13), *PC* is the consumers' expenditure deflator, and *RHPI* is real household post-tax disposable income.

Source: Defined by equation.

(H16) Mortgage arrears of more than six months (ARREARS)

$$\begin{aligned} \log ARREARS = & 0.8949 + 0.0411.IHGEAR \\ & + 0.0205.UR(-1) - 0.00377.LVRFTB \\ & - 1.565.UNDRAWN \\ & + 1.13.\log ARREARS(-1) \\ & - 0.2212.\log ARREARS(-2) \end{aligned}$$

where *IHGEAR* is household income gearing (H15), *UR* is the unemployment rate, *LVRFTB* is loan-to-value ratio for first-time buyers (exogenous), and *UNDRAWN* is undrawn equity (H18).

Source: Council of Mortgage Lenders, Table 25.

(H17) Mortgage debt at risk of households (DARH)

$$DARH = 0.0025.ARREARS * MORTH / GDPL$$

where *ARREARS* is mortgage arrears (H16), *MORTH* is household mortgage debt (H2), and *GDPL* is nominal GDP.

Source: defined by equation

(H18) Undrawn housing equity (UNDRAWN)

$$UNDRAWN = (GHW - MORTH) / GHW$$

where *GHW* is gross housing wealth, and *MORTH* is mortgage debt.

Source: defined by equation

Private Non-Financial Company Sector

(C1) Gross operating surplus of corporations (GOS)

$$GOS = 0.72. (GDPL - .0431.0.865.EMP * EARN)$$

where *GDPL* is nominal GDP, *EMP* is aggregate employment, *EARN* is average earnings.

Source: United Kingdom Economic Accounts A3, code CGBY.

(C2) Gross operating surplus of PNFCs (GOSPNFCO)

$$GOSPNFCO = 0.88.GOS$$

where *GOS* is gross operating surplus of corporations (C1).

Source: United Kingdom Economic Accounts A20, code CAER.

(C3) Net PNFCO interest payments (INTPNFCO)

$$INTPNFCO = 0.0025.(RS + PNFPREM)*NDEBT$$

where *RS* is the short-term interest rate, *PNFPREM* is the premium over short-term interest rates (C.4), and *NDEBT* is net debt of the sector (C10).

Source: United Kingdom Economic Accounts A20, codes ROCG, ROAY.

(C4) Corporate interest premium (PNFPREM)

Either

$$PNFPREM = PNFPREM(-1)$$

Or

$$\begin{aligned} PNFPREM = & -0.05885 + 0.4.(RL - RS) \\ & - 0.1434.\Delta RS \\ & + 0.94(PNFPREM(-1) - 0.4.(RL(-1) - RS(-1))) \\ & + 0.0064.\max (CGEAR - 22, 0) \end{aligned}$$

where *RL* is the long-term interest rate, *RS* is the short-term interest rate, and *CGEAR* is capital gearing at market values (C17).

(C5) Net distributions of PNFCs (DISPNFCO)

$$DISPNFCO = 0.3.(GOSPNFCO - INTPNFCO)$$

where *GOSPNFCO* is gross operating surplus of PNFCs (C2) and *INTPNFCO* is net interest payments of PNFCs (C3).

Source: United Kingdom Economic Accounts A20, codes RPBO + CAER - ROCG + ROAY (ie, balance of primary income (RPBO) = *GOSPNFCO* - *INTPNFCO* - *DISPNFCO*)

(C6) Gross disposable income of PNFCs (YPNFCO)

$$YPNFCO = GOSPNFCO - INTPNFCO - DISPNFCO - TYCSA$$

where *GOSPNFCO* is gross operating surplus of PNFCs (C2), *INTPNFCO* is net interest payments of PNFCs (C3), *DISPNFCO* is net distributions of PNFCs (C5) and *TYCSA* is corporate sector income taxation (seasonally adjusted).

Source: United Kingdom Economic Accounts A21, code RPKZ.

(C7) Investment by PNFCs (INVPNFCO)

$$INVPNFCO = 0.86.PGDP*IBUS$$

where *PGDP* is the GDP deflator and *IBUS* is business sector investment.

Source: United Kingdom Economic Accounts A22, code RQBZ

(C8) Net lending by PNFCs (NLPNFCO)

$$NLPNFCO = YPNFCO - INVPNFCO$$

where *YPNFCO* is gross disposable income of PNFCs (C6) and *INVPNFCO* is investment by PNFCs (C7).

Source: United Kingdom Economic Accounts A22, code RQBV.

(C9) Net equity of PNFCs (NE)

$$NE = NE(-1)*EQP/EQP(-1)$$

where *EQP* is equity prices

Source: United Kingdom Economic Accounts A57, code NLBU-NKXQ.

(C10) Net debt of PNFCs (NDEBT)

$$NDEBT = NDEBT(-1) - NLPNFCO - NEF - RF$$

where *NLPNFCO* is net lending by PNFCs (C8), *NEF* is net equity finance raised by PNFCs (C12) and *RF* is residual finance raised by PNFCs (C13).

Source: United Kingdom Economic Accounts A57, codes NYOT - (NLBU-NKXQ).

(C11) Market Value of PNFCs (MV)

$$MV = NDEBT + NE$$

where *NDEBT* is net debt of PNFCs (C10) and *NE* is net equity of PNFCs (C9).

Source: United Kingdom Economic Accounts A57, code – NYOT

(C12) Net equity finance of PNFCs (NEF)

$$NEF = NEF(-1)$$

Source: United Kingdom Economic Accounts A46, code NEVL - NESH.

(C13) Residual finance of PNFCs (RF)

$$RF = 0$$

Source: $RF = -NLPNFCO - DNDEBT - NEF$

(C14) Corporate liquidations rate (LQR)

$$\begin{aligned} \Delta \log LQR = & -2.1 - 0.32 \log LQR(-1) \\ & + 0.25 \Delta \log(NDEBT(-1)/GDPL(-1)) \\ & + 0.13 \log(NDEBT(-1)/GDPL(-1)) \\ & - 4.76 \Delta GAP - 1.42 GAP(-1) \\ & + 1.11 \log RW(-1) \\ & + 0.022 RSR(-1) - 0.025 \Delta RSR(-2) \\ & - 0.04 RSR(-4) \end{aligned}$$

where *GDPL* is nominal GDP, *GAP* is the output gap, *RW* is an index of real wages and *RSR* is the short term real interest rate, and *NDEBT* is net debt of PNFCs (C10)

Source: *LQR* is the ratio of liquidations (*AIHV*) to the stock of registered companies (*Companies House: Linearly interpolated annual data*)

(C15) Capital stock at replacement cost (CPNFCO)

$$CPNFCO = CPNFCO(-1) \cdot KBUSNH \cdot PGDP / (KBUSNH(-1) \cdot PGDP(-1))$$

where *KBUSNH* is business non-residential capital stock, and *PGDP* is the GDP deflator.

Source: ONS code CGVA - CGVM.

(C16) Valuation ratio (QPNFCO)

$$QPNFCO = MV/CPNFCO$$

where *MV* is the market value of PNFCs (C11), *CPNFCO* is the capital stock at nominal replacement cost of PNFCs (C15).

Source: Defined by equation.

(C17) Capital gearing at market value (CGEAR)

$$CGEAR = 100 \cdot NDEBT / MV$$

where *NDEBT* is the net debt of PNFCs (C10), *MV* is the market value of PNFCs (C11).

Source: Defined by equation.

(C18) Capital gearing at replacement cost (CGEARRP)

$$CGEARRP = 100 \cdot NDEBT / CPNFCO$$

where *NDEBT* is the net debt of PNFCs (C10), *CPNFCO* is the capital stock at nominal replacement cost of PNFCs (C15).

Source: Defined by equation.

(C19) Interest gearing (IGEAR)

$$IGEAR = 100 \cdot INTPNFCO / GOSPNFCO$$

where *INTPNFCO* is net interest payments of PNFCs (C3), *GOSPNFCO* is gross operating surplus of PNFCs (C2).

Source: Defined by equation.

(C20) Debt at risk as a proportion of GDP (DAR)

$$DAR = LQR \cdot NDEBT / GDPL$$

where *LQR* is the corporate liquidations rate (C14), *NDEBT* is the net debt of PNFCs (C10), *GDPL* is nominal GDP.

Source: Defined by equation.

Analysing yield spreads on emerging market sovereign bonds

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Yield spreads on emerging market economy sovereign bonds reflect market perceptions of the risks of default. But the information content of yield spreads is multi-faceted. This article describes some analytical tools used by the Bank of England in its financial stability assessment. Specifically, measures of dispersion and co-movement of yield spreads can shed light on the extent to which shocks are common, or not, across emerging markets; and analysis of the term structure of yield spreads can provide an indication of the time profile of risks. But care is needed in interpreting yield spreads, since they are influenced by a variety of factors other than the perceived creditworthiness of the borrower, including investors' appetite for risk and the liquidity of particular instruments. The relative importance of each of these factors is discussed.

THE PAST DECADE has seen a substantial growth in international bond issuance by emerging market economies (EMEs) (Chart 1). According to World Bank data, foreign investors bought more than US\$300 billion (net) of EME bonds during the 1990s, compared with US\$20 billion during the 1980s. This article focuses on bonds issued by EME sovereigns, for which secondary market data are readily available.

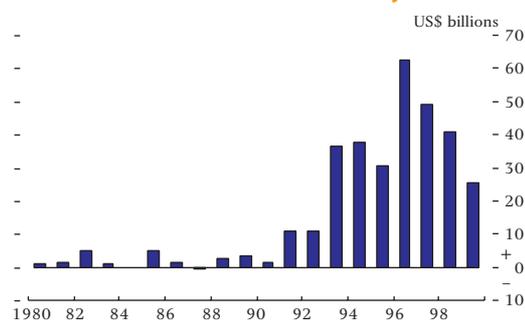
EME sovereign borrowers are often perceived to be more likely to default on their debt than developed market sovereigns, and so investors typically require additional compensation to hold EME bonds. This compensation is commonly measured by the yield spread, the difference between the yield on an EME bond and the yield on a bond of similar maturity issued by a borrower that is considered to be virtually free of default risk (typically a US Treasury bond).

When investors purchase fixed income securities, they are exposed to a number of risks. *Credit risks* arise from the possibility that debtors will default on their obligations. The risk of default depends on characteristics of the issuer, which in the case of sovereign debt include both the ability and the willingness to repay.

There are also *market risks*, because the price of the securities may fluctuate in secondary markets. Since changes in perceived credit risk will be one of the

Chart 1:

Net international bond issuance by EMEs^(a)



Source: World Bank.

(a) EMEs are here defined as all developing countries on the World Bank definition.

factors affecting secondary market prices, these two risks are related. But other factors, such as changes in the willingness of investors to hold risky assets, may also give rise to market risk. And changes in other asset prices affect the opportunity cost of holding the security¹. Lastly, it is possible that investors will not be able to liquidate their portfolios without depressing secondary market prices, exposing bondholders to *liquidity risks*.

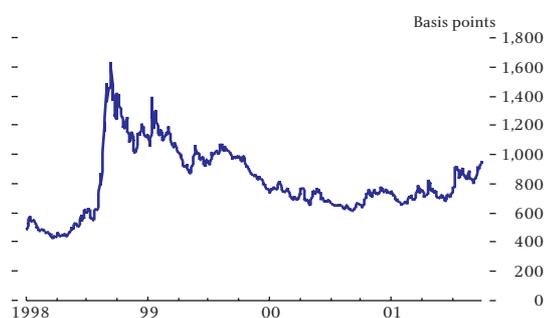
Measures of emerging market sovereign yield spreads

Yield spreads on emerging market sovereign bonds differ widely. A number of financial firms publish summary statistics of EME bond spreads, including average yield spreads on sub-sets of EME bonds. One

1: The risks faced by investors, and in particular the various forms of market risk, are described in more detail in Fabozzi (2001).

such composite index is JP Morgan Chase & Co's Emerging Market Bond Index (EMBI) Global, which, at end-September 2001, was based on around 150 sovereign² US\$ bonds with a combined face value of US\$245 billion, issued by 30 EMEs. Time-series of average yield spreads are available both for EMEs in aggregate – shown in Chart 2 – and by country, in all cases weighted by the market capitalisation of the instruments included in the average. The Bank of England uses the EMBI Global as one indicator of EME external financing conditions.

Chart 2:
Average emerging market sovereign bond spreads:
EMBI Global



Source: JP Morgan Chase & Co.

There is, however, potentially more information in emerging market bond prices than is reflected in this summary statistic alone. First, the composite index may mask different developments in the country components. For example, while Argentine spreads have risen through 2001, Russian spreads have fallen. Second, analysis of patterns across countries may help inform judgements on more generic emerging market financing issues. For example, the extent to which yield spreads on EME bonds move together in response to a shock in one country may reflect investors' perceptions about the potential for spillovers. The first section of this article presents several measures of dispersion and co-movement of the EMBI Global country sub-indices to help address these and other issues.

In a similar vein, at a country level there may be useful information in differences between the yield spreads on individual bonds that cannot be inferred from the country sub-indices. For example, if investors have expectations about the timing of any default as well as its likelihood then yield spreads might vary

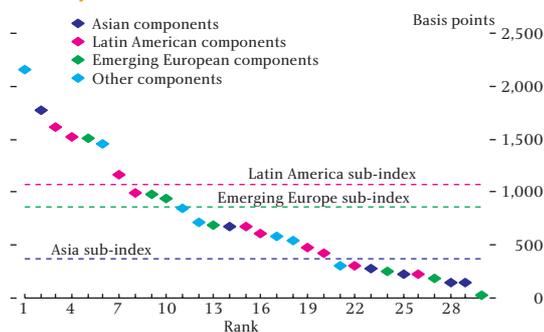
with the maturity (or duration) of the bonds. In other words, there may be information in the term structure of yield spreads. The second section of the article therefore describes a method of estimating the term structure of EME yield spreads, and uses prices of some of the instruments within the EMBI Global country sub-indices to derive yield curves for Argentina and Brazil.

The final section looks more closely at the potential relationship between changes in yield spreads and changes in credit risk by comparing the evolution of yield spreads with other measures of credit and liquidity risk, namely credit ratings and bid-ask spreads.

The dispersion and co-movement of emerging market sovereign bond yield spreads

The wide variation in yield spreads on EME debt, both across and within geographical regions, is illustrated in Chart 3. For example, the Hungarian sub-index of the EMBI Global averaged around 70 basis points in the first nine months of 2001, while at the other extreme the sub-index for Côte d'Ivoire averaged almost 2,400 basis points. These differences primarily reflect variations in creditworthiness across borrowers. But patterns in the distribution of country-level spreads and in the relative movements of those spreads may be informative about EME financing conditions more generally.

Chart 3:
Distribution of EMBI Global country spreads:
end-September 2001



Source: JP Morgan Chase & Co.

The EMBI Global is often used as a benchmark indicator of returns on investors' portfolios, so weighting assets according to their relative market

2: Some of these instruments are 'quasi-sovereign' bonds, for example debt issued by a public sector entity that is guaranteed by the sovereign, or tradeable loans. The methodology underlying the index is described in Cunningham (1999).

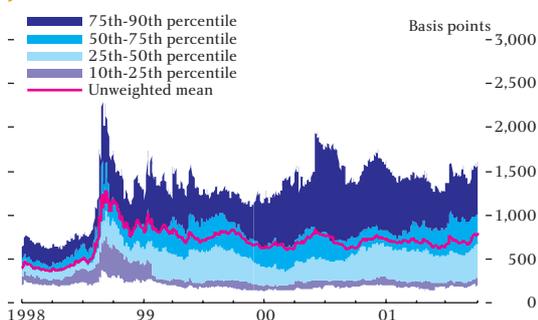
capitalisation is appropriate. But, although bonds issued by countries such as Peru and the Philippines may have little weight in a typical emerging market bond portfolio, a shock that is common across emerging markets would be expected to show up in the prices of these countries' bonds. An important feature of the measures discussed below therefore is that countries' yield spreads are weighted equally. Large movements in these measures are therefore more likely to reflect developments across a majority of EMEs, not just the largest bond issuers.

Spread dispersion

The *dispersion* of spreads across EME borrowers can provide evidence on the degree of credit discrimination and hence the possible vulnerability of emerging markets to contagion. For example, relative homogeneity in bond spreads across EME borrowers, despite large differences in credit quality, might indicate that investors were paying insufficient attention to these differences. This could make emerging market bond prices particularly sensitive to general swings in investor sentiment. Conversely, an appropriately wide dispersion of spreads might indicate that countries with sound fundamentals would be insulated to some degree from turbulence elsewhere.

