



---

# fsr

## **Financial Stability Review**

June 2001

---

## 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/Links/setframe.html](http://www.bankofengland.co.uk/Links/setframe.html). 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/fsr/themesandissues.htm](http://www.bankofengland.co.uk/fsr/themesandissues.htm) and the *Financial stability conjuncture and outlook overview* is at: [www.bankofengland.co.uk/fsr/overview.htm](http://www.bankofengland.co.uk/fsr/overview.htm) (The Bank's website also has details of job opportunities at the Bank of England at [www.bankofengland.co.uk/jobs](http://www.bankofengland.co.uk/jobs))

The postal address is: *Financial Stability Review*, Bank of England HO-3, Threadneedle Street, London EC2R 8AH.

By e-mail, general *Financial Stability Review* enquiries should go to [tim.kidd@bankofengland.co.uk](mailto:tim.kidd@bankofengland.co.uk) and Bank of England authors can be contacted at [forename.surname@bankofengland.co.uk](mailto:forename.surname@bankofengland.co.uk)

To add your name to the *Financial Stability Review* mailing list please refer to the last page.

This document was delivered to the printers on 22 June 2001 and, unless otherwise stated, uses data available as at 12 June 2001.

**Editorial Committee**

**Bank of England**

Alastair Clark  
Alex Bowen  
Peter Brierley  
Roger Clews  
Andy Haldane  
Patricia Jackson  
Peter Rodgers  
Clifford Smout  
John Trundle  
Paul Tucker

**Financial Services Authority**

Michael Stephenson

Articles published in the *Financial Stability Review*, whether written by the Bank or by outside contributors, are intended to add to debate, and are not necessarily statements of the Bank.





# f s r

## Financial Stability Review

June 2001

- |            |   |            |   |            |   |
|------------|---|------------|---|------------|---|
| <b>3</b>   | <b>Financial stability themes and issues</b>  | <b>117</b> | <b>The credit derivatives market: its development and possible implications for financial stability</b><br>David Rule, G10 Financial Surveillance Division, Bank of England | <b>148</b> | <b>Costs of banking system instability: some empirical evidence</b><br>Glenn Hoggarth and Victoria Saporta, Financial Industry and Regulation Division, Bank of England |
| <b>7</b>   | <b>The financial stability conjuncture and outlook</b>  | <b>141</b> | <b>Corporate liquidations in the United Kingdom</b><br>Gertjan Vlieghe, Monetary Assessment and Strategy Division, Bank of England  | <b>166</b> | <b>Market discipline and financial stability</b><br>Andrew Crockett, General Manager, Bank for International Settlements and Chairman, Financial Stability Forum        |
| <b>105</b> | <b>Financial flows via offshore financial centres as part of the international financial system</b><br>Liz Dixon, International Finance Division, Bank of England |            |   |            |   |

# The financial stability conjuncture and outlook

## Overview: risks to financial stability

This latest Bank of England review of global and UK financial stability suggests that some of the risks flagged in previous *Reviews* have crystallised over the past six months. That mainly reflects the slowdown in the US, and the associated sharp decline in global demand for information and communications technology (ICT). A US slowdown was, however, necessary if a further accumulation of imbalances and risks was to be avoided. Faced with these developments and the related correction in telecom and technology company equity prices – a ‘natural stress test’ – the international financial system (at least to date) has been resilient, perhaps aided by the substantial capital accumulated from high profits in recent years. That should also help internationally active banks, taken as a group, face the global economic slowdown, an associated rise in credit risks, and some continuing market risks.

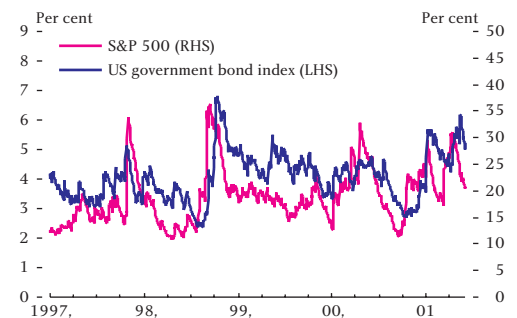
### Changes in the financial market environment

A year ago, the pace of growth in the United States appeared unsustainable, but there was uncertainty about the timing and degree of any slowdown and about the extent to which other countries would be affected. Since then, a significant weakening in growth has become evident, extending beyond the United States.

Against that background, the volatility of many asset prices has at times been high (Chart A), implying increased market risk. Forward-looking measures, derived from options prices, of volatility in ‘new economy’ equity markets were for a while very high, but have fallen back recently (Chart B). Most equity price indices dipped sharply in March, but subsequently recovered somewhat. Broad indices are now nevertheless a little lower than at the time of the *December Review*. Correlations of returns across different regional equity markets and industry sectors have generally increased, perhaps reducing the scope for portfolio diversification to reduce risk.

The sharp equity price movements suggest considerable uncertainty about future corporate earnings. Taken together with small falls in equity markets, this might have been accompanied by increased concerns about credit risk in bond markets. In fact, average spreads for investment-grade bonds in most industrial

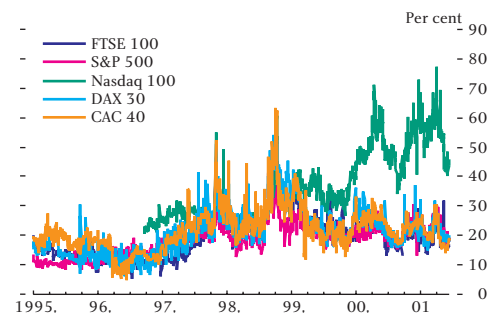
**Chart A:**  
Historical volatility of US equities and US government bonds<sup>(a)</sup>



Sources: Thomson Financial Datastream and Bank calculations.

(a) Volatility calculated as annualised 252-day rolling square-root of exponentially weighted moving average of squared daily log returns.

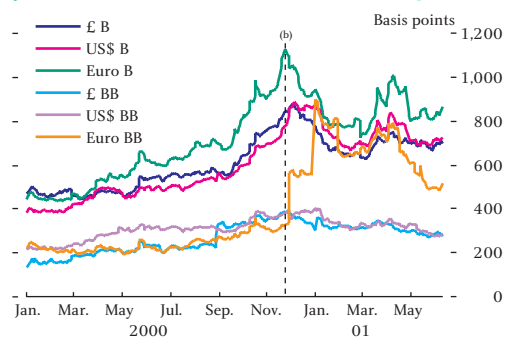
**Chart B:**  
Equity index implied volatility<sup>(a)</sup>



Source: Bloomberg.

(a) Nasdaq series begins in 1997.

**Chart C:**  
**Sub-investment-grade corporate bond spreads: US dollar, euro and sterling<sup>(a)</sup>**

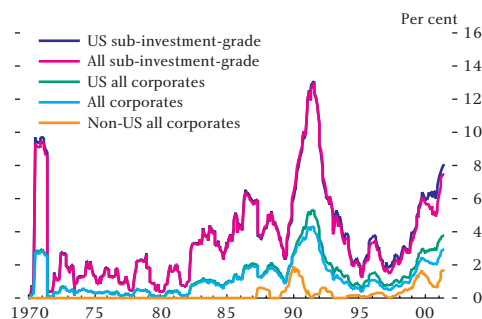


Sources: Merrill Lynch and Bloomberg.

(a) High yield indices spread over maturity-matched swap rates.

(b) December 2000 *Review*.

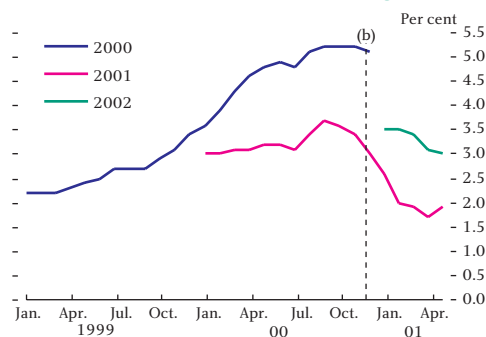
**Chart D:**  
**Moody's trailing twelve-month default rates<sup>(a)</sup>**



Source: Moody's Investors Service.

(a) Defaults in the previous 12 months divided by the number of issues in the rating category 12 months previously.

**Chart E:**  
**Consensus forecasts for US GDP growth<sup>(a)</sup>**



Source: Consensus Forecasts.

(a) Mean of forecasts.

(b) December 2000 *Review*.

countries are broadly similar to their levels last December, while average sub-investment-grade spreads are lower (Chart C).

This apparent improvement in forward-looking indicators of credit risk – some telecoms firms and emerging market economy sovereigns excepted – also contrasts with increases in profit warnings; a net balance of ratings downgrades; and rising bond default rates (Chart D), although that may be explained partly by the rising proportion of sub-investment-grade issuance in recent years. The reduction in spreads from their peaks at the turn of the year might also in part reflect improved market liquidity rather than reduced credit risk. Liquidity in the US dollar and euro sub-investment-grade bond markets dried up in late 2000, and rates on lower-rated US commercial paper increased over the year-end and into 2001.

While, according to the Federal Reserve's Senior Loan Officer Survey, bank lending conditions for US corporates are tighter than six months ago, they have perhaps eased back a little recently; and there have been few signs of a generalised credit crunch in international banking or capital markets. In particular, although some borrowers have had to concede higher spreads, bond issuance has been strong this year. By contrast, the market for initial public offerings of equity has been more difficult, constraining one important exit route for banks' and others' venture capital investments.

### Sources of risk

The major potential sources of risk are considered below. As usual, the focus is on downside risks rather than the most likely outlook, reflecting the *Review's* objective of identifying potential threats to stability. It is intended partly to give an idea of some of the scenarios that risk managers and regulators might wish to consider in 'stress tests'.

#### *Uncertainty about the US outlook*

There have been sharp falls in expectations of US growth in 2001 (Chart E), accompanying a fall in private sector ICT investment. It is particularly unclear what path the US economy will now follow, notwithstanding the robust monetary policy response and the recent fiscal package. First, there might be an early recovery after a relatively short slowdown – more likely if the slowdown was caused by a more-rapid-than-usual inventory correction and a temporary pause to ICT investment after a heavy wave of spending. Second, there might be a longer cyclical downturn, from a more protracted inventory adjustment and more pronounced 'accelerator' effects from the slowing of investment and the lengthening of the economic life of recently installed ICT equipment. The inventory correction in the ICT sector does not seem to be as far advanced as elsewhere in the economy. Third, household saving may rise in order to adjust balance sheets to positions more obviously sustainable in the long run,

with consequences for aggregate demand and therefore the timing of recovery. Fourth, the cyclical downturn might be exacerbated if any doubts were to develop about the prospects for productivity growth in the long run, leading to changes in savings behaviour and falls in asset prices as expected returns and incomes were marked down.

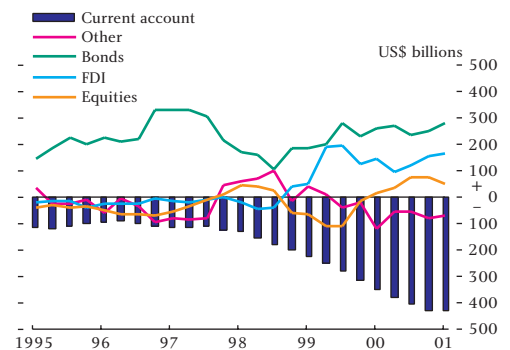
While these scenarios are not of course completely independent, broadly the second and third would have more serious implications than the first for credit risk; while the third and fourth would also heighten concern about asset market and exchange rate risk. But there has so far been no evidence of a deterioration in willingness to hold US assets – net capital inflows to the United States have apparently continued at a rapid rate, sustaining a large current account deficit and maintaining the strength of the dollar (Chart F).

Concerns about credit risk arise partly because household and corporate sector vulnerability to a slowdown is increased by their high levels of debt. In the household sector, saving rates (measured in a variety of ways) are abnormally low. The gearing (at book value) of the corporate sector has been steadily increasing in recent years (Chart G), and 'highly leveraged lending' has become a more important source of financing, especially for M&A-related activity. Business and non-business bankruptcies have risen over the past six months, and some loan problems have already emerged. In the corporate sector, this has been concentrated in particular industries or regions (eg California), and amongst syndicated and especially leveraged loans. In the household sector, losses have been registered in the sub-prime market, which has expanded in recent years. To an extent, recent losses may reflect somewhat relaxed lending standards – particularly in leveraged lending – in 1995-98; problem loans can take a few years to become manifest. Looking ahead, another possible area of concern is real estate; the downturn in the high tech sector has recently raised vacancy rates and had a localised impact on property markets. Compared with the downturn in the early 1990s, banks may benefit, however, from their increased regional diversification and from greater non-bank participation in US loan markets.

#### The technology, media, and telecommunications sector

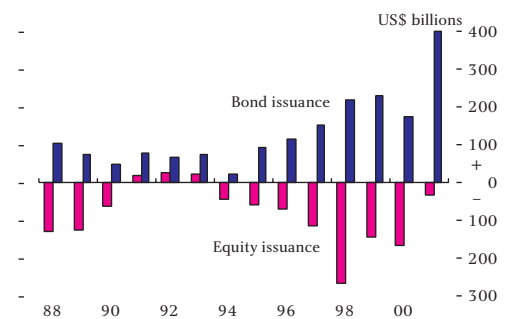
US technology, media and telecommunications (TMT) equity prices have fallen by over 50 per cent since the March 2000 peak (Chart H). But the reassessment has been worldwide: TMT equity index returns have been strongly correlated across countries, partly because the industries are highly integrated, and partly reflecting common changes in the way investors value the sector. Since last autumn, it has become evident – as it should perhaps have been already – that TMT stocks are not immune to cyclical downturns, and as a result the risk premium embodied in their prices may have increased. The TMT sector is

**Chart F:**  
Net capital inflows to the United States<sup>(a)</sup>



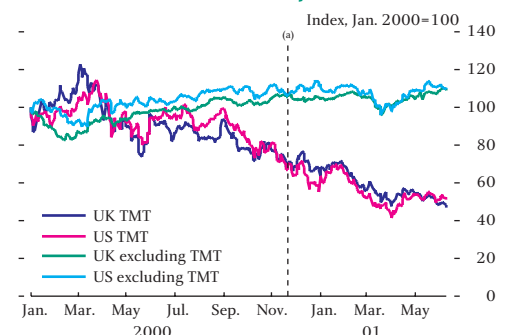
Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States 2001', Q1.  
(a) Four-quarter moving average at an annualised rate.

**Chart G:**  
Net US corporate equity and bond issuance<sup>(a)(b)</sup>



Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States 2001', Q1.  
(a) Average quarterly issuance, seasonally adjusted.  
(b) 2001 figure for first quarter 2001.

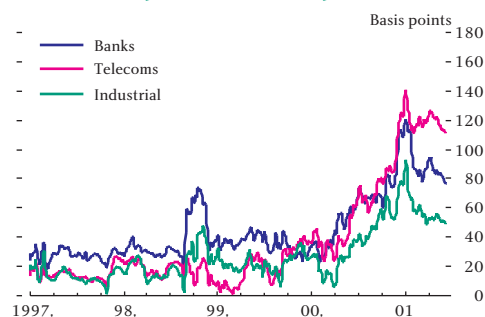
**Chart H:**  
TMT and non-TMT share prices, UK and US



Source: Thomson Financial Datastream  
(a) December 2000 Review.



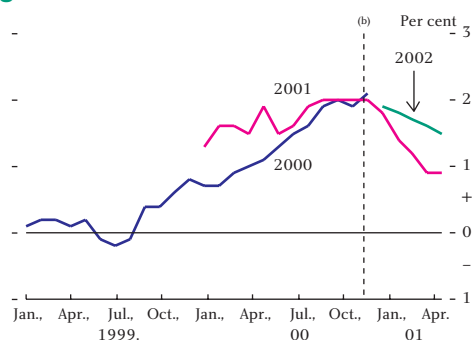
**Chart I:**  
**US A-rated spread over swap rates<sup>(a)</sup>**



Source: Bloomberg.

(a) Ten-year maturity A2-rated bond yields less ten-year swap rates. Five-day moving average.

**Chart J:**  
**Consensus forecasts for Japanese GDP growth<sup>(a)</sup>**

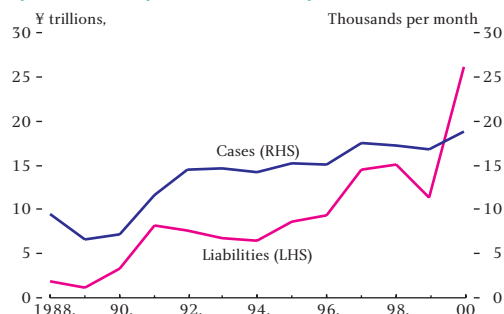


Source: Consensus Forecasts.

(a) Mean of forecasts.

(b) December 2000 Review.

**Chart K:**  
**Japanese corporate bankruptcies<sup>(a)</sup>**



Sources: Thomson Financial Datastream and Bloomberg.

(a) Financial years.

not, though, a monolith: since the *December Review*, for example, global indices of media stocks have fallen less than those of telecom equipment manufacturers.

Bond and loan markets seem to reflect this too. Credit spreads on telecom debt have generally remained higher than those in other sectors (Chart I); relative yields on sub-investment-grade telecoms have increased since December. The ratings of some of the large European telecoms operators have been downgraded further. But they have managed to refinance short-term debt in bond markets, sometimes at the price of conceding 'step-up' coupons, and have also begun to reduce debt burdens through asset sales and equity issues. The financing of so-called 'alternative' and start-up telecom operators by their equipment suppliers ('vendor finance') – recently mentioned by a number of bankers as a potential issue – may have exposed some suppliers to concentrations of credit risk highly correlated with their own business risks, and to liquidity risk to the extent that their customers have undrawn facilities. A significant 'credit event' in the telecoms sector cannot be ruled out, but the problems are not new and lenders have had time to disperse the risks, although it is difficult to judge the extent to which they have done so.

#### *The valuation of equity markets*

The deflation of what, at least with hindsight, was a 1999-2000 TMT 'bubble' has accounted for all of the fall in broader price indices since the *December Review*, and indeed since March 2000 (Chart H). So are market equity valuations generally now robust? Judging from options prices (Chart B), uncertainty about the level of the broader market remains materially higher than in the mid-1990s. In other words, market participants appear to perceive significant downside (and upside) risks. The likelihood of a greater than 20 per cent fall in the S&P 500 in the next six months, derived from equity index options, is similar to that at the time of the *December Review*. Another way of assessing the risk is to compare market valuations with those generated by theoretical valuation models (see Box 1): the greater the divergence, the stronger the questions about the market's valuation (or about the theoretical models). US valuations still seem somewhat high against benchmarks derived from this approach – partly reflecting the strength of non-TMT, as well as TMT, stocks from 1995-1999. But the divergence is smaller than six months ago.

#### *Japan*

Since the *December Review*, there has been further bad news about past and expected future Japanese output growth (Chart J), and the extent of debt-servicing problems in the corporate sector (Chart K). The quality of the banking sector's assets has deteriorated further; the life insurance sector has continued to suffer from a large gap between returns guaranteed to

policyholders and yields obtainable on yen assets; and there may also be bad debt problems in some public sector financial institutions. Some have argued that a determined programme of structural reform has the potential to stimulate confidence, and to encourage investment by a corporate sector constrained by its debt burden. While structural reform is clearly needed, there is a risk that in the short term it might lead to corporate closures and cut-backs, pushing up unemployment and reducing consumer confidence just when consumer spending needs to be encouraged. The effect would depend partly on who would bear any losses from the process, which is not yet clear. Also, the rapidly increasing public debt burden may at some point begin to constrain the government's capacity to finance large-scale restructuring.

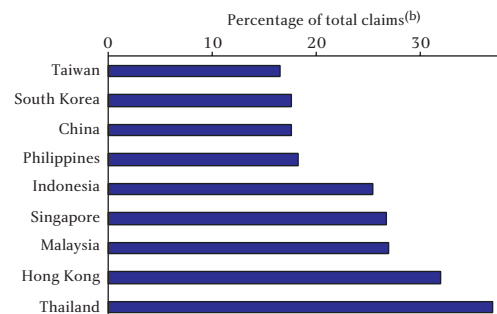
An important issue in the context of macroprudential surveillance is whether, in the event of more acute problems emerging in Japan, there might be effects on financial stability more widely. Emerging market economies in Asia would be adversely affected via trade and investment links, and through the impact on finance from the Japanese banking system (Chart L). Links with the international financial system include the foreign exchange forward and interest rate swap markets, involving counterparty and market risk, and cross-border capital flows. There have been some suggestions of internationally active banks stepping up efforts to manage exposures to Japan.

#### Emerging market economies

Some emerging market economies (EMEs) – such as the relatively export-dependent economies of Asia – are particularly vulnerable to the global slowdown in demand growth (Chart M). 'Credit events' amongst them would risk amplifying the financial stability impact of the slowdown. Some other EMEs, by contrast, have benefited from the widespread cuts in interest rates in industrial countries, which have allowed them to relax their own monetary policies. On balance, the risks to EMEs' macroeconomic and financing prospects have probably increased. But there is also evidence that investors are discriminating amongst borrowers to a greater extent; for example, Chart N indicates how the dispersion of credit spreads on EME sovereign bonds has widened over the past few years.

Two countries in particular – Turkey and Argentina – have experienced more pronounced difficulties since the December Review. Turkey suffered a currency crisis in February, prompted by political tensions, which was exacerbated by, and has had an adverse impact on, banks' balance sheets. But the risk of spillovers outside Turkey does not appear to be serious. In Argentina, sovereign yield spreads and short-term interest rates rose sharply again in late March in the face of increased political uncertainty (Chart O), and there was a significant outflow of deposits from the banking system. Although

**Chart L:**  
Consolidated claims of Japanese banks on individual Asian EMEs<sup>(a)</sup>

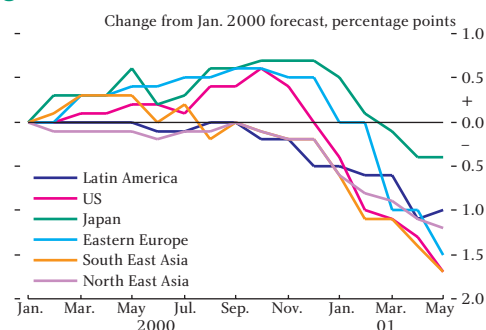


Source: BIS.

(a) Not adjusted for risk transfers.

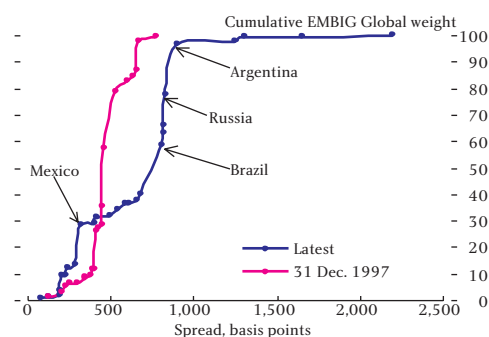
(b) Share of total claims of BIS-area banks on each country.

**Chart M:**  
Changes to Consensus Forecasts for GDP growth in 2001



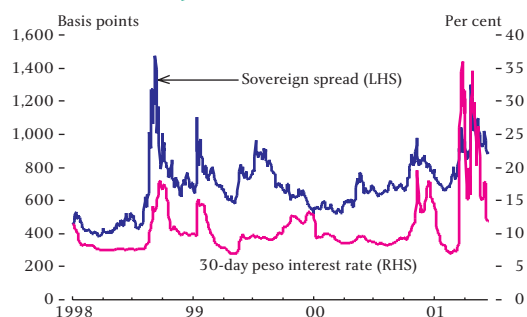
Source: Consensus Forecasts.

**Chart N:**  
EME sovereign US\$ bond spreads: snapshot cumulative distribution



Source: JP Morgan Chase & Co and Bank calculations.

**Chart O:**  
**Argentina: sovereign US\$ bond spreads**  
**and short-term peso interest rates**



Sources: JP Morgan Chase & Co and Bloomberg.

conditions have improved since, there is little evidence that economic growth has resumed. If there were to be any future difficulties, there is some risk of spillovers to countries with close links to Argentina, such as Brazil. There would only, however, be an effect on financial stability generally if developments were to trigger more widespread falls in EME asset prices, re-assessments of EME assets as a class, or reduced liquidity in EME debt markets. Argentinian debt accounts for nearly a fifth of emerging-market bond indices; and industrial-country banking-system credit exposures to Argentina are large relative to exposures to most other EMEs – but small relative to their overall credit exposures. The risk of widespread spillovers from any further disturbances is, therefore, probably small, but could conceivably be somewhat greater for financial systems with relatively concentrated EME exposures, such as Spain's to Latin America (see Box 4).

### The international financial system

Taken together, economic and financial developments in the past six months have had mixed effects on the environment in which banks and other financial firms operate. On balance, the bad news about growth prospects in the near future has probably been the most important factor. But so far the financial system has proved resilient in the face of these strains – a form of 'natural stress test'. There appear to have been few problems in dealing with trading losses or margin calls, and the financial market infrastructure has been robust. Market liquidity has been unimpaired on the whole. At present, an increase in bank credit risk is probably of as much concern as risks from sharp price movements in capital markets. So far, provisions and non-performing loans have tended to remain low in most industrial countries' banking systems – Japan excepted – perhaps partly because they are backward-looking measures. Internationally active banks in general have continued to report at least adequate rates of profit, increases in capital, and lower loan loss reserves relative to the stock of outstanding loans. Their exposures to EMEs – an important source of sharp changes in loan losses in the past – have generally fallen.

The robustness of the international financial system depends importantly on the design of the financial infrastructure and on effective risk management in firms themselves. There has been progress on both fronts. Section IX reviews a number of initiatives designed to reduce risks in the system and to improve the arrangements for handling crises if they arise. One of the more important – particularly given growing use of swaps as a fixed income benchmark – is the London Clearing House's central clearing of swap trades, SwapClear. Within firms, it seems that greater use is being made of risk management tools, with value-at-risk calculations being supplemented more frequently – especially at large global groups – by stress testing

and scenario analyses, as recently reported by the Committee on the Global Financial System<sup>1</sup>.

Developments in the international loan market are affecting risks in different ways. On the one hand, the increasing transfer of loan exposures and/or credit risk outside the banking system should help to disperse risk, provided it would not flow back to the banks if conditions deteriorated. On the other hand, banks register concerns about the terms of committed credit lines, which – as a number of recent US cases have underlined – can sometimes be drawn down by companies in difficulty. Competition to provide these lines seems to remain intense (with companies now looking to investment banks as well), but most bankers believe they are underpriced – a ‘loss leader’ to win higher return capital market business.

There are some indications, too, that leverage may have been increasing, while remaining well short of the excesses of 1997-98. Flows into hedge funds have recently been strong; and the number of funds has been rising quite rapidly. In part, this may reflect interest from a wider range of investors. Some international banks and insurance companies are guaranteeing the principal sum invested, which may involve complex hedging strategies. In general, so-called ‘crowded trades’, in which many leveraged intermediaries and investors are positioned ‘the same way round’, are said to be less common than a few years ago. One possible exception, discussed in Section VI, is convertible bond arbitrage.

## The United Kingdom

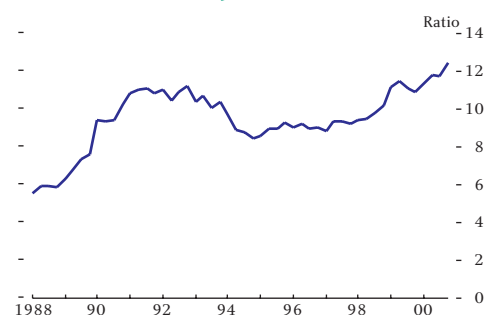
The international developments noted above may affect the UK financial system both directly and, given London’s role as a global financial centre, via the activities of internationally active financial firms. UK-owned banks’ total overseas claims are roughly equal to their exposures to the UK non-bank private sector (Chart U). In principle, if the UK maintains a stable macroeconomic environment – with low inflation, and low variability in output and real interest rates – the household and corporate sectors should be able prudently to carry a somewhat higher level of debt relative to income than in the past. Looking forward, however, current imbalances in the economy could be a potential source of risk if they persist<sup>2</sup>.

In aggregate, corporate sector debt remains high relative to trading profits (Chart P), and profit warnings have increased. Debt service ratios have risen in recent years, but remain much lower than in the late 1980s/early 1990s (Chart R). But the

<sup>1</sup>: A survey of stress tests and current practice at major financial institutions. April 2001. Committee on the Global Financial System of the central banks of the G10 countries. Available at [www.bis.org](http://www.bis.org).

<sup>2</sup>: See, for example, the minutes of the Monetary Policy Committee meetings on 9-10 May and 5-6 June.

**Chart P:**  
UK PNFCs’ debt-to-profits ratio<sup>(a)(b)</sup>

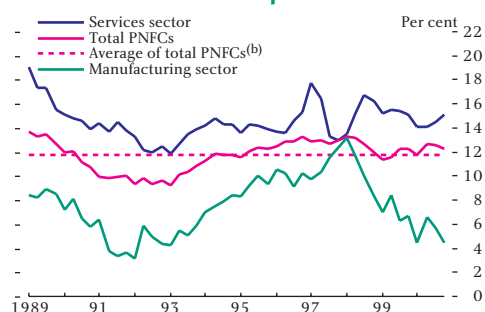


Sources: ONS and Bank calculations.

(a) Seasonally adjusted.

(b) Ratio of gross debt to operating profits.

**Chart Q:**  
Net rate of return on capital of UK PNFCs<sup>(a)</sup>

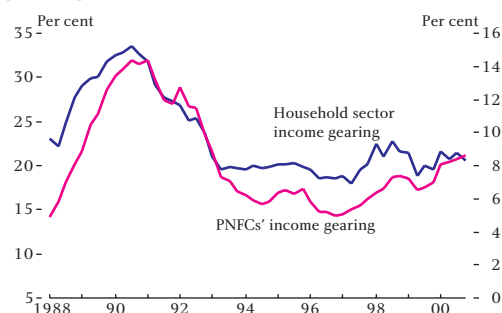


Sources: ONS and Bank of England.

(a) Net operating surplus, divided by net capital employed.

(b) Average is from 1989 Q1 to 2000 Q4.

**Chart R:**  
UK PNFCs’ and household sector income gearing<sup>(a)(b)</sup>

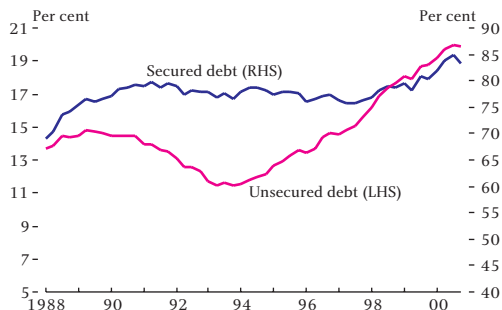


Sources: ONS and Bank of England.

(a) Household income gearing is total household interest payments over total household disposable income. PNFC income gearing is interest payments over pre-tax profits.

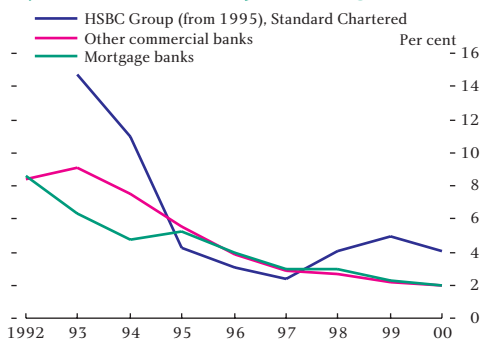
(b) Data are quarterly averages.

**Chart S:**  
**UK household sector secured and unsecured debt-to-income ratios<sup>(a)</sup>**



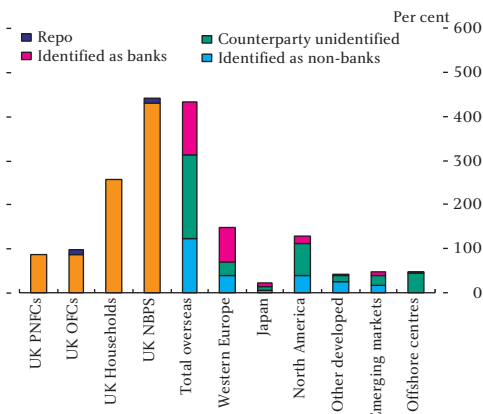
Sources: ONS and Bank of England.  
 (a) Percentage of disposable income.

**Chart T:**  
**Major UK banks' non-performing loans<sup>(a)(b)</sup>**



Sources: Bureau van Dijk Bankscope and published accounts.  
 (a) 'Non-performing': interest has been suspended or is no longer being accrued, 90 days overdue, provisions have been made, or being charged at a reduced rate. Expressed as a proportion of loans and advances.  
 (b) 'Other commercial banks' are RBS, NatWest, Barclays (from 1993), Bank of Scotland (from 1993), and Lloyds TSB (from 1994).

**Chart U:**  
**UK-owned banks' exposures as a proportion of capital<sup>(a)</sup>**



Source: Bank of England.  
 (a) Data for end-December 2000. NBPS: non-bank private sector.

aggregate numbers disguise the underlying picture. The net rate of return on capital in the manufacturing sector has fallen further (Chart Q), to levels last seen at the bottom of the business cycle in 1991, reflecting pressure from sterling's strength and weakening global demand. But the services sector has been strong, against a background of final domestic demand and especially household spending having grown rapidly for some time.

By past standards, household sector debt is also high relative to income, although debt service ratios have been broadly stable since the mid-1990s (Charts R and S). In an environment where output and income growth are expected to slow and where domestic demand will itself eventually need to slow, the longer robust household spending persists – especially if accompanied by continuing high rates of borrowing – the greater the risk of a difficult adjustment. In particular, rising indebtedness might increase household sector vulnerability in the event of a downturn in asset prices (particularly house prices), a slowdown in the growth of disposable income, or an increase in interest rates (in the event, for example, of an unexpectedly rapid recovery in world growth or larger-than-expected decline in the value of sterling).

#### The UK banking system

Global and UK developments have not yet led to a deterioration in the asset quality of UK banks, at least not on the basis of backward-looking indicators. Non-performing loans generally fell last year (Chart T), as did the gross charges made by the major banks for bad and doubtful debts. Some significant provisions against south-east Asian exposures have been released. Looking forward, the picture is not quite so reassuring. The risk on some EME exposures – particularly Turkey, Argentina, Brazil and Indonesia – has probably increased since December, although EMEs account for a declining share of UK-owned banks' total overseas exposures (Chart U). Domestically, lending to the commercial property sector – which has given rise to problems for banks in the past – has been increasing rapidly in recent months. So has unsecured consumer credit (especially credit card lending), necessitating increased provisions at some banks. And there are risks stemming from the economic imbalances described above and in Section VII. On balance, though, the UK banking system as a whole appears to be well-placed to accommodate increased credit risk.

Overall, as in December, financial systems in the UK, the rest of Europe and the US appear generally to be robust. Published data in most countries paint a picture of banking systems both profitable and well capitalised. But the operating environment may now become more difficult than appeared likely six months ago, especially if the slowdown in world activity turns out to be longer or deeper than currently expected in markets.



## I The US outlook

US economic prospects remain one of the most important uncertainties in assessing risks to financial stability. This section considers the resilience of the US household, corporate, and banking sectors, in the light of recent macroeconomic developments and their possible implications for credit risk in particular. It also discusses the links between US economic prospects and the dollar, given the continuing large US current account deficit.