One indicator of dispersion is shown in Chart 4. The individual country spreads that make up the EMBI Global are used to calculate percentiles of the distribution of spreads, and the chart shows time series of some of the percentile ranges.

Chart 4:
The dispersion of emerging market sovereign bond spreads



Sources: JP Morgan Chase & Co and Bank calculations.

The chart brings several points to light. First, as discussed in the June *Review*, the degree of compression in spreads prior to the Russian crisis in August 1998 is striking. Perhaps with hindsight it is hard to believe that that was an appropriate reflection of the diversity of risks across different emerging market borrowers at the time.

Since the Russian crisis, the dispersion has not only been wider, but has also been more variable over time. In particular, the variability in dispersion of the lower credit quality components stands in contrast to the stability of the dispersion of spreads of the most creditworthy borrowers. This suggests that, in recent years, whenever a country has gone into crisis, there has been only a limited tendency for emerging market debt as a class to be affected. This is sometimes taken as evidence that investors have become more adept at distinguishing between risks in different emerging markets.

Co-movement and correlation

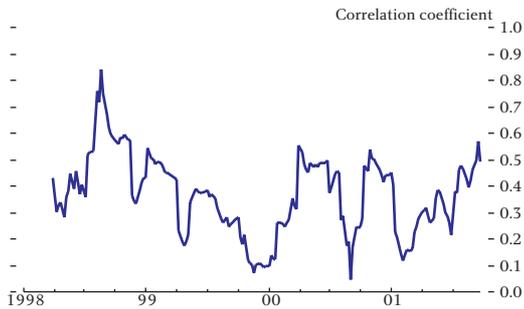
The degree of *co-movement* in emerging market bond spreads over time may provide an (*ex post*) indication of the nature of any shock to EME capital markets. A sustained increase in co-movement might suggest that investors view a shock as a common 'emerging market' event – perhaps caused by spillovers from developments in one particular country or a global factor driving all EME spreads in the same direction. In contrast, low co-movement might point to a more idiosyncratic set of shocks.

A measure of the degree to which emerging market sovereign bond spreads move together is shown in Chart 5, which plots the average bilateral correlation between changes in sovereign spreads across countries³. Recent periods of turbulence in emerging markets are clear. The peak during the Russian crisis of 1998 is most notable: the average correlation exceeded 80 per cent. But some other episodes over the past couple of years also stand out. For example, in May 2000, when the NASDAQ fell sharply, the correlation rose to nearly 60 per cent⁴. Increasing fiscal financing problems in Argentina and Turkey in the autumn of 2000 also led to a sharp rise in the correlation, although this quickly reversed.

3: Each point on the chart is the arithmetic average of the bilateral correlations between spread changes on the country sub-indices of the EMBI Global for a fixed population of 21 countries (which gives rise to 210 cross-correlations in all). These correlations are calculated over a thirteen-week rolling window, and are based on weekly spread changes to avoid any problems caused by differences in time zones.

4: Correlations between EME equity indices also rose sharply at this time, as did the correlation between equity prices in emerging markets and developed countries.

Chart 5:
Correlation between weekly changes in emerging market spreads



Sources: JP Morgan Chase & Co and Bank calculations.

Charts 6(a) and 6(b) are correlation 'heat maps', which give a snapshot of correlations. They show the full set of bilateral correlations of weekly changes in yield spreads over a six-month window. Chart 6(a) shows the second half of 1998, around the Russian crisis, and Chart 6(b) shows the six month period to end-September 2001. Darker blocks indicate higher correlations, and countries have been grouped into broad credit rating categories. (Because of rating changes, some countries change categories between the two periods.)

Chart 6(a) shows that high correlations were widespread in the second half of 1998, indicating that the Russian crisis had ramifications across many emerging markets. But the correlation between Russian yield spreads and those of other emerging markets was not high. This is because movements in

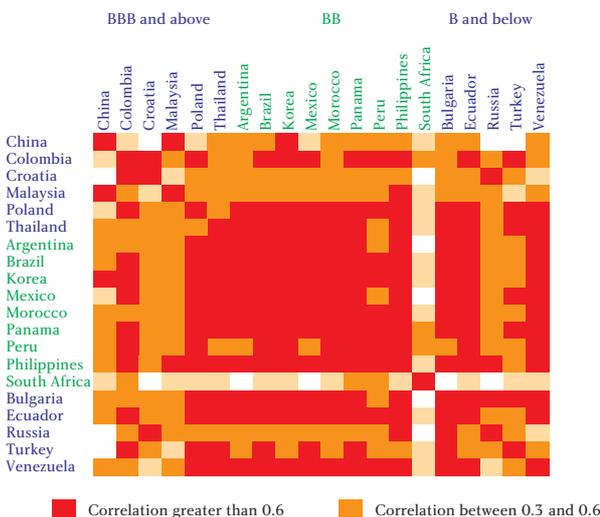
Russian spreads were far more extreme than those in other countries. (The relationship between correlations and volatilities is discussed further below.) The notable exception to this picture of widespread contagion is South Africa, whose spreads showed low correlation with those of other emerging markets in this period.

In the more recent period shown in Chart 6(b), the concentration of dark red in blocks along the diagonal indicates high correlations within credit rating groupings, but not across groupings. In particular, more creditworthy emerging market sovereigns seem to have been largely insulated from market turbulence emanating from the further problems in Argentina.

Correlations are one measure of co-movement, but are also affected by the volatility of the underlying assets. Formally, a correlation is the ratio of the covariance between two series to the square root of the product of their variances. During a period of market turbulence, higher volatilities mean that the covariance has to rise proportionately more than the variances if the correlation is to increase. So a shock that causes all spreads to move in the same direction may fail to translate into a higher correlation if volatilities also increase.

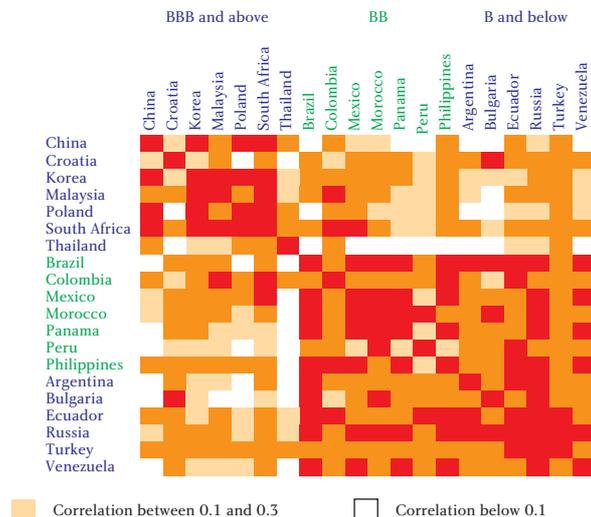
Chart 7 presents a co-movement statistic that considers only the direction, and not the magnitude, of spread changes. The chart plots a measure of the

Chart 6a:
Bilateral correlations in changes in yield spreads: July to December 1998



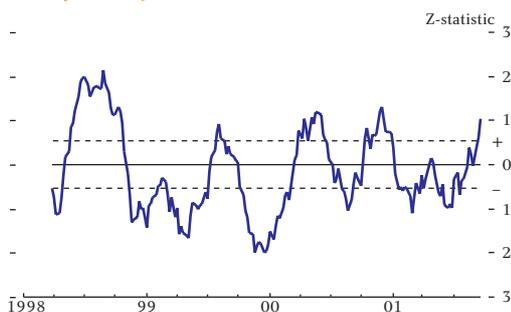
Sources: JP Morgan Chase & Co, Standard & Poor's and Bank calculations.

Chart 6b:
April to September 2001



statistical significance of the proportion of spreads moving in the same direction over a rolling 13-week period⁵. When the statistic breaches the upper critical value (the higher dotted line), this indicates a significant general increase in EME bond spreads, whereas a statistic that is below the lower critical value indicates a general reduction in spreads.

Chart 7:
Directional co-movement test for emerging market bond yield spreads



Sources: JP Morgan Chase & Co and Bank calculations.

This measure shows the same general pattern as the correlation measure, with the highest co-movement during the Russian crisis. But Chart 7 also indicates that EME spreads rise and fall in waves: periods of significant directional co-movement – both increases and reductions – are common.

The recent periods of turbulence – the Russian crisis, the NASDAQ episode and recent fiscal difficulties in Argentina and Turkey – have all been associated with a statistically significant generalised increase in spreads. An additional period of significant positive co-movement in spreads is apparent in August 1999, when Ecuador defaulted on its Brady bonds. This event may have caused investors to increase the probability they attached to EME sovereign default more generally, leading to a general increase in bond spreads.

Term structures of yield spreads

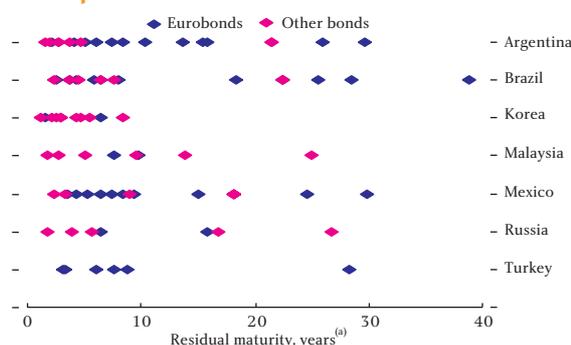
As well as varying by borrower, the compensation demanded by investors for holding default-risky debt may depend on the maturity of the borrowing, motivating analysis of the term structure of yield spreads. The shape of this term structure could

reflect expectations about the probable timing of any default, and the path of resolution and recovery thereafter. EME bond spreads may also embody so-called ‘term premia’: systematic variations across maturity that appear unrelated to the credit risk profile and that are frequently found in developed market sovereign debt prices.

The term structure of yield spreads is commonly perceived to slope upwards. This reflects the belief that, for the majority of borrowers, default in the near term is unlikely, but looking forward there is a greater likelihood of a significant deterioration in credit quality than of a significant improvement. But bond spreads may decrease with maturity for borrowers facing near-term financing difficulties. For these borrowers, the short maturity spreads reflect the high near-term risk of default, while lower spreads at longer maturities reflect the potential for corrective measures to be put in place to secure the long-term sustainability of the debt profile.

The maturity structure of emerging market sovereign debt varies widely across countries. For example, whereas Argentina has US dollar-denominated bonds distributed throughout the maturity spectrum up to 30 years, the longest-dated Korean bonds have a maturity of only 8½ years (Chart 8). Many more EME borrowers have only one or two actively traded bonds, making term structure analysis of their debt impossible.

Chart 8:
Maturity distribution bonds in the EMBI Global: end-September 2001



Source: JP Morgan Chase & Co.

(a) For bonds with the principal repaid over a number of dates (sinking fund), the residual maturity is calculated as the mean time to amortisation payment.

5: The test statistic is the 13-week moving average of a standard z-statistic calculated on the proportion, p , of n weekly changes, that are positive:

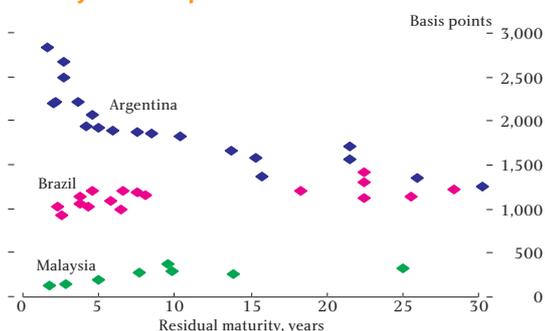
$$z = \frac{p - 0.5}{\sqrt{0.5 * 0.5 * n}}$$

The null hypothesis is that changes in the yield spreads of the country sub-indices of the EMBI Global index are independent. The 5 per cent critical value, taking into account the 13-week moving average, is ± 0.54 .

If the term structure of yield spreads is not flat, these differences in debt structure across countries could make comparisons between the average spread on each country's debt misleading. For example, if the curve is upward sloping, a country with long-dated debt might have a higher average spread – and hence appear to carry a higher risk premium – than a country with only short-term debt.

A scatter plot of the relationship between residual maturity and yield spread suggests that sovereign bond spreads are indeed subject to term structure effects (Chart 9). For example, at end-September 2001 the yield spread of Brazilian and Malaysian bonds was gradually increasing with maturity, whereas for Argentina spreads fell as maturity increased.

Chart 9:
Relationship between bond spreads and residual maturity: end-September 2001

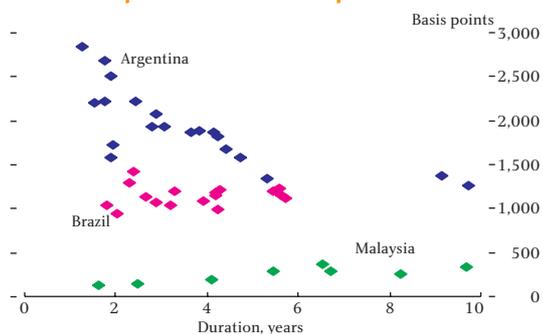


Source: JP Morgan Chase & Co.

Because a large proportion of the cash flows of emerging market bonds are paid as coupons throughout the life of the bond, the maturity date of a bond is a poor proxy for its average life. 'Duration' is a better proxy – a bond's duration measures how long, on average, an investor has to wait before being repaid. It is the average of the discounted values of the coupons plus the principal repayment weighted by the time to each cash flow⁶. The higher the coupon rate, the shorter the duration.

The general shape of the Argentine and Malaysian residual maturity term structures is maintained when the duration measure is used (Chart 10). But there no longer appears to be a clear pattern in the term structure of Brazilian spreads.

Chart 10:
Relationship between bond spreads and duration



Source: JP Morgan Chase & Co.

Nelson and Siegel yield and credit spread curves

Yield spreads on coupon bonds are, however, a rather crude tool for term structure analysis because coupon-bearing bonds maturing on the same date will have different yields to maturity (and hence yield spreads) if they have different coupon rates. Essentially, the yield spread on a coupon-bearing bond is a (weighted) average of yield spreads across a set of zero coupon bonds with maturities ranging from the first coupon date to the redemption date.

The effects of both maturity and coupons can be accounted for by using a term structure model to estimate zero coupon curves. An additional advantage of using such a model is that the curves are continuous and it is therefore possible to compare the cost of, say, ten-year borrowing across countries, even if they have no bonds of exactly ten years' maturity outstanding.

Term structure models have long been used in the context of developed country government bond markets (see, for example, Anderson and Sleath (2000)). But the relative paucity of EME bonds means that care is needed in applying standard yield curve estimation techniques to these markets. The Bank has applied the Nelson and Siegel (1987) model⁷ to estimate zero coupon (spot) yield curves for a small number of EMEs, which provide an estimate of the *average* interest rate for borrowing at a given maturity. The Nelson and Siegel model has the advantage of being relatively parsimonious – only four parameters are estimated – while allowing for some curvature in the term structure.

6: See, for example, Fabozzi (2001).

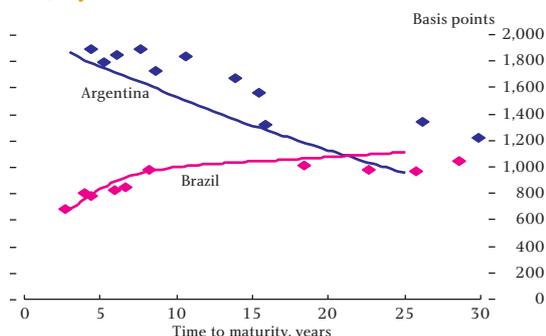
7: See the Annex for technical details.

The slopes of EME zero coupon yield curves will depend on both the term structure of risk-free rates and the term structure of bond spreads. The term structure of bond spreads can therefore be extracted by subtracting an estimate of the appropriate risk-free curve from the estimated term structure of yields. For example, if the emerging market yield curves are estimated using US dollar-denominated eurobonds, then the appropriate risk-free benchmark is the US Treasury zero coupon curve⁸.

To date, this technique has been applied by the Bank only to countries with plain vanilla US dollar-denominated eurobonds spanning the full maturity spectrum (for example, Argentina, Brazil, and Mexico). By adapting the methodology to include a broader range of bonds, it may be possible to generate yield spread curves for a wider set of EMEs.

Chart 11 shows examples of term structures of spot spreads for Argentina and Brazil. Superimposed on the chart is a scatter plot of the residual maturities and spreads on the bonds from which the curves were calculated. As would be expected, the spread curves have the same general shape as the scatter plots: the Argentine curve is sharply inverted whereas the Brazilian curve is gently upwards sloping, suggesting heightened short-term credit risk in Argentina, whereas concerns about Brazil's creditworthiness are less time-specific⁹. Box 1 contains a case study of

Chart 11:
A comparison of Argentine and Brazilian zero coupon spread curves with the underlying bond spreads: end-July 2001^(a)



Sources: Bloomberg and Bank of England.

(a) The data are shown as at end-July 2001 because the fitted term structures for Argentina cease to look plausible following the announcement of the second IMF package on 22 August. See the main text for further discussion of this point.

Argentine spot spread curve movements during 2000 and 2001.

Although there are clear analytical benefits to formal yield curve estimation over simply plotting spreads against maturity or duration, there are occasions when the fit of the curves appears poor. This is particularly apparent when the term structure slopes downwards. Part of the reason may be that the Nelson and Siegel function incorporates a flat term structure at long maturities, and this may be at odds with the data in some instances. Also, the downward slope of a zero coupon curve is occasionally so extreme that it implies that forward spreads at some maturities are negative, which casts serious doubt on the integrity of the term structure estimates. One possible explanation is that for highly distressed borrowers, investors' *expectations* of the income stream from their bondholdings differ substantially from the *contracted* payment stream, even if the borrower has not yet defaulted. This might occur, for instance, if a bond exchange were expected, in which case observed bond prices would reflect the anticipated payments on the new bonds to be issued in the exchange. Standard yield curve estimation techniques, which associate the observed bond price (reflecting expected cash flows) with the contracted payment structure, would thus be invalid.

Interpreting changes in yield spreads

How should changes in spreads over time be interpreted, and in particular how far should they be regarded as indicating changes in credit risk? Since credit risk is not the only factor affecting yield spreads it is not possible to draw strong inferences on the basis of yield spreads alone. But yield spreads can be used in conjunction with other evidence, such as credit ratings. And they can be interpreted in the light of other possible determinants of yield spreads, such as liquidity. This section does that for the second half of 1998, a period of extreme changes in spreads.

EME yield spreads rose sharply in August and September 1998 – for each of the 22 countries covered continuously by the EMBI Global, yield spreads increased by at least one third during August and September 1998 – before declining gradually

8: The examples shown in this article use risk-free term structures estimated using the Bank of England's VRP formulation.

9: This assumes that the *price* of risk (ie compensation for investors' risk aversion) varies only with the quantity of risk and not with the location or the maturity of the borrowing.

Box 1: Argentine yield spread curves during 2000 and 2001

The experience of Argentina during 2000 and 2001 can be used to illustrate how the term structure of bond spreads provides additional information over average spread levels.

Chart A shows a time series of ten-year and 25-year fitted bond spreads for Argentina. Until recently, the ten-year spread was highly correlated with the Argentina EMBI Global sub-index. The breakdown in this correlation and increase in the volatility of the estimated spreads during the third quarter of 2001 may be consistent with the estimation problems associated with analysing sharply downwards sloping term structures (see main text for more discussion).

Chart A:
Argentine sovereign bond spreads



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

Between January and November 2000, average Argentine spreads rose from around 500 basis points to over 900 basis points as investors became increasingly concerned about the sustainability of the country's debt dynamics. These heightened concerns were reflected across the maturity spectrum with the bond spread curve undergoing an almost parallel upward shift (Chart B).

Bond spreads narrowed and the curve flattened during the early part of 2001 as the authorities agreed a financing package with local banks, the IMF and other official creditors. But the narrowing more than unwound during March and April when, in the face of increased political uncertainty and weak fiscal data, short-term spreads rose sharply, causing the

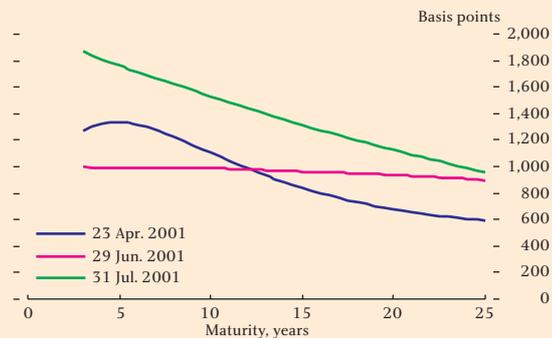
Chart B:
Evolution of Argentine credit spread curves



Sources: Bloomberg and Bank of England.

term structure to become steeply inverted. This could indicate that investors were attaching an increasing possibility to prospects for restructuring in the near term (Chart C).

Chart C:
Evolution of Argentine credit spread curves



Sources: Bloomberg and Bank of England.

In June 2001, the Argentine government conducted a debt exchange designed to alleviate near-term financing needs. This prompted a reduction in short-term spreads but long-maturity spreads rose. This change in the shape of the spread curve was consistent with the aims of the debt swap, but the failure of average spreads to fall might suggest that the exchange was not seen to have addressed longer-term vulnerabilities. The continued deterioration in the situation in Argentina in the third quarter led to a further sharp increase in the level of spreads and a reinversion of the curve.

through 1999. At the same time, while the dispersion of yield spreads increased (Chart 4), there was a sharp spike in the correlations between them (Chart 5).

It is possible that the changes in yields reflected general concerns about EME prospects and hence the credit risk attached to EME assets. It is, however, also possible that creditor-side factors, such as risk appetite or liquidity premia, had changed – for example following the problems at Long Term Capital Management.

The relationship between spreads and credit ratings

Credit ratings are one complementary indicator of credit risk¹⁰. Moody's downgraded 14 EME sovereigns during 1998, following five downgrades during 1997 (Table 1). There were only two upgrades during 1998.

Table 1:
Moody's sovereign rating changes, 1997 and 1998

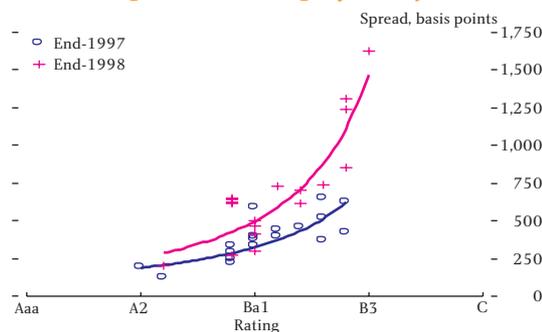
	Upgrade		Downgrade
1997	Argentina		Indonesia
	Bulgaria		Korea
	Egypt		Malaysia
	Philippines		Thailand
	United Arab Emirates		Turkey
	Uruguay		
1998	Hungary	Brazil	Pakistan
	Peru	Ecuador	Romania
		India	Russia
		Indonesia	Slovakia
		Korea	Ukraine
		Malaysia	Venezuela
		Moldova	Vietnam

Source: Moody's Investors Service.

Although the clear impression given by the credit ratings is of increased credit risk, ratings adjustments were not as widespread as the increase in yield spreads might have indicated. Any relationship between these two indicators of credit risk may therefore have changed during 1998, either because non-credit risk factors affected yield spreads or because the degree of risk associated with a given rating was seen to have changed.

Chart 12 plots sovereign ratings against EMBI Global country spreads at end-1997 and end-1998¹¹. In both cases, there is a high correlation between the rankings of ratings and spreads. However, the

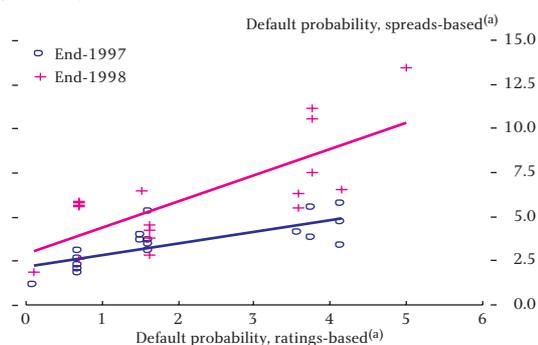
Chart 12:
Credit ratings and sovereign yield spreads



Sources: JP Morgan Chase & Co and Moody's Investors Service.

relationship seems to have shifted over the period as reflected in the logarithmic best-fit lines. The chart is, however, no more than illustrative because the ratings are plotted linearly, so that a change from Aaa to A2 is represented by the same movement along the horizontal axis as a change from Ba1 to B3. More rigorous analysis requires some means of translating the two measures into a common metric. Since both axes describe potential indicators of credit risk, one possibility is to evaluate the annual probability of default associated with each spread or rating¹². This is the approach taken in Chart 13.

Chart 13:
Credit risk proxies using credit ratings and sovereign yield spreads



Sources: JP Morgan Chase & Co, Moody's Investors Service and Bank calculations.

(a) Per cent, per annum.

- **Ratings.** Moody's has published details of the past default experience of corporate bonds with different ratings. Because ratings have only been assigned to most sovereigns for a few years, the sample of

10: The prospective relationship between sovereign ratings and default risk is discussed in Huhne (1996). Jackson and Perraudin (1999) examine ratings and spreads-based indicators of credit risk for corporate bonds.

11: Russia is excluded from this and remaining charts. This is because Russia was already in partial default in late 1998, so that spreads may have been driven by expectations of recovery more than the probability of default itself.

12: The two models used here are described in more detail in Buckle et al (2000).

sovereign default experience is too small for calibration. The average annual rate of default attached to sovereign ratings has therefore been calibrated using corporate default history. There are, however, a number of caveats. First, it is possible that sovereign default experience differs from that of corporates. Second, ratings may, in any case, offer an imperfect measure of credit risk (for example, because default experience varies over time). An additional uncertainty stems from the sensitivity of estimates of the average annual default probability to the maturity of corporate bonds. Here, a maturity of eight years is assumed, which is broadly in line with the median life of instruments currently included in EMBI Global.

- **Yield spreads.** A simple model – in which yield spreads are taken to be a function of credit risk alone – is used to derive a rough estimate of the probability of default associated with a given yield spread. Risk preferences and liquidity are ignored, as is the possibility of recovery after default and any implications of debt structure for pricing. The estimates are therefore crude.

Chart 13 has two notable features. First, the spreads-based estimate of default probability is almost always greater than the ratings-based estimate. (This may simply reflect the importance of risk premia and liquidity premia in bond pricing – discussed further below.) On average, the spreads-based estimates were 2.7 times higher than the ratings-based estimates at end-1997 and 4.6 times higher at end-1998. Second, as revealed by these ratios, the spreads-based estimates of credit risk rose more sharply during 1998 than the ratings-based measures. It is quite possible that any change in the relationship reflects some reassessment of the credit risk attached to given ratings. For example, investors may have felt that changing conditions in emerging market economies would lead to a greater incidence of default for a given rating than would be consistent with the average of past corporate experience.

It is difficult to test formally the significance of observed changes because, as noted above, secondary markets in EME sovereign bonds have only recently

become significant and ratings agencies have only recently begun rating EME sovereigns. The longer experience of corporate ratings may, however, reveal the potential for default rates to vary over time – and hence for investors to change their view of the credit risk associated with each rating. Table 2 reports the standard deviation of past corporate default experience alongside the mean annual default probability, using data from Moody's (2000).

Table 2:
Variability of past corporate default experience, by rating^(a)

	Cumulative ten-year default experience (per cent)	
	Sample mean	Sample standard deviation
Aaa	1.1	1.5
Aa	3.1	3.4
A	3.6	5.5
Baa	7.9	9.1
Ba	19.1	13.8
B	31.9	19.7

Source: Moody's Investors Service (2000).

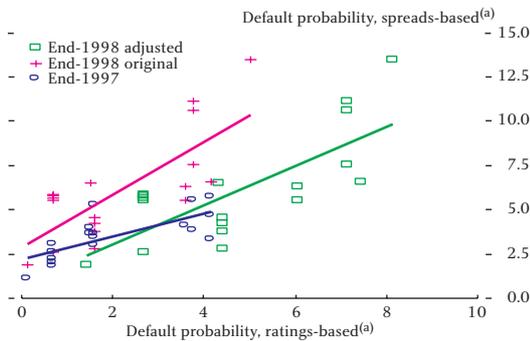
(a) Moody's quote data for the period 1920 to 1999.

The standard deviation of past default experience appears high relative to the average default rate, at all ratings. It is possible that the changed relationship between spread and rating-based estimates of sovereign default risk, illustrated in Chart 13, is within the bounds of the past variability of corporate defaults. For example, events in Russia in late 1998 may have triggered a widespread re-evaluation of credit risk by investors but not by ratings agencies. How significant was the rise in spreads relative to the historic variation in corporate default rates?

One way of addressing this question is to adjust the ratings-based estimates for end-1998 upwards, in the light of the data on the variability of past corporate defaults, and to assess whether the spreads-based estimates still appear high. This is the approach taken in Chart 14 in which the probabilities of default associated with each rating are revised upwards by two standard deviations¹³. This transformation is designed to capture any widespread and significant re-evaluation of the probabilities of default associated with each rating. The revised spread-rating pairs are shown in green. Changing the ratings-based estimates

13: The data on standard deviations are not, however, perfectly comparable with the default histories used to calculate the average default probabilities, so the results merely give a broad-brush impression. The default averages used to construct Charts 13 and 14 use data on 8-year default rates at 17 narrow rating categories (A1, A2, A3 etc) for which Moody's publish figures from 1983-1999. Standard deviation data are only published for 10-year default rates at six broad ratings categories (A, Baa, etc) from 1920-1999. Each 'broad' category encompasses several narrower ones so that, for example, Baa covers Baa1, Baa2 and Baa3. In principle, each narrow category represents a differing view of risk and has a differing default history.

Chart 14:
Credit risk proxies, increasing the default risk associated with credit ratings



Sources: JP Morgan Chase & Co, Moody's Investors Service and Bank calculations.

(a) Per cent, per annum.

in this way raises all the ratings-based estimates materially. As a result, the average ratio of spreads-based estimates to ratings-based estimated is reduced to 1.3, lower than that at end-1997. It is, therefore, possible that a major and widespread change in perceptions of credit risk drove the increase in sovereign yield spreads observed during 1998.

Non-credit risk factors

Yield spreads may be affected by at least two factors other than credit risk; liquidity and changes in investors' appetite for risk. Changes in risk appetite might follow from a change in preferences or from institutional factors, such as the need to adjust portfolios following losses incurred on holdings of other assets. The widespread falls in prices of other risky assets (such as high yield corporate debt and equities) in late 1998 would be consistent with a decline in investors' appetite for risk, but it is difficult to construct robust indicators of risk appetite.

It is, however, possible to construct proxies for liquidity premia such as the spread between bid and ask prices¹⁴. Chart 15 plots the average bid-ask spread for EME Brady bonds and loans covered by the Emerging Market Traders' Association's monthly survey. The spread rose sharply in August 1998 before falling back during 1999. There is, therefore, some correlation between the average bid-ask spread and average bond yield¹⁵. Looking at more recent data, this measure of liquidity appears lower now than in late 1998, though it is slightly higher than during most of 1997.

Chart 15:
Average bid-ask spreads for emerging market bonds^(a)



Sources: Emerging Market Traders Association and Bank calculations.

(a) Spread evaluated in absolute terms as the difference between bid and ask prices.

Although the chart does not quantify the significance of liquidity premia, it is consistent with the idea that factors other than credit risk may have had some part to play in the rise in EME yields in late 1998. This, in turn, may have contributed to the observed change in the relationship between spread-based and ratings-based proxies for default risk.

Conclusion

Yield spreads on EME sovereign debt can provide useful evidence on a variety of international financial stability issues. Reflecting this, the Bank has developed a range of tools for summarising yield spreads, both within individual countries and across EMEs as a whole. But developing such tools is an ongoing process. For example, the Bank's work on term structures of EME yield spreads is still in its early stages. In particular, there may be mileage in using explicit bond pricing models – which incorporate assumptions about such factors as the probability of default and expected recovery in the event of default – to distinguish between the root causes of movements in bond prices. This is an area for further research.

14: One factor driving bid-ask spreads is inventory risk – the risk that a market maker cannot sell a bond for as much as he bought it for. During periods of market illiquidity, inventory risk increases and so market makers charge a higher bid-ask spread.

15: At the individual instrument level, however, there is no significant correlation between bid-ask spreads and yield spreads.

Annex

The Nelson and Siegel yield curve model

The Nelson and Siegel method models the instantaneous forward rate¹⁶ as a function of four parameters:

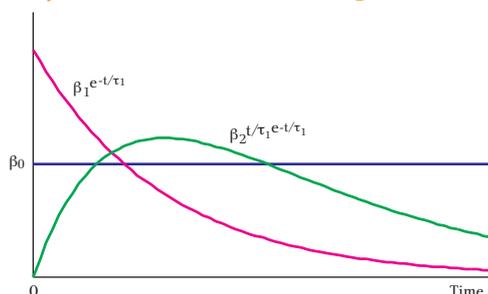
$$f(t) = \beta_0 + \beta_1 e^{-t/\tau_1} + \beta_2 \frac{t}{\tau_1} e^{-t/\tau_1}$$

It is possible to describe spot rates – yields to maturity on zero coupon bonds – using the same set of parameters:

$$r(t) = 1/t \int_0^t f(x) dx = \beta_0 + (\beta_1 + \beta_2) \frac{1 - e^{-t/\tau_1}}{t/\tau_1} - \beta_2 e^{-t/\tau_1}$$

The parameters can be interpreted as measuring the strengths of the short, medium and long-term components of the forward rate curve (Chart A.1).