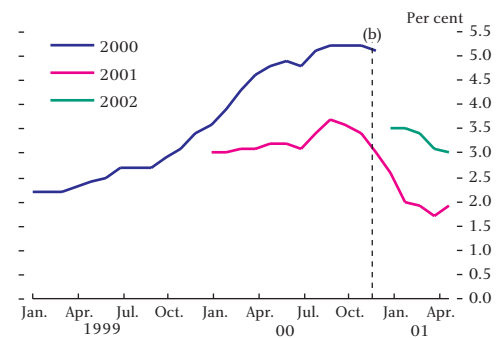
### Uncertainty about the length and depth of the US slowdown

Since the December *Review*, expectations of US growth in 2001 have fallen sharply (Chart 1) and output growth itself, having slowed in the second half of 2000, has remained sluggish. Analysts' forecasts for the growth of corporate earnings per share, both over the next twelve months and over the longer term, have also been revised downwards (Chart 2). Although the annualised rates of growth of 15-20 per cent last year were widely regarded at the time as unsustainable in the medium term, the slowdown was more sudden than most expected.

Two main downside risks were flagged in the December *Review*, both associated with a more prolonged downturn in growth than most forecasts then suggested. First, there was the possibility that the rapid productivity growth, which has accompanied the rapid output growth of the past five years, would not be sustained. Second, there was a danger that even a temporary downturn in productivity growth – in response, for example, to a sharp or extended cyclical downturn – might be misinterpreted as a more persistent fall. In either case, there was a risk that such developments would trigger a substantial rise in personal sector saving, a further slowing of corporate investment and a reduced willingness to hold US assets, with adverse consequences for demand, the creditworthiness of borrowers, and possibly the stability of exchange rates.

Those risks remain. If they were to crystallise, the recent downward revisions to typical forecasts would prove insufficient. The fall in private investment has been the most significant factor behind the slowdown in output growth since 2000 Q2, although consumption growth has also moderated (Table 1). A sharp decline in inventories and capacity utilisation in 2000 Q1 suggested that just a short, sharp inventory cycle might be in prospect. However, the considerable reduction in investment in equipment and software – widely regarded as the primary source of faster productivity growth – the fall in durable goods orders and the size of the falls in non-farm payrolls in April and May suggest that some firms may now be anticipating a longer period of slow growth. Its length will depend on, amongst other factors, why investment has fallen.

**Chart 1:**  
Consensus forecasts for GDP growth<sup>(a)</sup>

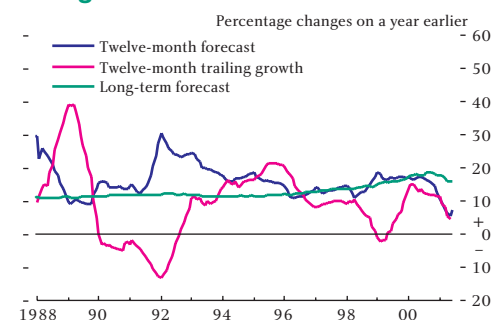


Source: Consensus Forecasts.

(a) Mean of forecasts.

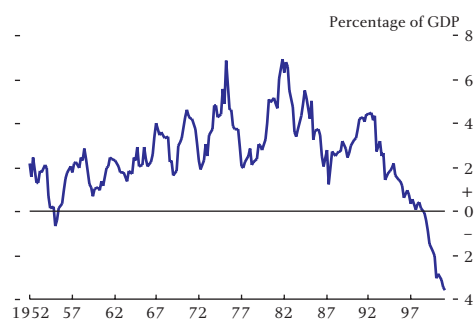
(b) December 2000 *Review*.

**Chart 2:**  
Expectations of S&P 500 earnings per share growth



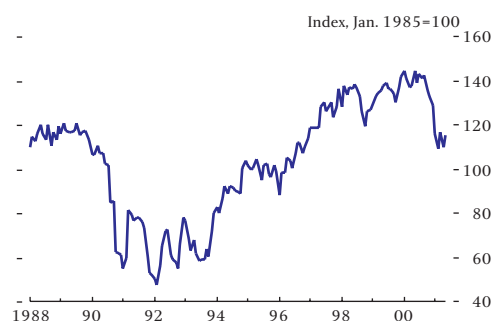
Source: Institutional Brokers Estimate System.

**Chart 3:**  
**US household financial balance**



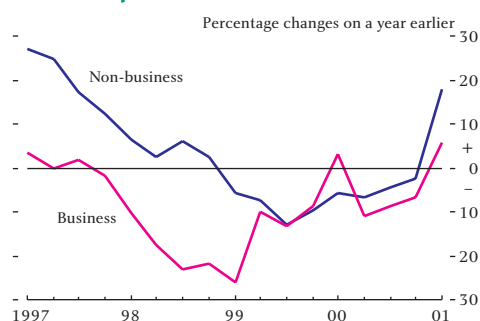
Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States 2001', Q1.

**Chart 4:**  
**Consumer confidence**



Source: Thomson Financial Datastream.

**Chart 5:**  
**US bankruptcies**



Source: Administrative Offices of US Courts.

**Table 1: Components of US real demand: annualised growth rates (per cent)**

	2000 Q2 on 1999 Q2	2001 Q1 on 2000 Q2	Change (pp)
Gross domestic product	6.1	1.5	-4.6
Private consumption	5.4	3.4	-2.0
Private fixed investment	10.6	1.5	-9.1
of which ICT <sup>(a)</sup>	27.0	6.3	-20.7
Government final expenditure	4.2	2.1	-2.1
Exports	10.2	1.2	-9.0
Imports	-14.5	-1.6	+12.9
Memo: Contribution of cumulative change in private inventories to growth of GDP	2.7	1.6	-1.1

(a) Information processing equipment and software.

On the one hand, the decline in investment may reflect an earlier bunching, especially in relation to ICT goods, perhaps partly associated with Y2K. If the pace of innovation means that the economic life of IT equipment remains short, orders may revive quickly. In that event, the downturn may be short-lived and shallow, particularly given the monetary easing that the Federal Reserve has undertaken (a cumulative interest rate reduction of 250 basis points since early January) and the prospective fiscal easing as a result of the recently agreed tax package. (Tax rebates in 2001 Q3 will initiate the fiscal stimulus, which may amount to as much as 0.4 per cent of GDP in FY 2001; how much of them will be saved is, of course, uncertain.) A relatively short-lived slowdown is still widely seen as the most likely outcome (see, for example, the *May Inflation Report*).

However, the balance of risk is on the downside. With a prospect of further falls in the prices of ICT goods, and uncertainties over future productivity growth, firms may delay or cancel new investment until the outlook for productivity gains and growth becomes clearer. Spare capacity may, nevertheless, continue to rise and even if it eventually transpires that the higher long-run productivity growth rate has been sustained, a more prolonged or deeper downturn, followed by slower recovery, might ensue. That would increase credit risk even if lenders and creditors remained convinced that long-run returns justified current asset values and hence did not give rise to market risk.

Overall, it is too soon to assess how far productivity performance has been permanently transformed. Although productivity growth did fall in 2001 Q1, that could simply have been a

consequence of demand slowing more quickly than firms expected so that they did not adjust their labour and other inputs appropriately – the usual cyclical pattern.

### The US household sector

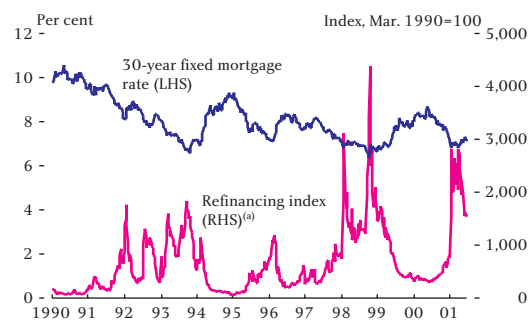
There would be two financial stability risks associated with the US household sector if the downturn were to last longer or be deeper than expected.

First, households might re-assess the appropriate level of debt in their balance sheets and increase their saving rates sharply, so exacerbating the deceleration of demand, if they come to believe that their future medium-term income growth is going to be less than they had expected. But the household sector saving ratio appears to have continued to fall recently, and the household sector financial balance remains in deficit to an historically unprecedented extent (Chart 3). There is some controversy about the appropriate way to measure the US saving ratio, but while most adjustments suggest that the true ratio is higher than the official data, they do not call into question the conclusion that saving has fallen and is close to or at historically low levels. There are some indications that expectations of future income growth have been changing. Consumer confidence, although it has stabilised this year, has fallen since the December *Review* and is well down compared with its peak in the first half of last year (Chart 4).

For many households, particularly those in the middle of the income distribution, capital losses on shares will have been offset by gains on housing. The distribution of equity wealth is heavily skewed: according to the latest triennial Survey of Consumer Finances, in 1998 only the richest 5 per cent of households held more wealth in equities than in housing. Nevertheless, for the richest 20 per cent of households, equities accounted for more than 10 per cent of assets and this figure would have been larger still if the value of stock options had been included. Much of the fall in the aggregate saving ratio over the past few years can be accounted for by reduced saving by higher-income households, who have benefited most from past increases in equity prices (Table 2). Hence there is a risk that the aggregate saving rate might be pushed up by a reaction of these households to equity market developments.

The second possible risk to stability would stem from a sharp decline in creditworthiness of indebted households if, for example, unemployment were to increase or if households' collateral – in particular, housing against which there may be scope to refinance more expensive debt – were to lose value. Chart 5 shows how US non-business bankruptcies have increased rapidly over the past six months. Recent cuts in nominal interest rates encouraged mortgage refinancing (Chart 6), but so far with little impact on household income gearing. From end-March,

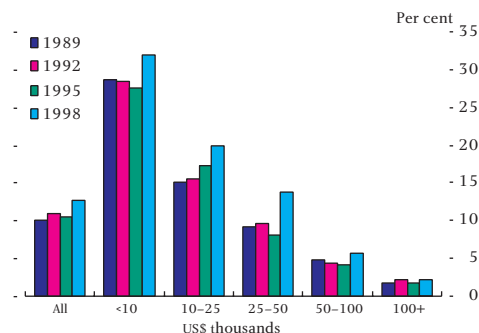
**Chart 6:**  
**Refinancing index and mortgage rate**



Source: Mortgage Bankers Association of America.

(a) Number of applications to refinance an existing mortgage.

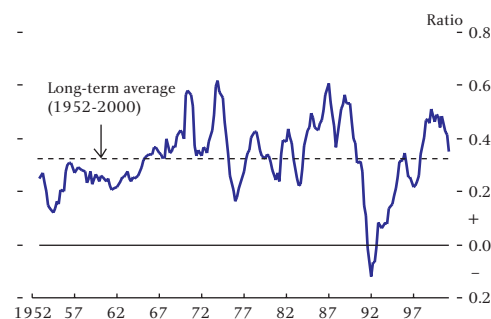
**Chart 7:**  
**Percentage of families with a heavy debt-service burden, by income group<sup>(a)</sup>**



Source: Board of Governors of the Federal Reserve System: 'Survey of Consumer Finances'.

(a) Debt-service payments greater than 40 per cent of disposable income.

**Chart 8:**  
**Ratio of net new debt to gross investment<sup>(a)</sup>**



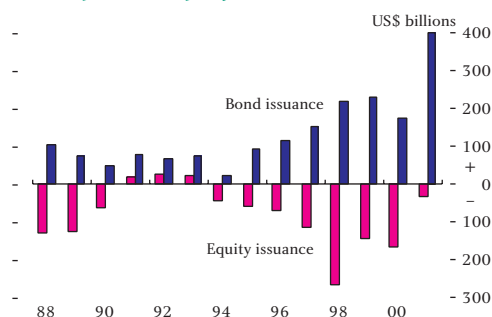
Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States 2001', Q1.

(a) Four-quarter moving average.



**Chart 9:**

**Net corporate equity and bond issuance<sup>(a)(b)</sup>**



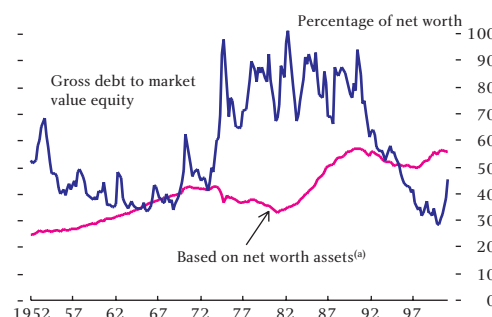
Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States 2001', Q1.

(a) Average quarterly issuance, seasonally adjusted.

(b) 2001 figure for first quarter 2001.

**Chart 10:**

**US corporate sector gearing**

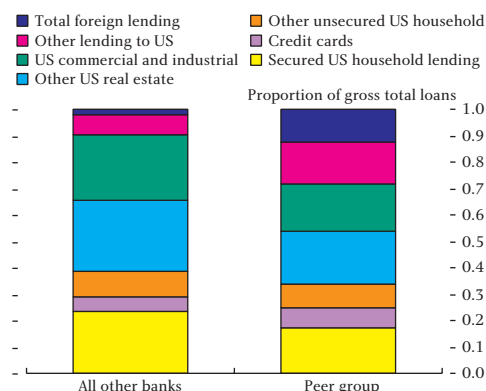


Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2001 Q1.

(a) Net financial assets plus tangible assets at replacement cost.

**Chart 11:**

**Composition of US bank lending<sup>(a)</sup>**



Source: Federal Deposit Insurance Corporation.

(a) Peer group: Bank of America, Bank One, Citigroup, JP Morgan Chase & Co, Taunus Corporation (Deutsche Bank). As of December 31, 2000.

**Table 2: The decline in the US saving rate**

Net worth-income ratios and saving rates by income quintile

Income category	Net worth-income ratio (per cent)			Saving rate (per cent)		
	1992 (A)	2000 (B)	Difference (B) – (A)	1992 (C)	2000 (D)	Difference (D) – (C)
Total	468.6	612.7	144.1	5.9	1.3	-4.6
81-100	639.5	869.2	229.7	8.5	-2.1	-10.6
61-80	332.2	417.1	84.9	4.7	2.6	-2.1
41-60	326.7	364.9	38.2	2.7	2.9	0.2
21-40	328.2	414.5	86.3	4.2	7.4	3.2
10-20	411.3	512.3	101.0	3.8	7.1	3.3

Source: Maki, DM and Palumbo MG (2001): 'Disentangling the Wealth Effect: A Cohort Analysis of Household Saving in the 1990s', Federal Reserve Board, April.

moreover, the 30-year fixed mortgage rate started to increase again as the yield curve steepened. Were output growth to remain low and layoffs to rise sharply, low-income debtors, whose debt-servicing obligations were highest as a proportion of income in 1998, would be at risk (Chart 7).

**The US corporate sector**

Companies have been increasing the proportion of gross investment financed by debt for nearly ten years (Chart 8), with significant net retirements of equity since 1994 (Chart 9), potentially exposing firms to more risk in consequence. US corporate capital gearing, measured at replacement cost, has remained very high (Chart 10). The falls in equity prices since March 2000 (see Section II) have entailed a rise in gearing at market value. However, it remains much lower than the replacement cost measure: book values are still low relative to equity prices.

Corporate profits fell in the second half of 2000 and continued to decline in 2001 Q1. With capital formation in the second half of last year higher than in the first, companies' external financing requirements rose. However, in 2001 Q1 capital spending fell in nominal terms, easing external financing needs somewhat. As indicated earlier, companies' earnings are expected to remain under pressure. According to Thomson Financial's First Call, the number of profit warnings was at a record level in 2001 Q1 and continued to run at around that level in Q2. The slowdown has increased financial pressures on some companies in both traditional cyclical industries and new economy sectors such as telecom equipment suppliers. The corporate bankruptcy rate has turned up (Chart 5).

Nevertheless, in the aggregate at least, recent changes in the pattern of companies' financial transactions appear to have contributed, on balance, to a strengthened balance sheet, which may be prudent if cash flows are prospectively under pressure. On the liabilities side, there was a very large increase in bond issuance in 2000 Q1, partly refinancing shorter maturity commercial paper. Although the volume of new equity issues fell sharply in 2001 Q1, net buybacks of equities, which had been large during the last nine months of 2000, were low. Another feature of financing patterns in 2001 Q1 was a sharp decline in direct investment flows, both into the United States and by US companies to their foreign affiliates; on balance a net inflow will have contributed to the sector's liquidity. A strong growth in trade receivables evident earlier has slowed since 2000 Q3<sup>1</sup>.

Overall, these developments enabled companies in aggregate to make net repayments of bank and other lending in 2001 Q1 while increasing liquid assets, particularly holdings of money market mutual funds. An important caveat is that full information on companies' off-balance-sheet assets and liabilities is not available. Some companies may well have contingent obligations which, if exercised by their counterparties, would place added pressure on their liquidity and raise credit risks. The companies themselves may in turn be able draw on facilities provided by the banks, so transferring any such pressures into the banking system.

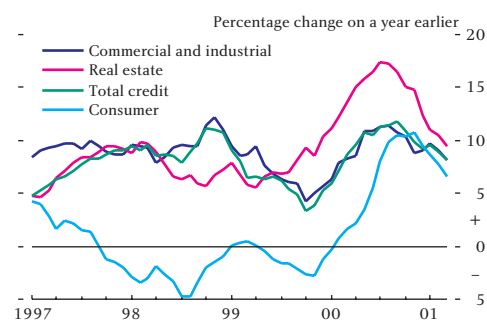
### Credit risks and the US domestic banking system

Against a background of slower growth and some uncertainty about the timing and strength of a recovery, how vulnerable might the banking system be, via domestic credit risks, to an unexpectedly severe recession or other shocks?

Chart 11 compares the (on-balance-sheet) loan portfolios (excluding securities) of the largest internationally active banks in the United States with those of other US banks. The two groups hold a similar proportion of property-based lending and unsecured lending to households, while the internationally active banks have a smaller relative exposure to domestic companies and to commercial real estate and construction. Internationally active banks are discussed further in Section VI, in the context of the resilience of the global financial system.

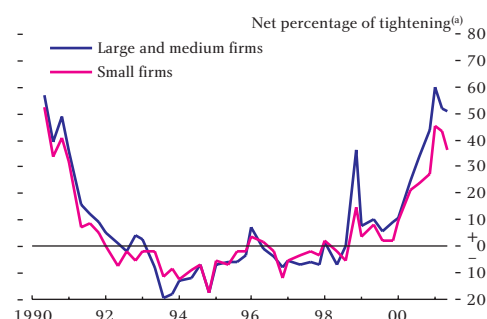
In terms of sectoral and industrial concentrations, commercial banks' loans secured by real estate have risen to almost 45 per cent of lending (from just over 40 per cent in 1990) but, within the real estate sector, there has been a shift towards residential mortgages from riskier construction and land development. Real estate is an important source of loan collateral for US firms, so a decline in property prices would increase the

**Chart 12:**  
**US bank credit**



Source: Board of Governors of the Federal Reserve System.

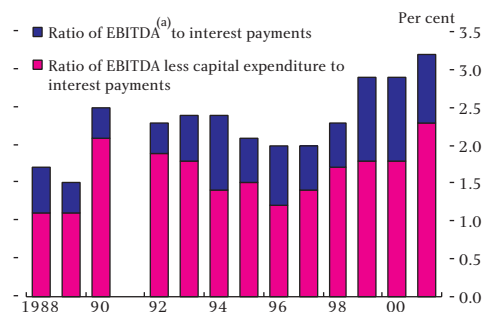
**Chart 13:**  
**Bank lending conditions for commercial and industrial loans**



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

(a) Net percentage of surveyed banks tightening credit standards over the past three months.

**Chart 14:**  
**Average cash flow multiples of highly leveraged loans**



Source: S&P/Portfolio Management Data.

(a) Earnings before interest, tax, depreciation and amortisation. Highly leveraged loans defined in relation to spread over LIBOR. Before 1996 includes loans with a spread of 250 basis points or more. From 1996 includes loans with a spread of 225 basis points or higher. Excludes media and telecom loans. Insufficient number of transactions in 1991 to provide a meaningful sample.

<sup>1</sup>: Issues surrounding vendor financing are discussed in Section II.

**Table 3: US regional house price inflation<sup>(a)</sup>**

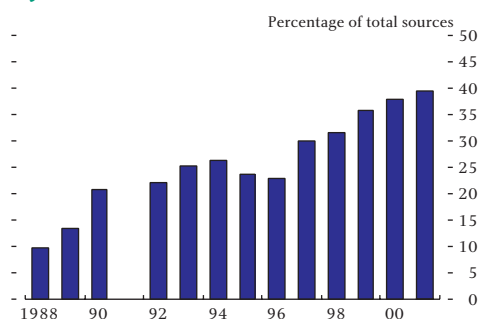
	2001 Q1 annual percentage change (quarterly)	2000 Q4 annual percentage change (quarterly)	Percentage change on five years earlier
<i>US total</i>	8.8 (1.7)	8.1 (1.8)	31.8
<b>States</b>			
<i>Highest</i>			
District of Columbia	15.4 (1.4)	14.8 (4.4)	38.5
California	14.7 (3.0)	13.8 (2.6)	47.2
New Hampshire	13.6 (1.1)	15.1 (2.7)	48.5
Massachusetts	13.2 (2.0)	14.5 (2.3)	54.6
<i>Lowest</i>			
Montana	5.9 (1.4)	7.1 (2.5)	22.1
Iowa	5.8 (1.5)	4.7 (1.1)	26.7
North Dakota	5.8 (1.9)	2.2 (0.3)	18.7

Source: Office of Federal Housing Enterprise Oversight (OFHEO).

(a) Average house price changes in repeat sales or refinancing on the same single family properties based on mortgages that have been purchased or securitised by the Federal National Mortgage Association and the Federal Home Loan Mortgage Corporation.

risks facing them and their creditors. Although prices have been increasing steadily, that has not led to a large speculative supply-side response and a general construction boom. Few, if any, cities or regions exhibit the scale of surplus of commercial property, completed or nearing completion, that led to large loan losses for banks in, for example, New England in the early 90s. However, both residential and non-residential property prices have risen more rapidly in areas associated with the high tech sector than in other regions (Table 3). The downturn in the ICT sector is beginning to have an impact on local property values as firms vacate offices and attempt to sub-let the space. According to Torto Wheaton Research, office vacancy rates rose sharply in 2001 Q1.

**Chart 15:**  
**Average equity contribution to leveraged buyouts<sup>(a)</sup>**



Source: S&P/Portfolio Management Data.

(a) Insufficient data for 1991 to provide a meaningful sample. 2001 figure for first quarter.

More generally, the economic slowdown has been accompanied by a fall in the growth of bank credit (Chart 12) and by higher provisions and charge-offs on lending to both companies and households, but from a low level compared with the early 1990s. Arrears are also increasing. Banks have been tightening credit conditions, according to the Federal Reserve's recent Senior Loan Officer Opinion Surveys.

Problem lending seems so far to have been concentrated in particular sectors, such as telecoms, autos, steel, health care, textiles and cinemas. Difficulties experienced by some ICT and energy companies in California represent a regional concentration of risk. In some cases an earlier period of easier lending standards may be contributing to higher defaults. There seems, in particular, to have been an easing of loan conditions

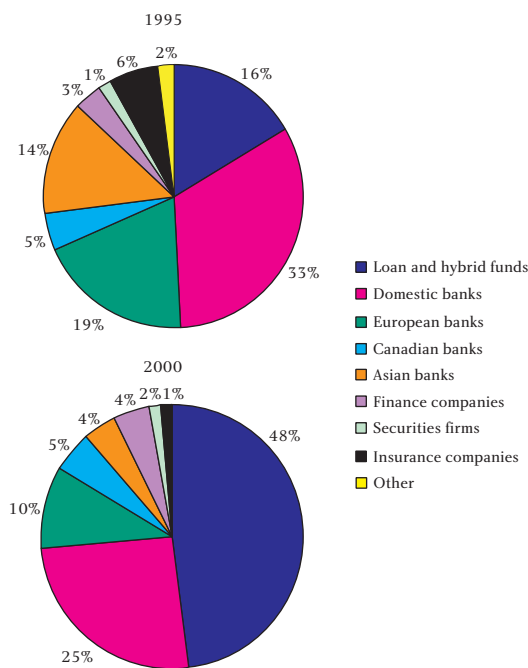
after the recession in the early 90s and then for a further period after 1996 (Chart 13).

Changes in the terms attached to 'highly leveraged lending' (lending to companies with financial leverage that significantly exceeds the norm for their industry) during the 1990s seem to reflect this. Such lending (which, according to Thomson Financial, accounted for a third of new syndicated credits in 2000) has in recent years been an important source of financing, particularly for mergers and acquisitions, and for other corporate restructurings and expansion. Bank participation in this activity can take many forms, including subordinated lending or equity finance through specialised affiliates. Participation may be either direct or through investment funds. In relation to new loans, average cash flow coverage of interest payments fell for a period during the mid-1990s but has since risen (Chart 14). Similarly, the equity cover for such deals slipped during the same period (Chart 15). For example, some contacts have questioned the robustness of some loans extended in recent years to so-called 'roll-ups', which involve the creation of a highly leveraged company to acquire a string of related businesses whose owners 'roll-up' their equity into the new enterprise; and where the robustness of the credit relies on a prudent assessment of enterprise value. While, as the charts indicate, underwriting standards have recovered since the mid-1990s, the lags between writing business and the emergence of any problems may mean that latent losses are not yet completely apparent. Combined with the effects of the macroeconomic slowdown, this might possibly be a drag on bank earnings in the coming quarters. In April, US regulators issued new guidance intended to strengthen banks' risk management in this general area<sup>2</sup>.

There are, therefore, some reasons to think that credit risk has increased. It seems possible, however, that those risks may to a degree be more widely dispersed than in previous downturns. In recent years there has been an increasing participation of investment funds and other non-bank institutions in the market for higher risk loans. According to S&P Portfolio Management Data, in 2000, such funds absorbed nearly one-half of the market for highly leveraged loans as against only 16 per cent in 1995 (Chart 16). Loan sales (Chart 17) and credit derivatives have also increased the potential for banks and other institutions to manage their credit risk more effectively. Nevertheless, there are questions about how far the issues associated with credit risk transfer are fully understood by all market participants (see the article by David Rule in this Review).

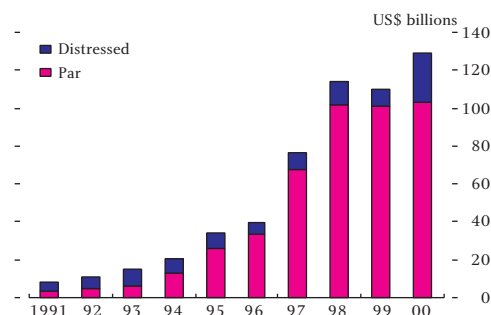
A related dimension in assessing banks' resilience is the extent to which sources of earnings and risk exposure have become more

**Chart 16:**  
US primary market for highly leveraged loans by investor type in 1995 and 2000



Source: S&P/Portfolio Management Data.

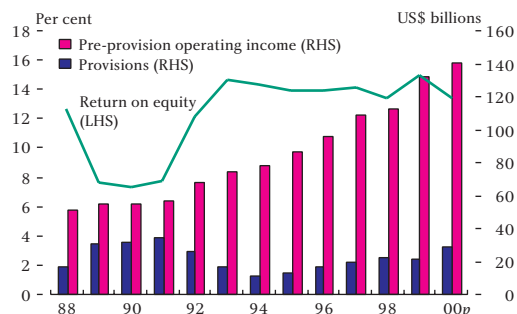
**Chart 17:**  
Secondary loan market volumes



Source: Loan Pricing Corporation.

<sup>2</sup>: 'Interagency Guidance on Leveraged Financing', Board of Governors of the Federal Reserve System, April 2001.

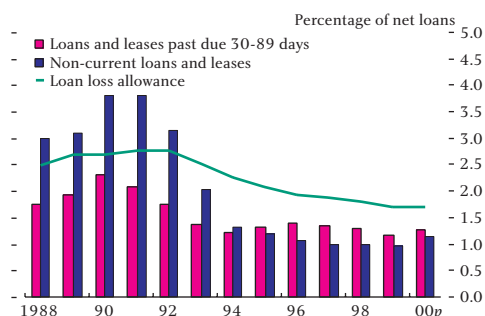
**Chart 18:**  
**US commercial banks' earnings and provisions**



Source: Federal Deposit Insurance Corporation.

(a) 2000 figure is preliminary.

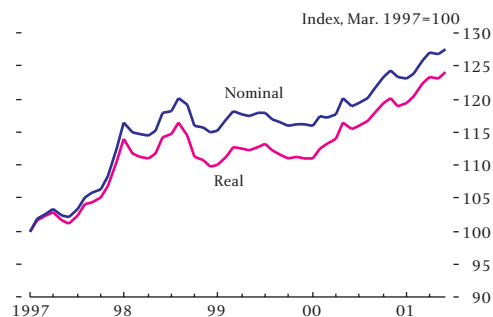
**Chart 19:**  
**US banks' non-performing loans and provisions<sup>(a)</sup>**



Source: Federal Deposit Insurance Corporation.

(a) 2000 figure is preliminary.

**Chart 20:**  
**Dollar nominal and real exchange rates<sup>(a)</sup>**



Source: Board of Governors of the Federal Reserve System.

(a) Broad indices.

diversified. Consolidation within the industry, the removal of restrictions on inter-state banking (1994 Interstate Banking and Branching Efficiency Act) and the steady erosion of those on investment banking and other financial activities, culminating in the 1999 Financial Modernisation Act, have allowed such diversification. Regional diversification seems to have helped reduce the risks faced by the larger banks from the financial problems of California's energy utilities. Throughout the United States, the number of small local banks with geographically concentrated portfolios has been subject to steady rationalisation and attrition. According to the Federal Deposit Insurance Corporation, the number of US banks with assets of less than \$100 million fell from 7,259 at end-1994 to 4,842 at the end of last year; the number of such small banks in California fell from 217 to 97.

Following the recovery from the early 1990s recession, US banks have enjoyed a largely uninterrupted period of high returns on equity and steady income growth (Chart 18) enabling capital resources to be built up. Non-performing loans as a percentage of total lending fell steadily until very recently (Chart 19), and the stock of provisions continued more than fully to cover non-performing loans – the coverage ratio remains close to its recent peak. The current environment is, though, perhaps more challenging than for a while – as is already apparent from some banks' announcements of material losses in some business areas.

### The dollar and the US balance of payments

The December *Review* drew attention to the possibility that any reassessment of US prospects in the medium to long term might affect willingness to hold an increasing stock of US assets, as well as affecting credit risk. Were that to happen suddenly, it might bring about a sharp fall in the dollar, with potentially significant consequences for the world economy and global financial markets. The downward revision of expectations about US growth in the short term (which has been bigger than for most other industrial countries) has, however, been accompanied by some strengthening in the dollar since the previous *Review* (Chart 20). Measures of implied volatility of dollar/euro and dollar/yen exchange rates derived from options prices suggest that exchange rate uncertainty has fallen sharply since early April (Chart 21) although in the case of dollar/yen this reversed an increase earlier in the year.

Taking a four-quarter moving average to smooth out erratic elements, over the past couple of years net capital inflows of bonds and foreign direct investment have been broadly stable with portfolio equity inflows rising (Chart 22).

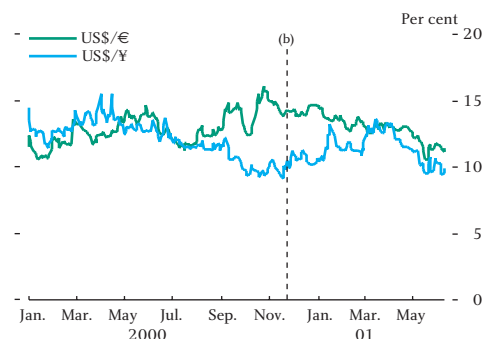
In the latest quarter for which data are available, 2001 Q1, the US current account deficit contracted to around its level a year earlier, as imports fell more than exports. Given the strength of

the dollar, the reduced net capital inflow – the counterpart to the smaller deficit – did not suggest that confidence in US assets had weakened. Although non-residents reduced their investment in US commercial paper, they increased strongly their holdings of both US government and corporate bonds. And, despite a much reduced flow of new issues, the flow of foreign net investment in US equities continued at broadly the rate seen in the second half of last year. Direct investment flows in both directions fell sharply, perhaps reflecting the worldwide slowdown in investment demand. US banks continued to reduce their net borrowing from their offices abroad, but flows into deposits with banks overseas were well down on the 2001 Q1.

As December's *Review* noted, it is not entirely straightforward to explain the capital inflows which have permitted such a large current deficit, at the same time as the real and nominal exchange rates of the dollar have appreciated. But some combination of the following may be at work: the allocation of a greater proportion of world saving to the acquisition of US assets, responding to higher expected real returns over the medium to long term in the United States compared with other regions; a rise in the price of US goods and services relative to foreign prices, brought about by dollar appreciation and leading to a current account deficit, thus supplying the dollars needed by overseas investors in US assets; a rise in the prices of 'non-tradable' US goods and services relative to 'tradable' ones (due to some combination of a less price-elastic supply response and a lower rate of growth of productivity for the former), pushing up the real exchange rate further.

The factors most vulnerable to sudden change are probably the portfolio choices made by investors. As discussed above, so far these appear to have remained relatively stable with regard to US assets, despite adverse news about the US conjuncture since last autumn, reductions in relative US interest rates, and some falls in equity prices. That may be because the conjunctural news and relative rate cuts are regarded as temporary, and the asset price movements as a global phenomenon – a possibility explored further in Section II.

**Chart 21:**  
Exchange rate implied volatilities<sup>(a)</sup>

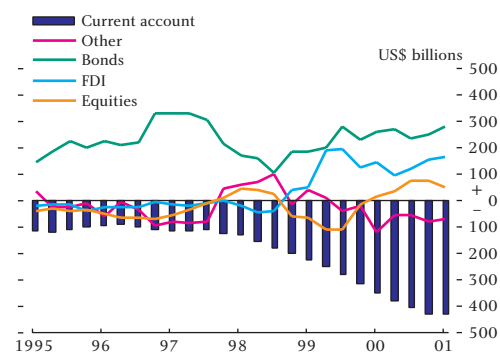


Source: JP Morgan Chase & Co.

(a) Three-month implied volatilities.

(b) December 2000 *Review*.

**Chart 22:**  
Net capital inflows to the United States<sup>(a)</sup>

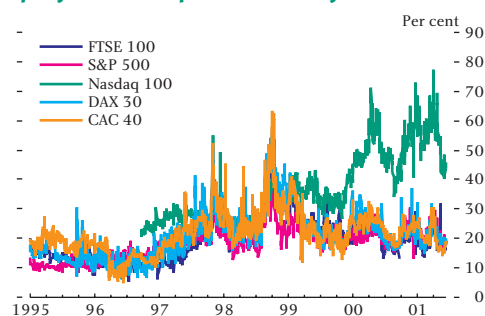


Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States 2001', Q1.

(a) Four-quarter moving average at an annualised rate.



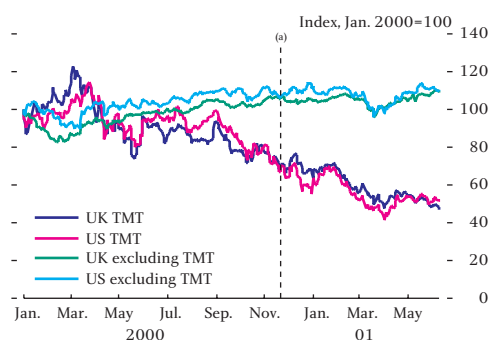
**Chart 23:**  
Equity index implied volatility<sup>(a)</sup>



Source: Bloomberg.

(a) Nasdaq series begins in 1997.