Chart A.1:
Components of Nelson and Siegel forward rate curve



β_0 is associated with a constant and is related to the long-run level of interest rates. β_1 is related to the short rate because its term declines asymptotically towards zero over time. β_2 , whose term starts at zero and is hump-shaped (or U-shaped if β_2 is negative), relates to the medium-term curve. The short rate is given by $\beta_0 + \beta_1$.

Nelson and Siegel curves have the flexibility to fit many of the shapes generally associated with yield curves: monotonic, humped and S-shaped. And because they have only four degrees of freedom, fitting them does not require many data points, making them suitable when using emerging market bonds.

Because the Nelson and Siegel approach used to estimate EME yield curves has only four parameters, there may be little practical advantage in using a more sophisticated technique to estimate the risk-free term structure needed to derive a term structure for yield spreads. Moreover, estimated EME yield curves have often been considerably more volatile and steeply sloping than risk free curves, so that risk free subtleties have been dominated. In its analysis of developed markets in their own right, the Bank of England does, however, use more subtle models. For example, the US Treasury yield curve, which in this article is used as the term structure of risk-free rates, is estimated using a VRP framework (Anderson and Sleath (2000)).

16: The instantaneous forward rate, $f(t)$, is the rate of interest that would apply on an agreement made at time zero to borrow at time t in the future for a very short amount of time, dt .

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Assessing the stability of emerging market economies' banking systems

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Weak banking systems may generate or amplify instabilities elsewhere in the economy, while a robust banking sector may ameliorate the impact of shocks. An assessment of banking system health is therefore central to an understanding of a country's macro-financial prospects. This short article describes some of the tools available to help make this assessment for emerging market economies (EMEs).

OVER THE LONG TERM, a well-functioning financial sector assists the efficient allocation of capital and hence benefits growth (Levine (1997))¹. Banking crises may, however, entail significant costs for the real economy (Hoggarth and Saporta (2001))² – not only through the direct costs of crisis resolution but also because tightening domestic credit conditions can affect access to funding for the corporate or personal sectors. Alternatively, if the banking sector remains robust, it may help to cushion problems in other sectors when access to domestic or international capital markets is limited, reflecting the central liquidity-providing services offered by banks.

Assessing banking sector risk

In providing financial intermediation, banks unavoidably take risks: *credit risks* arising from the possibility that borrowers' credit quality could decline or that the value of collateral may fall; *liquidity risks* due to a mismatch between the maturities of liabilities and assets; *market risks* from trading exposures (such as foreign exchange, securities or commodities); *interest rate risks* due to interest rate exposures in loan-deposit portfolios; and *operational risks*, for example, associated with the possible failure of banks' systems.

Prudent financial institutions have policies and procedures in place to measure and manage these risks, for example by setting aside provisions against

impaired assets. Regulation also plays a part, although it may sometimes distort incentives and decisions over capital allocation. The Basel Core Principles for Effective Banking Supervision describe a range of 'best practices' for supervision and have been adopted by regulators in many emerging and developed economies³. Improved accounting standards and auditing practices may assist management by promoting a prudent valuation of assets and hence accurate measurement of exposures to risks. Full disclosure of these data will assist external commentators and market counterparties in forming their assessments.

Banks' balance sheet data may provide a snapshot of risks taken and the potential to absorb them. The recent financial crises in east Asia stimulated a significant body of empirical research on potential leading indicators of banking crises, using both macro-economic variables and banks' accounting data. However, as discussed in Bell and Pain (2000)⁴, these models have a number of weaknesses. One is their failure to capture fully the potentially complex relationship between risks and risk-absorbing mechanisms. Tracking a fixed set of balance sheet ratios is unlikely by itself to give a full picture even of an individual institution's fragilities. For example, banks may hedge risks on their balance sheets using instruments such as options that are recorded off-balance sheet. These potentially complex

1: Levine, R (1997) 'Financial Development and Economic Growth: Views and Agenda', *Journal of Economic Literature*, June.

2: Hoggarth, G and Saporta, V (2001) 'Costs of Banking System Instability: Some Empirical Evidence', Bank of England *Financial Stability Review*, June.

3: Regulators from many emerging and developed economies are engaged in an ongoing dialogue to improve standards of banking supervision. See, for example, the publications of the Basel Committee on Banking Supervision at www.bis.org.

4: Bell, J and Pain, D, (2000) 'Leading Indicator Models of Banking Crises – a Critical Review', Bank of England *Financial Stability Review*, December.

interactions motivate system-level stress-testing as used, for example, in the International Monetary Fund's (IMF) Financial Sector Assessment Programmes, while supervisors also focus on the systems put in place by individual financial institutions.

Balance sheet ratios can, nevertheless, be a useful complement to such techniques in forming an assessment of banking system vulnerabilities. The Bank of England's assessments draw on cross-country comparisons of balance sheet ratios as well as country-specific data. The distribution of vulnerabilities across institutions and interlinkages between them are often crucial in understanding any systemic risks associated with individual bank failure.

Bank balance sheet indicators for Emerging Market Economy (EME) banking systems

Few countries – developed or emerging – publish sufficient data to allow the construction of a full range of the relevant measures. The IMF's encouragement of Financial Soundness Indicators (FSIs) is a welcome development, and one that is not solely relevant to EMEs⁵. But aggregate FSIs, or even peer group FSIs of the kind used by the Bank for the UK banking system (and described in the assessment chapter of the June *Financial Stability Review*), do not highlight differences between institutions. For that, indicators built up from individual banks' balance sheets need to be used.

Bureau van Dijk's proprietary Bankscope database is one source of data for cross-country analysis of banks' accounts. The database contains published accounts for approximately 11,000 banks, of which around 3,000 are located in EMEs⁶. These include both locally-owned banks and foreign-owned subsidiaries. Coverage of foreign-owned entities is important because foreign participation in EME banking sectors is increasing: Mathieson and Roldos (2001)⁷ show that, for 14 EME banking systems, banks with some foreign participation

accounted for 18 per cent of system assets in 1999, compared with 9 per cent in 1994. For some banking systems, foreign participation is much greater – for example, 60 per cent in Hungary.

Before using these data to assess any vulnerabilities, it is important to establish that the sample of banks in the database is representative. The coverage of the database can be assessed by comparing the sum total of the assets of banks covered against estimates of system aggregates from local sources⁸. In the Bank's work, the completeness of the sample of banks within the database has been assessed for 19 major EME banking sectors: Argentina, Brazil, Chile, Colombia, Mexico, Venezuela, China, India, Indonesia, Korea, Malaysia, the Philippines, Taiwan, Thailand, the Czech Republic, Hungary, Poland, Russia and Turkey. For 15 countries, the assets of banks covered in the Bankscope database were within 10 per cent of local estimates in 1999, while for China and Indonesia, coverage was within one third of local estimates. Coverage of the Russian and Czech banking systems was less complete so they were excluded from further analysis.

The accounting data can be used to construct a number of ratios, giving some indication of asset quality, profitability and exposure to liquidity and some market risks. There are, however, several important caveats. Accounting practices differ across countries (see for example, La Porta et al (1998)⁹) and banks' accounts are published infrequently and with a lag. There are also limitations to the accounting data reported in the accounts covered by the Bankscope database. Some banks' accounts appear less complete than others and some risks – such as exposures in differing currencies – cannot be tracked at all. Moreover, the accounting data reported in Bankscope sometimes differ from local sources.

Some of the ratios are shown in Table 1, which compares an unweighted average of ratios for the

5: The use of Financial Soundness Indicators is discussed in the IMF's 'Report of the Managing Director to the International Monetary and Financial Committee: The Fund's Crisis Prevention Initiatives', November 2001.

6: Figures exclude Offshore Financial Centres.

7: Mathieson, D J and Roldos, J, 'Foreign Banks in Emerging Markets', in 'Open Doors: Foreign Participation in Financial Systems in Developing Countries', Litan, R, Masson, P, and Pomerleano, M, (editors), Brookings Institution Press, 2001.

8: The exercise is, however, only indicative, as there may be differences in reporting treatment between local sources and the banks' accounts within the database.

9: La Porta, Rafael, Lopez-de-Silanes, Florencio, Shleifer, Andrei and Vishny, Robert W, (1998) 'Law and Finance', *Journal of Political Economy*. Recognising cross-country differences in accounting practices, the International Forum on Accountancy Development was set up in 1999 to, *inter alia*, contribute to a common strategy and framework of reference for accountancy standards. This work is described at www.icar.ru/eng/page4_2.html.

various EME banking sectors with UK commercial and mortgage banks between 1997 and 2000. There are surprisingly few differences, and where there are differences these may be explained by differences in the external environment. Interbank assets, however, typically account for a smaller part of EME banks' balance sheets which may suggest that there are fewer 'linkages' within the banking sectors. The main differences between EME and UK banks appear in indicators of profitability and asset quality. Non-performing loans are three times higher while profits are lower. To a large extent, this may reflect both the sample period (immediately after the Asian crisis) and the high returns earned by UK banks relative to banks in other developed countries. But lower profitability may also reflect EME banks' higher cost/income ratios.

Table 1:
Average banking ratios, 1997 to 2000 (per cent)

	EME banks	UK Mortgage/ commercial banks
<i>Balance sheet composition</i>		
Net loans/total assets	54	56
Securities/total assets	15	15
Interbank/total assets	10	17
Contingent liabilities/total liabilities	29	25
<i>Asset quality</i>		
Non performing loans/total loans and loan loss reserves	10	3
Loan loss reserves/non performing loans	52	62
<i>Liquidity</i>		
Net loans/deposits and borrowings	62	67
Liquid assets/short term funding	31	29
<i>Profitability/costs</i>		
Return on average equity (post tax)	9	19
Costs/income	64	55

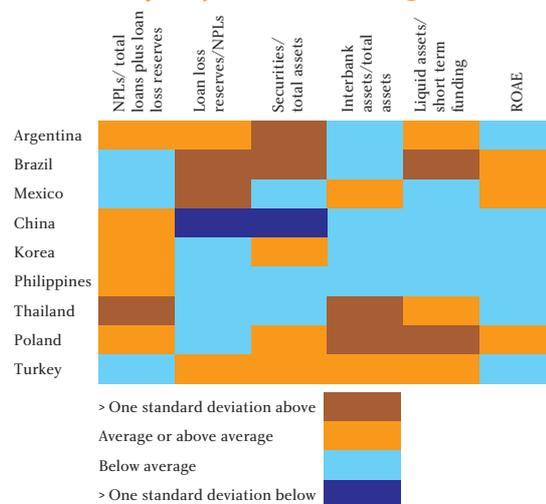
Sources: Bureau van Dijk Bankscope and Bank calculations.

While the table shows average ratios across the full panel of EME banking systems, there are some significant cross-country differences. Chart 1 illustrates the dispersion in 2000 for a selection of variables and EMEs. Cells shaded dark red indicate banking system ratios more than one standard deviation higher than the EME median; while dark blue cells are over one standard deviation below. This does not make any presumption about whether high ratios reflect relative vulnerabilities.

A number of features stand out from the chart and underlying data.

- On average, non-performing loans (NPLs) fell during 2000 to 11.5 per cent of total loans and loan loss reserves, from 14.2 per cent at the end of 1999. Asian banks continue to have the highest

Chart 1:
Cross-country dispersion of banking ratios, 2000



Sources: Bureau van Dijk Bankscope and Bank calculations.

NPLs. In particular, Thai banks' NPLs were more than one standard deviation above the panel median. Since these high NPLs coincide with below-average provisions, it seems likely that restructuring following the Asia crisis of 1997 was not yet complete. The data also show a clear correlation between high NPLs and low profitability.

- Argentine, Brazilian, Indian and Indonesian banks had particularly large holdings of securities (in all cases over of 25 per cent of total assets). This was fairly widespread across institutions within the banking sectors, suggesting that most institutions had some exposure to market risks, unless they had off-balance sheet hedges.
- Brazilian, Indian and Indonesian banks had large stocks of liquid assets relative to their short-term liabilities. This might suggest relatively low vulnerability to liquidity risks and follows from sizeable holdings of securities.
- Latin American banks hold relatively fewer interbank assets than Eastern European banks. Hungarian banks had the greatest proportion of interbank assets, at 25.8 per cent of total assets at the end of 2000. Around a third of banking systems had net interbank liabilities – notably in Chile and Venezuela. The interbank ratios may mask significant differences between banks within banking sectors. In Brazil, Poland, Thailand and Turkey around half the banks had net interbank liabilities while the others had net interbank assets.

Country-specific analyses

More detailed country-specific analyses can help draw out the potential role of banking sectors in propagating, aggravating or ameliorating crises – for example, through the interaction of public sector financing risks, monetary policy and banks' balance sheets. Two countries that have recently faced fiscal financing problems – Argentina and Turkey – illustrate some of these interactions.

Turkish banking system issues

Turkey's recent banking crisis and ongoing public sector financing vulnerabilities offer a clear example of the interaction of banking sector risks and fiscal prospects. Broadly, bank failures since November 2000 had fiscal costs which have impaired Turkey's fiscal outlook, while the flotation of the lira in February 2001 – itself related to uncertainty over economic and fiscal prospects – led to further losses for banks.

Since September 2000, 13 Turkish banks have failed and the banking system's pre-tax losses have totalled US\$10.2 billion (Table 2). These developments have had fiscal costs. Around a quarter of the Turkish banking system is state-owned, and these banks have made cumulative pre-tax losses of US\$1.0 billion since September. Moreover, the failure and subsequent transfer of banks to the deposit protection agency has a potential indirect fiscal cost if sale of banking assets does not cover liabilities. These fiscal costs had potentially significant implications for the public sector's financing prospects as the debt interest burden was already sizeable (15.7 per cent of GNP in 2000).

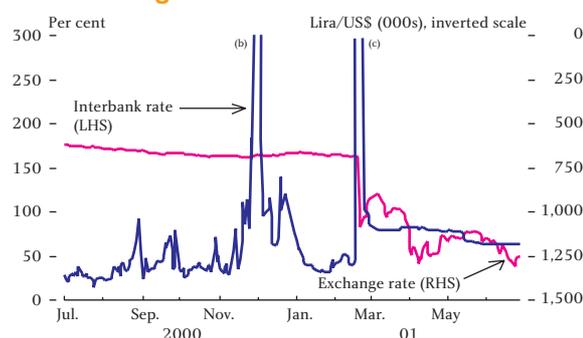
Table 2:
Turkish banks' profits and losses (US\$ billion)

	2000		2001	
	Q3	Q4	Q1	Q2
Pre-tax profits	0.9	-3.6	-3.1	-3.4
Net interest income (pre-tax, post provisions)	5.5	4.5	3.1	5.4
Provisions against interest income	0.7	2.2	0.6	1.6
Net non-interest income	-4.6	-8.1	-6.2	-8.8
<i>o/w</i>				
Net FX income	-2.4	-3.0	-3.9	-5.6
Net capital market income	1.0	0.5	-0.7	-1.3
Other provisions	0.5	1.9	1.6	0.6

Source: Turkish Bankers' Association

Between November 2000 and April 2001, there were sharp movements in interest and exchange rates (Chart 2). In part, these may have been caused by the

Chart 2:
Turkey: average overnight interbank rate and US dollar exchange rate^(a)



Sources: Turkish Central Bank and Bloomberg.

(a) Chart plotted to end June-2001.

(b) 873 per cent on 1 December 2000.

(c) 4018 per cent on 21 February 2001.

evolving banking crisis, for example as the fiscal costs of the banking crisis exacerbated the public sector's financing difficulties. The weakening currency and higher interest rates led to foreign exchange losses and losses on banks' trading portfolios.

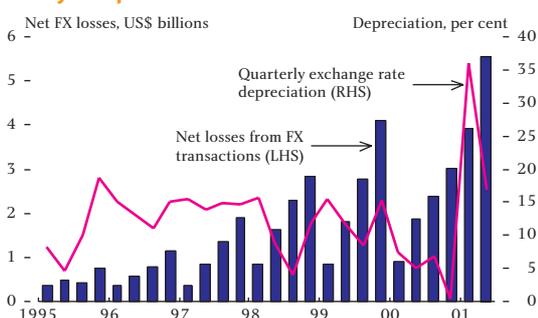
In November 2000, a legal inspection into several Turkish banks triggered a widespread increase in local interest rates and an outflow of reserves. Yields on government bonds rose – for example, from 37.3 per cent at the end of September to 44.8 per cent on 27 November for the August 2001 lira-denominated bond. In December, reserves were replenished under a revised IMF programme and the crawling exchange rate peg was reaffirmed. Reserves remained broadly stable until February, before falling sharply. On 22 February, the exchange rate was floated, depreciating by 33 per cent by the end of March. Local currency bond yields have since risen further, with the August 2001 bond yield rising to 72.9 per cent by the end of June 2001.