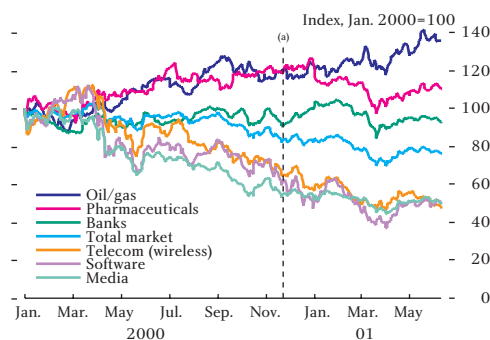
**Chart 24:**  
TMT and non-TMT share prices, UK and US<sup>(a)</sup>



Source: Thomson Financial Datastream

(a) December 2000 *Review*.

**Chart 25:**  
World sectoral indices<sup>(a)</sup>



Source: Thomson Financial Datastream

(a) December 2000 *Review*.

## II International financial markets

The deterioration in the US macroeconomic outlook and the monetary policy response have been the main factors influencing financial asset prices since the December *Review*. Another, closely related development has been the fall in global demand for information communications and technology (ICT) goods and the associated reassessment of the value of technology, media and telecommunications (TMT) companies worldwide.

### Equity markets

Major equity markets are lower than at the time of the December *Review* (Table 4). Price indices dipped sharply in the second half of March, but had recovered somewhat by mid-June. However they remain much lower than the March 2000 peaks. Indeed, the percentage fall in the Wilshire 5000 over the past 15 months is broadly comparable with the 1987 stock market correction; and the fall in the Nasdaq is larger. The decline in US market capitalisation, as measured by the Datastream total market index, has been some US\$4½ trillion or the equivalent of more than 40 per cent of GDP, significantly more than the reduction in wealth from the 1987 stock market correction (when the corresponding figures were US\$0.7 trillion and around 15 per cent of GDP respectively). An important difference from 1987 is that prices have fallen at a slower rate over a longer period – in 1987 the market peaked in October and troughed in December.

**Table 4: Major equity markets**

	24 Nov 2000	12 June 2001	Change (Per cent)
Wilshire 5000 (US)	12354	11632	-6
FTSE All-share (UK)	3030	2815	-7
CDAX (Germany)	529	482	-9
SBF 250 (France)	3887	3418	-12
Topix (Japan)	1342	1273	-5

Source: Thomson Financial Datastream.

This adjustment in prices has been accompanied by periods of high volatility across a number of markets, including developed world equity and US dollar bond markets (Chart 101 in Section VI). Measures of implied volatility from prices of equity index options – one indicator of uncertainty about future returns – have been high for the Nasdaq 100 in 2001 Q1, but have declined since March, suggesting that uncertainty may recently have been decreasing (Chart 23).

Underlying the changes in wider market indices are large variations in share price movements across different industry

sectors. Global sector indices that exclude the TMT sectors are slightly higher than a year ago and have been fairly stable since the December 2000 *Review*, except for a sharp dip in March (Chart 24). Relative to the world equity index, share prices in the oil and gas sector have increased strongly and those in the banking sector slightly less so (Chart 25). In contrast, TMT shares continued to fall globally until the end of March.

#### TMT equity prices

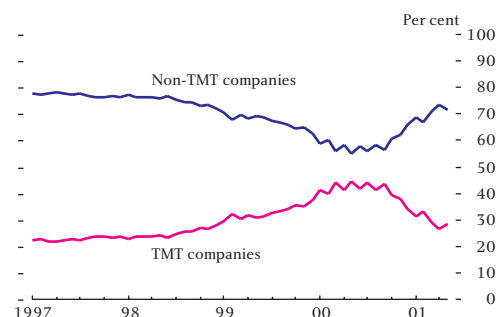
From March 2000 to March 2001, US TMT share prices fell by more than 50 per cent. At the peak, TMT companies comprised 45 per cent of the value of the US equity market<sup>3</sup> (Chart 26), although the output of the TMT sectors as a proportion of GDP was probably much smaller (around 9 per cent in the USA and 6 per cent in the EU in 1997<sup>4</sup>). Falls have varied in severity across different countries, reflecting different mixes of technology, media and telecoms companies (Chart 27).

In part, the decline of TMT share prices has been linked to the slowdown in the US economy. Investment in ICT equipment increased sharply in 1999 and 2000. Year 2000 preparations and the potential of the internet led many companies to invest at rates that may not have been sustainable. The subsequent fall in business investment has brought a reduction in demand for ICT goods, lowering the expected earnings of TMT companies at least for the immediate future.

The TMT reassessment, however, has been global, against a background of increasing global correlations between industry sector indices since the mid-1990s. Weekly price changes of US TMT stocks have been more correlated with those of European TMT stocks than with those of US non-TMT stocks since January 2000 (Chart 28). This probably reflects two factors. First, the industries are highly integrated, so that the same influences affect expected future earnings of companies in each region. Secondly, prices have moved as investors worldwide have changed the way in which they value TMT companies.

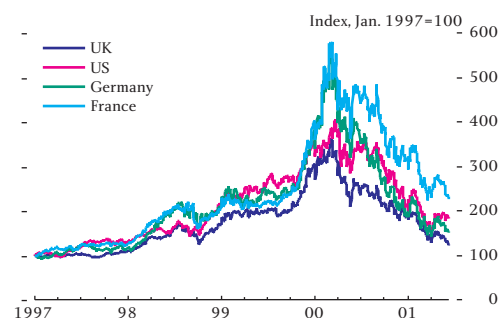
In retrospect, the rise and fall of TMT share prices globally shows many of the characteristics of the inflation and deflation of a bubble. Some investors based their decisions on expectations of how other investors would behave rather than on an assessment of future company earnings. The rise of day trading and flows into so-called 'aggressive growth' mutual funds were perhaps symptoms of a frothy market (Chart 29). This seems the most plausible explanation for some of the exaggerated valuations in early 2000 and the initial falls in 2000 Q2. Day trading has declined since, and turnover, particularly retail trading and via discount brokers, has fallen. For example, the daily average

**Chart 26:**  
Share of total US equity market (by market capitalisation)



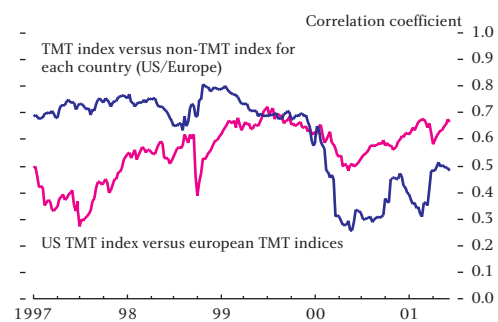
Source: Thomson Financial Datastream.

**Chart 27:**  
TMT indices for major European and US equity markets



Source: Thomson Financial Datastream

**Chart 28:**  
Average of pair-wise correlations of log returns<sup>(a)(b)</sup>



Sources: Thomson Financial Datastream and Bank calculations.

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

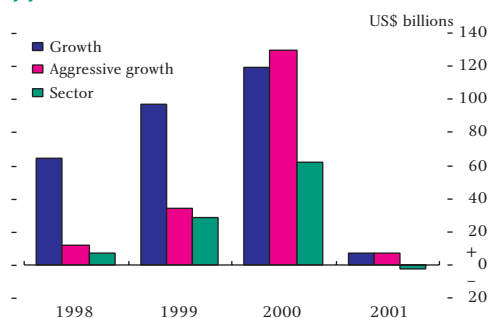
(b) European indices comprise the French, German and UK indices.

3: As measured by the Datastream total market index for the United States.

4: Estimates from *Measuring the ICT Sector*, p33, OECD (1999).



**Chart 29:**  
**Breakdown of flows into capital appreciation mutual funds<sup>(a)(b)(c)</sup>**



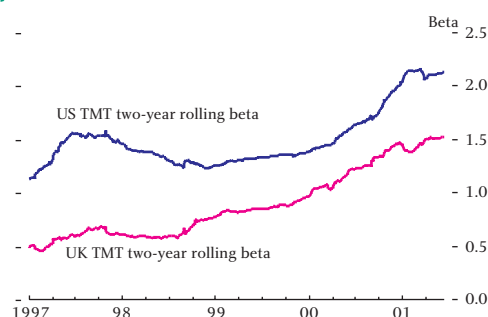
Source: Investment Company Institute.

(a) Growth funds invest primarily in common stocks of well-established companies.

(b) Aggressive growth funds invest primarily in common stocks of small, growth companies.

(c) Sector funds invest primarily in companies in related fields.

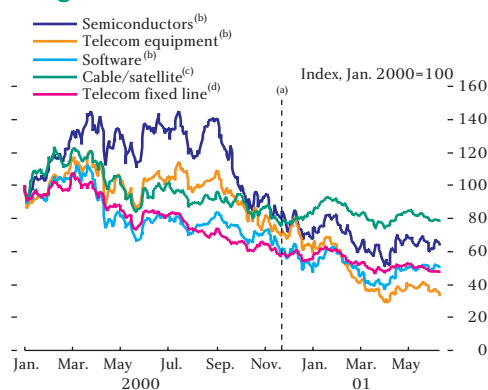
**Chart 30:**  
**US and UK TMT two-year rolling share price betas<sup>(a)</sup>**



Sources: Thomson Financial Datastream and Bank calculations.

(a) Betas are calculated against Thomson Financial Datastream World index.

**Chart 31:**  
**TMT global sectoral indices<sup>(a)</sup>**



Source: Thomson Financial Datastream.

(a) December 2000 *Review*.

(b) Technology.

(c) Media.

(d) Telecommunications

number of trades by all global clients of Charles Schwab in April 2001 was 39 per cent lower than in April 2000. Another feature of the market was the Initial Public Offering (IPO) boom, which some have suggested may have pumped air into the bubble. The subsequent volatility of many share prices following their IPOs may partly have been due to the relatively small share of total capital that was often publicly issued – typically around 20 per cent.

The further falls after September 2000 followed downward revisions to expected earnings of TMT companies. The risk premium required on TMT earnings may also have risen as it became apparent that the sector is, after all, subject to cyclical influences. If, for example, investors based their assessment of market risk on moving two-year share price betas – as proxied by the observed change in the value of US or UK TMT shares if the world equity index moves by one unit – their required risk premium would have tended to increase significantly (Chart 30).

But TMT is not a monolith. Since the December *Review*, share price movements across different TMT sectors have continued to vary (Chart 31). Globally, shares of media companies have fallen less than those of technology and telecom companies. The prices of telecom equipment manufacturers have fallen furthest, reflecting lower demand and perhaps concerns about their provision of so-called ‘vendor finance’ to telecom operators (see below).

### What is the risk of further equity price falls?

The correction in equity prices – especially the relatively gradual deflation of a TMT bubble – over the past year has probably reduced the risk of a dramatic collapse in markets. But could there still be a further correction?

#### Information from options prices

One way of assessing the likelihood of further price falls is to use information derived, on certain assumptions, from prices of options on equity index futures. Taking the TMT and non-TMT sectors together, the volatility of US and European share prices implied by equity index option prices is somewhat lower than at the time of the December *Review* (Chart 23). Market participants still appear to perceive a significant downside risk: the risk neutral probability assigned to a greater than 20 per cent fall in the S&P 500 in the next six months, based on probability density functions derived from index option prices<sup>5</sup>, is similar to that at the time of the December 2000 *Review*. But the probability distribution function (PDF) of future price changes is more symmetrical than it was in December, when it was skewed towards further price falls (Chart 32).

<sup>5</sup> See Box 3 of *The financial stability conjuncture and outlook* in the June 2000 *Review* for a description of the technique and its limitations.

### Equity valuations

Another way of assessing the risk of a future market correction is to look at the excess of market valuations over those generated by theoretical valuation models: the greater the divergence, the stronger the questions about the market's valuation (or about the theoretical techniques used). Charts 33 and 34 present the differences between observed equity price indices for the US and UK and hypothetical indices based on the assumptions that dividend growth in each country is expected to be at its long-run average, and that the equity risk premium is either 4 per cent or 2 per cent<sup>6</sup>. On the face of it, these charts suggest that, first, the UK market's valuation looks less at risk than the US market's and, second, the degree of any implied overvaluation has fallen over the past six months.

The problem is that there is no general agreement about what are the appropriate values of the key parameters used in those models. Indeed, the models are sometimes used to deduce the values of unobserved parameters, assuming that the market values equities correctly. To shed light on this, Box 1 explores the changes in the equity risk premium, expected long-run dividend growth, and expected long-run real rate of return on equity that would have had to have taken place to explain the movements in the US total market index under various assumptions.

### Credit markets

Many of the factors affecting equity markets – and in particular the outlook for earnings – have also been influencing the evolution of credit risk and so conditions in credit markets.

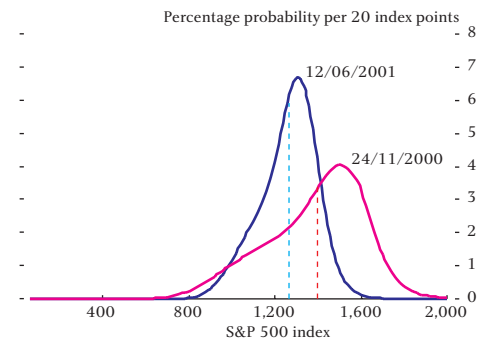
### Investment-grade bonds

Overall, markets are in better health than towards the end of 2000. Investment-grade corporate bond issuance has picked up, sharply so in the United States, and some multinational companies have been able to issue very large amounts (Chart 35 and Table 5). One reason for the fall in net issuance of commercial paper in the US market in 2000 Q1 may be that some companies have taken the opportunity to lengthen the maturity of their debt by issuing bonds.

There is no evidence that credit to good quality companies has been rationed. But some issuers – mainly telecoms firms – have continued to have to pay wider credit spreads than is typical for companies of their credit rating; and to concede clauses allowing for the coupon to increase in the event of a downgrade by the rating agencies. So investors appear – for the moment at least – to have become more discriminating.

<sup>6</sup> For example, a recent estimate of the average yield difference between US stocks (S&P composite index, calculated as the sum of the dividend yield and the average growth rate of dividends) and US Treasury bonds over the period 1926-1999 is around 4.3% but this yield difference falls to around 1% in the period 1990-1999. Jagannathan, R., McGrattan, E.R., and Scherbina, A. (2001) 'The declining US equity premium', Working Paper 8172, NBER.

**Chart 32:**  
**Implied PDFs for S&P 500<sup>(a)(b)</sup>**

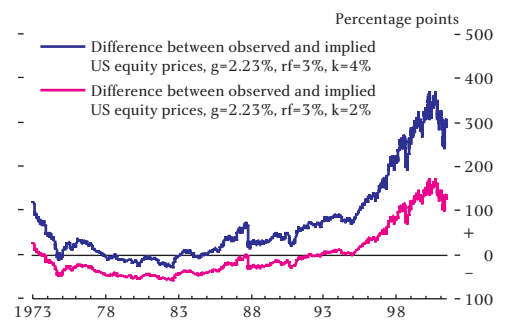


Sources: Chicago Mercantile Exchange and Bank calculations.

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

(b) Dashed lines show the mean.

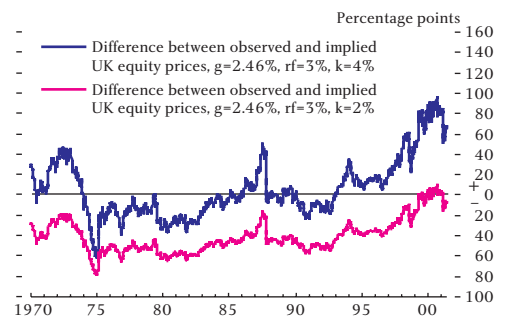
**Chart 33:**  
**Difference between observed and implied US equity prices<sup>(a)</sup>**



Sources: Thomson Financial Datastream and Bank calculations.

(a) See Box 1 for definitions of  $g$ ,  $r_f$  and  $k$ .

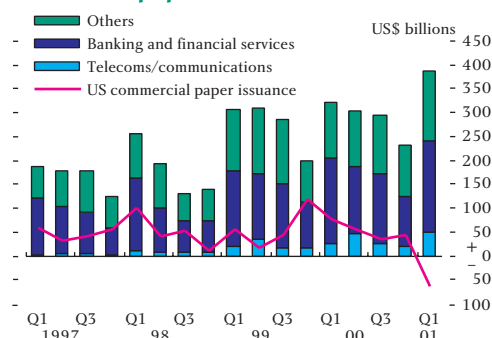
**Chart 34:**  
**Difference between observed and implied UK equity prices<sup>(a)</sup>**



Sources: Thomson Financial Datastream and Bank calculations.

(a) See Box 1 for definitions of  $g$ ,  $r_f$  and  $k$ .

**Chart 35:**  
**Non-government international bond and US commercial paper issuance<sup>(a)</sup>**



Source: Capital Data.

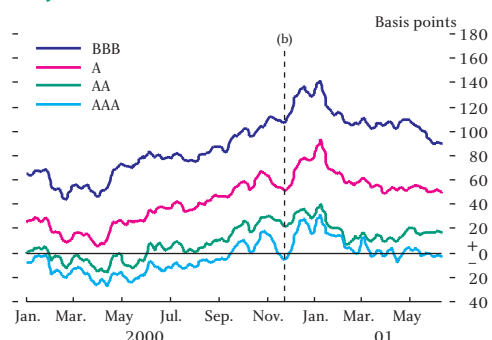
(a) Commercial paper issuance refers to all issuers and all net flows.

**Table 5:**  
**Largest corporate bond issuers since December Review**

Company	US\$ billions
France Telecom	19.8
Ford Motor Company	19.8
British Telecommunications	19.2
Daimler Chrysler	15.4
General Motors	15.2

Source: Capital Data

**Chart 36:**  
**US dollar investment-grade spreads over swap rates<sup>(a)(b)</sup>**



Source: Bloomberg.

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

(b) December 2000 Review.

Average investment-grade credit spreads in the United States and Europe are much the same as at the time of the December Review (Charts 36, 37 and 38). The continued fall in TMT asset values has, however, been reflected in higher credit spreads on telecom corporate debt. Spreads over swap rates on US industrial companies' A-rated bonds have returned to levels similar to those at the time of the June 2000 Review (although they are still higher than between 1997 and 2000). But spreads on US A-rated telecom bonds remain around 40 basis points higher (Chart 39). Nonetheless, perceptions of credit risk for large European telecom operators do appear to have improved since March, with spreads over swaps on bonds and credit default swap premia decreasing (Chart 40).

#### Sub-investment-grade bonds

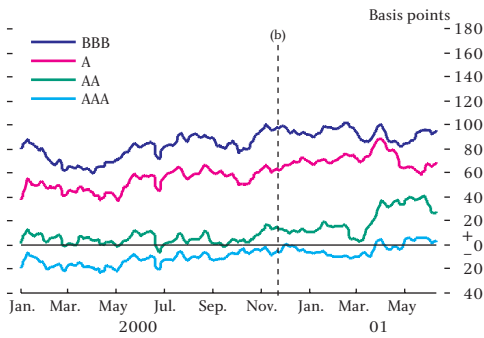
Average sub-investment-grade credit spreads are lower than in December (Chart 41)<sup>7</sup>. Market assessments of credit risk towards the lower end of the credit quality spectrum are more difficult to reconcile with the macroeconomic story of a temporary shock to the outlook for the corporate sector offset to some extent by monetary policy responses. In broad terms, the value of corporate equity has fallen somewhat, which is likely to have increased firms' gearing (measured at market prices). Asset returns in general are a little less uncertain than six months ago, judging by measures of implied volatility (Chart 23). Those two factors might have been expected to have had small but opposite effects on default risks among firms (as outlined in the December Review, where it was suggested that the Merton model for valuing individual stocks provides a framework for linking equity prices, uncertainty about asset values, and default risk)<sup>8</sup>. But for firms with lower quality credit ratings – outside the telecoms industry at least – default risk, as assessed by the market, appears to have fallen considerably. A possible explanation is that spreads over swaps of high yield bonds are based on quoted dealer prices, and that dealers reacted to a sharp decrease in market liquidity at the end of 2000 by widening their bid:offer spreads. On this basis, the reduction in spreads in 2001 may reflect lower liquidity risk as well as decreasing credit risk.

Another possible explanation, at least for the United States, is that the initial monetary easing by the Federal Reserve at the beginning of the year helped to reassure creditors that the downturn would not be allowed to push up default rates across the board (hence narrowing credit spreads), but that further policy action was necessary to convince market participants that medium-term growth prospects would be maintained (hence

<sup>7</sup>: The spread for Euro-denominated BB-grade bonds has been particularly volatile following two specific bonds being added to the index in January.

<sup>8</sup>: According to Merton's model, the price of risky debt should fall if the net asset value of the company (as reflected in the share price) falls closer to zero or if greater volatility in the share price indicates greater uncertainty about the value of the company's assets (see Box 1 of *The financial stability conjuncture and outlook* in the December 2000 Review).

**Chart 37:**  
Sterling investment-grade spreads over swap rates<sup>(a)(b)</sup>

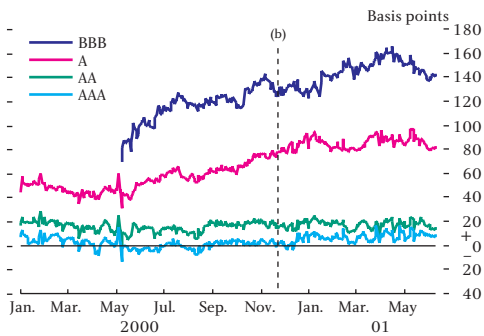


Source: Bloomberg.

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

(b) December 2000 Review.

**Chart 38:**  
Euro investment-grade spreads over swap rates<sup>(a)</sup>

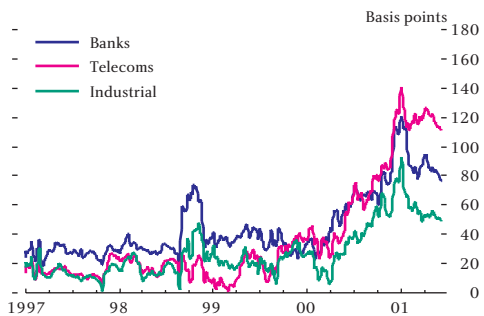


Source: Bloomberg.

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

(b) December 2000 Review.

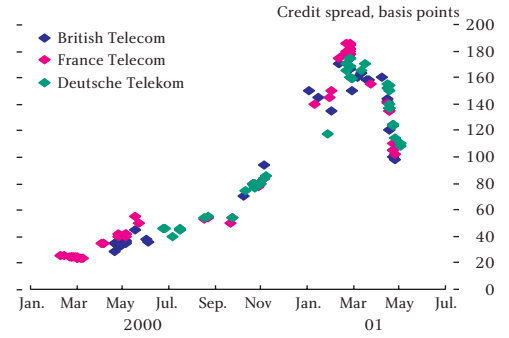
**Chart 39:**  
US A-rated spread over swap rates<sup>(a)</sup>



Source: Bloomberg.

(a) Ten-year maturity A2-rated bond yields less ten-year swap rates. Five-day moving average.

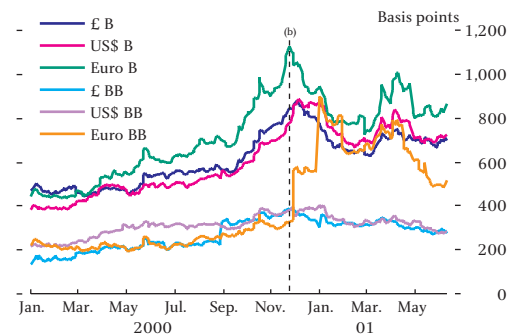
**Chart 40:**  
Five-year credit default swap premia for European telecoms<sup>(a)</sup>



Source: Creditex.

(a) Quoted offer prices on Creditex, an inter-dealer broker.

**Chart 41:**  
Sub-investment-grade corporate bond spreads: US dollar, euro and sterling<sup>(a)</sup>

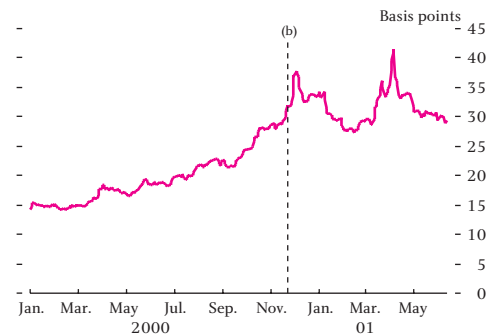


Sources: Merrill Lynch and Bloomberg.

(a) High yield indices spread over maturity-matched swap rates.

(b) December 2000 Review.

**Chart 42:**  
Dispersion<sup>(a)</sup> of US high-yield spreads

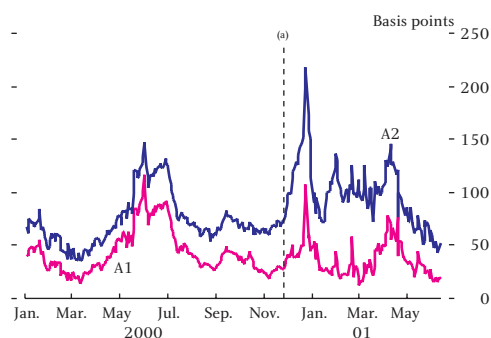


Sources: Merrill Lynch and Bloomberg.

(a) Dispersion is defined as standard deviation.

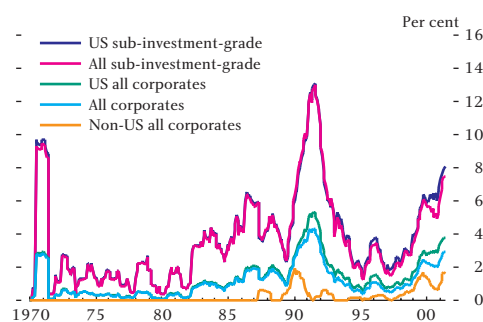
(b) December 2000 Review.

**Chart 43:**  
Commercial paper spreads to US treasury bills



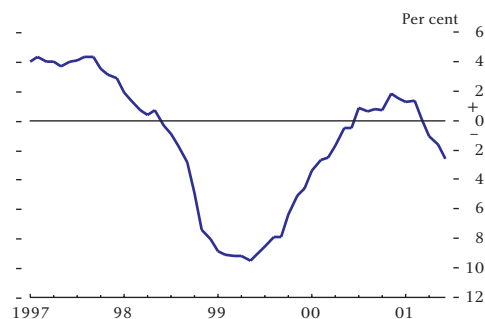
Source: Bloomberg.  
(a) December 2000 *Review*.

**Chart 44:**  
Moody's trailing twelve-month default rates<sup>(a)</sup>



Source: Moody's Investors Service.  
(a) Defaults in the previous 12 months divided by the number of issues in the rating category 12 months previously.

**Chart 45:**  
Moody's rating drift<sup>(a)</sup>



Source: Moody's Investors Service.  
(a) Rating drift: issuer upgrades minus issuer downgrades, divided by rated issuers.

reversing the broadly-based March dip in equity prices). The fall in current and expected near-term nominal interest rates will also have helped to reduce somewhat the risk of cashflow problems for borrowers.

The small narrowing in the dispersion of US high-yield spreads (Chart 42) and the more significant reduction in the tiering of credit in the US commercial paper market (Chart 43), following sharp increases in December, also suggest that concerns about prospective creditworthiness in the nearterm may have diminished, despite the downturn in US GDP growth. On the other hand, according to Moody's, *ex post* default rates have increased sharply for sub-investment-grade issues (Chart 44), and ratings drift (upgrades minus downgrades as a proportion of rated issues) has turned negative (Chart 45). These data may reflect risks already discounted in the market last autumn, and news this year may have improved the outlook. Moody's forecast that sub-investment-grade default rates will start to fall at the beginning of next year, which is not inconsistent with that possibility.

#### *Alternative telecom operators and vendor finance*

The US domestic and, to a lesser extent, the international sub-investment-grade bond markets reopened in the first half of 2001 (Chart 46). But issuance by sub-investment-grade telecom operators has remained low, with the exception of a few large convertible bond issues by stronger companies<sup>9</sup>. The spread over swap rates of Merrill Lynch's sub-investment-grade telecom bond index is, at around 12 per cent, nearly three percentage points higher than at the time of the December *Review*, although it has fallen since April 2001 (Chart 47). Moody's data show that, globally, sub-investment-grade telecom sector borrowers defaulted on US\$6.5 billion of debt in 2000, almost 90 per cent higher than 1999. This was the largest amount by any single sector, and accounted for 13.3 per cent of all defaults (by dollar value). But credit losses have so far still been relatively low, and the main losses have been to the market value of bonds.

With the effective closure of the sub-investment-grade bond market in 2000, equipment suppliers were left as one of the only remaining sources of finance for many so-called 'alternative' telecom operators<sup>10</sup>. In the United States, some equipment suppliers have provided additional funds to such companies, but some have also had to make provisions against loans and to write down the value of equity investments. For example, Lucent Technologies' earnings in 2001 Q2 included a large provision

<sup>9</sup>: See Section VI for a discussion of convertible bond issuance and convertible bond arbitrage.

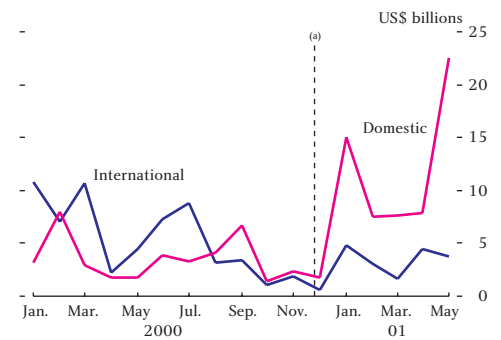
<sup>10</sup>: Including companies using new technologies to develop long distance networks, start-up cable operators, start up mobile telephone operators and those entering deregulated local telecom markets (competitive local exchange carriers or CLECs) in the US and, to a lesser extent, Europe.

against loans to Winstar Communications, a US telecom operator which had entered Chapter 11 proceedings. In Europe, equipment manufacturers are thought to have provided a major share of the finance this year for construction of 3G networks, especially by new entrants. In some cases, they have provided significantly more finance than needed to purchase the equipment they were selling to the network provider. Equipment providers have also provided vendor finance to telecom operators in Asia and Latin America.

On the one hand, equipment suppliers may be in a good position to assess and monitor loans, because they should understand the industry. On the other, they may have incentives to lend even if they have doubts about a borrower's creditworthiness, because the alternative is loss of market share, growth in inventories, and delays in the construction of infrastructure. Lending in order to finance sales might also raise questions about quality of earnings and the timing of income recognition.

Large vendor finance portfolios may mean that companies have concentrations of credit risk on their balance sheets even if their underlying business is strong. Portfolios are likely to be undiversified and credit quality may be correlated with the equipment manufacturers' earnings. Both factors would tend to increase risk. While many equipment manufacturers have relatively low debts and annual accounts suggest that long-term customer receivables were, in most cases, relatively modest at end-2000, this position may change quickly and some contacts have aired concerns about a lack of transparency in some vendor finance commitments. Estimates are that a half or more of vendor facilities are undrawn and companies will need to manage their own liquidity as these are drawn down: for example by arranging new bank facilities. Although a number of companies have securitisation programmes for finance receivables, it appears that investors sometimes have recourse to the manufacturer.

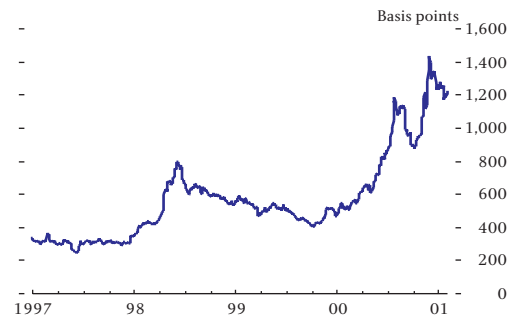
**Chart 46:**  
**Sub-investment-grade bond issuance**



Sources: Capital Data and SDC Platinum.

(a) December 2000 Review.

**Chart 47:**  
**Sub-investment-grade telecom bond spreads over swap rates<sup>(a)</sup>**



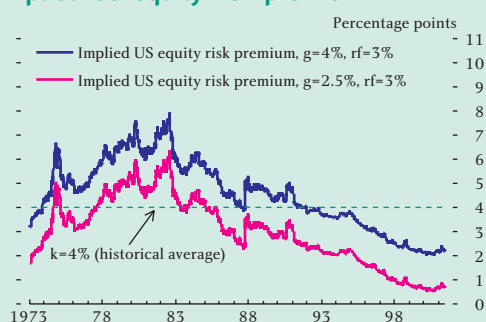
Sources: Merrill Lynch and Bloomberg.

(a) Yield is spread over maturity-matched swap rate.



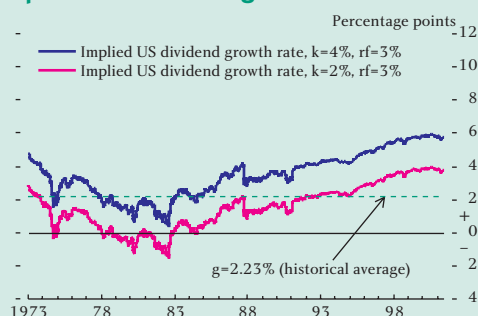
## Box 1: Equity market valuations

**Chart A:**  
Implied US equity risk premium



Sources: Thomson Financial Datastream and Bank calculations.

**Chart B:**  
Implied US dividend growth rate



Sources: Thomson Financial Datastream and Bank calculations.

What changes would be required in the major determinants of equity price indices to explain the large increases since the mid-1990s? Possible answers can be derived using the simple Dividend Discount Model (DDM), as discussed in Box 3, pp 19–20, of the June 1999 *Review*. According to the DDM, equity prices ( $P_t$ ) are determined by the present value of expected future dividends:

$$(1) \quad P_t = \frac{D_t(1+g)}{(k+rf)-g}$$

where the current (nominal) flow of dividends is  $D_t$ , real dividends are expected to grow at a constant rate  $g$ , and  $k$  and  $rf$  are a constant equity risk premium and risk-free real interest rate respectively. An acceleration in equity price indices could be triggered by falls in the equity risk premium or risk-free real interest rate, increases in the expected real growth rate of dividends, or more rapid general price increases inflating the nominal value of dividends. These are treated here as exogenous variables but, in reality, they are likely to interact – for example, a rise in the expected growth rate of dividends might lead shareholders to expect an increase in their lifetime incomes, leading them to borrow to increase their current consumption and therefore putting upward pressure on real interest rates.

Rising inflation can be ruled out as an explanation for the increase of the past few years. But recent academic literature argues that the equity risk premium might have fallen or appeared to fall during the 1990s, for a variety of reasons:

1. Greater opportunities for portfolio diversification, both domestic and across borders<sup>1</sup>;
2. Increased participation in equity markets<sup>2</sup>;
3. Past unexpected capital gains on equities exaggerating estimates of the equity risk premium based on differences in realised returns on equities and bonds<sup>3</sup>;
4. Falling trading costs<sup>4</sup>;
5. Investors acting as if they were insured against downside risk by the Federal Reserve<sup>5</sup>, the so-called 'Greenspan put'.

**1:** Jagannathan, R., McGrattan, E.R., and Scherbina, A. (2001) 'The declining US equity premium', Working Paper 8172, NBER.

**2:** Heaton, J. and Lucas, D.J. (2000) 'Stock prices and fundamentals', NBER Macroeconomics Annual.

**3:** Fama, E.F. and French, K.R. (2001) 'The equity premium', Working Paper 522. Center for Research in Security Prices, Graduate School of Business, University of Chicago.

**4:** Domowitz, I. and Steil, B. (2001) 'Innovation in equity trading systems: The impact on Transaction Costs and Cost of Capital', Princeton University Press, January 2001.

**5:** Miller, M., Weller, P., Zhang A. (2001) 'Moral hazard and US stock market: Is there a 'Greenspan put'?', mimeo, University of Warwick.

Chart A shows, for the United States, how the premium would have had to have fallen almost to zero to explain movements in the US total market index, assuming expected annual real dividend growth of 2.5 per cent (around the historical average) and a risk-free rate of 3 per cent. Even if investors now expected real dividend growth to be 4 per cent annually as a result of higher trend productivity growth, the premium would have had to have fallen to around 2 per cent, well below most estimates of the average over the second half of the 20th century. Another possibility is that the real risk-free interest rate has fallen. But the US Treasury Inflation Protected Securities (TIPS) market suggests that, if anything, medium-long term real rates probably rose between 1997 and the beginning of 2000. A third possibility is that expected annual real dividend growth has increased. Chart B shows that it would have had to have risen to almost 6 per cent, assuming an equity risk premium of 4 per cent; or to almost 4 per cent if the risk premium has fallen to 2 per cent. In either case, these rates are well above the long-run average growth rate of just over 2 per cent.

One possible reason expected dividend growth rates might have increased is that, since the mid-1990s, fewer US firms have been paying any dividends, despite higher earnings, and those firms still paying dividends have been paying out a smaller share of their earnings (Table A)<sup>6</sup>. More companies are repurchasing their stock, although the effect on these calculations should be limited because they are based on dividend yield per share. Firms may also have been reinvesting a higher share of earnings with the intention of boosting future earnings growth. It is possible to incorporate changes in corporate dividend policy in the DDM, assuming that increased retention of post-tax earnings are used to finance more investment. Assuming further that the reinvested funds are expected to earn the same real rate of return ( $r$ ) as existing assets and that that rate is expected to be unchanged, equation (1) is replaced by:

$$(2) \quad P_t = \frac{D_t(1+rb_t)}{(k+rf)-rb_t}$$

where the reinvestment rate ( $bt$ ) and rate of return on equity ( $r$ ) are observable variables.

Just as 'g' can be allowed to vary under the simpler variant of DDM, so 'r' can be allowed to vary in equation (2). What change in the real rate of return on equity would have warranted the actual change in the equity price index? Chart C shows that, assuming a constant risk premium of 4 per cent, it would have had to have risen to around 8 per cent (but to only around 5 per cent if the premium has halved to 2 per cent). That may seem more plausible, but in fact requires just the same increase in expected dividend growth as reported in Chart B. The question is whether the observed fall in the dividend pay-out ratio since the mid-1990s has really increased expected future earnings and so dividend growth to 6 per cent per annum?

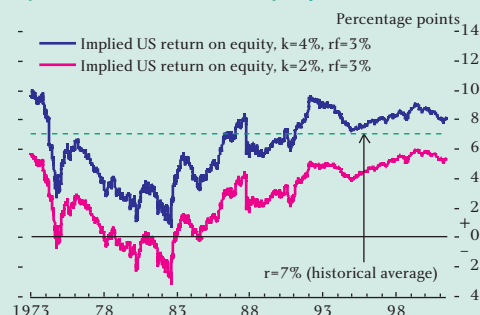
6: Fama and French (2000): 'Disappearing dividends: changing firm characteristics or lower propensity to pay', CRSP, Working Paper 509.

**Table A:**  
average US dividend-payout ratios (per cent)

	US
1973–01	44.7
1990–93	50.9
1994	45.4
1995	39.0
1996	37.6
1997	34.9
1998	33.8
1999	34.8
2000	30.8
2001*	28.5

\*Second quarter  
Source: Thomson Financial Datastream and Bank calculations.

**Chart C:**  
Implied US return on equity

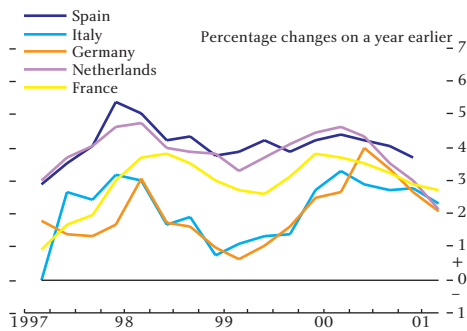


Sources: Thomson Financial Datastream and Bank calculations.



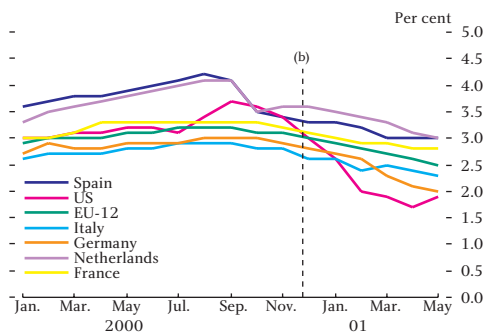
### III Europe

**Chart 48:**  
**Real GDP**



Source: Eurostat.

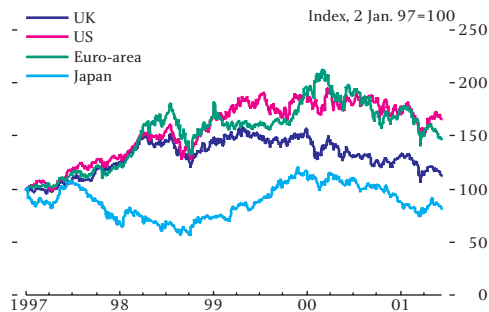
**Chart 49:**  
**Consensus Forecasts for 2001 GDP growth<sup>(a)</sup>**



Source: Consensus Forecasts.

- (a) Mean of forecasts compiled by Consensus Forecasts.
- (b) December 2000 Review.

**Chart 50:**  
**Equity indices (excluding multinational companies)<sup>(a)</sup>**



Source: Thomson Financial Datastream.

- (a) Denominated in US dollars.

While economic activity is slowing across the euro area, the downturn currently seems unlikely to be as sharp as in the United States, given the lower starting point; and, for the region taken as a whole, underlying imbalances and potential pressures on sectoral balance sheets are not so obviously apparent. Nevertheless, in some countries increased private sector gearing, rapid property price increases and falls in GDP growth rates continue to pose some risks.

#### Recent conjunctural developments: the euro area

Annual euro-area growth has slowed to 2.9 per cent in 2000 Q4 and 2.5 per cent in 2001 Q1 from 3.3 per cent in 2000 Q3. Growth in Germany and the Netherlands has slowed most (Chart 48). While decelerating domestic demand has been the main factor in Germany, a lower net trade contribution has so far been more important in France, as well as in more open economies such as Ireland. France, Germany and Italy account for most of UK-owned banks' total consolidated on-balance sheet claims<sup>11</sup> on European countries, representing 8 per cent, 5 per cent and 4 per cent, respectively, of total foreign claims.

There are indications that the extent of the slowdown and its implications for the medium-term outlook have surprised market participants. Since their peak in mid-2000, forecasts for German GDP growth in 2001 have been revised down by one percentage point, and GDP growth forecasts for Spain and the Netherlands by more than a percentage point each (Chart 49). Business confidence has continued to fall since its peak in June last year. And equity prices, including share prices of firms with predominantly domestic markets, have fallen since the December Review (Chart 50).

Sources of uncertainty regarding the outlook include the possible impact on the euro area of slowing US growth; the extent of any vulnerability to lower global demand for ICT; and the possible impact on demand of equity price falls. The likelihood of any of these turning into a major negative shock for the euro area, however, currently appears slim.

First, although far from immune to the slowing pace of US and world growth, the euro area as a whole is a relatively closed economy: trade exposures to the United States are not large for most countries (Chart 51). However, there may be common factors at work; the correlation of equity prices in the euro area and the United States has increased since the beginning of 2000 (Chart 52).

Second, the euro area may be less vulnerable than the United States to falling output in the ICT sector, since ICT represents a

<sup>11</sup> Includes claims of foreign affiliates in all currencies on local residents.

significantly smaller share of value-added in most continental European countries (Chart 53). On the other hand, French and particularly German TMT equity indices have fallen more than US TMT indices from their (higher) peaks last year, perhaps suggesting a more significant downward revision in growth expectations in Europe for the industries covered or that the TMT 'bubble' was more exaggerated there.

Third, although falling equity prices will tend to reduce current demand via wealth effects and increased costs of investment, the impact is likely to be less than in the United States. Stock market capitalisation in 2000 was higher in the US in relation to GDP (around 140 per cent) than in Germany (60 per cent), France (100 per cent) or Italy (65 per cent)<sup>12</sup>. And quoted equities represent a smaller share of euro-area household wealth (as low as 3 per cent in Germany and France) than they do in the United States (20 per cent). By contrast, housing represents a significantly greater share of household wealth<sup>13</sup>.

Fourth, overall credit conditions appear stable so far. Euro-area bank lending has moderated slightly, but continues to grow at an annual rate of around 8.5 per cent. Similarly, liquidity in capital markets has held up in the euro area as it has in the United States (Chart 54). On the other hand, ratings downgrades of ICT firms by some rating agencies have significantly outnumbered upgrades during Q1 partly as a result of a perceived weakening in issuer access to liquidity.

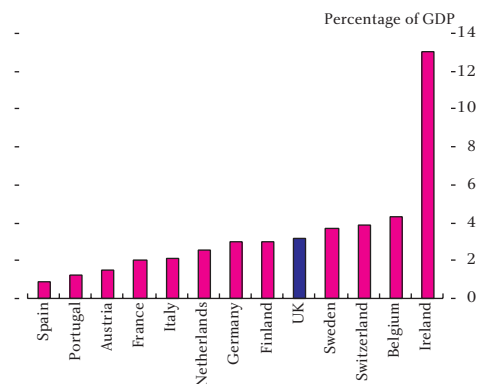
## Sectoral balance sheets

Although a major setback to euro-area growth seems unlikely, any slowdown would be likely to lead to further rises in the private sector debt-to-GDP and income gearing (ie interest payments-to-GDP) ratios. According to new data published by the European Central Bank in May 2001, the ratio of private sector debt to GDP in the euro area increased steadily between December 1997 and June 2000, one consequence of robust credit growth (Chart 55). The ratio of household debt to GDP increased from about 44 per cent in December 1997 to about 48 per cent in June 2000, compared with about 78 per cent in the UK in 2000 Q4 and about 70 per cent in the US in 2001 Q1. Income gearing also rose, in line with rising interest rates, reaching an estimated 3 per cent in June 2000, compared with about 6 per cent in the UK (2000 Q4) and US (2001 Q1). Although euro-area household saving as a share of disposable income has declined steadily in recent years to about 9.5 per cent, it remains high relative to the US and continues to offer some protection against a further increase in gearing ratios.

<sup>12</sup> Source: Thomson Financial Datastream and IMF.

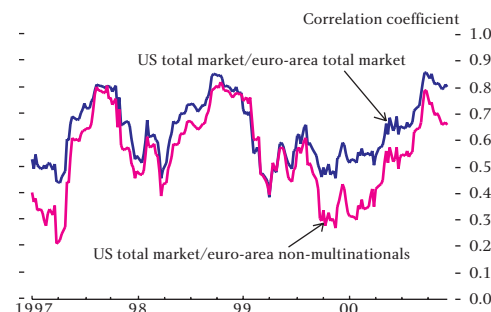
<sup>13</sup> Girouard and Blondal, S (2001) 'House Prices and Economic Activity', Economic Department Working Paper 279, OECD.

**Chart 51:**  
Exports to United States – 1999



Sources: IMF and Thomson Financial Datastream.

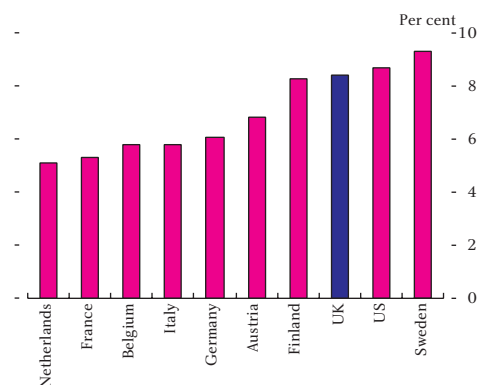
**Chart 52:**  
Correlations between US and euro-area equity markets



Source: Thomson Financial Datastream.

(a) Rolling six-month correlations of weekly price changes.

**Chart 53:**  
Share of ICT<sup>(a)</sup> value-added in total business sector<sup>(b)</sup>

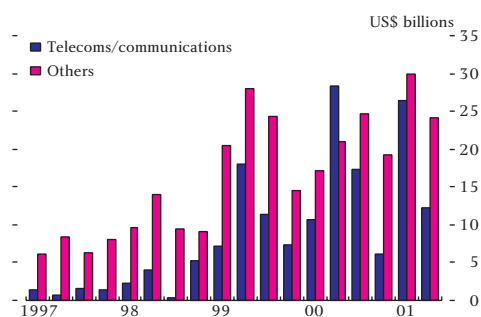


Source: OECD.

(a) Information, communications and technology.

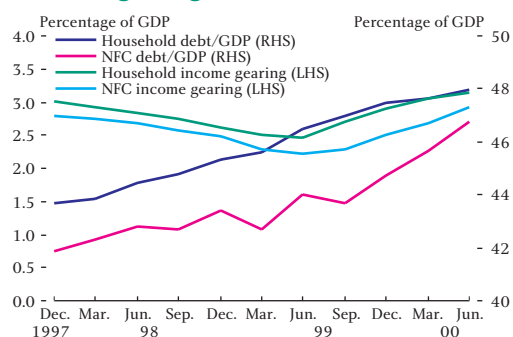
(b) 1997.

**Chart 54:**  
Bond issuance by non-financial corporates resident in the euro area



Source: Capital Data.

**Chart 55:**  
Euro-area gearing ratios<sup>(a)</sup>



Source: European Central Bank.

(a) NFC: non-financial corporates.

Among non-financial corporations (NFCs), debt has also risen as a proportion of GDP from about 42 per cent at end-1997 to about 47 per cent in June 2000, compared with 58 per cent in the UK in 2000 Q4 and about 72 per cent in the US at 2001 Q1. Income gearing rose from about 2 per cent in mid-1999 to about 3 per cent in June 2000, compared with about 4 per cent in the UK in 2000 Q4 and nearly 5 per cent in the US in most years<sup>14</sup>. Euro-area debt-to-GDP ratios are likely to have increased further subsequently, given that credit growth rates, although moderating, have continued to exceed GDP growth rates.

## The European banking sector

Table 6 shows the pattern of on-balance sheet credit exposures of the domestic banking systems of eight continental European countries, ordered by the scale of UK-owned banks' claims on their residents. In the five largest euro-area countries, lending to the domestic non-bank private sector accounts for a majority.

One particular issue over the past year or so has been the scale of banking system exposures to telecoms. While data are hard to come by, exposure to the telecoms sector is likely to have diminished somewhat as large companies have taken measures to reduce their debt and convert short-term commercial paper and bank debt into longer-term bond and equity liabilities (Section II).

The growth of a market for securitised loans in Europe (eg through asset backed securitisation and collateralised debt obligations) may give banks greater flexibility in managing credit and balance sheet risk. For example, the German Kreditanstalt für Wiederaufbau (KfW) has since September 2000 sponsored a

**Table 6:**  
Distribution of European banking system's exposures

Country (percentage of UK-owned banks' overseas exposures) <sup>(a)</sup>	Percentage of total banking sector assets (excluding domestic interbank claims) on:		
	Non-bank private sector	Public sector	Overseas sector
France (7.7)	54	12	34
Germany (4.8)	59	15	26
Italy (4.0)	69	16	15
Netherlands (2.1)	61	6	33
Ireland (1.9)	31	2	68
Spain (1.6)	68	14	18
Belgium (1.3)	33	20	47
Switzerland (0.8)	45	4	51

(a) Total consolidated on-balance sheet claims of UK-owned banks, including claims of foreign affiliates, in all currencies on local residents. Not including claims on overseas entities resident in the UK; eg on overseas banks' offices in London, via the interbank market.

<sup>14</sup> Corporate debt service figures relate to gross interest payments. Comparisons between the euro area, UK and US are indicative only; differences between each country and region may reflect definitional differences between official sources.

collateralised loan obligation (CLO) scheme ('PROMISE') for banks participating in its existing programme of support for small and medium size enterprises (the so-called Mittelstand). The scheme allows banks to transfer the credit risk associated with portfolios of such loans. KfW acts as an intermediary credit default swap provider between banks and investors. The initial PROMISE transaction in December 2000 was for more than US\$2 billion<sup>15</sup>.

Turning to the sector's robustness, profitability among the larger banks in Europe was strong in 2000 following several years of improving performance. Results in the last quarter of last year and the first quarter of this year, however, suggest that profits growth may be moderating. Although bank equity prices have declined since the December Review, they have outperformed the Euro Stoxx index as a whole (Chart 56).

Looking forward, banks have the challenge of the final changeover from legacy currencies to the euro at the end of this year, with potential operational risks for them and their customers.

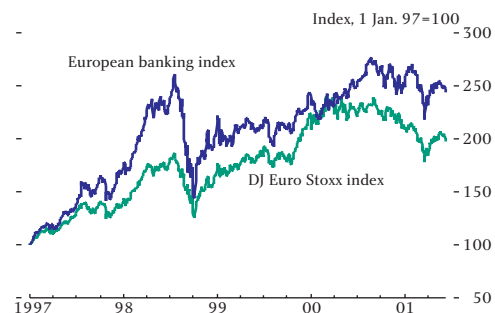
### Possible risks in individual economies

Over and above Europe-wide developments, there do seem to be some noteworthy country-specific risks.

In Germany (and increasingly elsewhere in the euro area), economic prospects are subject to the risk of slowing real income growth stemming in part from a stronger-than-expected tick up in inflation. Annual real income growth has slowed from just over 3 per cent at the end of 1999 to around 1.5 per cent in 2001 Q1, reflecting higher than expected oil and petrol prices, stronger food (and particularly meat) price increases and the continuing decline of the euro. Banks are also likely to be affected by exposure to further weakness in the non-financial corporate sector, including sharply falling industrial production growth rates (Chart 57).

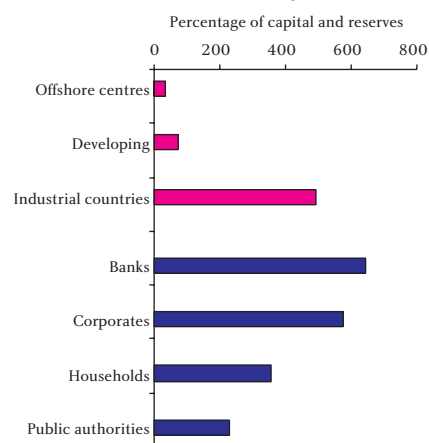
There also seem to be issues confronting some particular types of German banks. Average property price inflation in Germany has been negative or weakly positive since reunification, when prices rose modestly. In Berlin, however, weak office rent inflation in recent years followed a peak of about 80 per cent in 1990 (Chart 58). Any banks that lent extensively to the commercial property sector may have suffered losses as a result of the decline in returns and collateral value. For instance, the supervisory board of the Bankgesellschaft Berlin group (BGB) recently announced a €2 billion capital requirement for the group stemming, inter alia, from value adjustments in the real estate loan portfolios of its two member banks, Berlin Hyp and Landesbank Berlin, apparently

**Chart 56:**  
**Euro Stoxx indices**



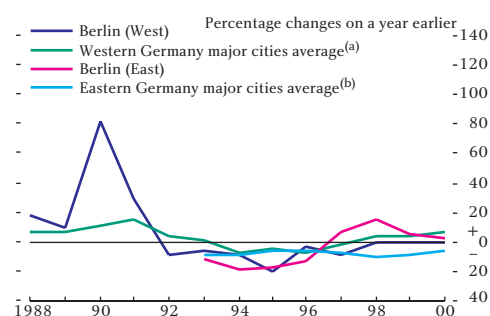
Source: Bloomberg.

**Chart 57:**  
**German-owned banks' exposure**



Sources: Bundesbank and BIS.

**Chart 58:**  
**Berlin office rents**



Source: Bulweil AG.

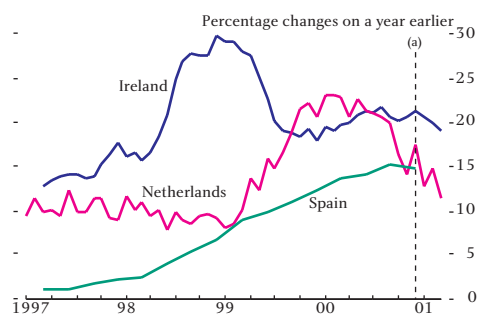
(a) Western Germany major cities includes Düsseldorf, Frankfurt (Main), Hamburg, Köln, München and Stuttgart.

(b) Eastern Germany major cities includes Leipzig, Potsdam, Rostock, Magdeburg and Dresden.

<sup>15</sup> Moody's Investors Service, 16 November 2000, 'KfW's programme for "Mittelstand" – loan securitisation "PROMISE"'. See also the article by David Rule in this Review.

entered into between 1993-97. Although not technically a Landesbank itself, BGB is majority-owned by the Land of Berlin, and is the fourth biggest of the Landesbank peer group. Landesbanks currently receive top ratings from rating agencies, partly because of government support. Underlying ratings are lower, reflecting a weaker business base. For example, most Landesbanks are rated Aaa or Aa1 by Moodys; financial strength ratings, however, average about C.

**Chart 59:**  
**Residential property prices**



Sources: Irish Permanent, Netherlands Land Registry and Bank of Spain.

(a) December 2000 *Review*.

As noted in the *December Review*, property prices have been rising rapidly in three countries – Ireland, Spain and the Netherlands (each representing about 2 per cent of total UK banks' foreign exposure as at end-2000), raising the question of whether their current levels are sustainable (Chart 59).

In Ireland, annual residential property price inflation has moderated slightly since the *December Review*, but has remained high (18 per cent in April). There is evidence that annual commercial property price inflation is also moderating, although it was still above 20 per cent in Q1<sup>16</sup>. The pace of bank private sector credit growth has also moderated as the ratio of private sector bank debt to GDP has risen above the euro-area average. Rapid asset price inflation has been associated with robust GDP growth and an economy-wide inflation rate significantly above the euro-area average. But tradable sector inflation – as proxied by producer price inflation in the manufacturing sector – has not been significantly higher than the euro-area average, probably reflecting strong price competition in the tradables sector. Strong productivity growth in that sector may have spilled over into higher wage growth in the wider Irish economy, thus pushing up domestic non-tradables inflation. But overall, economy-wide indicators of increasing inflation in Ireland have not necessarily been accompanied by a loss of competitiveness.

To the extent, however, that inflation begins to reflect an excess of economy-wide output over its equilibrium value, inflationary pressures may build in both traded and non-traded sectors, acting as a necessary restraining influence on growth rates via an appreciation of the real exchange rate. This effect would be reinforced if fiscal policy were set to be contractionary. While a gradual restoration of equilibrium via a slowing of growth would represent little cause for concern, a sharper shock to GDP growth could precipitate a deeper correction in asset prices. A more severe economic downturn in the United States could conceivably precipitate such a correction; Irish exports to the United States account for over 13 per cent of GDP and there are further links via cross-border ownership of firms which could lead to investment cut-backs. Whether any such developments would pose a material problem for the banking system would depend on its diversification. That may be more of an issue for

<sup>16</sup>: As measured by changes in the Jones Lang LaSalle Property Price Index.

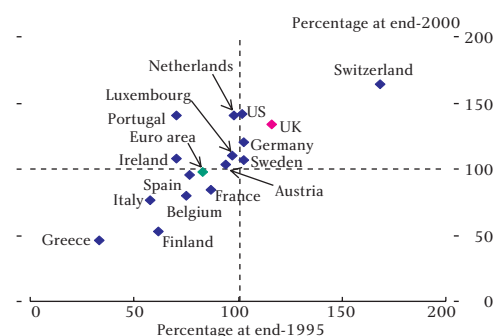
smaller banks. In this context, in February, the Central Bank of Ireland urged banks to tighten lending conditions to households.

Developments in Spain have been similar to those in Ireland in several respects. Annual inflation has been significantly above the euro-area average over the past six months at around 4 per cent. GDP growth has also been well in excess of euro-area averages during recent years, as has the growth rate of bank credit to the private sector. The extent to which the causes of relatively higher inflation in Spain mirror those in Ireland is an open question; productivity data are subject to considerable uncertainty. However inflation in the manufacturing sector remains only slightly above the euro-area average, which is suggestive of some similarity with the Irish case. As in Ireland, property prices have increased markedly, perhaps reflecting an increase in expected disposable incomes.

In the Netherlands, annual house price inflation fell back to 13 per cent in April, down from annual rates of over 20 per cent a year ago. It is possible that housing demand has, to some extent, been predicated upon a continuation of output growth at rates difficult to sustain in the longer run. Annual output growth remained at or above 3 per cent during 1998-2000, but dipped to 2.5 per cent in 2001 Q1. Inflation reached 5.3 per cent in April. Bank credit has also expanded rapidly and the ratio of bank private sector credit to GDP has increased significantly in recent years. New tax measures introduced in January reduce the tax relief available on mortgage interest payments in certain respects.

In two countries, Portugal and especially Greece, private sector bank credit has been growing particularly rapidly relative to GDP (Chart 60). In Greece, the ratio of bank debt outstanding to the private sector to GDP is still the lowest in the euro area and the growth rate of credit relative to GDP there may simply reflect financial intermediation 'catching up' with the rest of Europe. Nevertheless, it poses a question of how long banks can maintain adequate prudential standards under such conditions. In Portugal, on the other hand, where the growth of bank credit relative to GDP has also been rapid, the financial 'catch-up' argument no longer applies: the ratio of outstanding bank credit to GDP is now over 140 per cent, the highest in the euro area. Bank credit does not represent a significantly larger share of total private sector credit in Portugal than in the euro area as a whole. Moreover the growth of bank debt-to-income ratios has been rapid for a sustained period: it was 70 per cent in 1995. (In the UK, the ratio of bank credit to GDP is about 130 per cent, up from 116 per cent in 1995. See Section VIII.) External liabilities are also accumulating rapidly in Portugal; the current account deficit has averaged about 9 per cent of GDP in recent quarters. Nor do recent productivity growth rates there obviously suggest that debt has been financing investment with high rates of return which will facilitate repayment of debt in the future.

**Chart 60:**  
**Bank private sector credit as share of GDP<sup>(a)</sup>**



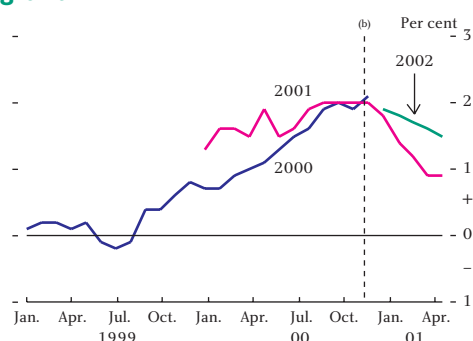
Sources: IMF, OECD and Bank calculations.

(a) Greek credit data for 2000 measured at January 2001, Swedish data at 2000 Q3.



## IV Japan

**Chart 61:**  
Consensus forecasts for Japanese GDP growth<sup>(a)</sup>

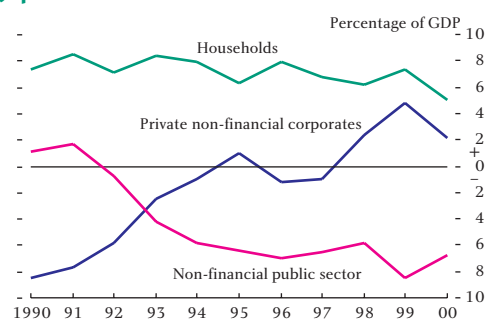


Source: Consensus Forecasts.

(a) Mean of forecasts.

(b) December 2000 *Review*.

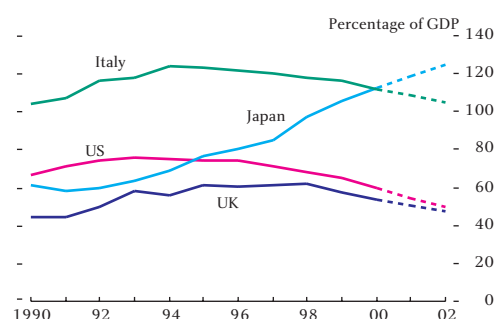
**Chart 62:**  
Japanese financial balances<sup>(a)</sup>



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

(a) Financial years, except for the latest observation which is calendar 2000.

**Chart 63:**  
General government gross debt to GDP ratio<sup>(a)</sup>



Source: OECD Economic Outlook.

(a) Figures for 2001 and 2002 are OECD forecasts.

Japan's economy has slowed further since the December *Review*, prompting various policy responses and at the same time highlighting the continuing bad asset problems. As well as reviewing recent economic and financial developments, this section therefore examines the potential, through economic and financial links, for any financial system stress in Japan to affect international financial markets.

### Recent economic and financial developments

Japan's real GDP grew by 1.5 per cent in 2000. However, slowing external demand, especially in the United States and in the ICT sector worldwide, has since affected industrial production and export growth. In 2001 Q1 (in quarter-on-quarter terms) industrial production fell 3.7 per cent, exports of goods and services 3.6 per cent, and real GDP 0.2 per cent. Looking ahead, the Consensus Forecast for growth in 2001 was 0.9 per cent in May, compared to around 2 per cent at the time of the December *Review* (Chart 61). Deflationary pressures have persisted: the GDP deflator fell 1.2 per cent and land prices fell by over 6 per cent in the year to March.

Preliminary data for calendar year 2000 show some narrowing of the financial surpluses of both the household and private non-financial corporate sectors (Chart 62). The general government deficit narrowed a little, but remained large in relation to GDP, taking the general government gross debt-to-GDP ratio to 112 per cent at the end of 2000 (Chart 63). A better measure is the general government (excluding social security) net debt-to-GDP ratio, which stood at 88 per cent at the end of 2000, and both measures are still below the levels reached in Belgium and Italy during the 1990s. However, none of these figures include any of the contingent liabilities arising from Japan's numerous public corporations, public sector lenders and government loan guarantees. Non-financial public corporations, whose public works may in many cases not yield an economic return, had gross financial liabilities of ¥187 trillion (36 per cent of GDP) at end-2000. Lending by public sector institutions totalled ¥186 trillion (36 per cent of GDP) at end-2000. Bad debt provisions are low and in many cases their assets are in effect guaranteed by the government, which would therefore bear the cost of any bad loans. Loan guarantees made by government credit guarantee agencies totalled ¥42 trillion (8 per cent of GDP) at end-2000. If economic weakness were to persist, some of these contingent liabilities could crystallise, further raising government debt.

In recent years, the net worth of the household sector has been broadly stable; its large financial surplus has made up for losses due to falling land prices. In 2000, however, capital losses on securities of ¥25.6 trillion (or 2½ per cent of net financial

assets) effectively offset the household sector's financial surplus for the year. Households remain risk averse, and at end-2000 held 55 per cent of their financial assets as cash or bank and post office deposits, 18 per cent in insurance reserves, 10 per cent in pension reserves, and only around 6½ per cent in direct equity holdings.

Industrial and commercial companies continued their balance sheet restructuring, repaying ¥16.8 trillion of loans, although intra-sectoral trade credit rose somewhat. The number of corporate bankruptcies increased by 12 per cent in fiscal year 2000 while the gross liabilities of bankrupt firms more than doubled (Chart 64). The failure of four mid-sized life insurance companies during the year accounted for much of the sizeable increase in the total liabilities of bankrupt firms, but there has been a more general increase in the number of large firms going bankrupt. Because of the combined effect of balance sheet restructuring, bankruptcies and debt write-offs, industrial and commercial companies' net financial liabilities declined by 13.5 per cent to ¥507 trillion.

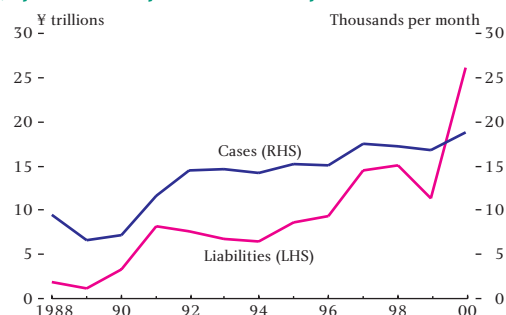
Bank lending fell during 2000, and has continued to do so this year; adjusted for write-offs, the outstanding stock of bank loans in May was 1.6 per cent lower than a year earlier. Within the total, lending to households has increased but lending to companies is still falling sharply. The latest Senior Loan Officers survey conducted in April pointed to a further weakening of loan demand from firms.

### Recent policy measures

On 19 March the Bank of Japan (BoJ) announced a change in its operational target for monetary policy, substituting a target for banks' reserves for the overnight call rate. It intends to maintain this policy until the actual rate of consumer price inflation rises and stabilises at or just above zero. Overnight money market rates have fallen back virtually to zero and euro-yen interest rate futures contracts imply the market expects that short-term rates will remain very low for at least the next two years (Chart 65). But yields on longer-term Japanese government bonds (JGBs) have risen, which may reflect any, or a combination of: increases in expected inflation, in expected real interest rates, or in the JGB risk premium (Chart 66).

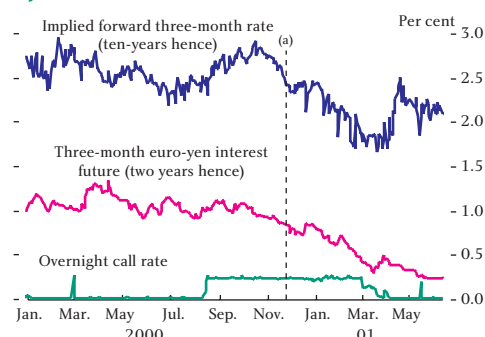
A package aimed at revitalising the financial and corporate sector was announced by the government at the beginning of April. It included outline proposals to facilitate the removal of non-performing loans from banks' balance sheets, while promoting debt forgiveness and company reorganisations; and measures to reduce banks' cross-holdings of shares through the sale of 'excess' shares to a special purpose vehicle, possibly supported by government funding. These measures could be implemented in a range of ways; it is not yet clear how any losses

**Chart 64:**  
Japanese corporate bankruptcies<sup>(a)</sup>



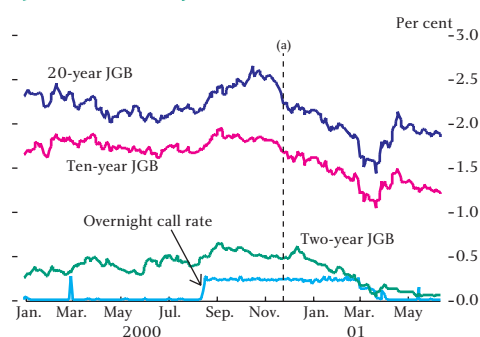
Sources: Thomson Financial Datastream and Bloomberg.  
(a) Financial years.

**Chart 65:**  
Japanese interest rates and market expectations



Source: Bloomberg.  
(a) December 2000 Review.

**Chart 66:**  
Japanese bond yields



Source: Bloomberg.  
(a) December 2000 Review.

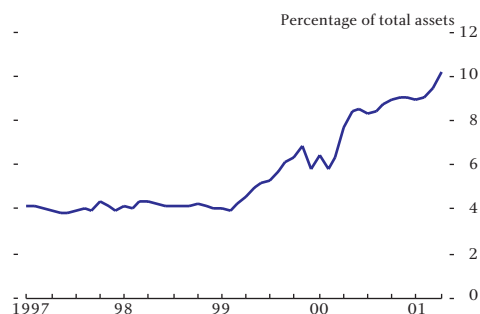


**Table 7:**  
**Reprivatisation of nationalised problem banks**

Problem Bank	Acquirer
Long-term Credit Bank	Ripplewood (US)
Nippon Credit Bank	Softbank-led consortium
Kofuku Bank	Wilbur Ross-led fund (US)
Tokyo Sowa Bank	Lone Star Fund (US)
Kokumin Bank	Yachiyo Bank
Namihaya Bank	Kinki Osaka Bank
Niigata Chuo Bank	Six regional banks

Source: Press reports.