How might these developments have affected banks' balance sheets? During the fourth quarter of 2000, increases in provisions largely accounted for banks' losses. Some of this may reflect the deterioration of banks' loan portfolios through 2000 as gross non-performing loans increased by a third to US\$5.9 billion. The Turkish economy has weakened during 2001 (latest Consensus forecasts are for a 6.3 per cent contraction of GDP), due in part to high real interest rates, and this may well lead to a further deterioration in credit quality. Additionally, the sharp movements in interest and exchange rates also led to

losses where banks were exposed to exchange rate, market and interest rate risks.

Exchange rate risks. Many local banks financed local currency lending through foreign currency borrowing from foreign institutions, so that banks' net foreign currency liabilities had risen to US\$20.7 billion by 2000 Q3 (they have since declined to US\$12.6 billion). While these may have been hedged, banks' profit and loss returns show increasing foreign exchange losses during the first half of 2001 (Table 2, Chart 3).

Chart 3:
Turkey: depreciation and banks' net FX losses



Sources: Turkish Bankers' Association and Bloomberg.

Market risks. Government bonds and securities accounted for 8.2 per cent of banks' assets at the end of September 2000. As the secondary market prices of these assets fell, banks will have experienced trading losses. In other words, the deterioration of the public sector's credit standing contributed to banks' losses. Banks' profit and loss returns show trading losses during the first half of 2001, though data for 2000 Q4 do not reveal trading losses.

Interest rate risks. Some banks also funded themselves through short-term borrowing on interbank markets. This was reflected in interbank liabilities, which had risen to 5.8 per cent of total gross liabilities by 2000 Q3 from 3.0 per cent at the end of 1992. If interbank interest rates rose faster (and further) than lending rates during 2000 Q4, pressure may have been put on banks' net interest income.

What was the potential for any losses to be absorbed by banks' capital? The accounting data reported in the Bankscope database suggest that Turkish banks were typically better capitalised than the average of EME banks at the end of 1999, with equity capital equal to 11.6 per cent of total assets (EME average 8.4 per cent). Returns to the Turkish

Bankers' Association are more timely, but do not appear consistent with the data in Bankscope. On these data, equity capital was just 7.1 per cent of total assets in September 2000. Moreover, Turkish banks also had significant commitments and contingent claims. Equity capital was just 3.3 per cent of total assets inclusive of these elements.

Argentine banking system issues

Financial stability risks in Argentina stem from large public sector financing needs at a time of recession and high real interest rates. So far during 2001, Argentine banks – both locally and foreign-owned – have so far helped ameliorate the public sector's external financing problems by providing foreign currency credit. The scale of their holdings makes banks' robustness closely related to the sovereign credit standing.

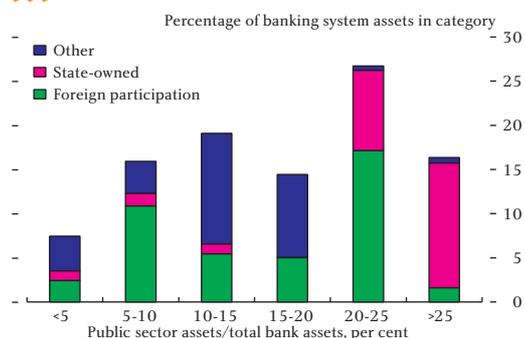
In turn, any loss of liquidity in the Argentine banking sector could have a direct impact on economic prospects if it caused banks to reduce lending and raise interest rates. Moreover, rapid withdrawal of dollar deposits from the banking system may weaken Argentina's currency board by reducing the stock of dollars available to cover the local currency. Were there eventually to be a depreciation of the peso, it would adversely affect the fiscal position as the public sector has net foreign currency liabilities (around US\$105 billion in June 2001).

Public sector financing

As well as rolling over maturing debts, Argentine banks have increased their holdings of public debt during 2001. Public sector assets were some 19.9 per cent of system assets in September 2001, compared with 17.4 per cent at the end of 2000. Almost 90 per cent of these exposures are denominated in foreign currencies. Individual banks' accounts suggest that, even before this year, public sector exposures were widespread within the banking sector (Chart 4).

The Argentine banking system is, however, well capitalised according to published data, with equity equal to 16.2 per cent of total assets at the end of September 2001. This is true of both locally and foreign-owned institutions. As a result, the banking sector may be able to absorb some losses on public sector exposures. However, these figures may overstate the robustness of the banking sector as the falling price of government bonds during 2001 may have led to losses on a mark-to-market basis that have not yet been reflected in banks' returns.

Chart 4:
Argentina: banks' holding of public sector debts, 1999 accounts



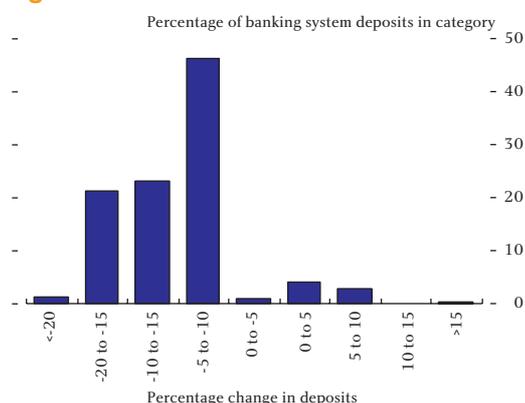
Sources: Bureau van Dijk Bankscope and Bank calculations.

Much of the Argentine banking sector is foreign-owned. Financial institutions with foreign subsidiaries accounted for 35 per cent of system assets in September 2001 and foreign branches a further 18 per cent.

Banking sector liquidity

Banking sector deposits have fallen by US\$9.3 billion (10.8 per cent) during the first nine months of 2001 with sharp falls in both March and July/August. The timing, with outflows coinciding with increases in sovereign yields, suggests that deposit outflows have been related to concerns over public sector financing. The widespread nature of the deposit withdrawals (Chart 5) certainly suggests that outflows reflected general rather than institution-specific concerns.

Chart 5:
Argentina: change in banks deposits during July and August



Source: Argentine Central Bank.

Borrowing costs have increased during 2001 with, for example, average peso overdraft rates rising to 44 per cent in September from 32 per cent at the end of 2000, while dollar overdraft rates rose to

25 per cent from 10 per cent. The stock of banks' credit to the private sector fell by 12.5 per cent in the first nine months of 2001 after a 3.8 per cent fall during 2000. These declines were probably due to a number of factors including the ongoing weakness of the economy and 'crowding out' as public sector exposures have increased. But the cost and availability of credit may also be affected by the decline in banking sector liquidity following deposit outflows. Moreover, any persistent major withdrawal of US dollar deposits may lead to concerns over the robustness of Argentina's currency board – further increasing the cost of borrowing in pesos.

Conclusion

The robustness of the banking system is central to an economy's prospects. Recent developments in Turkey illustrate both the potential for economic developments to affect banks' balance sheets and for banking sector vulnerabilities to affect fiscal and broader economic prospects. In Argentina, the banking system has so far helped ameliorate the public sector's external financing problems by providing foreign currency credit. But increased holdings of public sector securities and rapid withdrawal of deposits have weakened banks' balance sheets. This may have been one factor behind slowing credit growth during 2001.

Banks' exposure to risks and their ability to absorb them may be revealed by an assessment of their balance sheets. However, there are a number of limitations to these assessments. Published balance sheet data are often imperfect because accounting standards differ across countries and balance sheet data are often disclosed incompletely or with a lag. This motivates ongoing efforts to promote implementation of international accountancy standards and development of financial soundness indicators, such as those proposed by the IMF. Even then, balance sheet ratios are unlikely to give a full picture of institutions' vulnerabilities. Banks may, for example, use *off balance sheet* transactions to hedge risks on their balance sheets or, alternatively, to take speculative positions. This motivates the use of more complex approaches to risk monitoring, such as value or earnings at risk and stress-testing, as well as ongoing supervision of banks' risk management practices.

The resolution of international financial crises:

private finance and public funds

Andy Haldane, International Finance Division, Bank of England and Mark Kruger, International Department, Bank of Canada¹

Foreword by Paul Jenkins and Mervyn King

THE SERIES OF international financial crises that began in the mid-1990s – the Mexican peso crisis of 1994-95, the Asian financial crisis of 1997, the Russian default of 1998, the Brazilian crisis of 1998-99, and more recently, the situations in Turkey and Argentina – have been very costly to those directly affected and to the global economy more generally. Considerable work has been undertaken within the public, academic, and private sectors to find ways to prevent and manage better such crises. Significant progress has been made, but there is a general recognition that the work is not complete. The issues are complex. While each crisis has had a unique character, there have been a number of common elements from which lessons are being learned.

In terms of crisis prevention, there is broad consensus on the steps countries should take, and the international community has devoted considerable resources to assist in the task. There has been less agreement, however, on how crises should be resolved once they do occur.

It is in this latter area – the resolution of international financial crises – that the Bank of Canada and the Bank of England have undertaken joint work. The paper ‘The Resolution of International Financial Crises : Private Finance and Public Funds,’ by Andy Haldane and Mark Kruger, pulls together the work we have done over the past year and a half.

Our objective in this joint effort has been to develop a framework for crisis resolution that aligns incentives of all parties in a way that deals with the crisis and preserves the integrity of the international financial

system. It is a framework built on principles, not rules. It is a framework that attempts to be clear about the respective roles and responsibilities of the public and private sectors. This is especially important in light of the substantial changes in recent years in international financial markets. It is also important for the accountability of decisions taken.

The cornerstone of the framework is a strong presumption about the scale of ‘normal’ access to official financing. Such a presumption, we believe, would provide the backstop for debtor-creditor negotiations and help condition expectations in financial markets. With limits on IMF (International Monetary Fund) lending, private sector involvement becomes a crucial part of crisis resolution. The precise form of private sector involvement is a choice for the debtor country. But it would be selected from a range of options, including both voluntary and involuntary solutions. Among the former, bond exchanges and agreement with creditors to reschedule debt have proved helpful in past crises. Among the latter, standstills are potentially useful in dealing with crisis situations and are included in the framework as an important part of the international community’s ‘tool kit’ for crisis resolution.

The international community faces many challenges in promoting the benefits of global economic integration. The prevention and resolution of international financial crises remains one of those challenges. By publishing this joint work, the Bank of Canada and the Bank of England hope to further the debate and discussion of these important matters and to move us closer to agreement on how the international financial system can be improved.

1: The authors wish to acknowledge the substantial input and involvement of Paul Jenkins, Deputy Governor, Bank of Canada and Mervyn King, Deputy Governor, Bank of England. The paper has also benefited from the comments and criticisms of a great many members of the official community over the last 18 months.

When international financial crises strike, how should the official sector respond? Having a clear framework for crisis resolution is one key aspect. This article suggests some of the ingredients of such a framework. There should be clarity about the roles and responsibilities of debtors, creditors and the official sector. There should be presumptive limits on official sector lending. And there is a need to establish orderly mechanisms for restructuring sovereign debts. In short, there is much still to be done.

SINCE THE MID-1990s, the incidence of financial crises among emerging market countries appears to have increased. In response, governments and international financial institutions have worked intensively on ways to reduce the likelihood and virulence of crises. This is the debate on the so-called ‘international financial architecture’.

There is now a fairly widespread consensus within the official community on appropriate crisis *prevention* measures. For example, the best defence against financial crises is to establish sound macroeconomic fundamentals and to have a credible policy framework able to deal with economic and financial shocks. A broad international consensus has also emerged on the importance of prudent balance sheet management, with a particular focus on the balance sheet positions of governments and the financial system. And considerable work has been done by international groups to establish codes and standards of best public policy practice. The official community should not be prescriptive about the adoption of standards. But it should promote transparency about the degree of country compliance with them.

Even with such prevention measures in place, however, crises will still occur from time to time. Moreover, there is less consensus among policymakers on appropriate crisis *resolution* measures in these circumstances. The IMF has responded to crises by providing often large-scale lending packages, conditional on the implementation of macroeconomic and structural reform. These programmes are intended to offer bridging finance to the debtor. And this combination of reform plus bridging finance is in turn intended to help catalyse private sector capital flows.

But there is a concern that official lending on this scale may also undermine the incentives of debtors and creditors operating in international capital markets – a moral hazard risk. And the lack of *ex-ante* clarity about the scale of official assistance represents an additional source of risk for borrowers and lenders operating in these markets. It may also serve to delay

negotiations between debtors and creditors should repayment problems arise.

Against that backdrop, this paper sets out an alternative framework for the resolution of international financial crises. The framework has the following ingredients. It is based on a presumption that multilateral official finance is limited in size. These limits mean that there would be some point at which the private sector would necessarily be involved in resolving crises. The precise form of private sector involvement will depend on the crisis at hand. A range of private sector involvement options are possible, including voluntary debt rollovers and bond exchanges. From time to time, the crisis may necessitate the debtor calling a temporary payments standstill. This can be done in an orderly fashion, with support from the IMF, so as to benefit creditors as well as debtors. The framework allows for IMF lending limits to be breached in exceptional circumstances. But such exceptional financing would be subject to strict procedural safeguards.

In one sense, the proposal made here is a modest one because all of its elements already exist. The key difference is that here these elements are put together in the context of a sequenced and structured crisis resolution framework. Sequenced because the resolution of a crisis can be traced out as a chronological decision tree; and structured because the framework aims to align the incentives of all parties to a crisis. In this way, the incidence and cost of crises would potentially be reduced.

A spectrum of approaches to crisis resolution

There has been intense debate among academics and policy makers on the best approach to crisis resolution. At one end of the spectrum, some have suggested that the IMF could provide emergency liquidity assistance in potentially unlimited amounts – an international lender of last resort. At the other end, official finance is seen by some as part of the problem.

Fischer (1999) argues that not only is there a need for an international lender of last resort, but that the IMF has *de facto* taken on this role. He argues that it is not necessary for an international lender of last resort to be able to issue liquidity in order to be effective. What is needed, in most cases, is the reallocation of resources from liquid to illiquid entities. Since the IMF is akin to a credit union, potential borrowers have access to a pool of resources that the IMF can onlend from member countries. In addition, Fischer notes that the IMF can borrow from the General Arrangements to Borrow (GAB) or the New Arrangements to Borrow (NAB), where necessary.

The International Financial Institutions Advisory Commission (2000), the 'Meltzer Commission', also recommends that the IMF act as an international lender of last resort. Liquidity loans would have short maturity (120 days, with one rollover), be made at a penalty rate and be collateralized by a clear priority claim on the borrower's assets. Moreover, loans would only be made to countries that had met stringent pre-conditions, including on financial soundness.

Schwartz (1998) argues that official financial institutions engender moral hazard and so do more harm than good. She notes that the private sector successfully dealt with financial panics in the latter part of the 19th century by relying on clearing house loan certificates by private sector clearing houses. Thus, Schwartz recommends that "in the interest of a more stable and more free international economy" the IMF be abolished, not reformed.

These approaches are unlikely to be optimal. Turning the IMF into an international lender of last resort is impractical as there is neither the capacity nor the political will to provide official money in unlimited amounts with the requisite speed. It is also undesirable because of the risk of moral hazard affecting both debtors and creditors. This would hinder the efficient intermediation of funds from developed to developing countries.

Equally, a world without official finance would also be sub-optimal. This would ensure the maximum degree of private sector involvement. But crisis resolution would come about through a combination of greater policy adjustment by the debtor and/or greater financing by the private sector. So output losses would be sharp and payment interruptions frequent and disorderly. Such an outcome would have adverse

consequences for creditors as well as debtors – a deadweight cost. In short, it too would hinder the efficient functioning of the international financial system.

Between these two extremes, there is a middle way. This would recognise that modest amounts of official money can serve as a deterrent to self-fulfilling crises and provide time for policy adjustment. For example, the Independent Task Force sponsored by the Council on Foreign Relations (1999) argued that the IMF should return to normal lending limits for crises that do not pose a systemic threat. In exceptional circumstances, the IMF should turn to the NAB/GAB or a 'contagion facility'. And activation of the systemic facilities would require a supermajority decision by creditors.

The current framework for crisis resolution

Some progress has also been made by the official sector in cultivating that middle way. For example, the statement by the G7 at the Cologne Summit in 1999 set down some principles and tools for dealing with crises. By themselves, however, these principles and tools do not constitute a fully-fledged framework for crisis resolution. We know the ingredients of such a framework, but still lack a recipe for combining them. In this respect, we would highlight two aspects of the current framework that warrant attention.