**Chart 67:**  
**Japanese banks' holdings of government bonds**



Source: Bank of Japan.

from restructuring would be distributed across the sectors of the economy, which could make a material difference to spending in the short run. More generally, the package highlighted a potential tension between the medium-to-long-term benefits of structural reform and the shorter-term impact on demand. On the one hand, financial restructuring and reform – including a promised move from full to partial deposit insurance from April 2002 – might in the short term constrain the supply of bank credit, further depress asset prices and dampen business confidence. Accelerated corporate restructuring might add to unemployment, depress household incomes and confidence, so further aggravating the current weakness of the economy. On the other hand, some argue that these effects could be outweighed by a determined programme of structural reform boosting confidence.

### Financial sector restructuring

Corporate and financial sector restructuring in Japan (as elsewhere in Asia) is attracting foreign financial institutions. US investment banks and specialised funds are targeting distressed asset sales; major US insurers have restructured two more failed Japanese life insurers; and two US funds have acquired failed regional banks. This might help generate greater liquidity in markets for distressed assets, and has already helped complete the reprivatisation of nationalised problem banks (Table 7).

Japan's banking sector is going through major structural changes, with the arrival of new entrants and the formation of three new mega-bank groups as planned on 2 April. The quality of loan portfolios remains difficult to assess, however. In April the Japanese Financial Services Agency (JFSA) disclosed new figures for banks' loans to problem borrowers for end-September 2000, including (unlike previous figures) loans covered by collateral such as government guarantees and JGBs (Table 8). The data are welcome from the standpoint of greater transparency and highlight the uncertain scale of banks' bad debt problems, especially the size of potential bad loans to borrowers that need attention as well as the importance of loan collateral. In the six months to March, the major 16 banks reported ¥3.4 trillion of additional bad loans, almost offsetting the disposal of ¥4.4 trillion of bad debts. In the financial year to March, loan-loss charges exceeded core operating profits for the eighth consecutive year.

Against a background of low demand for credit, Japanese banks have increased their holdings of government bonds to 10 per cent of total assets from just 4 per cent two years ago (Chart 67); they now hold around 20 per cent of the outstanding JGB stock. While a positively sloped yield curve provides positive income flows for the time being, exposure to market risk may have risen unless otherwise hedged.

**Table 8: Bank loans to problem borrowers at September 2000**  
(¥ trillion)<sup>(a)</sup>

Borrowers' status	Uncertain recovery	Covered by prime collateral or guarantee <sup>(b)</sup>	Total Problem loans
Bankrupt/quasi bankrupt	13.2	10.7	23.9
Special attention	9.6	2.0	11.6
Others needing attention	40.9	34.7	75.6
<b>Total</b>	<b>63.7</b>	<b>47.4</b>	<b>111.1</b>

Source: Japan's Financial Services Agency.

(a) A 'problem' borrower is defined as one whose ability to service its loans is in doubt.

(b) Prime collateral or guarantee includes JGBs, high-grade equities, government guarantees and specific loan-loss provisions.

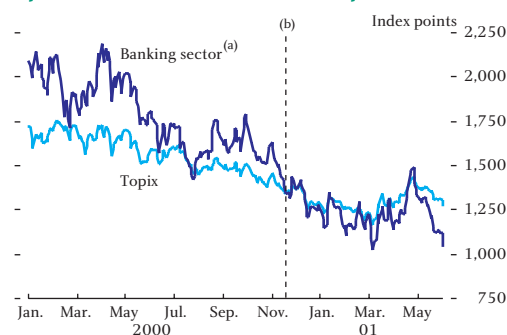
Changes in the banks' accounting rules, which require marketable securities to be marked-to-market, took effect from this financial year and will be reflected in the September interim results. The 13 per cent decline in the Tokyo stock exchange index between end-September 2000 and end-March this year eroded the major banks' unrealised gains on securities (including bonds) from ¥2.8 trillion to ¥0.8 trillion. All four mega-banks nevertheless reported end-March BIS capital adequacy ratios of over 10 per cent. Since the previous *Review*, however, bank share prices have declined more than the overall market to levels last seen in October 1998 (Chart 68).

Japan's life insurance industry has continued to suffer from declining policy subscriptions and poor investment performance. Tokyo Life, the 12th largest life insurer, filed for bankruptcy on 23 March with net liabilities of ¥34 billion. Total assets at all life insurers continued to decline to ¥181 trillion at the end of February, ¥12 trillion below the 1998 peak (Chart 69). Actual investment returns at the major ten life insurers again fell short of the guaranteed policy yields of 3.2 to 3.8 per cent in the financial year 2000. Major life insurers reported declines in their solvency margins, partly reflecting the use of a stricter definition. Discussions are also taking place on whether to allow insurers to reduce guaranteed returns on existing policy liabilities – a move opposed by many insurers who fear it may hurt their business.

### Links to the international financial system

Japan's protracted economic and financial difficulties remain a drag on world economic growth as well as affecting the income of its residents. In terms of stability, the most direct risks appear to be to Japan's own financial system – from the impact of a sharper or more protracted macroeconomic downturn on the health of the corporate sector and the quality of financial intermediaries' assets. If more institutions were to encounter severe difficulties, there could conceivably be pressure for government intervention, which if on a significant scale could further strain the already

**Chart 68:**  
**Topix index and banks' share price<sup>(a)</sup>**

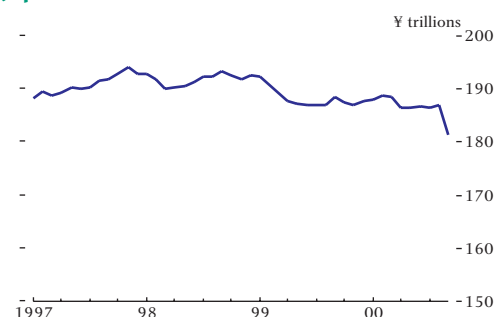


Source: Bloomberg.

(a) Rebased to equal Topix on 24 November 2000.

(b) December 2000 *Review*.

**Chart 69:**  
**Japanese life insurers' total assets**



Source: Bank of Japan.

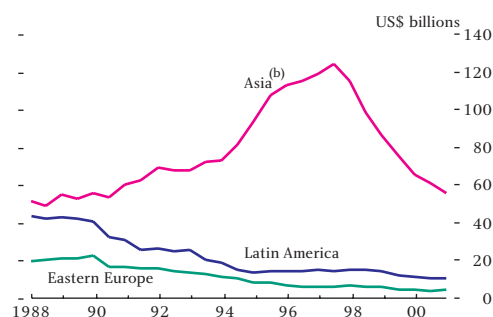
**Chart 70:**  
**Asian exchange rate movements against US dollar**



Source: Bloomberg.

(a) December 2000 *Review*.

**Chart 71:**  
**Consolidated claims of Japanese banks on EMEs<sup>(a)</sup>**

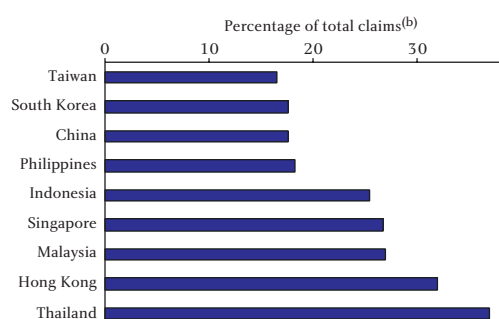


Source: BIS.

(a) Not adjusted for risk transfers.

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

**Chart 72:**  
**Consolidated claims of Japanese banks on individual Asian EMEs<sup>(a)</sup>**

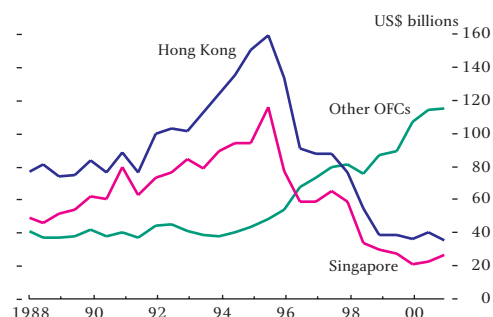


Source: BIS.

(a) Not adjusted for risk transfers.

(b) Share of total claims of BIS-area banks on each country.

**Chart 73:**  
**Consolidated claims of Japanese banks on offshore financial centres<sup>(a)</sup>**



Source: BIS.

(a) Not adjusted for risk transfers.

weak public sector debt position. The impact of any adverse developments in Japan on international financial markets would clearly depend, however, on the extent of economic and financial system links.

#### *Links with the rest of Asia*

Other countries in Asia would be directly exposed, via trade and direct investment links, to a weaker outlook in Japan. Japan imported 11 per cent of non-Japan Asia's exports in 1999, although some of this was intraindustry trade in capital and intermediate goods whose final product destination was the United States or Europe. Since February, exchange rates in several Asian countries have tended to depreciate broadly in line with the yen, adding to inflationary pressures (Chart 70). A pronounced Japanese downturn could, if it were accompanied by yen depreciation, present some Asian countries with a monetary policy dilemma given the pressures – described in Section V – on their highly geared corporate sectors.

Perhaps reflecting low relative yen yields, EME borrowers have been making more active use of yen capital markets, increasing the yen-denominated proportion of their international bond issuance to 13 per cent in the latest 12 months, compared with 5 per cent in the year to June 2000.

Claims of Japanese banks on Asian economies have halved since the 1997-98 Asian crisis, but are much bigger than their other EME business and still account for about 20 per cent of overall claims of BIS-area banks on these countries (Chart 71). At end-2000, claims of Japanese banks accounted for 37 per cent of total claims of BIS-area banks to Thailand and around a quarter of lending to both Malaysia and Indonesia (Chart 72). Claims of Japanese-owned banks on entities domiciled in offshore financial centres (other than Hong Kong and Singapore) have risen markedly during the 1990s, possibly because of increased securitisation through the Cayman Islands (Chart 73; see also the article by Liz Dixon in this Review).

#### *International financial system links*

Japan's gross external assets and liabilities provide one illustration of the scale of financial links between Japan and the rest of the world (Table 9). Japan as a whole, and the public sector, the banking sector and the non-bank private sector taken separately, have sizeable net external assets.

At end-2000, Japan held gross external assets totalling US\$3 trillion, of which US\$263 billion were in equities and US\$989 billion in debt securities. Most of this portfolio investment, and Japan's international bank lending, was in North America (where Japanese residents held 10 per cent of all US Treasury securities) and in continental Europe (Chart 74). Japanese banks' claims on developed countries (divided broadly

**Table 9: Japan's external balance sheet (US\$ billion, end-2000)**

Asset Class	Assets	Liabilities
Direct investment	279.2	50.5
Equity securities	263.0	560.1
Bonds	916.5	266.9
Money market instruments	68.9	47.2
Financial derivatives	3.3	3.2
Loans	755.4	720.4
Trade credits	41.5	9.5
Currency and deposits	189.6	85.5
Other	141.1	116.1
Reserve assets	362.0	
<b>Total</b>	<b>3,020.6</b>	<b>1,859.4</b>

Source: Bank of Japan international investment position of Japan, converted at year-end exchange rate of US\$1=¥114.58; totals may not add up due to rounding.

equally between Europe and North America) have risen steadily, from US\$489 billion in mid-1998 to US\$690 billion at end-2000. This has more than offset the decline described above in claims on emerging market economies, and Japanese banks' overseas branch assets have stabilised over the past two years, following retrenchment in 1997-98 (Chart 75). At end-2000, on a consolidated basis, Japanese banks accounted for 26.2 per cent of BIS-area banks' claims on the United States, and 7.7 per cent of BIS-area claims on Europe.

By sector, Japan's gross external liabilities of US\$1,859 billion at end-December 2000 were split between US\$244 billion of government liabilities (bonds and money market instruments), US\$962 billion of non-bank private sector liabilities (mainly equities and loans), and US\$652 billion of bank liabilities (mainly loans and deposits). External liabilities here include liabilities to overseas subsidiaries of Japanese firms.

Foreigners held just 6 per cent of outstanding JGBs at end-December, worth around \$215 billion (11.5 per cent of Japan's total gross external liabilities). The proportion of Japanese equities held by foreigners increased markedly during the 1990s, reaching 18 per cent (\$600 billion) by end-2000. The United Kingdom had by far the largest exposures to Japanese debt securities (US\$108.3 billion) and equities (US\$212.4 billion) (Chart 76) although much of this reflects international investment management activities rather than exposures of the UK domestic sectors.

Foreign exposure to the Japanese banking system would be another potential channel of transmission for any disturbance in the Japanese financial sector. Japanese banks currently participate in the local and international short-term interbank

**Chart 74: Japanese assets by region**



Sources: Bank of Japan and BIS.

**Chart 75: Japanese banks' overseas branches' assets**



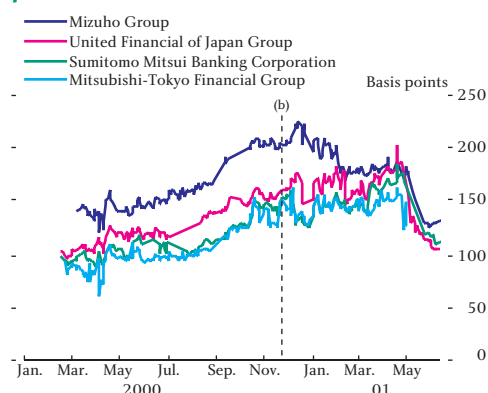
Source: Bank of Japan.

**Chart 76: Japanese liabilities by region**



Sources: Bank of Japan and BIS.

**Chart 77:**  
**Japanese banks' sub-ordinated debt yield spread<sup>(a)</sup>**



Source: Bloomberg.

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

(b) December 2000 *Review*.

markets without having to pay any significant 'Japan premium' on their funding costs, partly no doubt because of market expectations of government support and their low demand for funds. But underlying fragility is suggested by credit ratings and spreads on longer-term debt. The major banks' unweighted average Moody's financial strength (ie stand-alone) rating is only E+ (cf B+ for the major UK-owned banks). Spreads on the subordinated debt of Japanese banks have narrowed since the previous *Review* but remain significantly higher than those of other large internationally active banks (Chart 77).

On-balance sheet claims of BIS-area banks on Japan totalled US\$398 billion at end-December 2000, of which 62 per cent was on Japanese banks and a further 21 per cent on the non-bank private sector. However, less than half (US\$151 billion) was claims of banks based in the 18 separately identified BIS reporting countries, with most of the remainder representing claims of subsidiaries of Japanese banks based in BIS reporting countries on companies in Japan. The largest identified bank claims were those of Germany (US\$37.7 billion), France (US\$25.9 billion) and the United Kingdom (US\$23.4 billion).

In addition, internationally active banks have exposures to Japanese banks via derivatives contracts – perhaps especially swaps. Although the market value of Japan's financial derivatives liabilities was only \$3 billion at end-December 2000, this could of course change materially if financial market volatility were to increase sharply. According to the Bank of Japan, the notional amount outstanding of interest rate-related over the counter contracts held by the 17 major Japanese banks was \$11.2 trillion. The notional amount outstanding of yen interest rate swaps, which often involve overseas counterparties, was \$6.6 trillion, although their replacement value was much smaller. Anecdote suggests that Japanese banks largely pay floating and receive fixed in these contracts, perhaps motivated by a desire, given their bad debt problems, to generate income from the upward sloping yield curve. If at any point JGB yields were to rise because of an increased risk premium, counterparties would tend to be in-the-money, and so have counterparty credit exposures, at just the point when the robustness of implicit public sector underpinning of the banking system might be being called into question. Collateral, and other risk management, policies might of course address this. More generally, there have been some suggestions of internationally active banks stepping up efforts to manage Japan exposures.

In summary, it is difficult to assess the extent and nature of linkages between Japan and the international financial system. The above represents a preliminary step in that direction, which does not take account of the 'second round' or behavioural effects of any deepening of Japan's problems.

## V Emerging market economies

The December *Review* described a deterioration of emerging market economy (EME) asset prices during the second half of 2000, following a year of gradual improvements. Although yield spreads on sovereign bonds narrowed during the second quarter of 2001, many EME asset prices are weaker than a year ago. The risks to EMEs' macroeconomic and financing prospects are also probably greater than in June 2000 in the face of falling asset prices and a weaker macroeconomic outlook in the industrial world. Many EMEs remain vulnerable to such external factors. Argentina and Turkey continue to display overt symptoms of vulnerability. So far, however, there has been little evidence of widespread or sustained contagion to other EMEs or beyond.

### Asset prices and capital flows

On average, EME equity prices are a little lower than in December but around 30 per cent lower than a year ago, in US\$ terms. In all regions increases in equity prices during December and January were offset by sharp price falls during the remainder of the first quarter. Since then, equity prices have picked up a little (Chart 78). Movements in sovereign yield spreads have been less uniform. In higher-rated EMEs, sovereign yield spreads have fallen over the past twelve months. However, among low-rated economies, such as Argentina and Turkey, spreads remain higher than a year ago (Chart 79).

Gross financing flows to EMEs have slowed so far during 2001. Sovereign issuance has been US\$20 billion in 2001 to date, compared with US\$30 billion over the same period of 2000, while flows to EME corporates slowed from US\$74 billion to US\$46 billion (Chart 80). The Institute of International Finance expects net capital flows to EMEs to fall this year. However, this reflects Turkish and Argentine prospects, with net flows to other EMEs projected to rise by US\$6 billion.

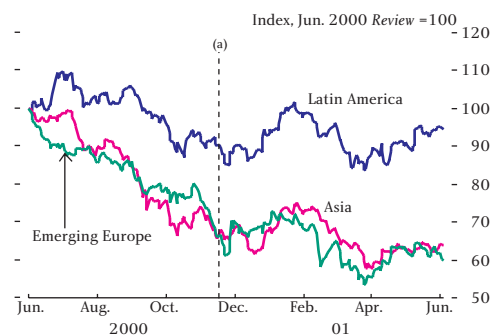
### Potential external shocks

Sections I to IV have described the risks arising from the worsening macroeconomic outlook among the industrial economies. These might affect EMEs both through the trade account, as demand for exports falls, and through the capital account if the supply of external capital to EMEs is affected.

#### Trade links

Exports to industrial economies accounted for almost 60 per cent of developing countries' exports in 1999. Weakening macroeconomic prospects in the industrial economies are a factor explaining the downward revisions to growth forecasts for most EMEs (Chart 81). These trade effects may, however, be partially offset if lower interest rates in industrial economies permit looser monetary policy amongst EMEs – for example where currencies are pegged to the US dollar. There is some

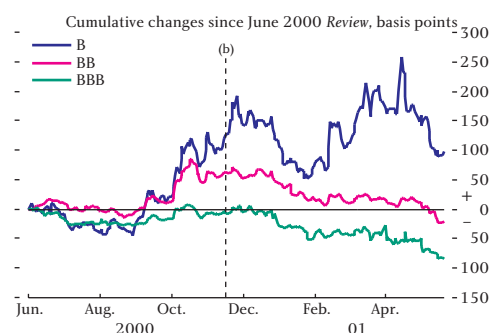
**Chart 78:**  
EME US\$ equity prices: by region



Source: MSCI.

(a) December 2000 *Review*.

**Chart 79:**  
Changes in EME sovereign US\$ bond spreads: by rating<sup>(a)</sup>

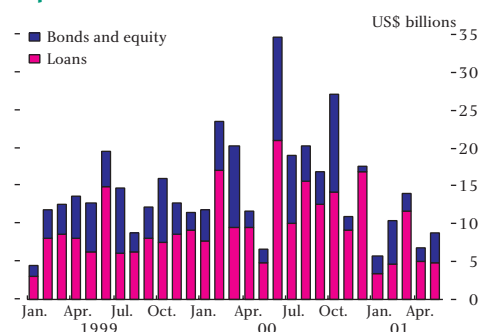


Sources: JP Morgan Chase & Co and Standard and Poor's.

(a) Based on latest ratings.

(b) December 2000 *Review*.

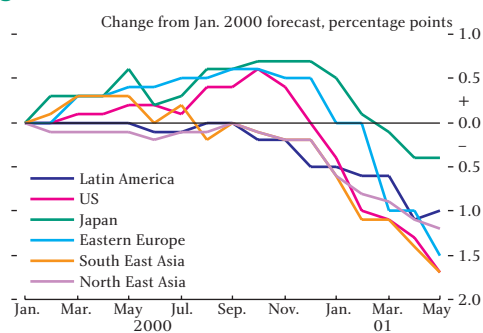
**Chart 80:**  
Gross international financing by EME corporates



Source: Capital Data.

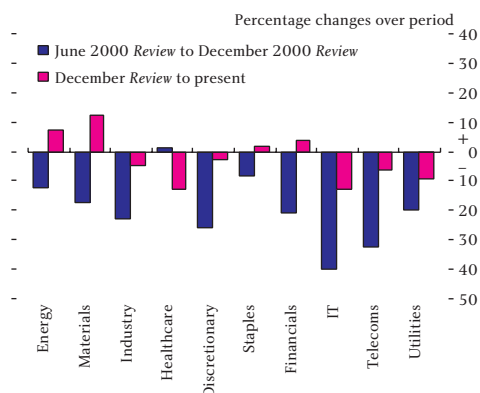


**Chart 81:**  
**Changes to Consensus Forecasts for GDP growth in 2001**



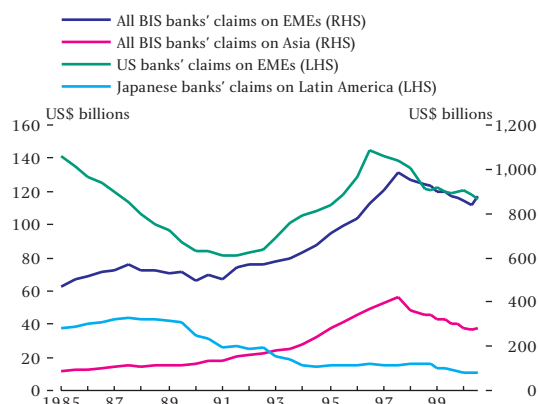
Source: Consensus Forecasts.

**Chart 82:**  
**EME US\$ equity price changes: by sector**



Source: MSCI.

**Chart 83:**  
**Industrial-country banks' external claims on EMEs<sup>(a)</sup>**



Source: BIS.

(a) Using consolidated data, not adjusted for risk transfer.

correlation between trade exposures to the United States and revisions to country growth forecasts. Notably, in Latin America, Mexico (for whom the United States was the destination for 88 per cent of exports in 1999) has seen a 1.9 percentage point reduction in Consensus growth forecasts for 2001 since December.

Exports to industrial countries are particularly important for the Asian EMEs, which are more open than the EME average. The Asian EMEs are also more exposed to the sectoral slowdown in technology growth, as ICT-related products account for a significant proportion of exports. Box 2 reviews trade links between non-Japan Asia and the United States in more detail. As discussed in Section IV, the Asian EMEs have relatively close economic and financial links with Japan, where macro-economic prospects have also deteriorated. The relative exposure of Asian EMEs to external demand shocks and the significance of the technology sector may be factors behind the substantial falls in Asian equity prices over the past twelve months (Chart 78). This would also be consistent with the concentration of falls in EME equity prices within the IT and telecoms sectors (Chart 82).

#### Supply of finance

The conjunction of weaker macroeconomic prospects in industrial countries and the reduction in wealth associated with lower asset prices may reduce the pool of external financing available, particularly to higher risk borrowers. In the past, macroeconomic and asset price weakness in industrial economies or their banking systems has sometimes coincided with reductions in the stock of bank lending to some EMEs. For example, US-owned banks' external claims on EMEs fell by almost a third between 1986 and 1991 (Chart 83), while Japanese banks' claims on Latin America fell by around a half between 1988 and 1993. However, data are available only for a short period and other factors, such as losses following the increased incidence of EME defaults during the 1980s, may have been more important. Moreover, any possible relationship between conditions in industrial countries and capital flows to EMEs is less clear in broader measures of net capital flows – that include equity and foreign direct investment (FDI) – which rose through the early 1990s. More recently, local factors in the borrowing countries may have dominated.

#### Internal factors: some country issues

Vulnerabilities in EMEs can arise from a variety of sources, including significant economy-wide external financing needs; sectoral balance sheet weaknesses such as high leverage among firms; and concentration of trade revenues in particular markets. These structural factors might, in adverse circumstances, constrain the policy options available to accommodate or deal with shocks.

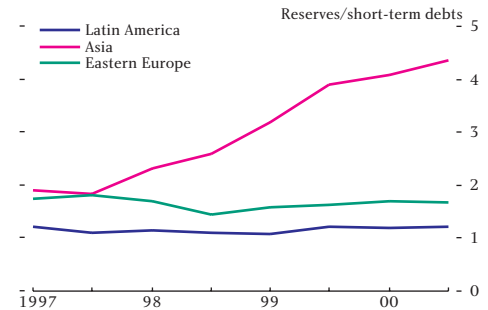
### External financing needs

Where short-term external debts are significant, the recurring need to refinance maturing liabilities leaves a country vulnerable to any fall in the supply of capital. This may then magnify the effect of any deterioration of trade or fiscal prospects. As noted in previous *Reviews*, many EMEs have short-term external debts that are high relative to liquid assets such as official foreign currency reserves. At a regional level, while most Asian EMEs have increased stocks of foreign currency reserves and repaid debts since 1997, Latin American economies typically continue to have significant financing needs relative to reserves (Chart 84). In some EMEs, these external financing vulnerabilities are exacerbated by other features of public sector balance sheets. For example, in South Africa the Reserve Bank still has a significant (over US\$7 billion) net open forward position, leaving liabilities sensitive to changes in the exchange rate.

In Brazil, the structure of public sector debts has improved markedly since the previous *Review* with, for example, the average duration of traded Federal securities rising over 50 per cent to 9.5 months. But debt servicing costs remain sensitive to sharp movements in asset prices, as 24 per cent of local-currency denominated Federal securities are indexed to the exchange rate and a further 51 per cent pay floating interest rates. The Brazilian exchange rate has depreciated by 18 per cent so far in 2001, and this weakness has been associated with a sharp rise in near-term interest rates (Chart 85). Brazilian asset price movements reflect close links with Argentina and the United States. These economies were the destination for a third of Brazil's exports in 1999, while the US was the source of a fifth of Brazilian FDI inflows in 2000. Additionally, Brazil's near-term macroeconomic prospects have recently been affected by energy shortages.

The Eastern European accession economies typically have lower external debt servicing requirements than the Latin American EMEs. However, the larger economies have relied on sizeable net equity inflows to finance the trade deficits associated with industrial restructuring during the late 1990s (Chart 86). If these deficits persist, asset prices and exchange rates would weaken if the supply of equity capital were to fall, for example because of an economic downturn in the EU (the source of the bulk of recent FDI inflows) or if the likelihood of EU accession were to be reappraised. In Poland, where the current account deficit was 6 per cent of GDP in 2000, the risks associated with reduced capital flows might be magnified by the banking sector's off-balance-sheet commitments. According to central bank figures, these have increased substantially in gross terms since 1998, though the net position may be smaller if exposures have been hedged with strong counterparties.

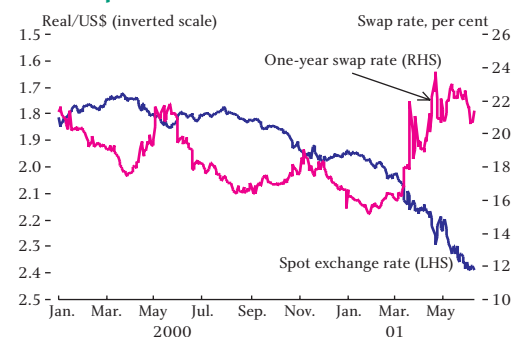
**Chart 84:**  
Reserve coverage of short-term external debts to BIS area banks: by region<sup>(a)</sup>



Sources: BIS and IMF.

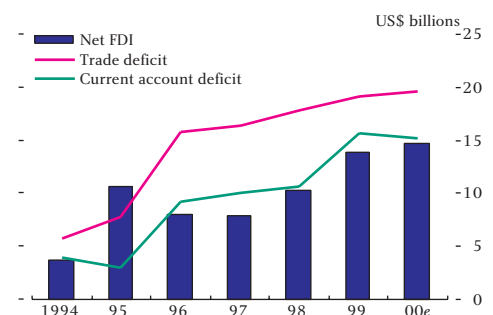
(a) Regional figures are a weighted average of major EMEs' ratios. Weights reflect UK-owned banks' current external claims. The sample covers EMEs accounting for over 90 per cent of each region's liabilities to UK-owned banks.

**Chart 85:**  
Brazil: exchange rate and one-year interest rate swap



Source: Bloomberg.

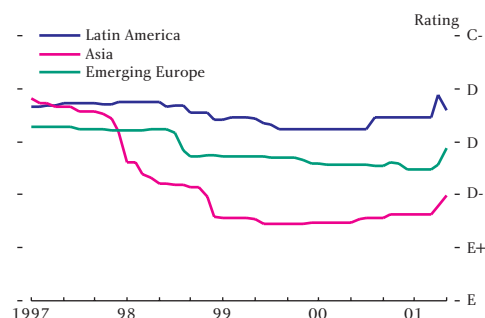
**Chart 86:**  
Major accession economies' balance of payments<sup>(a)</sup>



Sources: IMF and IIF estimates for 2000.

(a) Poland, Hungary and the Czech Republic, which together accounted for over 70 per cent of accession economies' US\$ GNP in 1999.

**Chart 87:**  
**Moody's bank financial strength ratings<sup>(a)</sup>:**  
**regional averages<sup>(b)</sup>**

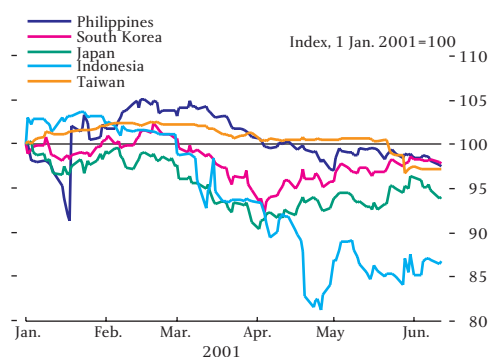


Sources: Moody's Investors Service and Bank calculations.

**(a)** Bank financial strength ratings reflect Moody's opinion of the likelihood that a financial institution will require third party support. They are made on a scale A (least risk) to E (most risk). From February 2001, the number of categories within this range was increased to permit greater differentiation of risks. Changes in ratings around this period often reflect this adjustment rather than a change of view.

**(b)** Regional figures are an average of constituent country figures, weighted according to current UK-owned banks' external claims. Country figures are an asset-weighted average of individual institutions' ratings. The sample covers EMEs accounting for around 90 per cent of each region's liabilities to UK-owned banks.

**Chart 88:**  
**Asian exchange rate developments vs the US\$**



Source: Bloomberg.

### Sectoral balance sheet weaknesses

Countries' sectoral balance sheet positions are considerably more complex than can be captured by focusing solely on external financing needs. The Asian crisis is a recent example of how links between corporate and banking sector balance sheets can magnify the impact of external shocks. The main crisis economies – Indonesia, Korea and Thailand – have increased their international reserves since 1997. However, public sector domestic debts have risen and falls in equity prices have raised the cost of equity capital. Banks' balance sheets weakened during the 1996/97 crises, as the stock of non-performing loans rose. Balance sheet weaknesses were reflected in downgrades by ratings agencies. For example, Moody's downgraded their bank financial strength ratings, which give an indication of the likelihood that individual banks will require support (Chart 87). Banking sectors in the crisis economies remain relatively weak. Non-performing loans are still quite high, though in some countries they have been reduced in part as bad loans have been transferred to separate asset management companies. These sectoral balance sheet weaknesses could exacerbate the potential consequences of slowing global demand. Some other Asian economies, such as Malaysia and Hong Kong, appear to have more robust sectoral balance sheets, but exchange rate pegs constrain the policy response to external shocks.

Indonesia remains the most vulnerable of the major Asian economies. State interventions to assist ailing and failed banks have led to a significant increase in public sector debt. The government's domestic debt rose from near zero at end-1997 to around 50 per cent of GDP in 2000. Because of Indonesia's position as an oil exporter, rising oil prices during 1999 and 2000 helped offset some of the fiscal costs of bailouts and debt service. But these costs are ongoing, leaving Indonesian prospects vulnerable to any fall in oil prices. Moreover, since around half of public sector debts are foreign currency-denominated, debt-servicing costs are sensitive to exchange rate movements. The rupiah has depreciated markedly during 2001, relative to both the US dollar and the yen (Chart 88).

The Korean economy has close trade links with industrial countries (see Box 2) and is particularly exposed to any slowdown in demand for technology products. During the first quarter, the won depreciated against the US dollar, broadly in line with the yen (Chart 88), which is one factor behind the rise in inflation during 2001 (Chart 89). The cost of servicing Korean corporates' US\$57 billion external debts will also have risen<sup>17</sup>. However, any tightening of domestic monetary policy could tend to raise the cost of servicing domestic debts and would affect

<sup>17</sup>: Regrettably, data on debts are split by residence rather than currency. The Financial Stability Forum's 'Report of the Working Group on Capital Flows' discusses the use of balance sheets for risk monitoring in some detail.

Korean firms needing to rollover maturing loans. Recent developments at Hyundai's affiliates, which have asked banks to restructure debts, illustrate the ongoing weakness of corporate balance sheets.

Malaysia and Taiwan also have close trade links with industrial countries, are very open, and have a concentration of exports in the technology sector. In Malaysia, the current monetary policy regime of fixed exchange rates limits the options for absorbing external demand shocks, such as a US slowdown. Foreign currency reserves have declined by around 15 per cent since the *December Review*. In Taiwan, the exchange rate is floating, the depreciation of the Taiwanese dollar since March is likely to have increased competitiveness (Chart 88).

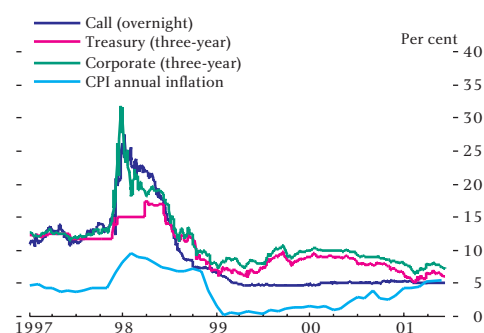
Hong Kong also has a fixed exchange rate regime and close trade links with industrial countries. So far however, and despite superficial similarities with the currency board structure in Argentina, there has been little indication of pressure on Hong Kong's currency, as interbank rates have remained close to US dollar rates (Chart 90). This may partly reflect higher wage and price flexibility in Hong Kong and so a greater capacity to adjust to shocks. Consumer price deflation has, however, been associated with falling property prices. Given the concentration of domestic banks' assets in the property sector, this might have been expected to weaken banks' balance sheets. According to the Hong Kong Monetary Authority, balance sheets appear robust, with persistent post-tax profits and low non-performing loans. However, the full effects of lower property prices on banks' balance sheets may not yet have been felt.

China is considerably less exposed to external disturbances than most other EMEs as the economy is less open and less reliant on the technology sector. But any sharp change in Asian exchange rates could affect Chinese competitiveness. As noted above, many Asian currencies have depreciated against the US dollar during 2001. But there is little evidence of Chinese exchange rate pressure in forward markets. The Chinese banking sector has a weak balance sheet with non-performing loans of around 40 per cent, according to the World Bank. Future prospects are linked closely to the performance of China's state-owned enterprises, which account for the bulk of bank loans, and improvements in risk management within the banking sector.

#### Commodity dependence

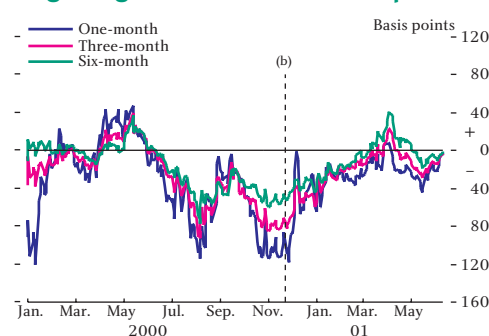
Many EMEs remain dependent on a few primary commodities for a large part of their export receipts (Table 10). The most significant single commodity is oil, accounting for around a third of commodity exports from the major EMEs. Although oil prices have fallen from their peak in September 2000, they remain well above the trough in 1998. As discussed in the *December Review*, oil-importing EMEs, such as Korea and India, have therefore

**Chart 89:**  
**Korea: interest rates and inflation**



Source: Thomson Financial Datastream.

**Chart 90:**  
**Hong Kong: US dollar interbank spreads<sup>(a)</sup>**



Source: Reuters.

(a) Hong Kong dollar rates from HIBOR, US dollar rates from LIBOR.

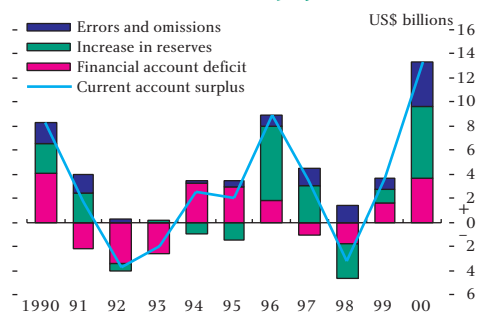
(b) December 2000 *Review*.

**Table 10:**  
**Share of exports contributed by primary commodities; selected EMEs (1998, per cent)**

Country	All primary	Oil
China	11	2
Malaysia	19	6
Korea	7	3
Thailand	24	2
Indonesia	38	17
Singapore	12	7
Hong Kong	3	0
Philippines	9	1
Argentina	63	8
Brazil	42	1
Mexico	14	6
Venezuela	76	70
Colombia	68	22
Chile	51	0
Russia	47	37
Turkey	21	1
Hungary	15	1
Czech Republic	11	1
Poland	19	1

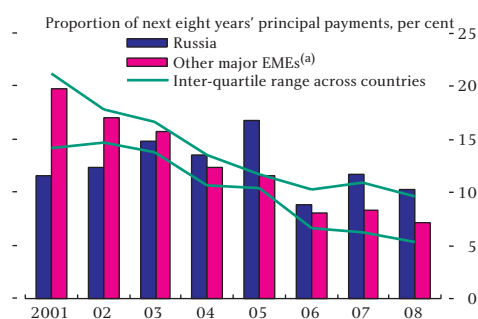
Source: International Trade Centre.

**Chart 91:**  
**Venezuela – balance of payments**



Source: IMF.

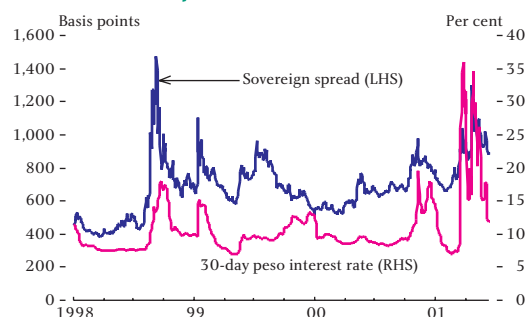
**Chart 92:**  
**Russian amortisation schedule on external debts**



Source: World Bank.

(a) Based on cumulated principal payments due from a sample of major EMEs.

**Chart 93:**  
**Argentina: sovereign US\$ bond spreads and short-term peso interest rates**



Sources: JP Morgan Chase & Co and Bloomberg.

experienced deteriorating terms of trade. Oil exporters have gained from the price rises but, despite this, some major oil exporters remain vulnerable to financing shocks. However, options prices suggest that substantial price changes are not seen as likely in the near term.

For example, in Venezuela, the real exchange rate has appreciated by about 40 per cent over the past four years, reducing the competitiveness of the non-oil sector – 30 per cent of exports – and hence prospects for diversification. Inflationary pressures may have been fuelled by expansionary fiscal policy as the non-oil fiscal deficit rose to almost 11 per cent of GDP in 2000. Moreover, although the authorities have set up a fund to save a portion of oil receipts, some of the oil windfall may have leaked abroad. 'Errors and omissions' in the balance of payments, sometimes used as an indicator of capital flight, have been large (Chart 91). Consequently, reserves have not risen in line with trade surpluses.

In Russia, 'errors and omissions' in the balance of payments have also been significant in the past, but international reserves nevertheless rose sharply, by US\$15.8 billion, in 2000. Russia has relatively small near-term financing needs, but faces a larger amortisation burden between 2003 and 2005 (Chart 92). These amortisation humps leave some vulnerability to a sharp and sustained fall in oil prices, with taxation of energy producers accounting for about 5 per cent of GDP in 1999. There is also some risk that inflation may rise, as the monetary injection accompanying the rise in foreign currency reserves has not been fully sterilised by central bank monetary operations.

### EMEs: recent crisis cases

The December *Review* described the onset of tight financing conditions for two major EMEs – Argentina and Turkey. In both cases, the root cause lay in local factors. In Argentina, prolonged macro-economic stagnation and structural fiscal and labour market weakness was exacerbated by an appreciating real exchange rate. In Turkey, the banking sector's net foreign currency exposures led to losses as the exchange rate depreciated during 2000.

#### Argentina

At the time of the previous *Review*, Argentina posed the greatest EME risk to international financial stability, with relatively large liabilities to BIS-area banking systems and market perceptions of significant credit risk. These perceptions, as reflected in sovereign yield spreads, improved in the early part of 2001 as the authorities agreed a financing package with local banks, the IMF and other official creditors. However, this was more than reversed in late March when, in the face of increased political uncertainty, yield spreads rose along with short-term interest rates (Chart 93). Yields have since fallen back somewhat, helped by the



US\$29.5 billion swap of public sector debts in June. In the recent past higher yields have raised the cost of refinancing maturing government debts.

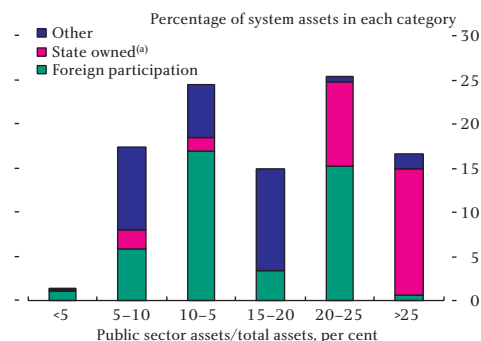
Moreover, economic fundamentals in Argentina have not strengthened since December. The economy remains depressed and industrial production is no higher than in 1996. The authorities have announced a series of tax and structural reforms intended to stimulate growth. Recovery is widely expected by 2002, though in the near term the potential for growth may have been dampened as real interest rates have risen. There was a significant outflow of deposits from the banking system during March, which may have affected the scope for bank lending. Recent relaxations in banks' liquidity requirements may have offset this effect, but at a potential cost in terms of reduced robustness of banking sector balance sheets. A number of large (primarily state-owned) banks have significant exposures to the public sector (Chart 94) so that the banking sector's robustness is related in some degree to sovereign credit standing.

#### Turkey

In Turkey, macro-financial fundamentals have deteriorated in the aftermath of the currency crisis in February. Even after a revised US\$7.5 billion IMF programme announced in December, asset prices weakened early in 2001. The crawling exchange rate peg was abandoned on 22 February and the lira has since depreciated by about 40 per cent relative to the US dollar (Chart 95).

The currency crisis has had an adverse impact on banks' balance sheets, raising the cost of servicing the banking system's net foreign currency liabilities. Banks with, in aggregate, around 30 per cent of system assets had net foreign currency liabilities greater than their capital at the end of 2000 (Chart 96). Any re-capitalisation of the banking sector as a whole will pose a fiscal cost unless private buyers are found. Fiscal prospects have already deteriorated, because the depreciation has raised the cost of servicing foreign currency debts and higher real interest rates have been paid on refinanced lira debts. In response to these developments, the IMF announced a further US\$10 billion financing package in April, to alleviate any near-term public sector financing shortfall. In June, the Turkish authorities announced a debt swap which will lengthen maturities. The IMF package includes some significant structural reforms, particularly in the banking sector. But some risks remain, notably because real interest rates are currently high. High real interest rates may more than offset the impact on final demand of any gains to competitiveness: Consensus forecasts for GDP growth in 2001 have been revised down by 9.1 percentage points since December (to a contraction of 4.8 per cent), though recovery is expected in 2002.

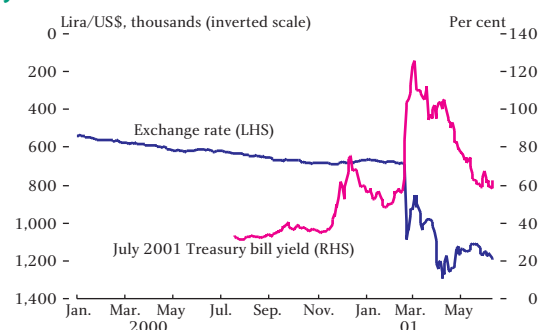
**Chart 94:**  
Argentine banks' exposure to the public sector, 1999 accounts



Sources: Bureau van Dijk BankScope and Bank calculations.

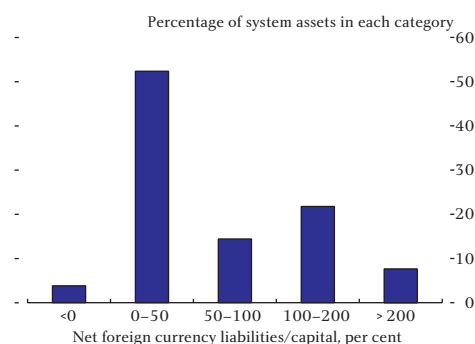
(a) Banks classed as state owned following local central bank definitions.

**Chart 95:**  
Turkey: exchange rate and Treasury bill yield



Sources: Bloomberg and Reuters.

**Chart 96:**  
Significance of net foreign currency liabilities across the Turkish banking system, end-2000<sup>(a)</sup>

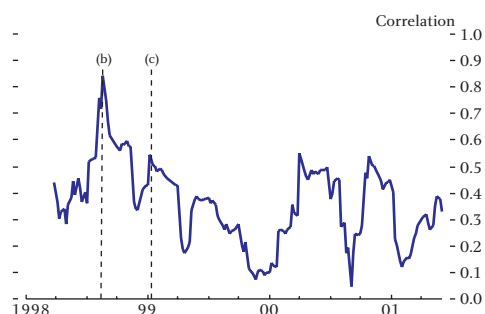


Sources: The Banks Association of Turkey and Bank calculations.

(a) Excludes intervened banks.



**Chart 97:**  
**Correlation between changes in EME sovereign yield spreads<sup>(a)</sup>**



Sources: JP Morgan Chase & Co and Bank calculations.

(a) Correlation between weekly changes in spreads of EMEs within JP Morgan's EMBI Global index.

(b) Russian crisis 17/8/98.

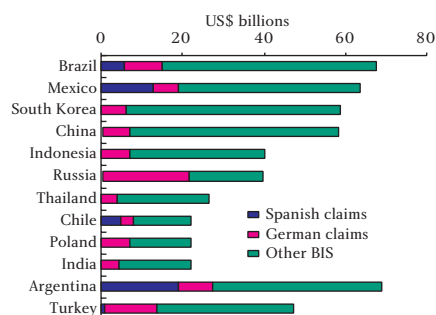
(c) Brazilian devaluation 13/1/99.

**Table 11:**  
**Importance of crisis economies as a destination for regional exports**

	Proportion of local regional exports (per cent)
Argentina (1999)	3
Turkey (1999)	2
memorandum item:	
<i>Argentine links with Mercosur</i>	12
Brazil (1999)	3
Russia (1998)	9
Thailand (1996)	2
Mexico (1994)	2

Source: IMF.

**Chart 98:**  
**EMEs' liabilities to BIS banks by origin, end-2000<sup>(a)</sup>**



Source: BIS.

(a) Using consolidated data, not adjusted for risk transfer.

## Links to the international financial system

Developments in EMEs may affect global financial stability through a number of channels, including through their impact on other EMEs and the credit exposures of financial institutions in industrialised countries.

### Links amongst EMEs

The December Review discussed possible channels through which adverse developments in one EME may affect other EMEs. These include economic links, such as trade relationships, and links through the global financial system. So far, however, there has been little evidence of sustained asset price contagion from recent pressures on some EMEs. Although the correlation between weekly movements in EME bond yields has risen recently, it remains lower than in late 2000 or at the time of the Russian and Brazilian crises (Chart 97). Indeed, Mexican sovereign yield spreads have fallen since the previous Review.

Intra-EME trade links are typically less significant than trade with industrial countries. At a regional level, only a small proportion of Latin American and Eastern European exports are destined for Argentina and Turkey respectively (Table 11). However, the regional figures mask a concentration of trade flows within the narrower Mercosur trading block, of which Argentina is a member along with Brazil, Paraguay and Uruguay.

Regional trade effects may be magnified by 'common creditor' effects if lenders specialise in lending to particular regions. Losses incurred on exposures to one EME may, depending on the circumstances, affect creditors' appetite for risk generally. And even if risk appetite does not change, losses may cause a reassessment of risk and return for EME assets as a class. For example, Spanish banks have significant claims on Argentina relative to their total external claims. But Spanish banks are nowhere else as significant for the borrowing country as in Argentina. German banks have significant claims on Turkey, accounting for over a quarter of Turkish liabilities. Russian liabilities are also concentrated amongst German-owned banks (Chart 98). German banks' claims on EMEs are, however, small relative to their total cross-border claims.

Possibly the most significant links arise from Argentina's position as a major EME bond issuer (Table 12). Concerns about the future liquidity of EME debt markets might occasionally dominate credit risk as determinants of the cost of capital. Developments following Russia's partial default in August 1998 illustrates the potential for these indirect market linkages to lead to widespread falls in EME asset prices. Spreads on all major EMEs' bonds rose by more than half in the two months to end-August 1998.

Argentine bonds account for a larger part of the JP Morgan's Global Emerging Market Bond Index than Russian bonds did at the time of its crisis. Moreover, trade links between Argentina and Brazil – also a major bond issuer – are significant. However, there are also some reasons to expect less contagion than in the recent past. First, in 1998, some creditors to Russia may have been forced to adjust portfolios rapidly to the extent that the default was a surprise – although Russian bond yields began to rise several months prior to the partial default (Chart 99). In contrast, market perceptions of Argentine creditworthiness have deteriorated over some time. Second, creditors' behaviour may have changed since 1998, with a greater differentiation of country risks. This is consistent with the increased dispersion of sovereign yield spreads described in Box 3. Finally, market anecdote suggests that highly leveraged institutions are less prevalent in EME markets than they used to be, reducing the potential for forced selling following localised falls in asset prices.

#### Links to global financial markets

Links from EMEs to industrial countries operate primarily through the impact of losses incurred on portfolios of EME assets. Available data suggest that US mutual funds holdings of emerging market equities amount, however, to just 0.4 per cent of their total equity funds. Banking system loan exposures to Argentina and Turkey are also generally small. Some 'off-balance-sheet' exposures, such as committed lines and credit derivatives, are not captured and could conceivably be significant. But the available data on credit derivatives suggest that only a small proportion of these are structured around sovereign instruments, and therefore even less will relate to EMEs.

Developed-country banking system credit claims on Argentina and Turkey are large relative to their claims on most other individual EMEs, but small relative to their overall credit exposures. Argentina has the greatest liabilities to BIS-area banks, while Turkey ranks sixth. But taken together, these two EMEs account for just 1.5 per cent of BIS-area banks' total external claims and much less of total assets. As noted above, these aggregate data mask a concentration of exposures of Spanish banks to Argentina (Chart 100). Box 4 in Section VI therefore discusses Spanish banks' exposures to Latin America in the context of their position in the international financial system more generally.

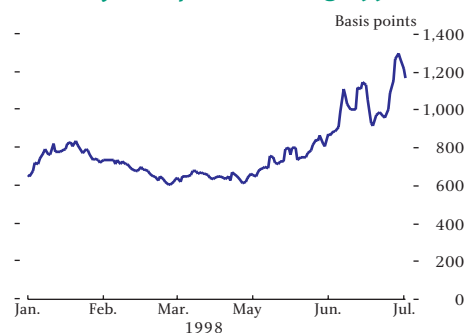
**Table 12:**  
Importance of crisis economies in EME capital markets

	Weight in EMBI (Global) per cent
Argentina	19
Turkey	3
memorandum item: <sup>(a)</sup>	
Brazil (Dec 1998)	19
Russia (Jul 1998)	10

Source: JP Morgan Chase and Co.

(a) Brazilian and Russian weights for the month preceding devaluation/partial default.

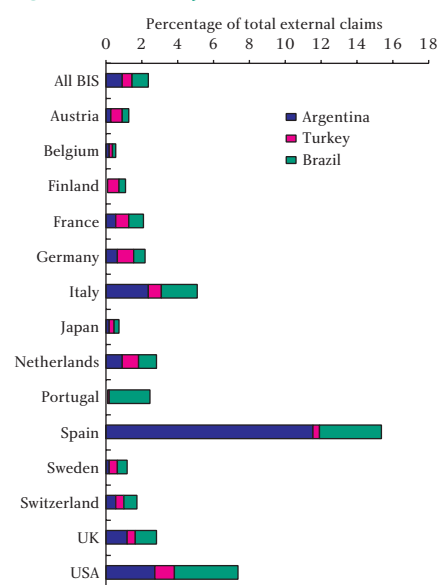
**Chart 99:**  
Russian yield spreads during 1998<sup>(a)</sup>



Source: JP Morgan Chase & Co.

(a) Spread on US dollar-denominated instruments.

**Chart 100:**  
Concentration of BIS banks' claims on Argentina, Turkey and Brazil, end-2000<sup>(a)(b)</sup>



Source: BIS.

(a) Full data are not available for Canada, Denmark and Ireland.

(b) Using consolidated data, not adjusted for risk transfer.

## Box 2: The macroeconomic impact of the US slowdown on growth in non-Japan Asia

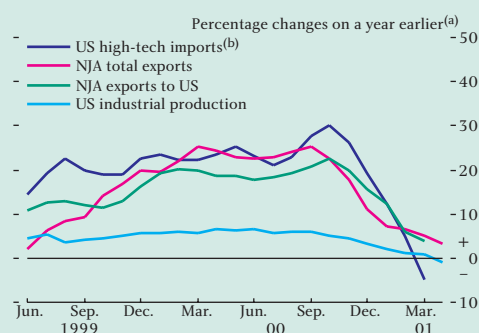
**Table A: NJA Trade Patterns, 1999**

	Merchandise trade as percentage of GDP	Percentage high-tech products in total exports <sup>(a)</sup>
China	36	15
Hong Kong	223	22
India	19	n/a
Indonesia	61	6
Korea	65	30
Malaysia	190	52
Philippines	87	63
Singapore	269	53
Taiwan	81	37
Thailand	94	26

Sources: IMF Direction of Trade Statistics and World Economic Outlook database and World Trade Organisation.

(a) Defined as office machines and telecoms equipment (SITC 75, 76 and 776).

**Chart A: NJA total exports and imports to US**

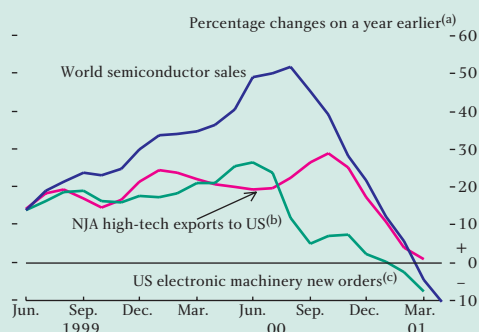


Sources: Bloomberg, IFS, US Census Bureau and Thomson Financial Datastream.

(a) Three-month moving average except US industrial production.

(b) Defined as telecommunications, semiconductors, electrical apparatus, computer accessories and computers.

**Chart B: NJA high-tech exports**



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

(a) Three-month moving average.

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

(c) Seasonally adjusted.

There have been widespread downward revisions to Consensus forecasts of growth in the Asian EMEs. Forecasts for Korea, Malaysia and Thailand have been revised most markedly. Both the general worsening of Asian growth prospects and patterns within the region may well reflect trade patterns.

51 per cent of non-Japan Asian (NJA)<sup>1</sup> exports were to industrial economies in 1999, with the US accounting for 21 per cent of total exports, the EU 18 per cent and Japan 11 per cent. Additionally, the industrial economies are also a final destination for much of the intra-regional trade in intermediate products. In the current conjuncture, weakening demand prospects in the US and Japan may therefore have a significant impact on Asian exports. There is already some evidence of this in macro-economic data as US imports of goods from NJA have weakened in recent months (Chart A).

Export growth has declined particularly sharply in the Philippines, Taiwan and Thailand. This may also reflect the composition of their exports, which is skewed towards the high technology products (Table A). Looking forward, recent falls in new electronics orders in the United States, and in world semiconductor sales (Chart B) may lead to a further slowing of NJA export growth. However, computer chip prices have fallen more slowly so far in 2001 than during late 2000.

Slowing exports may well have a material impact on prospects for growth because Asian economies are typically open, with trade significant relative to GDP (Table A). However, measures of openness may overstate the potential impact of an external demand shock on growth. Some economies, such as the Philippines, specialise in assembly and re-export of imported intermediate goods where the value added is lower than the full US\$ value of exports. Other economies, such as Korea, may be affected more because the bulk of their exports are from higher value-added export production sectors.

In the near term, fiscal expansion, monetary loosening and/or exchange rate depreciation might offer a partial offset to weaker external demand. However, continued high levels of corporate or public debt, fixed exchange rate regimes (for example, in Malaysia) or inflation concerns may limit policy flexibility.

<sup>1</sup> Non-Japan Asia is taken to cover China, Hong Kong, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan and Thailand. Together, the GDP of these economies was US\$2.8 trillion in 1999, compared with US\$4.5 trillion in Japan. Data on the direction of trade flows exclude Taiwan which is not covered by the IMF's Direction of Trade Statistics.

### Box 3: The dispersion of yield spreads on EME sovereign bonds

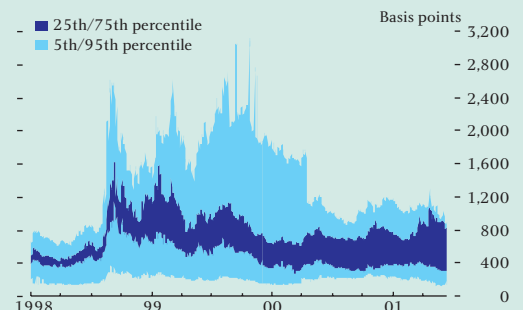
Yield spreads on broad EME sovereign bond indices, such as JP Morgan's EMBI Global, can provide a useful summary of investors' pricing of the risk inherent in these assets. But, as with any average, it may mask interesting developments in the components. Patterns in spreads across countries provide one possible indicator of the risk of contagion following a credit event. And the variation in spreads across countries of differing creditworthiness gives some indication of investors' willingness to hold debt of different credit quality.

Chart A shows the evolution of yield spreads across the country components of the EMBI Global index. The darker band shows the range of spreads for the 50 per cent of index capitalisation around the median, while the lighter band covers 90 per cent. The increase in spread dispersion following the Russian crisis in August 1998 is notable. Spread dispersion, as reflected in the 50 per cent band, remains more than three times greater than prior to the Russian crisis.

It seems likely that yield spreads were unusually compressed during 1997 and early 1998, suggesting some mispricing of credit risk or possible creditor exuberance. This is apparent from Chart B, which describes the distribution of spreads across a narrower index of 11 EMEs (accounting for around 75 per cent of today's market value) available before 1998. The bulk of country spreads had declined to between 300 and 600 basis points in the 18 months prior to the Russia crisis. Asset price contagion may have been exacerbated as views were revised post Russia. This suggests that, as well as debtor countries needing to learn some lessons about prudent national balance sheet structures, creditors from industrialised countries also had lessons to learn about the pricing of risk, particularly once risk correlations and the aggregate effects of their own credit policies are factored in.

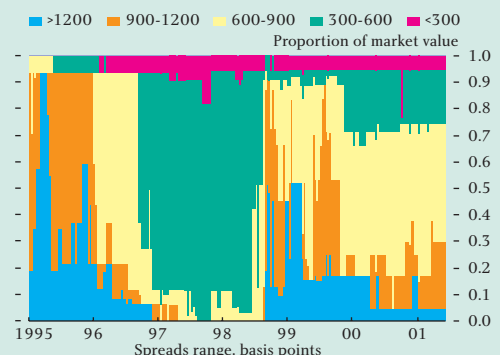
Chart B also suggests that the current position is more healthy. At the end of 1997, around 70 per cent of the value of the index was contained within the range 300–600 basis points. Now, no 300 basis point 'bucket' contains more than half the index. Chart C therefore examines the yield spread on each of the country components in more detail. It plots the cumulative distribution of yield spreads, reflecting the prevailing market capitalisation of each country's bonds. The blue line, which shows the most recent values, confirms that the variation of spreads is currently greater than in 1997, with spreads ranging from 67 basis points (Hungary) to 2,187 basis points (Ivory Coast).

**Chart A:**  
EME sovereign US\$ bond spreads:  
distribution over time<sup>(a)</sup>



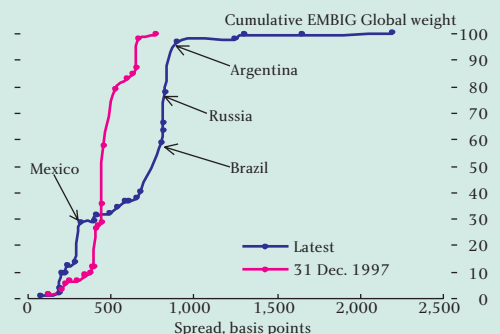
Sources: JP Morgan Chase & Co and Bank calculations.  
(a) Cross-country distribution across components of the EMBI Global index.

**Chart B:**  
EME sovereign US\$ bond spreads: time  
series of spread buckets<sup>(a)</sup>



Sources: JP Morgan Chase & Co and Bank calculations.  
(a) Cross-country distribution across components of the EMBI.

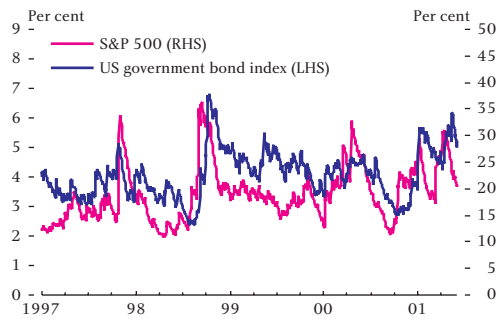
**Chart C:**  
EME sovereign US\$ bond spreads:  
snapshot cumulative distribution



Source: JP Morgan Chase & Co and Bank calculations.

## VI The international financial system

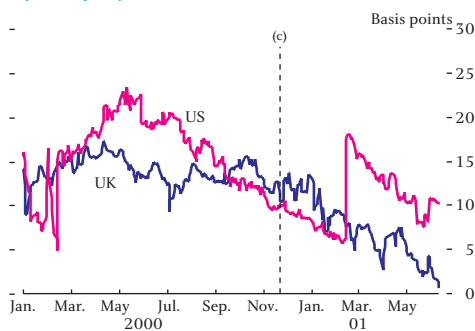
**Chart 101:**  
Historical volatility of US equities and US government bonds<sup>(a)</sup>



Sources: Thomson Financial Datastream and Bank calculations.

(a) Volatility calculated as annualised 252-day rolling square-root of exponentially weighted moving average of squared daily log returns.

**Chart 102:**  
Liquidity spreads in the UK and US<sup>(a)(b)</sup>



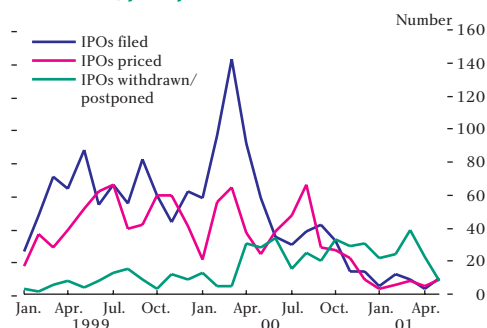
Sources: Bloomberg, Merrill Lynch, Reuters and Bank of England.

(a) UK: gap between the spread on the 8.5 per cent Treasury 2007 and the lower envelope of spreads on benchmark gilts. US: off-the-run minus on-the-run 30-year Treasury bond yields.

(b) Break in US series in February 2001 caused by new 30-year on-the-run bond.

(c) December 2000 *Review*.

**Chart 103:**  
Number of US IPOs filed, priced and withdrawn/postponed



Source: ipo.com.

This Section addresses the question of how robust the international financial system is in the face of the developments and risks described in Sections I – V. This is especially important for the United Kingdom, given London's role as a global financial centre and the involvement of foreign-owned firms in domestic UK financial intermediation. Some important developments in infrastructure, regulation and other public policies relevant to the functioning of international financial markets are reported in Section IX.

### Recent resilience of the system

As Section II discussed, there has been considerable volatility and uncertainty in markets since last autumn (Chart 101). High volatility entails greater market risk for investors and intermediaries taking direct exposures to the level of markets; and, furthermore, impedes risk management if returns across assets of different types and geographical location are positively correlated, reducing the scope for diversification. Correlations between returns on TMT and non-TMT equities have, in fact, increased since the *December Review*, as have correlations between regional equity markets (see Chart 28 in Section II). Increased cross-regional correlations, if they were to persist, would reduce the scope for mitigating risk by the geographical allocation of portfolios.

Notwithstanding potentially difficult conditions, most financial markets have continued to function smoothly. There have been no serious problems with market infrastructure. Most secondary markets appear to have remained liquid. For example, spreads between on- and off-the-run yields in the US and UK government bond markets have remained low (Chart 102). New issuance and liquidity in bond markets have generally been strong. This is helpful, as the capacity for capital markets to remain open and liquid in such conditions affects the ease and extent to which risk can be transferred to and from the banking system<sup>18</sup>. An exception was the drying up of liquidity in the US dollar and euro high-yield bond markets in late-2000, although conditions have since improved somewhat (see Section II).

Less helpful has been the weakness of the IPO market (Chart 103), which, amongst other things, has made it more difficult for some companies to reduce debt through asset sales and restricted the main exit through which venture capital investors realise value. While the biggest venture capital investors are pension funds and other long-term investment institutions, some banks also have significant venture capital exposures.

<sup>18</sup> See, for example, remarks by Chairman Greenspan at the 36th Annual Conference on Bank Structure and Competition of the Federal Reserve Bank of Chicago, May 4 2000. Available at [www.federalreserve.gov/boarddocs/speeches/2000/20000504.htm](http://www.federalreserve.gov/boarddocs/speeches/2000/20000504.htm).



With markets generally remaining open, market participants, taken as a whole, appear to have coped well, notwithstanding volatile trading conditions. No very large trading losses have been announced, and there have been few obvious signs of distressed selling in order to raise liquidity or meet margin calls. One reason may be that firms have been able to adjust to greater price volatility over time rather than facing a sudden, unexpected market crash. Higher historical volatility will have increased measured value-at-risk (VaR) for the many market participants using these models to measure exposure to market risk. It is possible that they responded by reducing the size of positions during that period.

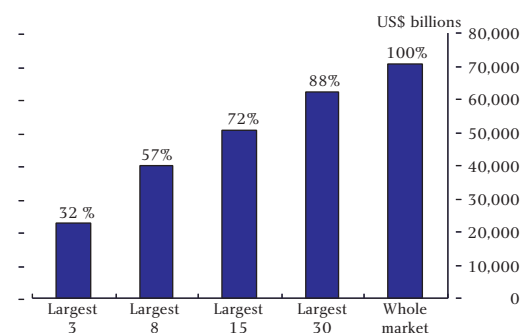
The June 2000 *Review* reported that the pattern of financial intermediaries' business with customers might have enabled them – perhaps in part as a defensive position against high equity market valuations – to benefit from high and rising price volatility: for example, by combining purchases of put options written by companies as part of share buy-back programmes with purchases of covered calls written by investment funds. Contacts suggest that such customer business declined as equity market prices fell and volatility rose. Although intermediaries probably remain 'long' equity market volatility, which might insulate them to some degree from sharp market disturbances, the size of these positions may typically be smaller now than a year ago.

### Internationally active banks

While markets are one potential channel through which any major disturbances to the international financial system could spread, another is the links resulting from the scale and complexity of international banking activity. Cross-border banking is relatively concentrated amongst a number of large international banks, which often – but not always – have a significant share of banking activity in their home market. Overall, as measured by the BIS, interbank exposures account for just under one-half of total cross-border lending. Counterparty exposures relating to over the counter (OTC) derivatives are also relatively concentrated within a small number of large banks and securities firms (Chart 104).

The business of these internationally active firms, and the effectiveness of their risk management therefore has a material effect on the global pattern of exposures and risks. That is, of course, why the Basel Capital Accord, which is currently being updated, is designed to cover internationally active banks. It also provides the background to a recent survey<sup>19</sup> undertaken by the G10 central banks' Committee on the Global Financial System on the use of stress tests and scenario analysis by internationally

**Chart 104:**  
Interest rate swaps: Notional principal outstanding of 64 banks and securities firms<sup>(a)</sup>



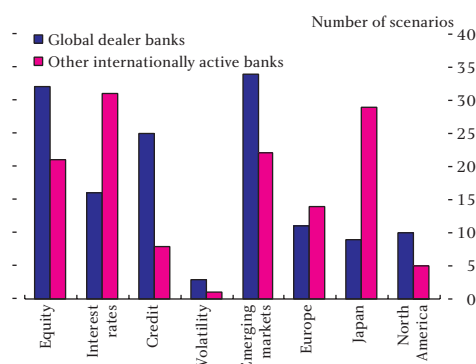
Source: Swaps Monitor.

(a) As at 31 December 2000 (data only available for some firms as at end-1999). Whole market refers to the sample of 64 banks and securities firms from the US, UK, France, Germany, Japan, Canada, Australia and the Netherlands.

<sup>19</sup> A survey of stress tests and current practice at major financial institutions. April 2001. Committee on the Global Financial System of the central banks of the G10 countries. Available at [www.bis.org](http://www.bis.org).

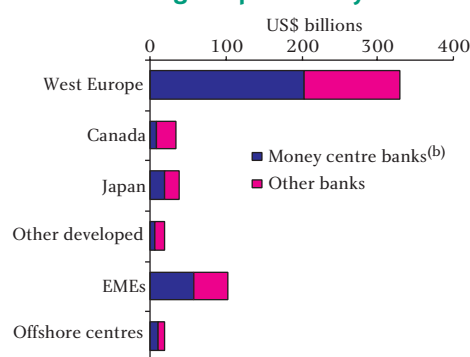


**Chart 105:**  
Stress test scenarios: by peer group and theme



Source: BIS.

**Chart 106:**  
US banks' foreign exposures by bank size<sup>(a)</sup>

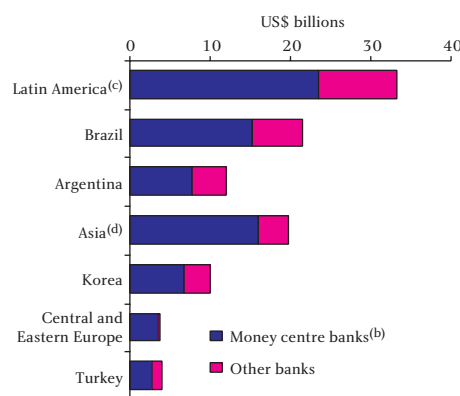


Source: Federal Financial Institutions Examination Council.