First, there is a need for greater clarity regarding the amount of official financing. The size of official packages has varied considerably across recent IMF programmes. And in a number of recent large-country cases, normal IMF access limits have been breached, often by a significant margin. Too much discretion regarding official actions leads to confusion among debtors and creditors and time-consistency problems among policymakers. Greater clarity about the scale of official financing would help to condition the actions and expectations of debtors and creditors about the roles they are expected to play in resolving crises.

Second, some of the crisis-resolution tools identified by the official sector have so far been under-utilised. One example would be the inclusion of collective action clauses in bond contracts to facilitate debt restructuring. Another would be a payments standstill, which provides a debtor with temporary respite from debt payments and allows for an orderly work-out of debt problems. Too often in the past,

sovereign default has been disorderly, with the work-out process slow, inefficient and inequitable. A better approach would recognise that default is a natural feature of the market mechanism, not something to be avoided at all costs. But it would seek to limit the costs of sovereign default when they do occur.

A clear framework

The framework presented here aims to strike a balance between official lending, debtor adjustment and private sector involvement, recognising that each has a role to play in the resolution of crises. But those roles and responsibilities need to be made clear *ex-ante* to all parties. Indeed, this is precisely the role of a crisis resolution framework.

The key elements of this proposed framework are as follows:

A presumption of limited official finance

When crises strike, macroeconomic policies have to be adjusted to offset the adverse effects of shocks. But policy adjustment usually takes time. If policy is not credible, or if financial markets are impatient, then the prospect of adjustment may not be sufficient to change expectations. A country can fall victim to a self-fulfilling speculative attack.

Official money can help in these circumstances, serving as bridging finance during the period of domestic adjustment and helping catalyse private capital flows. But such lending needs to be limited, to prevent the adjustment incentives of debtors from being dented, or official money simply substituting for private capital flows. For this reason, there should be a clear presumption that 'normal' official lending limits apply in times of crisis.

Greater clarity about the limits on IMF lending would deliver three important benefits. First, it would reduce uncertainty, among both creditors and debtors, about the extent of the public sector contribution. Private creditors demand compensation for that uncertainty through a risk premium, which increases the cost of borrowing for emerging markets. A clearer framework for crisis resolution would reduce that uncertainty premium, to the benefit of both debtors and creditors.

Second, limits would reduce the potential for the private sector to game the official sector into providing more money *ex-post* than would have been

optimal *ex-ante*. The official sector has to strike a balance between the need to resolve the current financial crisis and the need to prevent future financial crises. In short, the official sector faces a time-consistency problem (Kydlund and Prescott (1977)).

This balance between *ex-ante* and *ex-post* efficiency is familiar from a corporate bankruptcy context (Eichengreen and Portes (1995)). The IMF faces a similar dilemma (Miller and Zhang (1999)). As Rogoff (1999) argues, bailouts by the IMF encourage greater risk-taking by industrialised country banks, and those banks are also likely to take risks because of domestic support arrangements.

Policy-makers are, of course, familiar with the time-consistency problem. It crops up in all fields of public policy – fiscal, monetary, regulatory etc. In response, they have often adopted clearer public policy frameworks. For example, in the monetary policy sphere, inflation-targeting combines clarity about the objective of policy – the inflation target – with discretion about how best to achieve this target. It is a framework of 'constrained discretion', with clear roles and responsibilities for the different players. This helps mitigate time-consistency problems in monetary policy.

The adoption of a clear framework for crisis resolution could offer the international financial community similar time-consistency benefits. It would set out the presumptive constraints on official lending. And debtors and creditors would then have the discretion to operate in their own best interests, subject to these constraints.

Some have argued that the official sector should pursue a policy of 'constructive ambiguity' in the resolution of crises. An analogy is sometimes made with domestic lender of last resort facilities, where ambiguity is used to mitigate moral hazard. But international moral hazard can be mitigated in ways that do not introduce costly uncertainty into the framework for crisis resolution – for example, by limiting lending.

Third, a related benefit of lending limits is that they would guard against moral hazard. Moral hazard applies to both debtors (by blunting incentives to undertake the necessary adjustment and reform) and creditors (by blunting incentives to undertake

effective risk management). Moral hazard is clearly a question of degree. Every insurance contract possesses some degree of moral hazard. And the empirical evidence on the moral hazard effects of official lending is not conclusive. Nevertheless, anecdotal evidence of the importance of moral hazard is widespread. And the longer the current system of non-binding lending limits persists, the greater the scope for moral hazard to increase in the future.

The nature of private sector involvement

While there is broad agreement on the need for private sector involvement in crisis resolution, there is still uncertainty about what precisely it means and how best to bring it about.

Crisis lending by the official sector and private sector involvement are two sides of the same coin. So with limited IMF lending, private sector involvement would at some stage become an element in resolving all crises.

The precise form of private sector involvement is, above all, a choice for the debtor country, in consultation with its creditors. A spectrum of private sector involvement options is possible. Both voluntary solutions (such as bond exchanges and debt rollovers) and involuntary solutions (such as standstills) should be acceptable, in principle, by the official community. The role of the official sector is to make clear on what terms and conditions official finance will be available, and the limits of that finance. The debtor country must then decide for itself which option to take. The appropriate option will depend on the specifics of the crisis at hand.

In the majority of crisis cases, it should be possible for debtors to secure private sector involvement voluntarily, either by raising new money in the markets, or by reprofiling existing money in consultation with creditors. This has worked effectively in helping resolve crises in the past – for example, in Korea in 1997 and in Brazil in 1999. For countries with unsustainable debt burdens, market-based bond exchanges which write down the face value of debt outstanding – for example, as in Pakistan in 1999 and Ukraine and Ecuador in 2000 – are a second voluntary means of resolving crises.

On occasions, however, the combination of limited IMF lending and policy adjustment may be inadequate to mobilise sufficient private finance on a

voluntary basis – for example, if capital flight is pervasive. In such situations, it would be counterproductive for the official sector to continue financing private capital flight. What is needed is some backstop measure to provide debtors and creditors with a breathing space to arrive at a co-operative outcome – a standstill.

The role of standstills

Standstills should not be construed as a way of relieving debtors of their obligation to service their debts in full and on time. Rather, they are a way of enhancing the effectiveness of the crisis management process. In particular, they offer three benefits.

First, they can promote creditor coordination. An orderly standstill can break the circuit of destabilising and, ultimately, self-fulfilling creditor expectations. By reducing creditor externalities, standstills can be a positive-sum game, advantageous for debtors and creditors alike. In a domestic context, Diamond and Dybvig (1983) show that allowing banks to suspend withdrawals can be a fully efficient mechanism for eliminating collective action problems among creditors.

Second, standstills can align creditor and debtor incentives. Creditors will be more willing to reach voluntary agreements quickly if there is a credible threat of a standstill. And debtors will be more willing to negotiate if they know that official monies are limited. So having standstills as a backstop should prevent the prolonged debt negotiations that have characterised a number of recent IMF programme cases. For example, in the case of Korea in late 1997, a large official assistance package did little to reduce capital flight and stabilise the balance of payments. It was only after “the Federal Reserve Bank of New York called a meeting to convince key US banks that a rollover of their maturing interbank lines was in their own interest as not all of them could exit at the same time” (IMF (2000)) that debtors and creditors were able to arrive at a solution.

Third, standstills can help ensure that payment stoppages are orderly. Standstills provide a safe harbour while debtors put in place remedial policy actions – for example, macroeconomic policy adjustment or debt restructuring. In this way, they are potentially useful both in cases where a country faces a short-term liquidity problem that necessitates the reprofiling of debt service, and in cases of

unsustainable debt burdens where debt reduction is required.

The decision to call a standstill lies with the debtor. But the official sector can play a useful supporting role. Such support could take the form of the IMF's lending-into-arrears (LIA) – the provision of bridging finance. IMF lending would only occur under strict conditions, however, including the debtor negotiating with its creditors in good faith, creditors being treated equally, and the process having a definite time limit. That would ensure that debtors play fair during a standstill, neither calling them too often nor maintaining them too long. These guidelines would help ensure that a standstill is orderly.

Standstill guidelines

Standstill guidelines provide a framework for the resolution of sovereign debt problems. They are in some respects akin to bankruptcy procedures. For this reason, some have asked whether sovereign payments standstills should have a statutory basis. This would require a change in the law in all jurisdictions in which a debt contract might need to be enforced. The advantage of this is that it would confer legal protection on a debtor calling a standstill.

But changes in the law in many jurisdictions would also be a formidable exercise. Moreover, it is clear that countries, having sovereign rights, are different from corporations in several important respects. Sovereign debtors do not require a court's permission to call a standstill. Moreover, creditors cannot easily seize the domestic assets of a sovereign. Nor can they insist that a country's management be replaced. Because of these differences, many of the benefits of a standstill can be achieved within a non-statutory framework, underpinned by a set of guidelines (Schwartz (2000)). These guidelines would then form the conditionality that applied to the IMF's lending-into-arrears. An illustrative set of guidelines might include:

1. Transparency. The debtor should communicate effectively by releasing all pertinent information to all creditors on a timely basis.
2. For the debtor to be bargaining in good faith, offers must be reasonable. Debtors that are illiquid should be offering rescheduling that maintains the value of their obligations in net present value terms. If debt reduction is necessary, the amount

of the haircut offered by the debtor should not be greater than necessary to achieve a sustainable medium-term debt profile.

3. Creditors should, as far as possible, be treated equally. This means that not only should individual creditors (foreign and domestic) within a class of instruments be treated the same, but also that holders of different instruments be treated according to the seniority of their contracts. A presumption of seniority should not be made where none exists in the debt contract.
4. Net new money should be granted seniority over existing claims, consistent with the 'super-priority' principle in a corporate insolvency context. Trade credit should be exempt from the standstill to help maintain production.
5. The process should be explicitly time-limited, to prevent debtors maintaining standstills too long. Should the time limit expire as a result of the debtor failing to submit to creditors a reasonable offer, then the guidelines will have been breached. If, however, the time limit expires as a result of some or all creditors failing to accept a reasonable offer made by the debtor, then the debtor is not in breach of the guidelines.

As long as the debtor is taking action that complies with the guidelines, the IMF should be willing to offer support by lending-into-arrears. With this framework in place, there would be incentives for debtors and creditors to reach timely agreement on a debt re-profiling. It would also be reasonable to hope that, for a debtor country following the guidelines, the risk of litigation from a creditor would be reduced. That is because creditors would know that when a debtor has followed the guidelines, and is therefore treating all creditors in an even-handed manner, it would be easier to persuade the courts to side with the debtor and not allow a minority creditor to grab a country's assets. Past experience shows that courts do take the behaviour of debtors into account. It is true that the recent Elliot Associates versus Peru case shows that creditors can prevent a negotiated agreement from coming into effect. But the recent experience of restructuring debt in Russia, Pakistan, Ukraine, and Ecuador offers some encouragement. And either way, there is real merit in putting in place guidelines that could be used by courts in their interpretation of the behaviour of debtors and creditors.

Clearly, these guidelines would need to evolve in the light of experience, to ensure they strike the right balance between creditor moral hazard on the one hand (IMF loans financing capital flight) and debtor moral hazard on the other (debtors calling standstills too frequently or maintaining them for too long). But all regulation needs to be dynamic and responsive to the changing behaviour of market participants.

Potential costs of standstills

A number of potential costs of standstills have been identified. While they should not be taken lightly, many of these costs are more apparent than real.

One argument against standstills is that they undermine the primacy of contracts. This argument does not, however, hold up under close scrutiny. The presumption should always be that debtors meet their obligations in full and on time. But faced with a genuine liquidity shortfall or an unsustainable debt burden, meeting contractual terms may be impossible. In such cases, sovereign debtors need a safe harbour. Bankruptcy law provides this in a corporate context. Everyone accepts this as an important part of the capital market mechanism; it supports, not supplants, market forces. The same is true in an international context, where standstill guidelines can serve as surrogate bankruptcy law.

A second argument against standstills is that they may encourage debtors to default. Given emerging market economies' dependence on international capital, it seems unlikely that they would wilfully default on their obligations. Moreover, the IMF can play a useful role in guarding against strategic default, by refusing to lend-into-arrears to those countries. The conditions attached to lending-into-arrears would also help ensure the debtor played fair during the standstill phase.

Some have argued that including standstills in the framework for crisis resolution might encourage investors to 'rush for the exit' at the first sign of trouble, thereby triggering a crisis. Investors with a short time horizon will always want to get out quickly, regardless of the institutional arrangements in place. Against this, the situation for relationship lenders, who value returns over the medium term, is quite different. A credible, well-managed standstill ought to enhance value for longer-term investors, by mitigating the costs of co-ordination failure. So the incentive for longer-term investors to rush for the exits will be

reduced. This would mitigate – and potentially offset – the negative consequences arising from the behaviour of skittish investors.

Others have argued that standstills may require capital controls to be enforceable, and that these are administratively impossible or extremely costly to impose. In the vast majority of cases, however, capital controls would not be needed to enforce a standstill; it would simply be a case of the sovereign ceasing payments temporarily. Occasionally, this moratorium may need to extend to the banking system. On rare occasions, when capital flight is large and persistent, capital controls may be required to provide a breathing space. But these cases would be the exception, not the rule. And because these controls would be temporary, their costs would not be punitive.

Another concern regarding standstills is that they might lead to contagion. Spillovers are a fact of life in a world of large, cross-border capital flows. The issue is whether standstills would worsen these spillovers. Orderly standstills, as part of a coherent crisis resolution framework, ought to mitigate uncertainties about the work-out process and preserve value. In this way, they may well relieve contagion risks by comparison with the counterfactual case of disorderly default.

An apparently powerful argument against standstills is that they may increase the cost of borrowing and reduce the flow of capital to emerging markets. This might happen, for example, because markets raise their perceived probability of a sovereign default. Given the high cost of borrowing for emerging markets, this argument is a potentially potent one. But it is only part of the story.

First, a lower volume of capital flow does not necessarily translate into lower welfare for a country. Before the Asian crisis, more capital flowed to emerging markets than could readily be absorbed. The bust that followed the boom was very damaging to the countries concerned. A lower but more stable flow of capital would have been welfare-enhancing.

Second, even if aggregate capital flows are lower in a world of standstills, the composition of capital flows – less short-term and more long-term lending – is likely to improve. This improved composition of capital

would reduce countries' susceptibility to future crises, by reducing the probability of capital flow reversals.

Third, there are good reasons for believing an orderly framework for standstills will not raise the cost of capital for emerging markets. In pricing country risk, markets take account of three factors: the probability of a country defaulting; the recovery value in the event of a default; and a compensation for risk – a risk premium. An enhanced role for payments standstills might arguably increase the perceived probability of default (though it is possible that the expectation of a standstill could actually *reduce* the incidence of default). But against that, a predictable framework for crisis resolution will increase the recovery value on debt in the event of default and lower the degree of uncertainty regarding work-out procedures. In this way, the cost of capital for sovereigns may well be reduced with a clear crisis resolution framework in place.

Exceptional finance

While the framework is founded on the principle of limited official finance, exceptional events do sometimes occur. No rule or constraint is inviolable. So there is a need to preserve the incentives and credibility of a system of official lending limits, while allowing for a degree of flexibility to deal with truly exceptional circumstances.

The IMF has long had the ability to lend beyond normal limits by invoking an exceptional circumstances clause or, more recently, through the provision of loans under the Supplemental Reserve Facility (SRF), a short-term facility introduced in late 1997 in the wake of the Asian crisis. But procedural safeguards on these facilities are limited and the definition of exceptional circumstances is left vague. Procedural safeguards need to be buttressed.

One possible model of procedural safeguards for exceptional lending is the US Federal Deposit Insurance Corporation (FDIC) Improvement Act of 1991. The Act allows the FDIC to exempt a bank from 'least cost resolution' provisions if it believes that the financial security of the United States is threatened and FDIC assistance would mitigate adverse effects. This judgment would be made by the Secretary of the Treasury, based on the recommendation of two-thirds of the FDIC Board and the Board of Governors of the Federal Reserve, following consultation with the President. The General Accounting Office is required

to review the basis for the decision *ex-post* to ensure that regulators are held responsible for the spirit of the Act (Bentson and Kaufman (1998)).

Similar rules for good governance can be developed for IMF lending in the context of international financial crises. First, there is a case for identifying more clearly than at present the circumstances that would justify a departure from normal lending limits. For example, one justification for exceptional finance could be situations that threaten the stability of the international monetary system. This is consistent with the rationale the IMF uses when it seeks supplementary financing from the NAB countries.