(a) As of 31 December 2000.

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

**Chart 107:**  
US banks' exposures to emerging markets<sup>(a)</sup>



Source: Federal Financial Institutions Examination Council.

(a) As of 31 December 2000.

(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.

active banks. The survey found that both global dealer banks<sup>20</sup> and other internationally active banks without the same global reach made extensive use of stress tests, but global dealer banks did more scenario analysis. Nearly 80 per cent of global dealer banks used stress tests to set limits and 42 per cent considered interactions between market and counterparty credit risk; the equivalent percentages for other internationally active banks were 45 per cent and 12 per cent respectively. Both groups of firms looked at a range of scenarios (Chart 105).

#### US banking system

A wide range of official data is published on the US banking system by a number of agencies, including the Federal Reserve, the FDIC, the OCC and their joint venture, the Federal Financial Institutions Examination Council (FFIEC).

According to FFIEC data, the five *commercial banks* – the money centre banks – with the largest international lending exposures accounted for over three-quarters of the industry total as at end-2000 (Chart 106). The bulk of these banks' exposure was to non-banks; about a quarter were interbank. They also had the larger share of exposures to EMEs, although these were low in relation to capital (Chart 107). The international exposures of smaller US banks were predominantly interbank, and concentrated in major OECD countries, particularly Europe and Canada.

US banking system exposure to Japan (including the replacement cost value of counterparty credit exposures on OTC derivatives) was the equivalent of 14 per cent of Tier 1 capital at end-2000. Cross border claims at end-2000 had fallen slightly since September (Chart 111).

The OCC publishes a measure of the US banking industry's counterparty credit exposures from international and domestic OTC derivatives business, which (as already noted) will largely relate to the activities of the largest banks. At replacement cost values, these exposures fell from a peak of around 300 per cent of regulatory capital in late 1998 to around 250 per cent at end 2000 (Chart 108).

Venture capital accounted for about 10 per cent of total income at several US banks in 2000. Although such investments are a negligible proportion of the total assets of the US banking system, a few of the large US banks have large portfolios. The fall in asset values in the TMT sector and the relative drying up of the IPO market might constrain earnings from this source for a while. It is difficult to assess the significance of this.

Overall, following a long period of high profitability, internationally active commercial banks in the US appear to be

<sup>20</sup> See footnote 10 of the CGFS paper for the definition of 'global dealer bank'.

in a stronger position to meet the demands of a downturn than before the early 1990s recession. According to FDIC data, the overall risk-based capital ratio for the largest US banks (those with assets greater than US\$10 billion) was over 11 per cent at end-2000 and the Tier 1 ratio over 8 per cent. Equity capital ratios averaged over 8 per cent, compared with less than 5 per cent in 1989. The ratio of impaired assets to total assets was 0.8 per cent at end-2000. While higher than the 1997 low, this is much less than the 4 per cent at end-1991.

The reported capital resources of the large US *investment banks* (securities firms and investment banking arms of banks) more than doubled in the second half of the 1990s, with earnings boosted by a sharp increase in fees from customer trading and underwriting revenues. Average value at risk (VaR) – the maximum amount which, on the basis of relatively recent price movements and within a specified level of confidence, an institution would expect to lose on its positions over a given trading period – generally declined for the trading books of major US securities firms between annual reporting dates in 1999 and 2000 (Chart 166 in Section VIII). Given that volatility of many markets in 2000 was relatively high, lower reported VaRs suggest that securities firms might have reduced the size of their market risk positions.

Securities firms' sources of earnings were diverse in the 1990s (Chart 109). 2001 Q1 profits increased slightly on the previous quarter, reflecting an increase in foreign earnings (US earnings were flat). Strong bond underwriting income contrasted with weak earnings from IPOs and M&A: a pattern that has continued in the initial results for 2001 Q2. Recent market volatility seems not to have led to significant problems with margin credit exposures.

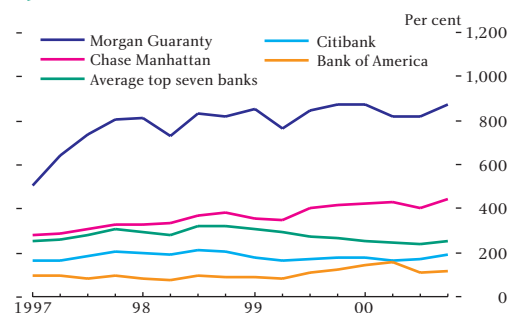
#### European banking systems

Rather less data are available on a consistent basis for European banking systems. As in the United States, published data show that aggregate bank capital ratios have increased since 1997. The average risk-based capital ratio for large banks in Europe was over 12 per cent by end-2000. The ratio of average loan loss provisions to gross loans increased following the 1997-98 crises, but has fallen significantly since.

On-balance-sheet *cross-border* exposures<sup>21</sup> of European banks to the United States vary widely by creditor country, with Dutch, Belgian and Swiss banks having the largest exposures in relation to capital (Chart 110). However, these data exclude exposures of US offices and, for some European banks, these are likely to be substantial.

<sup>21</sup>: This excludes local currency exposures of local offices, for which aggregate data is not available.

**Chart 108:**  
Major US banks with derivatives – ratio of derivatives credit exposure<sup>(a)</sup> to risk-based capital<sup>(b)</sup>

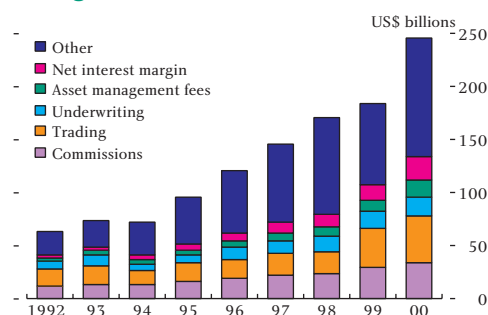


Source: Office of the Comptroller of the Currency.

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

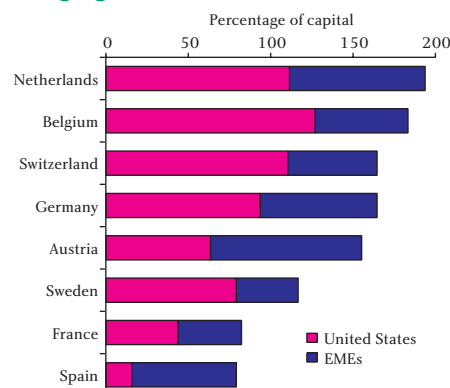
(b) Capital is Tier I plus Tier II capital.

**Chart 109:**  
Composition of US securities industry earnings



Source: Security Industries Association.

**Chart 110:**  
European banks' exposures to US and emerging markets<sup>(a)(b)</sup>

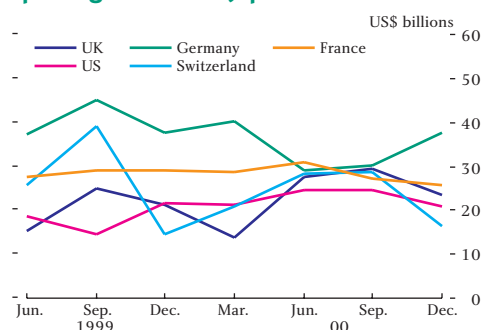


Sources: BIS, IMF and OECD.

(a) Consolidated data on balance sheet only. Excludes exposures of local subsidiaries.

(b) Switzerland is based on December 1999 and Sweden is based on September 2000 data; the rest are December 2000 data.

**Chart 111:**  
**Consolidated international claims of reporting banks on Japan**



Source: BIS.

German and French banks have larger claims<sup>22</sup> on Japan than US, UK and Swiss banks. They have fallen since 1999, although German banks' claims increased in 2000 H2 (Chart 111).

On-balance-sheet cross-border exposures to EMEs similarly vary significantly. Austrian banking system exposure – around 90 per cent of capital – largely results from its business with neighbouring and nearby central and eastern European countries. German, Dutch and Spanish banks also have large EME businesses. Cultural and historical ties to EMEs might aid risk management. For example, despite Argentina's prolonged recession, Spanish banks' profits from that source have been high and increasing in recent years. Box 4 examines the exposure of Spanish banks to the Latin American region.

Since 1999, large European banks have made increasing use of collateralised loan obligations (CLOs) to transfer credit risk on their corporate loanbook. For example, 29 of the 51 CLO transactions rated by Moody's globally in 2000 were by European banks, transferring the risk on portfolios totalling more than US\$40 billion<sup>23</sup>. Most of these transactions were designed to transfer the credit risk on loans to German, French, Spanish or Italian companies. Large European banks appear to have made greater use of CLOs than US banks in 2000, perhaps because they have larger corporate loanbooks. The main investors in European CLO tranches are said to have been European insurance companies<sup>24</sup>.

#### Sectoral exposures – telecoms

The most significant credit exposure of the international banking system to a single industry sector probably remains telecoms. Consistent public data on the relative exposures of US and European banks do not exist. But, according to Capital Data's Loanware database, outstanding syndicated loan commitments (drawn and undrawn) of all international banks to European telecom operators and equipment manufacturers at the end of April 2001 totalled US\$179 billion (April 2000: US\$91 billion), of which US\$130 billion (US\$61 billion) was to the large operators. Nearly US\$83 billion of these facilities mature in the second half of 2001.

Ratings of some of the large European operators have continued to fall since the December Review (Table 13). Further downgrades could begin to limit access to commercial paper markets and would lead to higher interest costs on those recent bond issues that include step-up clauses. There have, however, been a number of positive developments this year. In particular, the large

**Table 13:**  
**Ratings of European telecom operators**

	December Review	12 June 2001
British Telecom	A-/A2	A-/Baa1
France Telecom	A-/A1	A-/A3
Deutsche Telekom	A-/A2	A-/A2
Vodafone	A-/A2	A-/A2
KPN	A-/A3	BBB+/Baa2
Telefonica	A+/A2	A+/A2

<sup>22</sup>: Again, local currency exposures of local offices are excluded.

<sup>23</sup>: Moody's Investor Services 2000 *Review of CDOs and outlook for 2001: The European market matures*, January 25 2001.

<sup>24</sup>: See the article by David Rule in this *Review*.

## Box 4: Spanish banks' exposures to Latin America

The consolidated claims of Spanish banks on Latin America have grown significantly to US\$51.5 billion in 2000 Q4 from US\$44.1 billion in Q2 and US\$39.7 billion at end-1999, putting Spanish exposure just below that of the United States and about twice that of the United Kingdom<sup>1</sup>. Spanish banks' claims represent 18 per cent of all BIS banks' consolidated claims on the region and 31 per cent of all Spanish-owned banks' international claims. This constitutes a far greater regional concentration than that recorded by banks in most other countries.

These BIS data cover a wide range of assets (loans, securities and equities) and include foreign currency-denominated lending by local subsidiaries as well as those of the parent group. This is important in the case of Spain, as Spain's two largest banks (BSCH and BBVA) have significant subsidiary operations in Latin America, some of whose businesses will be in foreign currencies such as the US dollar. But the BIS data understate total group exposures to credit risk as they do not include local currency loans by foreign subsidiaries. So, for example, if BBVA's Mexican subsidiary lends peso to a Mexican firm, the loan will not be included in the BIS data. The data are collected in this way on the basis that subsidiaries funded locally are treated on a stand-alone basis by the parent bank and its exposure is limited to its capital investment.

An alternative way of measuring exposure is to look at all the assets of the consolidated group. As Table A shows, the total on-balance sheet assets of Spanish-owned subsidiaries in Latin America are far higher than external claims. Calculations scaled to reflect partial or total ownership suggest that, as at end-2000, subsidiaries of BSCH and BBVA had Latin American assets of US\$95 billion and US\$51 billion, respectively.

While large exposure to parts of Latin America clearly represents a risk in the current conjuncture, BSCH's and BBVA's earnings in the region have been strong. This might reflect a number of factors, including a 'first-in' advantage as well as historical and linguistic ties with the region.

### Links to the international financial system

The exposure of BIS-area banks to banks located in Spain was US\$70.7 billion at end 2000. Given the predominance of Spanish-owned banks in the Spanish banking sector, it is likely that much of this exposure was to Spanish-owned banks. Spain accounted for only 2 per cent of UK-owned banks' on balance sheet consolidated cross-border claims (US\$9.8 billion), of which about half were to the banking sector. In addition, offices of UK-owned banks located in Spain had local currency claims on local residents of US\$7.3 billion. As for their activity in London, at end-2000 Spanish banks represented only 0.6 per cent of the aggregate balance sheet of UK-resident banks and accounted for only 0.3 per cent of the inter-bank business.

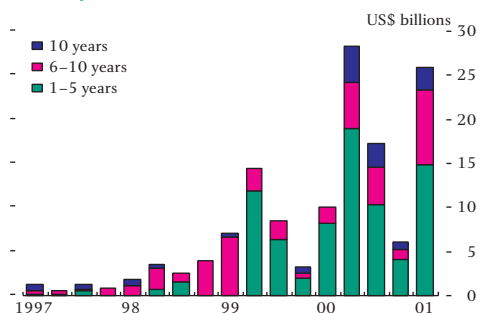
**Table A:**  
**Assets of Spanish subsidiaries in Latin America**  
**(US\$ billion)**

	BSCH	BBVA	All Spanish consolidated claims
Argentina	9.8	7.0	19.0
Brazil	32.2	5.2	5.7
Mexico	25.6	22.3	13.0
Total LA	94.9	50.5	51.5
<i>Memo:</i>			
<i>Parents' equity</i>	29.2	21.9	
<i>Group assets</i>	376.6	321.7	

Source: Bureau van dijck Bankscope.

<sup>1</sup>: Data not adjusted for risk transfers.

**Chart 112:**  
European telecom bond issuance by maturity



Source: Capital Data.

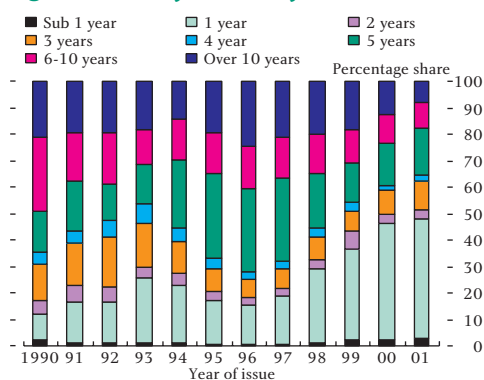
European operators have been able to refinance some short-term debt in the bond markets (Chart 112), probably thereby reducing the risk to banks that commercial paper back-up lines will be drawn and lessening the number of maturing undrawn facilities that will need to be replaced later this year. To some extent, debt has also been reduced through asset sales and equity issues, although equity market weakness has constrained debt reduction plans. Credit exposures to the large European operators are plausibly – but not certainly – reasonably well distributed through the international banking system.

As discussed in Section II, risks in lending to alternative telecom operators in the US and Europe remain high, particularly for those needing additional finance to implement business plans. Although bondholders and equipment suppliers have provided a large share of the debt for many of these companies, bank exposures might increase if distressed companies were to draw down committed lines.

### Market developments with potential effects on system resilience

While the system has proved resilient in recent choppy market conditions and the international banking system in aggregate has built up capital resources over recent years, there are, nevertheless, a variety of issues to which risk managers, regulators and the monetary authorities generally need to be alert. Sections I-V covered some risks related to the macroeconomic conjuncture and specific country or sectoral vulnerabilities. The remainder of this Section identifies developments, possibly creating potential risks, sourced in recent patterns of business within the financial industry itself.

**Chart 113:**  
New syndicated loan arrangements by original maturity of facility



Source: Capital Data.

#### Shortening maturity of syndicated bank facilities

Whereas most syndicated lending until the late-1990s was through five-year or longer maturity facilities, since 2000 nearly half has been for one year or less (Chart 113). This has been accompanied by a trend towards financing through securities markets. The reduced participation of Japanese banks, industry consolidation and a greater focus on risk-adjusted returns by banks probably all contributed to a steepening of the supply curve for bank lending. Bank borrowing is now typically used either when corporates need funds quickly and flexibly – for example, when acquiring another company – or as liquidity insurance in case they are unable to issue securities. The shorter maturity of bank facilities should mean that banks have more flexibility in reviewing whether and on what terms to lend – for example, to increase prices if credit quality deteriorates. But it increases refinancing risk for borrowers.

#### Commercial paper back-up lines

Issuance of US\$ commercial paper (CP) has increased rapidly in recent years, particularly paper backed by corporate assets such

as trade receivables (Chart 114). Money market mutual funds are amongst the largest buyers. Under their investment guidelines, however, many are not allowed to invest in paper below a certain rating threshold. For this reason, the ability to issue commercial paper can fall sharply if it is downgraded. In early 2001 the supply of A2-rated commercial paper in the United States increased following rating downgrades of some large issuers. Inelastic demand may have been one reason why the spread of A2/P2-rated over A1/P1-rated commercial paper remained high in early 2001 following the increase at the end of 2000, which may have been an end-of-year effect (Chart 115).

Reportedly some issuers found it cheaper to draw down back-up lines than continue issuance. There has been market comment to the effect that lines were not intended to be available to an issuer on demand but were there to provide insurance against market-wide events which made issuance impossible. It has also been suggested that clausuring on back-up lines, which could perhaps have protected banks against idiosyncratic company risk, has weakened in recent years, and that banks may sometimes be unwilling to enforce material adverse change clauses. Where clauses linked to ratings have existed, borrowers have in some instances pre-empted these by drawing down a facility shortly before a downgrade. Even if facilities have a maturity of less than one year, the issuer is often able to draw down a longer-term loan under so-called 'term-out' clauses.

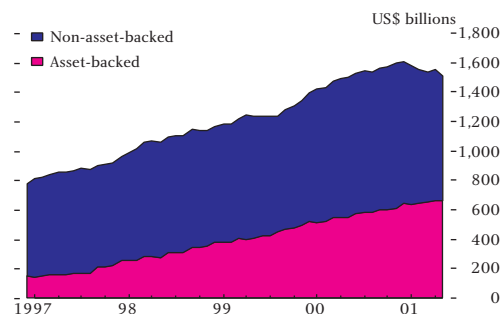
The latest Federal Reserve System Senior Loan Officer Opinion Survey showed that almost all banks in the US believed that back-up lines were under-priced, although most thought profits could be recouped from ancillary or capital markets business with an issuer (Table 14).

#### *Convergence of investment and commercial banking*

A broadly related development is the increasing use of bank loans as a 'bridge' to future bond or equity issues. The December *Review* reported that commercial banks had been using their capacity to lend in order to compete for IPO or bond business with investment banks, which had responded by providing bridge loans themselves. It is now said that investment banks are also under some pressure to provide general corporate credit, especially commercial paper back-up lines. To the extent that they choose to do this business, and of course some may not, systems will be needed to manage the associated credit and liquidity risks.

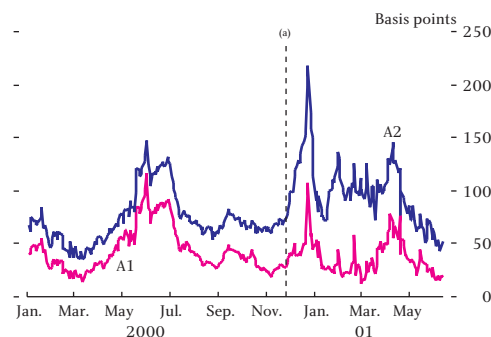
These developments may partly reflect cyclical influences, such as weakness of equity capital markets business and some increased corporate demand for liquidity insurance given current macro and market uncertainties. But it may also reflect structural factors such as consolidation in the commercial banking sector and a greater emphasis on return on capital. Large companies

**Chart 114:**  
**Outstanding commercial paper, including asset-backed**



Source: Board of Governors of the Federal Reserve System.

**Chart 115:**  
**Commercial paper spreads to US treasury bills<sup>(a)</sup>**



Source: Bloomberg.

(a) December 2000 *Review*.



**Table 14:**  
**May 2001 Senior Loan Officer Opinion Survey responses on commercial paper back-up lines**

Profitability	% of respondents <sup>(a)</sup>	%
Profitable on standalone basis	2.3	
Profitable overall <sup>(b)</sup>	77.3	
Unprofitable overall	20.5	
<i>Of which expecting a change in volume over the longer-term:</i>		
	Minor decline	33.3
	Moderate decline	44.4
	Fairly considerable decline	22.2

Source: Board of Governors Federal Reserve System

(a) Based on the 44 firms in the Senior Loan Officer Opinion Survey on Bank Lending Practices providing commercial paper back-up lines.

(b) After taking into account associated business opportunities.

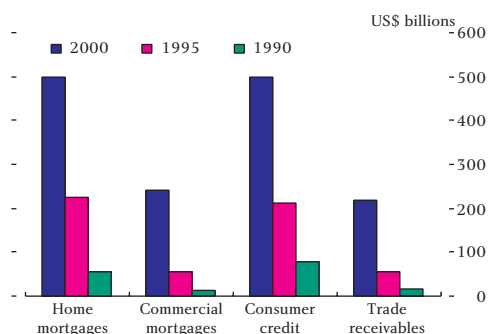
also seem to be reducing the amount they want to borrow from banks while expecting banks and investment banks both to arrange their capital markets financing and to be willing to provide back-up liquidity when needed. While it is too early to tell, investment banking and commercial banking may therefore be converging further, with potential implications for regulators and central banks. In Europe, universal banking has a longer tradition, so this development may be more significant for the large US securities firms and commercial banks.

*Transfer of credit risk from the banking system*

As well as reducing the maturity of their lending, US and European banks are also transferring, often outside the banking sector, a greater proportion of the credit risk on facilities that are drawn down. Arrangers of syndicated facilities say that the amount they seek to retain on their own balance sheet has decreased over the past five years or so. Sales of loans in the secondary market are increasing, including to non-bank investors (see Chart 17 in Section I for developments in the US domestic market). Just under a third of unsecured consumer credit in the US has been securitised (Chart 116). Moody's rated 51 collateralised loan obligations (CLOs) in 2000 compared with 40 in 1999<sup>25</sup>. Large banks have also been purchasing credit protection on individual corporate and sovereign exposures using single name credit default swaps.

Non-bank investors, such as insurance companies, mutual funds and pension funds, have always been exposed to credit risk in other ways, directly via corporate bond holdings and indirectly through investment in bank equities and other capital instruments. An interesting new development, so far apparently

**Chart 116:**  
**Stocks of securitised assets in US market<sup>(a)(b)(c)</sup>**



Source: Board of Governors of the Federal Reserve System.

(a) All values refer to the end of year shown.

(b) Commercial mortgages include multi-family residences.

(c) Proportion of all outstanding loans of this type at end-2000 (proportion of all non-public domestic credit market debt end-2000).

<sup>25</sup> Moody's Investors Services 2000 CDO Review/2001 Preview, 19 January 2001. See also the article by David Rule in this Review.

limited in scope, is the provision of contingent capital to banks by reinsurance companies<sup>26</sup>. For example, a reinsurer might commit to subscribe for new preference shares at a pre-agreed price if bad debts on a bank's portfolio exceed a threshold figure.

The transfer of loan exposures or risk outside the banking system is welcome if it spreads credit risk more widely and the holders are able to manage it sensibly. However, if banks have mainly been able to transfer risk on the better quality credits, the average credit quality of assets remaining on their balance sheet may have deteriorated. Other developments may also have the same effect. First, some banks have moved into relatively risky lines of business, such as leveraged financing and sub-prime consumer lending. Secondly, if corporate borrowers pledge assets with more certain cashflows to back their commercial paper or securitisation programmes, the quality of assets for general creditors, including other banks, may have deteriorated. Moody's data indicate that recovery rates on loans and bonds have fallen since 1997 (Chart 117).

The combination of a shift from direct lending to provision of liquidity insurance and a probable increase in the transfer of credit risk outside the banking sector has probably increased the share of undrawn relative to drawn commitments. This might mean that, in relation to capital, reintermediation could have a greater effect on bank balance sheets if corporate credit quality deteriorated, the liquidity of primary capital markets reduced, or non-bank investors' demand for loans fell.

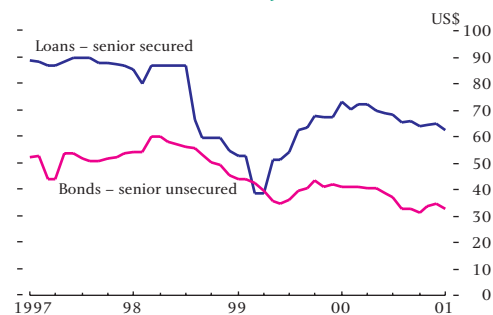
#### Leverage and hedge funds

As the events of 1998 demonstrated, combinations of credit and liquidity risk can sometimes be associated with a crystallisation of market risk. Asset price volatility is more likely to lead to disruptive spillovers if highly leveraged intermediaries become forced sellers. One of the main ways to obtain balance sheet leverage is through sale and repurchase (repo) of securities. Repo financing by US government securities dealers has been increasing over the past six months (Chart 118), and reverse repo lending to non-residents by UK banks has continued steadily – raising the question of what activities are being financed (Chart 119).

Lending to the non-bank private sector in the Cayman Islands, where many hedge funds are domiciled, has also been continuing to increase (Chart 119). Such flows were not certainly associated with hedge fund borrowing – they might, for example, have been purchases of securities issued by SPVs incorporated in the Cayman Islands – but there has recently been considerable growth in the hedge fund industry: according to TASS Research,

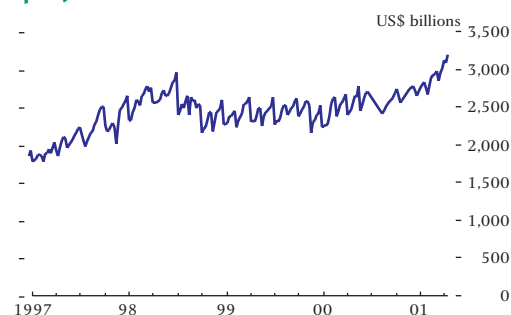
<sup>26</sup>: For example, Swiss Re is reported to have entered into a contingent capital transaction with Royal Bank of Canada in 2000.

**Chart 117:**  
Defaulted bond recovery values



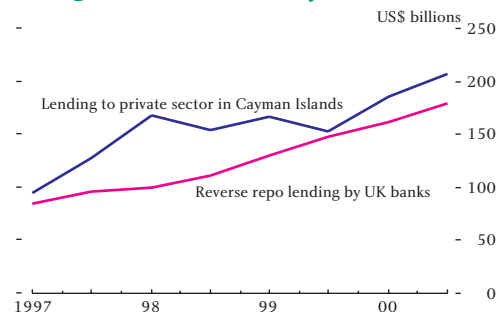
Source: Moody's Investors Service.

**Chart 118:**  
Financing by primary US government securities dealers (repos plus reverse repos)



Source: Federal Reserve Bank of New York.

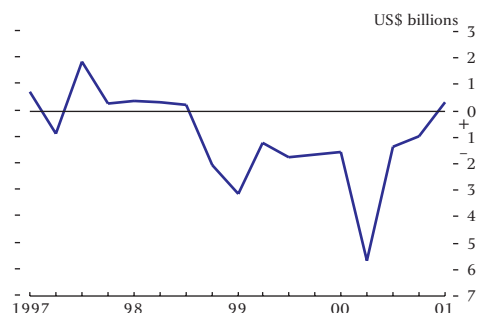
**Chart 119:**  
Lending to the non-bank private sector in the Cayman Islands<sup>(a)</sup> and reverse repo lending to non-residents by UK banks



Sources: BIS and Bank of England.

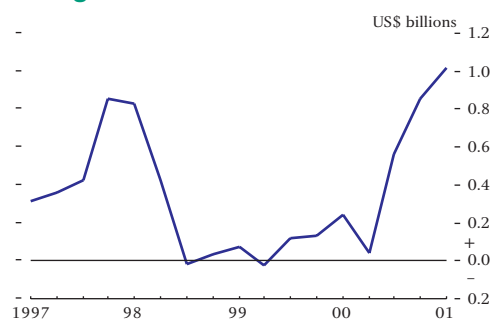
**(a)** Cross-border lending by BIS reporting banks. Total lending to the Cayman Islands during H1 was US\$ 231 billion. Adjusting for risk transfer to the country of ultimate risk, lending to the Cayman Islands was US\$ 186 billion. Adjustments for risk transfer are not available for individual economic sectors.

**Chart 120:**  
**Quarterly inflows into global macro hedge funds**



Source: TASS Research.

**Chart 121:**  
**Quarterly inflows into convertible bond arbitrage**



Source: TASS Research.

US\$6.9 billion was invested in hedge funds in 2001 Q1, the largest quarterly inflow since 1998 Q1 and approaching the US\$8 billion invested in the whole of 2000. Equity market (long/short and market neutral) funds have continued to attract the greatest share of investment. Funds investing in distressed debt – for example, of US, Japanese and some EME companies – also appear to be attracting more investment, but from a smaller base. Flows into global macro funds were positive in 2001 Q1 for the first quarter since the autumn of 1998 (Chart 120).

The population of investors in hedge funds also seems to be broadening to include more pension, insurance and investment funds. The number of ‘alternative investment strategy’ mutual funds has been increasing, typically as ‘funds of funds’, investing in a number of hedge funds. Some international banks and insurance companies have offered investors principal-protection, with the yield typically linked to the return on a fund of hedge funds but with the principal guaranteed – similar products are also said to be offered on some mutual funds. Most are thought to cover their risk exposure by ‘delta’ hedging: investing in the underlying hedge funds in combination with risk-free bonds.

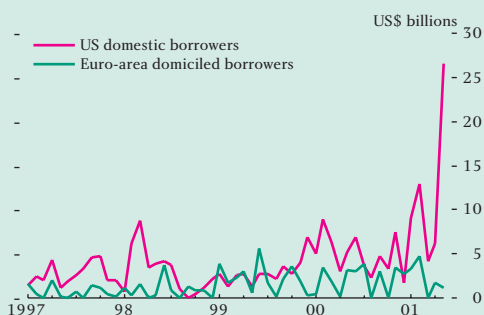
In general, so-called ‘crowded trades’ in which leveraged intermediaries and hedge funds are positioned ‘the same way round’ are said to have been less common in recent years than in the mid-1990s. One possible exception might be convertible bond arbitrage (Box 5). This has been a profitable hedge fund strategy, attracting investors (Chart 121) and contributing to increasing issuance of convertible bonds; sub-investment-grade companies have recently been large issuers in the United States. Funds are said typically to be leveraged around 4 or 5 times, and to have broadly the same types of positions. The strategy involves funds being ‘long equity volatility’ – they gain if equity implied volatility increases but lose if it decreases. Equity volatility rose during 2000 and into 2001, which may help to explain the recent profitability of the strategy. Volatility has fallen back somewhat more recently, but still remains high. The risk that a sudden fall in volatility could cause simultaneous forced sales of convertible bonds seems to be regarded in the market as relatively low. Another possible vulnerability to sudden pressures might be incomplete hedging of interest rate or credit risk on the bonds. Investment banking operations might also be exposed if they were to underwrite high-risk convertible bond issues on the expectation that hedge funds – but maybe no-one else – will buy them. Given the popularity of the trade, it is important that the various possible ways in which the strategy could go wrong are stress tested by intermediaries and investment funds.

## Box 5: Convertible bond arbitrage

A convertible bond gives the bondholder a right to exchange the bond for a predetermined number of shares in the issuing company (exchangeable bonds are similar but the shares are in another company). Convertibles package together a straight bond and an embedded 'out-of-the-money' equity call option. As the bondholder has the option not to convert, the bond portion of the convertible sets a floor to its value.

Since the December *Review*, issuance of convertible bonds in the US has increased (Chart A), perhaps reflecting a combination of falling US bond yields in 2001 Q1 as well as high equity volatility. Some sub-investment-grade issuers, in particular, have been able to issue convertibles even though straight bond and equity markets were effectively closed to them.

**Chart A:**  
**US domestic and international convertible bond issuance**



Sources: Capital Data and SDC Platinum.

Contacts suggests that investment funds, particularly specialist hedge funds, have been large buyers of convertibles. According to published data, at the end of 2001 Q1 a little less than 6 per cent of total hedge fund

assets were invested in convertible arbitrage funds<sup>1</sup>. US hedge funds are said to own around 30 per cent of all convertible bond issues outstanding in the US.

An 'arbitrage' opportunity exists if the call option embedded in the convertible is under-priced. Issuers may be willing to sell call options on their shares in order to raise funds if they are liquidity constrained; or if they think the implied volatility is too high. The strategy involves purchasing the convertible bond and simultaneously selling short the underlying equity. The size of the short position is adjusted dynamically to ensure that it 'delta' hedges changes in the value of the embedded option as the equity price moves. Provided the delta-hedge can be maintained, the arbitrageur should be protected against any decline in the value of the equity. It remains exposed to interest rate and credit risk on the bond, but these can, in principle, be hedged using OTC derivatives such as asset swaps and credit default swaps<sup>2</sup>. A fully hedged position leaves the arbitrageur 'long' volatility – it gains if the implied volatility of the share price increases and loses if it falls.

The arbitrageur is exposed if implied equity volatility falls, leading to a decline in the value of the embedded option. It may face a similar risk if it overpays for the convertible because of miscalculation or poor volatility assumptions. Markets in single stock options are often illiquid, so traders rely on pricing models. There is also a risk of the cost of maintaining a hedge increasing. For example, an equity may become more expensive to borrow to cover the short sale if, for example, the issuer is subject to a hostile take-over bid. The arbitrageur may be exposed if it chooses not to hedge fully the interest rate or credit risk on the bond. For example, returns on convertible bond arbitrage funds were negative in 1994, when US interest rates increased unexpectedly. There may also be exposures to counterparty credit risk on these various OTC hedging transactions.

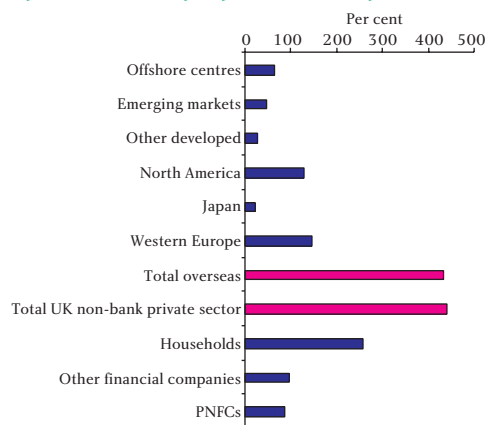
**Table A:**  
**Risk assessment of convertible bond arbitrage (buy convertible bond; sell equity short; buy protection using credit default swaps; buy an asset swap)**

	Investor wins (loses) on...	Investor loses (wins) on...
Equity price falls (rises)	Short stock position	Long convertible position
Credit spreads rise (fall)	Credit default swap	Long convertible position
Interest rates rise (falls)	Purchased asset swap	Long convertible position
Equity implied volatility rises	Long convertible bond position	
Equity implied volatility falls		Long convertible bond position

<sup>1</sup>: TASS Research.

<sup>2</sup>: In an asset swap, the fund would agree to pay a counterparty the fixed interest payments on the convertible bond and receive floating rate payments linked to LIBOR plus (or minus) a fixed spread.

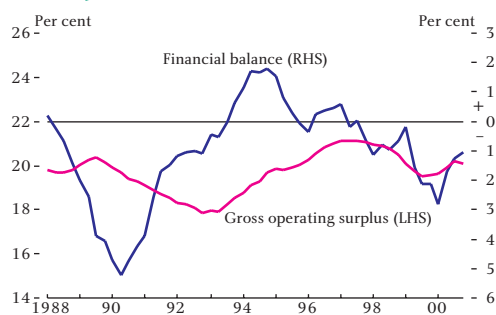
**Chart 122:**  
UK-owned banks' domestic and overseas exposures as a proportion of capital<sup>(a)</sup>



Source: Bank of England.