Second, the mechanism for taking such a decision needs to be better defined. A special IMF Staff report could be prepared demonstrating that exceptional circumstances exist. In addition, the Staff's findings would have to be confirmed by a supermajority of the Executive Board. If a decision was taken to provide exceptional financing, the Staff report should be made public in the form of an open letter from the Fund's Managing Director.

Third, it would be necessary to ensure that official monies were not financing capital flight on an on-going basis. A floor on reserves could be established to serve as a brake on capital outflows. If the reserve floor was breached, additional official monies would be suspended.

Finally, those taking the decision to grant exceptional access would be accountable for their actions *ex-post* and subject to an independent evaluation. This function could be performed by the Fund's new Independent Evaluation Office.

A framework for IMF intervention

The flowchart (Annex 1) is intended as a summary of the framework. It is shown as a decision tree, tracing out the chronology of crisis in terms of the options open to the debtor in moving from crisis to a sustainable solution.

Consider a stylised example. The first order of business would be an assessment of the country's debt burden. If a country's debt burden is not sustainable, then the provision of official finance risks worsening a country's financial position: the solution to the country's problem is less debt, not more. Moreover, since official creditors typically have

seniority, this additional official finance reduces the value of existing private claims.

In assessing a country's medium-term debt sustainability, too much emphasis has in the past been put on the profile of the country's debt-to-GDP or debt service-to-exports ratios, with the debt burden judged to be sustainable if the ratios are falling over time. This sort of analysis says nothing about the sustainable level of these ratios (Cohen (2000)). Sustainability analysis should also assess sustainability thresholds.

If debt is unsustainable, creditors will be required to reduce their exposures in net present value terms. In these circumstances, it is important that there is an efficient means of organising creditor-debtor negotiations during the workout. It is also important that creditor losses be allocated fairly. Standstill guidelines provide one means of ensuring that the debt work-out process is efficient, equitable and expeditious.

If the debt burden is sustainable, the presumption would be that normal IMF lending limits applied. Some countries may be eligible for the IMF's Contingent Credit Line (CCL), if they have satisfied the requisite *ex-ante* conditionality. Other countries may be eligible for a Stand-By Arrangement (SBA), in which case they would be required to abide by the requisite *ex-post* conditionality. In most cases, limited official assistance of this type would be sufficient to buy time for the country to overcome a crisis.

In more severe cases, however, official finance may not by itself be sufficient. The country may need to approach creditors in order to raise new money, or to work out a reprofiling of its existing debt service. Because the country's debt burden is sustainable, creditors would not suffer losses in net present value terms under such a rescheduling. So it should be possible to raise net new financing through market-based, voluntary procedures, such as debt rollovers, swaps and exchanges.

But if a voluntary agreement cannot be reached, or if capital flight is pervasive, the country has recourse to a standstill in order to halt the liquidity drain. The IMF can support the standstill by lending-into-arrears if the country is abiding by its standstill guidelines. The amount of official resources available under lending-into-arrears would be limited to the amount

not previously drawn under the SBA, so that there is an overall limit on access to IMF resources.

The presumption of normal limits applies to both SBA- and CCL-eligible countries. Additional financing would be available, but only under exceptional circumstances. These require additional justification. The additional resources would be provided under the Supplemental Reserve Facility (SRF). Funds available under the SRF are of shorter maturity and higher cost than under the SBA.

Conclusions

There is both a need and a desire for greater clarity in the framework for crisis resolution. A clear understanding of the respective responsibilities of the private and official sectors is fundamental in this regard. A central element in shaping private sector expectations is knowledge that the official sector will behave predictably. Constraints on IMF lending are a key step in that direction. They ensure that private sector involvement is a crucial part of crisis resolution. And they help encourage debtors and creditors to seek co-operative solutions to crisis.

In resolving crises and securing private sector involvement, the official sector must decide how much official finance will be made available and on what conditions. The debtor country must then decide which option to follow. One such option is a payments standstill. The official sector should stand ready to support standstills if they are implemented in an orderly fashion. In exceptional circumstances, it may be necessary to breach normal lending limits. But such financing would be subject to stringent safeguards. A framework with these characteristics – constraints, clarity and orderliness – has the potential to reduce the incidence and cost of crises.

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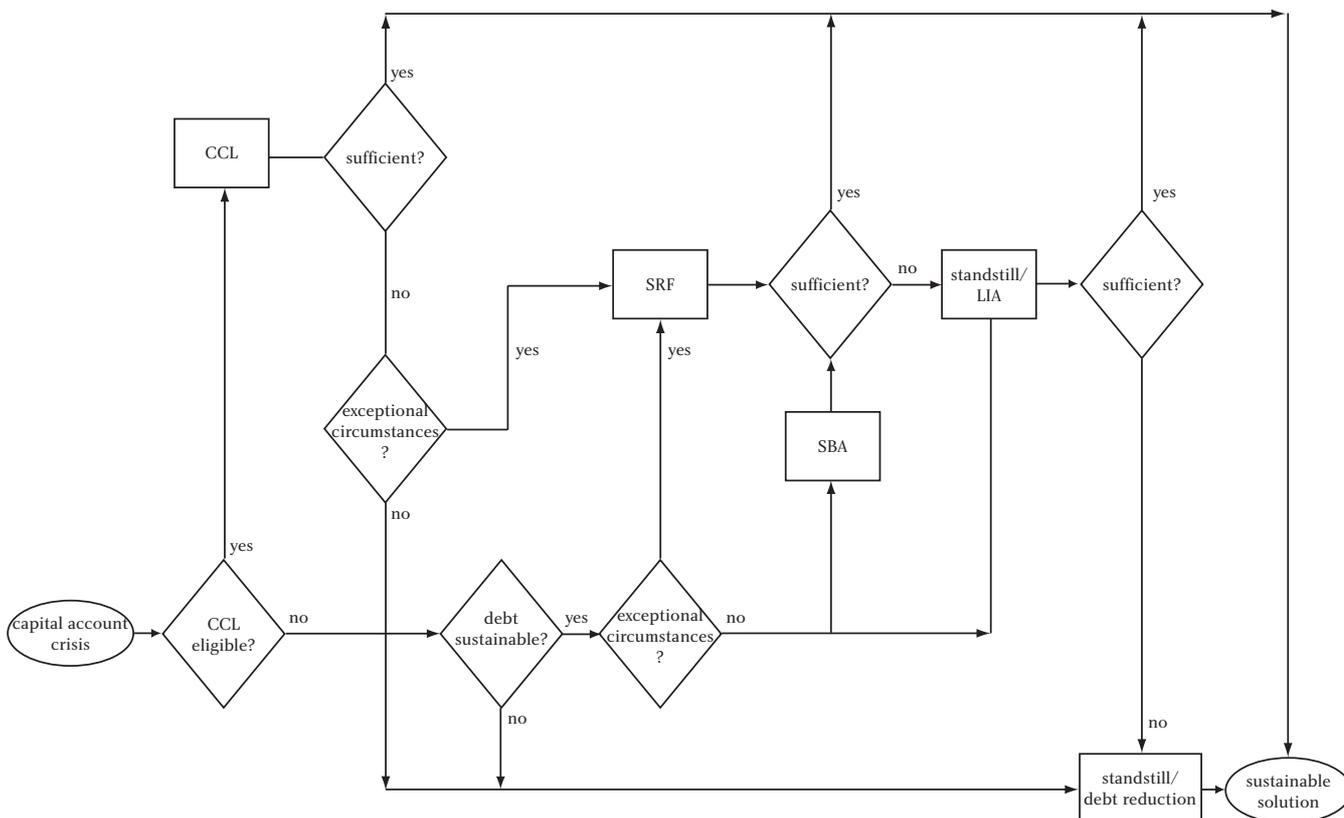
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Annex 1: Chronology of crisis resolution



Debt workouts for corporates, banks and countries:

some common themes

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In this speech, delivered at the Sixth Quadrennial Congress of INSOL¹ International in London on 19 July 2001, the Deputy Governor examines some similarities and differences between corporate, financial sector and sovereign debt workouts.

I AM DELIGHTED to have the opportunity to speak at this, the Sixth World Congress of INSOL International. The Bank has a long-standing interest in insolvency arrangements. As the keepers of the London Approach, we have a direct, if informal, role in corporate workouts. This is in part historical, but it is no accident. Development of a satisfactory framework for corporate workouts is integral to the Bank's core purposes of maintaining financial stability and seeking to ensure the effectiveness of the UK financial system. The Bank is more commonly associated with the Monetary Policy Committee and the pursuit of monetary stability. But financial stability is an important counterpart to this; it is difficult to achieve one without the other. In addition to its macroprudential surveillance of risks to the system, the Bank is closely involved with the design of regulation and financial infrastructure, such as payments and settlement systems, to ensure that these are robust and the system is, as a result, better able to withstand a crisis. Our interest in insolvency arrangements is similar. Without a framework that is predictable, equitable and transparent, designed to maximise value for all interested parties, the costs and wider economic disruption from unnecessary corporate liquidations may be enormous.

My speech this morning, therefore, provides an opportunity to signal the Bank's support for INSOL's mission to take a leadership role in international insolvency and credit issues and to bring about greater international co-operation among the main

players. The growing interest by a number of international organisations in the design of orderly and effective corporate insolvency regimes, and in the encouragement of greater co-operation in cross-border corporate insolvencies, suggests you have been successful in that objective. I think this has been greatly assisted by the important work which the INSOL Lenders Group has been co-ordinating in developing a set of principles governing corporate workouts at the pre-insolvency stage.

But corporate workouts represent just one strand in financial restructurings more generally. There are two others I want to cover; and these are, first, restructurings of financial institutions, including banks, and, second, sovereign debt workouts. Indeed, in many instances, restructurings in the corporate sector will need to proceed in tandem with those in the financial and sovereign sectors. I would argue that, in all three cases, a collective approach by the different participants in the private and public sectors, and effective co-ordination among creditors and debtors, should help to preserve value. So I would like to consider today the extent to which these differing approaches raise common themes, and also whether there are distinguishing features which could affect the interactions between the three strands.

I recognise, of course, that more progress has been made in the corporate context than in the area of financial institutions or sovereign debts; and I think

1: International Federation of Insolvency Professionals.

that reflects great credit on many individuals and organisations represented at this Congress. So I will start by offering a few thoughts on corporate workouts, linking these to the Bank of England's long-standing involvement in the London Approach and our responsibility for the maintenance of financial stability. I will then turn to look at how the desirable features, incorporated into the agreed principles governing international corporate workouts, might be applied to financial restructurings; and finally in a similar way look to whether these principles can be carried across into the field of sovereign workouts. This raises the issue of the role of the various different parties to debt restructurings, including the official sector. By drawing out some common themes, I hope to put INSOL's work on the corporate sector into the broader context of differing approaches to resolving debtor difficulties.

Corporate workouts

Let me start then with corporate workouts; and let me begin by saying a few words about the Bank's interest in this issue. As I noted a moment ago, it arises mainly from our financial stability responsibility, although I would argue that our role in promoting the efficiency and effectiveness of the financial system is also relevant. Episodes of incipient or actual financial instability are often accompanied by failures in the corporate sector which may lead more generally to losses throughout the financial system. In some cases, the corporate failures reflect an inability to resolve temporary liquidity problems affecting a company that remains viable in the longer term. Creditors may act without the benefit of all available information on a company's solvency. This imbalance in information available to company and creditors can be compounded by conflicts of interest between different types of creditors, or between banks, bondholders and other financial institutions. The end-result is often the same: the unnecessary liquidation of viable companies, which represents a market failure capable of amplifying financial instability. That, in a nutshell, explains the Bank's interest and involvement in this area.

A country's insolvency regime should seek to limit the costs arising from potential market failure, for example by supporting effective private sector mechanisms for reorganising viable companies. I would say it should do so partly by providing incentives for debtors and creditors to negotiate

workouts at the pre-insolvency stage. This will hopefully reduce the risk of unnecessary corporate liquidations and avoid benefiting one group of creditors at the expense of others.

Most of you, of course, will know that, guided by these principles, the Bank took the lead in developing a framework governing corporate workouts in the 1980s and early 1990s – the 'London Approach' or 'London Rules'. We are not jingoistic about this; we are equally supportive of variants whether Hong Kong Guidelines or Jakarta Initiatives. In any case, 'rules' is definitely the wrong word, since the London Approach has no legal or statutory backing – it is merely an informal codification of a set of practices that had come to be widely accepted in the vast majority of large corporate workouts undertaken in the UK in recent years. This includes arrangements for an informal standstill while an independent review of the company's long-term viability and financing needs is carried out. But what is perhaps less well-known is that, in developing the London Approach, the Bank built on a tradition of involvement in industrial restructuring dating back to the 1920s. Indeed, a cursory glance at R S Sayers' excellent history of the Bank from 1891-1944 reveals that Montagu Norman's involvement in corporate restructuring in the inter-war period probably took up more of his time than any of his other duties, often to the consternation of some of his more conventional colleagues!

Since the recession of the early 1990s, and reflecting the more stable macroeconomic conditions in recent years, the Bank's direct participation as a mediator in corporate workouts has declined. We do, however, remain willing to take on that role again if invited to do so and where this appears necessary to help resolve the potentially conflicting problems of a company's creditors. Where we have tried to add value in recent years has been in promulgating the London Approach abroad and in working to develop the framework in the light of recent innovations and developments in global financial markets. Several issues have loomed large. One is the applicability of the unanimity requirement given the proliferation in the number and type of creditors in any large international workout. Another is the lack of a formal moratorium over all or part of the period of resolution of a company's problems, as distinct from the informal standstill of the London Approach during the initial period of collecting all available

information and evaluating the company's long-term prospects. More broadly, the extent to which the Approach is affected by developments such as securitisation, loan trading and credit derivatives is exercising our minds and those of others closely involved in corporate workouts.

These issues raise potentially very tricky questions. For example, loan trading arguably makes the creditor co-ordination problem more challenging, but at the same time provides an exit route for those unwilling to be involved in the restructuring and an entry for specialist turnaround investors. Credit derivatives raise a different set of issues, because they need not involve transfers of the company's debt until, in the case of physical settlement, a credit event occurs. The knowledge that debt will change hands following a credit event might, however, affect the incentives facing the company, its 'pre-credit event' creditors and its potential 'post-credit event' creditors in unpredictable ways. One possibility is that a bank which has purchased credit protection via a credit derivative may have an incentive to put an ailing company into liquidation in order to obtain a payment from its counterparty rather than participate in a restructuring, the results of which are uncertain. For many banks, such an approach would be incompatible with building banking relationships, but the recent debate as to whether restructuring, rather than failure, constitutes a credit event for the purposes of a credit derivative contract shows the matter is highly topical. At the very least, active markets in credit derivatives and secondary loans might make it more difficult to identify and organise creditors in order to negotiate any debt workout.

These are, as I have noted, awkward issues. But I am encouraged to see that the INSOL Lenders Group (ILG) has attempted to address some of them in the course of drawing up its Statement of Principles for a Global Approach to Multi-Creditor Workouts. I am also encouraged that discussions on the Principles involved not only the largest global banks, but also a range of other finance providers, including insurance companies, institutional investors, hedge funds and secondary market debt providers. As the Governor noted in providing the Bank's endorsement of the ILG's initiative in October 2000, past experience suggests that a collective approach by the major

creditors to a debtor company in financial difficulties can help to preserve value, to the benefit of the creditors as a whole and of others with an interest in the company. Although I know there have been tricky issues to resolve in the negotiations – notably those relating to the standstill, debt trading and the provision of new money – in the end, the Principles seem broadly consistent with the London Approach, based as they are on the enlightened self-interest of all the creditors. Ultimately, although some debt providers may be able to gain in individual cases by striking out on their own, in the long run a co-operative approach will ensure greater recoveries for creditors, including bondholders, in aggregate.

Just as greater international co-operation can produce net gains at the workout stage, so that needs to be backed up by greater co-ordination in cross-border corporate insolvencies. That is why we welcome the UNCITRAL² Model Law (UML) on cross-border insolvencies. The Model Law is consistent with the UK insolvency regime and contains many helpful provisions relating to co-operation between insolvency courts in different jurisdictions, and to the granting of recognition to foreign insolvency practitioners. We would therefore urge other countries to enact the UML.

In this context, we also welcome the ongoing work by international organisations, including the International Monetary Fund (IMF) and World Bank, on the design of efficient and effective insolvency regimes worldwide. It is, of course, difficult to establish international standards in this area, because the approaches adopted by different countries reflect not only different legal traditions but also different policy choices, most especially on the extent to which the system should favour debtors or creditors. Indeed, this is a debate that is live in several countries, including the UK where new measures were announced last month in the Queen's Speech, and I am sure is occupying minds at this Congress. But the IMF work argues, rightly in my view, that any insolvency regime, whether debtor- or creditor-oriented, will enhance financial stability effectively only if it protects value for the benefit of all interested parties and the economy in general; and this requires the allocation of risk among market participants to be done in a way that is predictable, equitable and transparent.

2: United Nations Commission on International Trade Law.

Financial sector restructurings

Let me turn now to my second area: financial sector restructurings, and I would like to start by noting the importance of confidence in the smooth running of a financial system. Confidence is important in most industries, but it is at the heart of the financial industry. It is confidence that permits banks to operate, as a matter of course, with gearing many times capital, and with a maturity mismatch between their assets and liabilities, often concentrated in short-term or sight deposits. They are thus peculiarly vulnerable to a loss of confidence, individually and as a group. The potential for contagion – the threat that trouble in one bank will result in a run on others that might endanger the system as a whole – makes monitoring banks' solvency and liquidity a core activity for central banks. Whether responsible day-to-day for supervision or not, central banks still need to stand ready to act as lender of last resort. However, any such operation must be carefully considered. Any decision to support an institution, particularly in circumstances of underlying insolvency, creates a moral hazard that undermines market discipline. Designing effective arrangements for restructuring financial institutions is thus a particular challenge – there is a need to act quickly and finally; intermediate arrangements are much more difficult to sustain.

The challenge is complicated by the degree to which financial markets are now global and financial groups operate in a number of different jurisdictions. The G30 report on international financial insolvencies, published in March 1998, raised several themes that are rather similar to those relating to cross-border corporate insolvencies. In particular, it emphasised that a close degree of international co-operation was necessary to prevent the disorderly failure of a bank or insurance company. Effective co-operation would help to bring about a reorganisation or if necessary an orderly disposal of assets, and avoid the delays, uncertainties and loss of value often associated with formal legal proceedings. If the financial institution does fail, in my view some of the provisions of the Model Law, especially those relating to judicial cross-border co-operation, are potentially helpful in providing a starting point for negotiations.

There used to be a clear distinction between banks and securities houses, fund management and insurance, and financial institutions of different nationalities. Restructuring could be to some extent

contained within one market or one jurisdiction. Now the distinctions between different markets and types of firm have become blurred and the increasing consolidation of financial groups has given rise to a range of large complex financial institutions or LCFIs. Restructuring one of these groups would be far from straightforward. The steps involved with winding up an LCFI have been the subject of recent discussion among central banks. This has involved not only co-ordination and information sharing arrangements but also how the wider risk to the system would be assessed in these circumstances. Winding up a firm on this scale could be a large undertaking in itself. But the wider repercussions in terms of dislocation of markets could be enormous.

Thankfully, as yet, we have had little if any experience of restructuring or winding down an LCFI. As with corporates, however, the first step would be an assessment of the long-run viability of the institution prior to the restructuring. This will determine whether liquidity support to the LCFI may be justified, or whether it should be closed, in much the same way as the independent review in a corporate restructuring will determine whether the company should be reorganised or liquidated. With financial institutions, the time available to make an assessment and reach a decision on providing support may be limited.

Other common themes in the two strands are the need for co-operation between all the relevant parties, based on full exchanges of information, and the need for equitable treatment of similar classes of creditors, investors and depositors. It may also be possible to envisage, in the winding down or restructuring of an LCFI, the authorities playing a facilitating role in a private sector solution, raising parallels with the Bank's role in the London Approach.

There has, as yet, been little in-depth exploration of the linkages between corporate sector and financial sector restructurings. I believe that efforts to explore the complementarities between the two approaches would reap dividends. A well-designed corporate restructuring framework, by rehabilitating viable companies facing short-term problems, should maximise the value of creditors' claims if it preserves the going concern value of the companies. By providing for an orderly recognition and allocation of losses, it should also improve banks' ability to assess the value of impaired assets and determine the

appropriate level of loan loss provisions. As the IMF has noted, this should encourage more accurate and predictable pricing of distressed claims, assisting the development of a deeper secondary market in which financial institutions can trade distressed claims and thereby transfer loans to specialist turnaround investors.

Of course, some of these complementarities may be difficult to exploit in countries, especially emerging market economies, in which banks are facing major problems arising from their corporate loan books. Banks with inadequate loan loss provisions and low capital ratios may be reluctant to participate in corporate workouts, because they may then be forced to recognise actual losses. The role of the public authorities is often crucial in such cases. In practice, bank restructuring programmes have often transferred distressed corporate sector debt to separate government agencies. Indeed, this has happened in recent years in some G10 countries, notably the US, Japan and Sweden. This can lead to tensions between maximising short-term debt recoveries to limit the public costs of bank recapitalisation and preserving longer-term corporate value. Effectively, the public authorities may liquidate companies prematurely, in an effort to secure immediate cash recoveries, when a longer-term restructuring of these companies might be a more effective way to preserve value in both the corporate sector and the wider economy, including the banking sector. To avoid this conflict, corporate and banking sector restructurings need to be more effectively co-ordinated. I would argue that this can lead to synergies by facilitating the rehabilitation of viable companies in a manner benefiting all the creditors – including the public authorities – in the longer term.

Having said all that, there is no doubt that financial restructurings and insolvencies do contain several distinguishing features compared with corporate reorganisations, besides the importance of confidence with which I started. Indeed, that probably explains why much of the debate on the Model Law is on whether its principles can be applied to the insolvencies of banks and other financial institutions. Different views on this meant that the Law had to contain an effective opt-out for banks and insurance companies. I would certainly agree that depositors or policyholders are in a different position from ordinary creditors. They are likely to have less information, be greater in number, and be less well

organised to recover their assets than professional creditors. So any application of corporate workout and insolvency principles to international financial insolvencies would have to allow for depositor and policyholder protection schemes.

The role of supervisors would also, of course, need to be recognised explicitly. In particular, the principles underlying corporate workouts and insolvencies would have to be consistent with internationally recognised principles of banking and insurance regulation. In the European Union (EU) framework, that requires consistency between cross-border corporate sector initiatives such as the Model Law and ILG Principles and the EU passport system and principle of home state responsibility for banking and insurance supervision. Relevant EU directives would also need to be taken into account.

All this strengthens my view that although synergies should be realised through consistency in the approaches to corporate and financial sector workouts, we need to recognise that banks (and insurance companies) are different. I have noted that, in corporate insolvencies, countries may differ in the extent to which their legal and statutory arrangements favour the debtor or the creditor. But they will also differ in the extent to which their insolvency laws embody a universal or territorial approach to cross-border insolvencies. Exactly the same distinction is relevant in an international financial insolvency. In the 'single-entity' approach, a bank with branches in several jurisdictions will be wound up according to universal principles, so that creditors and depositors worldwide are entitled to an equal claim on the bank's worldwide assets. By contrast, a 'separate-entity' (or 'ring-fencing') approach to liquidating an LCFI proceeds according to territorial principles, so that creditors and depositors of an individual bank branch in a particular jurisdiction take precedence in the distribution of all the LCFI's assets within that jurisdiction, before the local liquidator is authorised to turn over any excess assets to the home country liquidator.

This implies that, in both corporate sector and financial sector insolvencies, banking supervisors and insolvency practitioners will be subject to varying legal responsibilities that may make the co-ordination problem more difficult. I would argue that initiatives such as those of the ILG and UNCITRAL are more

consistent with the spirit of a universal approach. In fact, I would go further and suggest that the application of these initiatives to international financial restructurings and insolvencies is only possible, in all respects, if a country adopts a single entity approach to the liquidation of international banks. Continued adherence to separate entity approaches could therefore make it more difficult to achieve greater consensus on the principles governing cross-border corporate workouts and international financial insolvencies.

Sovereign debt workouts

I would now like to stray into even more uncharted territory and turn to my third area, sovereign debt workouts. I hope I have already said enough to clarify that the establishment of an effective framework governing the relationships between non-sovereign debtors and their creditors provides a means of involving the private sector in the resolution of financial crises. But how does this relate to the current very live debate about private sector involvement (PSI) in sovereign debt workouts? The potential linkages between the three strands of financial restructurings are amply illustrated by the Asian crisis of 1997-98, which involved widespread defaults by the corporate sector on both its domestic liabilities and its obligations to foreign creditors. This impacted not only on the banking sector's balance sheets and capital positions, with further feedback effects on the corporate sector, but also on the sovereign sector, through its need to involve itself in bank recapitalisation and corporate sector restructuring. On top of that, there were contagion effects on public and private sector holdings of sovereign debt at a time when public finances in many countries were themselves deteriorating independently.

I think it is important to appreciate that the existing framework governing sovereign debt workouts in emerging market economies (EMEs) evolved in a world where official financing dominated and private financing was provided by a relatively small number of developed country banks. But private claims now outweigh official claims on the major EMEs – by a ratio of 70:30 in recent years. And these private claims are increasingly to bond investors rather than banks – direct and portfolio investment flows now dwarf bank lending as a source of finance for EMEs. Bondholders are dispersed and often anonymous, so there are potentially greater creditor co-ordination

problems. To contain the potential systemic consequences of future crises, both the public and private sectors have an incentive to devise a new framework that can deal more effectively with sovereign debt workouts, and most especially with the role of PSI, when private claims, particularly bondholdings, are substantial.

This is very similar in kind to the challenge of adapting the London Approach, whose original principles were most relevant where the creditor group largely consisted of a fairly small group of relatively homogeneous banks, to a world where creditor groups had become much more disparate and international, involving large numbers of bondholders and other financial creditors. It seems sensible, therefore, to consider to what extent the sovereign sector can borrow from the ideas discussed by the ILG and others in developing principles governing multi-creditor global corporate workouts that are more appropriate to modern financial markets.

I take considerable encouragement from the fact that, in recent months, a number of different private sector groups have published views on 'best practice' principles that might underlie sovereign debt workouts. Although there are inevitably differences between the various groups, in all cases a collaborative framework to facilitate negotiations and co-operation between a sovereign debtor and its creditors, and also to overcome possible co-ordination problems between different creditor groups, seems to be envisaged. These general principles seem to me to have much in common with the themes underlying the ILG's corporate workout principles. They also include several other suggestions to enhance creditor co-ordination, such as the inclusion of collective action clauses in bond contracts and, more widely, the use of 'creditor country clubs' as a conduit for information exchanges.

The key to all this is, in my view, the creditor co-ordination issue. A failure of creditor co-ordination in the sovereign context can lead to cancellation of longer-term investment projects and protracted exclusion from international capital markets. The private sector groups argue that, when a sovereign encounters financial difficulties likely to trigger a debt default, it should encourage a process of dialogue between the affected creditors and the sovereign. That should involve co-operation to facilitate a full exchange of information and analysis

relating to the current financial situation and prospects of the sovereign. This will be easier if the country has already taken the necessary action to improve data availability and transparency and to meet relevant IMF data standards and codes. There is a close parallel with the way in which corporate and financial sector restructurings are governed by independent reviews based on full exchanges of information on the corporate's or bank's financial position. In both cases, it is essential that those analysing the debtor's financial position (the IMF in the sovereign context and the independent accountants in a corporate case) are able to distinguish between different types of default. More effective monitoring should improve the discipline on the debtor and facilitate the extension of more lending by the private creditors in both cases.

Another area where sovereign debt workouts could borrow from corporate and financial restructurings is in possible recourse to a neutral mediator, charged with facilitating a co-operative creditor solution. In the sovereign context, one possible facilitator might be the IMF. It would certainly have the resources and expertise to do the job, although one possible drawback is that the IMF, unlike an arbiter in a corporate workout, will sometimes itself have claims on the debtor, in this case the sovereign. And this raises a separate issue of whether, or in what circumstances, the IMF might provide financial support during a sovereign debt workout – so-called lending into arrears. Such an approach would have to be designed to limit the moral hazard implications, incorporating strict conditionality. But it can be useful as a means of supporting a country as it takes remedial policy action through bridging finance.

The issue of the standstill is, as many of you will know, controversial in the sovereign context, notwithstanding the fact that an informal standstill plays a crucial role in corporate workouts. Voluntary debt rollover agreements with creditors or bond restructurings are, I believe, useful aspects of effective PSI. But historical experience of involuntary sovereign debt standstills, in the form of payments suspensions, has not exactly been encouraging – the process has often been inefficient and inequitable. Nevertheless, there are circumstances in a sovereign debt crisis where the immediate payments relief provided by a standstill may make an important contribution. An example would be where capital flight is pervasive because immediate policy

adjustment is insufficient to bring about adequate voluntary private sector refinancing.

In these circumstances, a standstill may realise the same advantages as in a corporate workout if it provides breathing space for remedial policy measures to be evaluated and put in place; if it promotes creditor co-ordination and avoids unjustified creditor preference by treating creditors of the same type equitably; and if it provides incentives to both creditors and debtors to reach a voluntary arrangement sooner rather than later. That is a lot of ifs and, as I have noted, a further provision is that if the standstill is supported by IMF lending into arrears, it would need to be subject to strict conditionality. But again these conditions could usefully borrow from the corresponding provisions attached to corporate workout standstills. In both cases, the standstill should be subject to a strict time limit; it should allow for a full release of all relevant information from debtor to creditors on a timely basis; it should facilitate equitable treatment of similar types of creditors (for example through the formation of bank creditor and bondholder committees); it should provide for the seniority of any new money; and above all it should deliver the rapid presentation of a restructuring plan to creditors.

What this means is that any sovereign debt standstill would need to be orderly, efficient, equitable and expeditious. Easier said than done, of course, especially given the fact that generally no single organisation represents the disparate group of private creditors. But, as with corporate workout standstills, the key is to reduce the incentives for creditors to rush for the exits.

Of course, some have argued that attempts to negotiate a standstill could have the opposite effect, in other words they could prompt a rush for the exits. But longer-term investors benefit from country runs being forestalled, so the net effect might be a beneficial switch from short-run to long-run investors. Others have suggested that standstills create moral hazard and alter debtor incentives in the process by undermining the primacy of debt contracts. But, as I have noted before, a well-designed framework for sovereign debt workouts, involving a voluntary standstill where that is thought to be helpful, might be no more likely to provide perverse incentives for sovereign debtors to default than insolvency law does for corporate debtors. But it would have to be clear

that the standstill option would be used sparingly and in tightly-defined circumstances; otherwise, it could be self-defeating.

Having highlighted all these common themes, I could be accused of wearing rose-tinted spectacles if I did not also acknowledge that there are important distinguishing features between sovereign and corporate workouts. Unlike a company, a sovereign, of course, cannot be liquidated. Public policy approaches to crisis management recognise that there is an argument for sovereign debt restructuring in cases where the crisis arises from poor performance and policy. In such cases, as more generally, crisis management will involve a careful combination of official finance, policy adjustment by the debtor and PSI. This is rather different to the corporate case, where the creditors might well decide to liquidate, rather than restructure, a company whose problems arose solely from poor management. The lack of a corresponding insolvency law back-up in the sovereign case might mean that the incentives to repay are weaker, and that the moral hazard effect inducing a voluntary default is more common than in the corporate case.

Such factors might be compounded by other differences between the corporate and sovereign frameworks, including the lack of collateral (or the means to acquire it) underlying sovereign debt, and the greater uncertainties in the sovereign case on issues such as creditor seniority, assessing ongoing debt sustainability and burden sharing. This latter point also raises the thorny issue of Paris Club comparability, which could be regarded as imposing a form of involuntary PSI on the private creditors. The sovereign case will also generally be subject to political factors that are simply not present in the corporate case.

The uncertainties surrounding these questions explain why progress has been slow in devising a framework governing sovereign workouts that is capable of commanding widespread support. I believe there is great scope in developing such a framework to draw heavily on the principles governing corporate and financial sector restructurings, where they are relevant, without compromising the distinct features of sovereign workouts. I am pleased to see that this seems to be the approach being taken by the various private sector groups, and I wish them well in their efforts.

Conclusion

Let me try to bring my remarks to some conclusion. In a financial system that has become ever more global and interconnected, central banking increasingly involves spotting linkages between developments in different countries, sectors or markets. Usually this is a matter of identifying and dealing with threats before they emerge. But there is also an opportunity to take ideas developed to address one set of problems and apply them elsewhere. I have tried to give you a flavour of the synergies that I believe exist in debt workouts affecting, first, companies, then financial institutions and finally sovereign countries. But I hope I have also not underestimated the difficulties in realising those synergies, especially as the number and type of players involved in workouts has increased. Significant progress towards a global approach to corporate workouts has been made, however, thanks to the efforts of many of you. I am convinced that this has laid the foundations for further moves towards more effective frameworks governing bank and, especially, sovereign debt workouts.