(a) Data are for December 2000. Total overseas exposures include inter-bank.

**Chart 123:**  
PNFCs' profits and financial balance<sup>(a)(b)</sup>

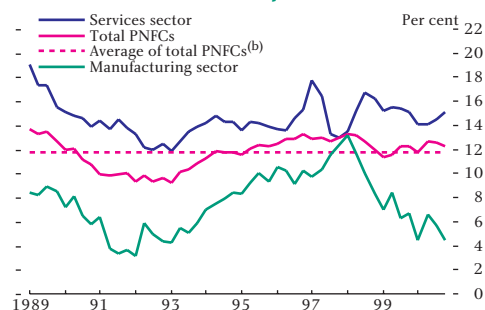


Source: ONS.

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

(b) Data show a four-quarter, backward-looking moving average.

**Chart 124:**  
Net rate of return on capital of PNFCs<sup>(a)</sup>



Sources: ONS and Bank of England.

(a) Net operating surplus, divided by net capital employed.

(b) Average is from 1989 Q1 to 2000 Q4.

## VII UK corporate and personal sectors

The domestic exposures of UK-owned banks are broadly similar in size to their total international loan exposures (Chart 122). This section switches the focus to the United Kingdom. The overall assessment of the UK corporate and household sectors does not suggest a high level of financial risk, although the imbalances in the economy may, if they persist, create some risks looking further ahead.

### The corporate sector

Last December's *Review* concluded that the vulnerability of the corporate sector to a rise in interest rates or some other shock had increased. Since then, slowing growth has further constrained profitability, especially in manufacturing, and profit warnings have increased. The underlying financial deficit has fallen back somewhat and the growth of bank borrowing has eased, but debt remains high relative to trading profits. Balance sheet indicators present a mixed message on capital gearing, while income gearing remains low historically, mainly because of the level of interest rates. Liquidity is generally still relatively high.

#### *Profitability and the macroeconomic environment*

GDP growth declined from 3.2 per cent in 2000 Q1 on the same quarter a year earlier to 2.6 per cent in 2001 Q1; and, according to the modal projection of the Bank's Monetary Policy Committee in the May *Inflation Report*, is likely to fall a little further during 2001. The Foot and Mouth epidemic<sup>27</sup> is likely to have a relatively modest impact on growth, but it may nevertheless increase credit risk in those sectors particularly affected (agriculture, tourism and leisure).

Slower GDP growth may constrain firms' profitability and financial position. There was a renewed fall in the gross operating surplus of private non-financial companies (PNFCs) in 2000 Q4, excluding the alignment adjustment in the national accounts. A smoothed measure of the financial balance shows a reduction in the deficit in 2000 Q4 to around 1 per cent of GDP (Chart 123). A large part of this change reflected a fall in dividends.

The rate of return on capital of PNFCs (net of depreciation) fell slightly in 2000 Q4. Profitability in manufacturing companies is much lower, relative both to its own level in the past and also in relation to other sectors (Chart 124), partly reflecting the persistently high sterling effective exchange rate. The slowdown in US growth will affect the profitability of UK companies both directly through their activity in the United States and indirectly through lower demand in the United Kingdom. Just under one fifth of FTSE-350 companies derived at least 40 per cent of their

<sup>27</sup>: See page 19, *Inflation Report*, May 2001.

turnover from the United States in 1999/2000. Against this background, it is perhaps not surprising that the frequency of profit warnings has risen since the December Review. Consensus forecasts for profits in 2001 fell during 2000, but forecasts for 2002 are currently higher than for 2001 and not far below the level implied by the average profit growth since 1993 (Chart 125). So the recent rise in profit warnings may reflect adjustment from earlier optimistic expectations for earnings growth, rather than an absolute weakening of corporate profitability.

The rate of company insolvencies recorded by the Department of Trade and Industry (DTI) has fallen almost continuously since its peak in 1992, to an annual level of around 1 per cent of active registered companies in 2001 Q1. The Dun and Bradstreet measure of business failures, which includes both incorporated and unincorporated businesses, fell by nearly 6 per cent in Q1. But bad trade debts, according to the Euler Trade Indemnity Survey, rose by around 7 per cent in 2001 Q1. This survey also suggests that risks from trade credit may have increased since the December Review, with a further rise in Q1 in delays of payments to suppliers across all sectors, and continued high growth in payment delays from domestic customers.

#### External financing, capital gearing and income gearing

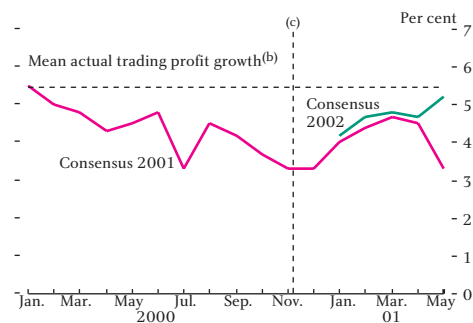
The slowing in the economy comes after a period in which PNFCs' debt had risen to historically high levels in relation to trading profits (Chart 126). This may conceivably have raised the external finance premium; and it may have been one factor behind the sharp increase in the number of rating downgrades this year (Chart 127).

Other measures of corporate indebtedness present a mixed picture. Capital gearing on a replacement cost definition fell marginally in 2000 Q4, but remains close to the highest levels recorded over the past 30 years (Chart 128). The growing difficulty of measuring assets in company balance sheets may make debt in relation to the market value of capital a more relevant measure of balance sheet strength. But although this measure might appear less worrying, it relies on current market values being sustainable (see Section II). The recent rise in gearing (on both measures) may be an adjustment to lower interest rates and a more stable macroeconomic environment, rather than a sign of incipient financial fragility. It has not led to significantly greater difficulties in companies' ability to service debt. Income gearing – the ratio of interest payments to pre-tax profits – has risen a little recently but remains low in relation to historical experience (Chart 129).

#### Liquidity

Further rises in capital and income gearing may not imply greater risk of default if companies have liquid assets that could

**Chart 125:**  
PNFC profit growth forecasts for 2001/2002<sup>(a)</sup>



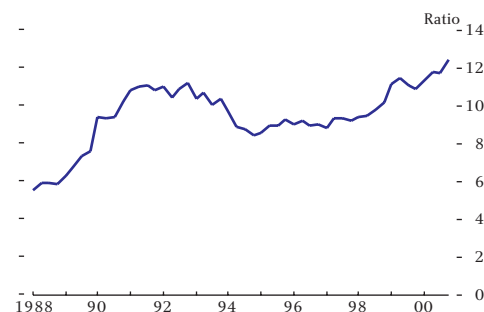
Sources: Consensus Forecasts and Bank of England.

(a) Average percentage change on previous year.

(b) Average annual growth rate of non-oil company trading profits from 1993 to 2000.

(c) December 2000 Review.

**Chart 126:**  
PNFCs' debt-to-profits ratio<sup>(a)(b)</sup>

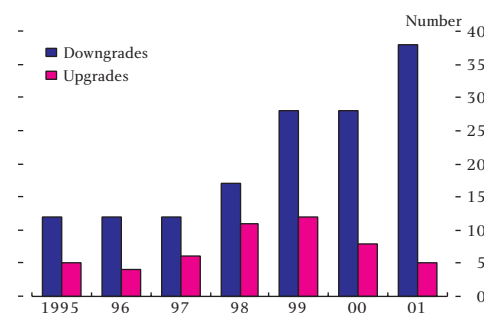


Sources: ONS and Bank calculations.

(a) Seasonally adjusted.

(b) Ratio of gross debt to operating profits.

**Chart 127:**  
Number of Moody's ratings changes<sup>(a)</sup>

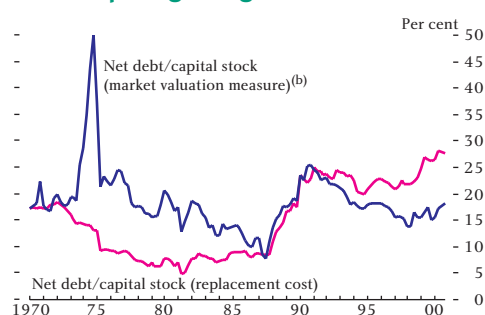


Source: Moody's Investors Service.

(a) 2001 figures are estimates based on the total for the first five months of the year at an annual rate.



**Chart 128:**  
**PNFCs' capital gearing<sup>(a)</sup>**

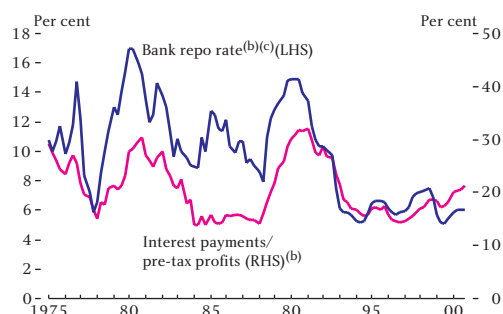


Source: ONS.

(a) Seasonally adjusted.

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

**Chart 129:**  
**PNFCs' income gearing<sup>(a)</sup>**



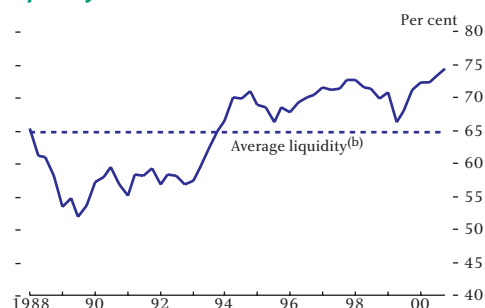
Source: ONS.

(a) Seasonally adjusted.

(b) Data are quarterly averages.

(c) Or equivalent in earlier periods.

**Chart 130:**  
**Liquidity of PNFCs<sup>(a)</sup>**



Sources: ONS and Bank of England.

(a) Liquidity ratio is sterling and foreign currency deposits and money market instruments (MMIs), divided by sterling and foreign currency short-term bank and building society lending and MMI liabilities.

(b) Average from 1988 Q1 to 2000 Q4.

be used to service or repay debt if necessary. National accounts data cannot easily be translated into measures of corporate liquidity, but the ratio of total corporate sector short-term deposits to an estimate of short-term bank lending rose further in 2000. On this measure, liquidity remains well above the average of the most recent ten years (Chart 130). But deposit growth has fallen in recent months. Lending growth has remained robust in services and real estate/construction; the manufacturing sector made net repayments of bank debt in 2000 Q4 and 2001 Q1.

Over the longer term, high aggregate liquidity since the early-1990s contrasts with low liquidity in the mid-to-late 1980s, when the debt-income ratio, capital gearing and income gearing all rose to high levels. Combined with low income gearing, this implies that the corporate sector in aggregate should be better placed than in the late 1980s to absorb the impact of unexpected declines in income or cash flow.

#### *Dispersion in corporate performance*

Aggregate data may, however, mask underlying developments. Previous *Reviews*<sup>28</sup> have noted a sharp widening in the dispersion of UK corporate financial performance in recent years. Table 15 shows profit margins for smaller quoted companies, larger quoted companies, and old and new economy sectors. The least profitable tenth percentile of quoted companies in 1999 was concentrated in the smaller quoted company and new economy sectors. Available information for 2000 (covering around 80 per cent of listed companies) suggests a modest decline in sales-weighted profitability at the tenth percentile (Chart 131); a further increase in the dispersion of liquidity, associated entirely with higher liquidity at the top of the distribution; and a marked increase in the dispersion of capital gearing (Chart 132). At the highest decile, the changes in net gearing largely reflect rising

**Table 15:**  
**Operating Profit Margins (1999) by types of firms<sup>(a)(b)</sup>**

Percentile	All quoted firms	Smaller quoted	Larger quoted	New economy	Old economy
10th	-11.6	-18.6	2.2	-15.3	-10.8
50th	7.5	5.9	11.9	7.9	7.5
90th	20.8	17.5	25.9	19.9	21.0

Source: Thomson Financial Datastream and Bank of England.

(a) The OECD definition of new economy firms includes firms operating in information and communication technology sectors, specifically with the following SIC codes: 3000, 3130, 3210, 3220, 3230, 3320, 3330, 516, 6420 and 7133. Old economy firms are defined as all other non-financial firms.

(b) Profit margin is earnings before interest and taxes divided by turnover.

<sup>28</sup> Benito, A and Vlieghe, G, 'Stylised facts on UK corporate financial health: evidence from micro data', *Financial Stability Review*, June 2000, 83-93 and *Financial Stability Review*, December 2000, 67.

gross debt, whereas at the lower percentiles they are largely accounted for by increased cash holdings.

National accounts data for 2000 Q4 suggest that, in aggregate, companies have reacted to the build-up of debt by reducing dividend payments. Company accounts data for 2000 show that over 19 per cent of quoted companies cut their dividends, compared with a 25-year average of about 12 per cent. A further 30 per cent of quoted companies paid no dividend at all last year, against a 25-year average of just under 13 per cent (Chart 133). There are several possible explanations for these developments.

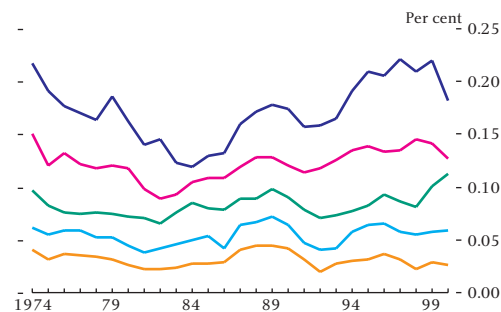
Recent changes to the tax treatment of dividends may have encouraged companies to distribute returns to shareholders in different ways. But this cannot explain the increasing tendency to omit dividends over a longer period. Another possible explanation is increased financial fragility. Or, alternatively, it could signal a desire to retain more earnings to finance future investment at rates of return that at least match those more generally available to shareholders. The increases in dividend omission in the recessions of the early 1980s and early 1990s were attributable largely to companies that had previously paid dividends and reflected financial fragility. But the more recent rise in dividend omission is mainly attributable to companies that have never paid dividends and may therefore be more structural in nature (Chart 133). Bank discussions with FTSE-350 companies suggest that they increasingly regard dividends as one among several components of total shareholder compensation. Share buy-backs have become more popular, increasing in value from £2.5 billion in 1997 to £8.4 billion in 2000, although this remains small compared with total dividend payments of £56 billion.

Disaggregated data, then, continue to show evidence of wide dispersion of financial strength among sectors, with a further deterioration in the performance of the externally-exposed industrial sector combining with continuing growth in services. In these circumstances, the corporate sector may again have become more vulnerable to an unexpected fall in income or cash flow, partly because the more benign aggregate indicators are masking increasing divergences within the sector. The implications for banks remain limited, however, because bank loans appear not to be concentrated among the more vulnerable companies.

### The commercial property sector

The commercial property sector has been a material source of loss to banks in the past. A substantial fall in property prices adversely affects banks by reducing the net worth of PNFCs and by increasing the probability of default of real estate investors, as

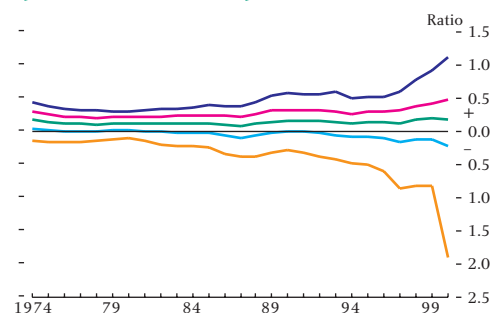
**Chart 131:**  
Distribution of weighted operating profit margins of quoted PNFCs<sup>(a)(b)(c)</sup>



Sources: Thomson Financial Datastream and Bank of England.

- (a) 90th, 75th, 50th, 25th and 10th percentiles shown.
- (b) Earnings before interest and taxes divided by turnover; sales weighted.
- (c) Data for 2000 are provisional estimates, based on 1,103 company accounts. The sample size reflects available information.

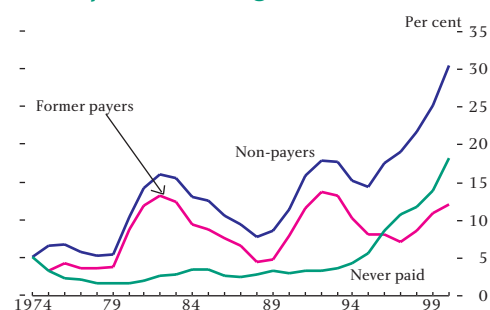
**Chart 132:**  
Distribution of capital gearing at replacement cost of quoted PNFCs<sup>(a)(b)(c)</sup>



Sources: Thomson Financial Datastream and Bank of England.

- (a) 90th, 75th, 50th, 25th and 10th percentiles shown.
- (b) Net debt divided by capital stock at replacement cost.
- (c) Data for 2000 are provisional estimates, based on 1,075 company accounts. The sample size reflects available information.

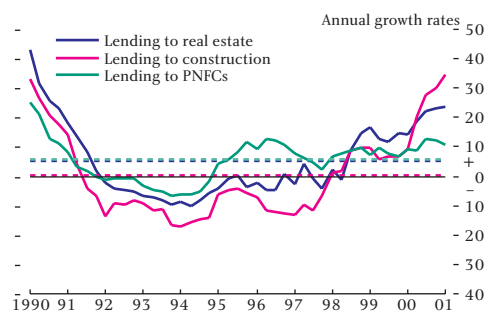
**Chart 133:**  
UK companies omitting a dividend<sup>(a)</sup>



Sources: Thomson Financial Datastream and Bank of England.

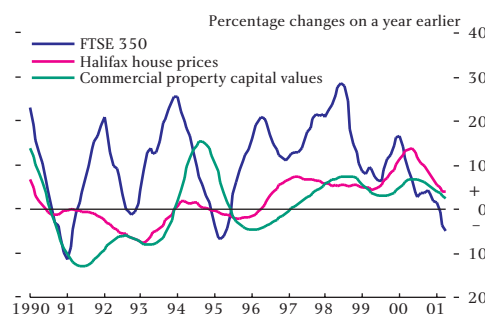
- (a) Data for 2000 are provisional estimates, based on 1,102 company accounts. The sample size reflects available information.

**Chart 134:**  
**Lending to real estate, PNFCs and construction<sup>(a)(b)(c)</sup>**



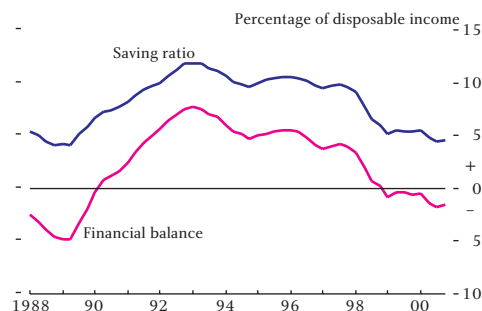
Source: Bank of England.  
**(a)** Not seasonally adjusted.  
**(b)** Lending to PNFCs includes banks' holdings of securities, but lending to real estate and construction do not.  
**(c)** Dashed lines indicate respective averages, from 1990 Q1 to 2001 Q1.

**Chart 135:**  
**Asset values**



Sources: Investment Property Databank, Halifax and Thomson Financial Datastream.

**Chart 136:**  
**UK household saving ratio and financial balance<sup>(a)(b)</sup>**



Sources: ONS and Bank of England.  
**(a)** Seasonally adjusted.  
**(b)** Data are a four-quarter, backward-looking moving average.

well as reducing the value of a standard form of collateral for loans not directly related to property.

Annual growth in bank lending to real estate was over 23 per cent in both 2000 Q4 and 2001 Q1, a marked increase on a year earlier and well above the growth of lending to PNFCs in aggregate (Chart 134). Loans to construction rose by 35 per cent in the year to 2001 Q1, coinciding with strong growth in public expenditure<sup>29</sup>. The acceleration in bank lending to the property sector has occurred in an environment of low and stable borrowing costs relative to property yields and continuing difficulties in raising capital market finance by property companies trading at discounts to net asset value. An apparent low willingness to lend on a speculative basis (compared with the late 1980s), reported by market contacts and discussions at the Property Forum hosted by the Bank, may provide some comfort<sup>30</sup>. But the same contacts also report more aggressive lending by some institutions and an increase in residual value risk<sup>31</sup>.

The December *Review* reported a combination of strong tenant demand and tight supply, consistent with the lowest vacancy rates since the 1980s. But there are indications that the balance of demand and supply is changing. Demand in London and the M4 corridor may be particularly sensitive to a slowdown in the United States. Data on take-up of City offices suggest a weakening in Q2, and market contacts confirm a weakening of demand more generally. On the supply side, new orders placed for commercial properties rose by about 16 per cent in 2001 Q1. There has also been a marked increase recently in City offices planned but not started.

These changes in demand and supply have been associated with a slowing of capital value growth (Chart 135). Annual growth in retail capital values has been negative in 2001 for the first time since 1996. Total capital values rose by less than 1.5 per cent in the year to April 2001, down from around 7 per cent in the year to April 2000.

Greater availability of finance, and perceived low nominal funding costs relative to the past, may also encourage supply, putting further downward pressure on capital values and so potentially weakening the balance sheet of the corporate sector in general. The potential exposure of UK banks to property might also increase if real estate investors take on more debt because they have unrealistic assumptions of continuing rises in capital

<sup>29</sup>: Although lending for construction includes some commercial property activity, it also covers activities such as construction under government contracts, private civil engineering projects and construction for residential property.

<sup>30</sup>: See *Financial Stability Review*, November 1999, 72, for a description of the Property Forum.

<sup>31</sup>: The risk that the value of outstanding debt does not cover the market value of the property at the contractual maturity date.

values. These factors taken together suggest some rise in financial risks from the commercial property sector since the *December Review*.

## The household sector

Like the corporate sector, the household sector has continued to run a significant underlying financial deficit; secured and unsecured debt-income ratios have risen further. Balance sheet and debt-service indicators appear more benign, underpinned by earlier increases in wealth and lower interest rates. Disaggregated data are more reassuring than in the corporate sector. Overall, however, developments since the *December Review* reinforce the conclusion that continued rapid growth in household borrowing has somewhat increased the sector's vulnerability to an economic downturn or market correction, or an increase in interest rates.

### *Saving and the household sector financial balance*

The household sector saving ratio rose in 2000 Q4. However, part of the rise reflected erratic income flows; smoothing these, the underlying saving ratio was close to 4 per cent, compared with its post-1988 low of 3.4 per cent in 2000 Q3. The household sector has been running a financial deficit since 1998 Q2, which (on a smoothed estimate) amounted to 1.5 per cent of disposable income in 2000 Q4 (Chart 136).

### *Debt-income ratios*

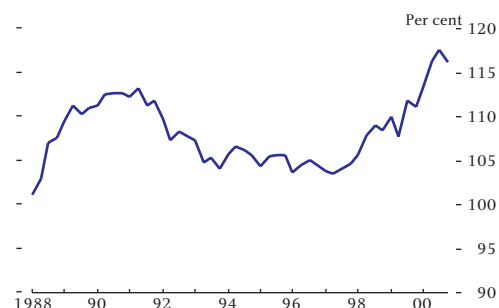
Household wealth-income ratios have risen almost continuously since 1996 and have been accompanied by a sustained rise in the debt-income ratio to historical highs (Chart 137). As noted in the *December Review*, debt-income ratios have been increased by the substantial rise in the share of mortgages repaid through endowment policies in the mid-1980s. But, other things being equal, the subsequent fall in this share will tend to reduce debt-income ratios over the next two decades.

### *Unsecured debt*

While secured debt dominates, the ratio of unsecured debt to income has risen rapidly since 1994 from under 12 per cent to around 20 per cent in 2000 (Chart 138). This reflects increases in both credit card and other unsecured lending (Chart 139). Growth in credit card outstandings in part reflects the increased use of cards as a payment medium. But, over the past year, there has been a greater rise in interest-bearing balances (Chart 140), and the average life of credit card debt has also risen (Chart 141). The average life of other unsecured consumer loans has also risen over the past three years (Chart 142).

The decision by households to make greater use of unsecured credit, and over longer periods, will have been driven in part by the more attractive terms that have been offered in a competitive market. According to banks, past experience suggests that credit card debt and other unsecured personal lending are more likely

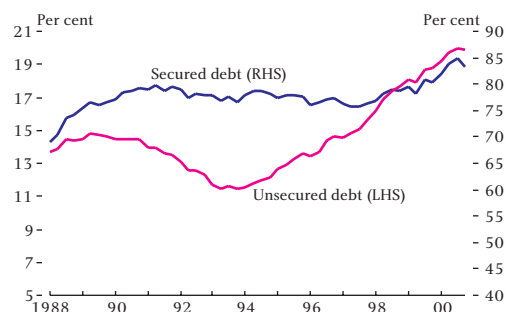
**Chart 137:**  
UK household sector debt-to-income ratio<sup>(a)</sup>



Source: ONS.

(a) Gross debt as a percentage of disposable income.

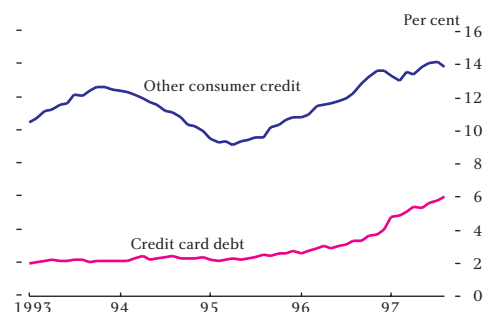
**Chart 138:**  
Household sector secured and unsecured debt-to-income ratios<sup>(a)</sup>



Sources: ONS and Bank of England.

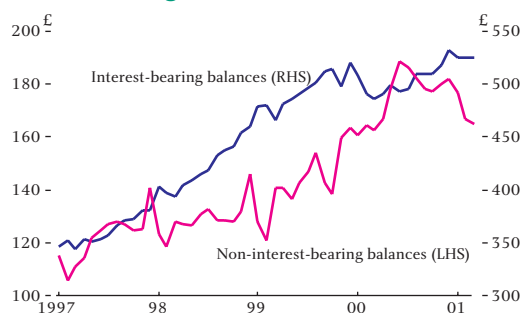
(a) Percentage of disposable income.

**Chart 139:**  
Other consumer credit and credit card debt as a percentage of post-tax income



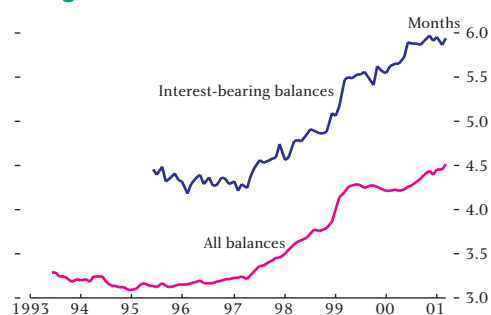
Sources: ONS and Bank of England.

**Chart 140:**  
Average non-interest-bearing and interest-bearing credit card balances



Sources: BBA and Bank of England.

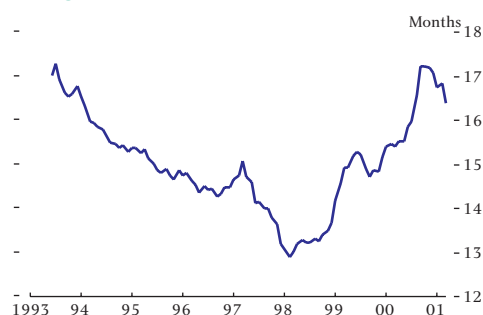
**Chart 141:**  
Average life of consumer credit card debt<sup>(a)</sup>



Sources: BBA and Bank of England.

(a) Average life is the average turnover of debt, estimated by the stock of debt divided by new credit extended, using data which are three-month averages.

**Chart 142:**  
Average life of other consumer credit<sup>(a)</sup>



Source: Bank of England.

(a) Average life is the average turnover of debt, estimated by the stock of debt divided by new credit extended, using data which are three month averages.

to default in times of financial stress than secured lending. Default rates on credit cards have risen since 1999.

### Housing

That part of lending secured on housing but not used to fund investment in housing is called mortgage equity withdrawal (MEW). This adds to unsecured borrowing to augment the resources available for consumption or investment in financial assets. MEW in 2000 Q4, in relation to total household resources, was however well below its peak in 1988. A recent survey carried out by MORI for the Bank and the Council of Mortgage Lenders found that the majority of households who withdrew equity between June 1998 and September 2000 used the proceeds for home improvements, furnishings, appliances etc<sup>32</sup>.

If buyer expectations about future house prices or future income proved to be unrealistic, households might find they had taken on more mortgage debt than prudent. Advance-to-income ratios have risen, for both first-time buyers and existing owner-occupiers, moving house since the previous *Review*, to historically high levels (Chart 143). Although advance-to-income ratios for all buyers have risen across the whole of the UK since 1998 Q3, loan-to-value ratios have fallen almost continuously from 1996 (see Section VIII). This probably reflects house prices rising more rapidly than income, rather than a tightening of credit conditions in the mortgage market, although the house-price-to-earnings ratio is close to its long-run average (Chart 144).

### Capital and income gearing

Although household debt is historically high relative to income, capital and income gearing remain relatively low, implying that households are not over-indebted in relation to their balance sheets, at least provided capital values and incomes are broadly maintained. Capital gearing has risen a little since the previous *Review* (Chart 145), but past increases in equity and house prices have kept gearing low. Prospects depend on the outlook for both equity and house prices.

Recent low income gearing reflects low nominal interest rates and robust household income growth. Income gearing in 2001 H1 is likely to fall further following the MPC's recent reductions in interest rates (75bp since the December *Review*), although this effect will be offset to some degree by rising gross debt. The interest rate effect may also be limited because recent cuts in rates have not yet been fully reflected in average mortgage rates<sup>33</sup>. Average mortgage rates being paid by borrowers in aggregate are likely to fall further as more borrowers transfer to new lower

<sup>32</sup>: For further details see the article in the *Bank of England Quarterly Bulletin* by Melissa Davey, 'Mortgage equity withdrawal and consumption', Spring 2001 100-103.

<sup>33</sup>: *May Inflation Report*, page 9.



standard variable rates, and as recent cuts in the Bank's repo rate are passed through.

Evidence from the British Household Panel Survey (BHPS) also provides a reassuring picture of mortgage income gearing (see Table 16). Income gearing fell across all deciles of the distribution in 1999. Over the whole of the 1990s, the fall has been most marked among heavily geared households. But nominal measures of mortgage debt service costs do not take into account movements in the real cost of servicing a mortgage, and so do not necessarily mitigate concerns over rising debt-income ratios.

**Table 16:**  
**Distribution of mortgage income gearing (per cent)<sup>(a)(b)</sup>**

Year	10th	30th	50th	70th	90th
1992	5.5	9.9	14.8	21.3	38.3
1994	5.0	9.0	12.8	18.2	31.2
1996	5.3	9.0	12.5	17.4	28.3
1998	6.2	10.4	14.3	19.4	29.4
1999	5.5	9.0	12.6	17.2	29.0

Sources: British Household Panel Survey and Bank of England.

(a) Data for some years have been omitted for space reasons.

(b) 10th, 30th, 50th, 70th and 90th percentiles shown.

### Bankruptcies and distress

Given the recent strength of the economy, it is perhaps unsurprising that house possessions have continued to fall from already low levels. The number of new bankruptcies, including voluntary arrangements, has remained around 7,000 since 1998, compared with a peak of just below 11,000 in 1993 Q1. The BHPS survey also provides indicators of financial mortgage

**Table 17:**  
**Indicators of mortgage financial distress (%)<sup>(a)</sup>**

Year	Payment problems <sup>(c)</sup>	Arrears of 2 or more months <sup>(b)</sup>	Payment required borrowing <sup>(c)</sup>	Payment required cutbacks <sup>(c)</sup>
1992	16.2	3.8	2.3	13.4
1994	10.6	2.5	1.3	8.4
1996	7.2	1.3	1.2	6.0
1998	7.0	0.9	1.4	5.8
1999	6.1	0.9	1.1	4.6

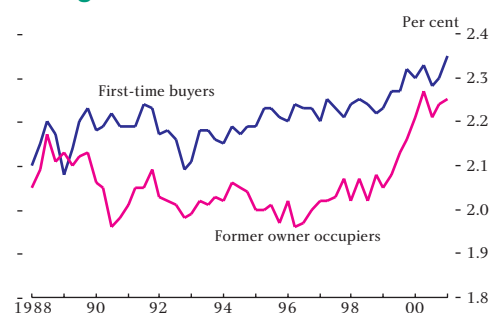
Sources: British Household Panel Survey and Bank of England.

(a) Data for some years have been omitted for space reasons.

(b) Percentage of those renting or with a mortgage.

(c) Percentage of those with payment problems.

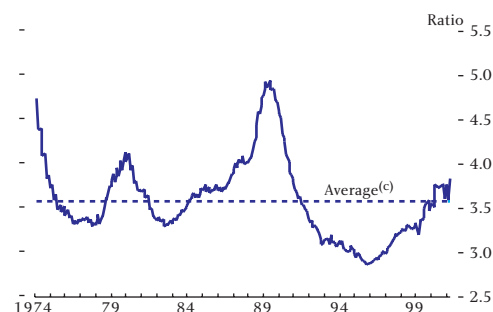
**Chart 143:**  
**Average advance-to-income ratios in the housing market<sup>(a)</sup>**



Source: Council of Mortgage Lenders.

(a) Data prior to 1992 are for building societies. Thereafter they cover all lenders.

**Chart 144:**  
**House price-to-earnings ratio<sup>(a)(b)</sup>**



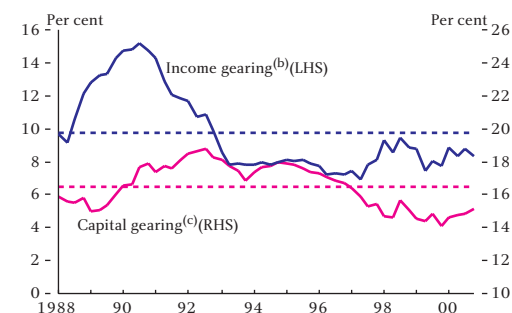
Sources: Halifax and ONS.

(a) Data for April 2001 are provisional.

(b) Halifax house prices divided by ONS whole economy earnings, seasonally adjusted.

(c) Average from January 1985 to April 2001.

**Chart 145:**  
**Household sector income and capital gearing<sup>(a)</sup>**



Sources: ONS and Bank of England.

(a) Dashed lines indicate respective averages from 1988 Q1 to 2001 Q1.

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

(c) Capital gearing is total liabilities as a percentage of total financial assets plus housing wealth.



distress across households. The proportion of households who had mortgage arrears of two months or more, or payments problems, fell to 7 per cent in 1999 from 8 per cent in 1998 and 20 per cent in 1992 (Table 17).

## Risks to the outlook

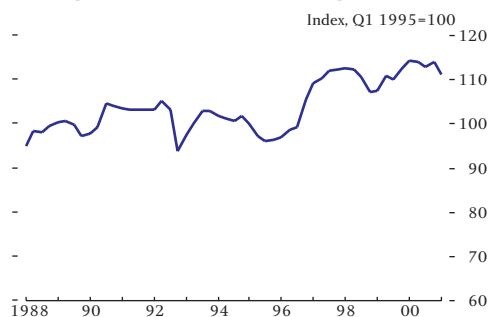
As described above, the balance sheets of both the corporate and household sectors, in aggregate, seem to be robust at the moment, notwithstanding an extended period of rapid debt accumulation (Charts 126 and 137). A forward-looking view needs, however, to take account of how prospective developments in the economy might affect sectoral balance sheets. The imbalances which have for a while characterised the economy are relevant in this context since, as discussed by the Monetary Policy Committee<sup>34</sup>, they seem set to persist. Final domestic demand has grown more rapidly than the economy's productive capacity for some while. If robust household spending were to continue, it may well be accompanied by continuing high rates of borrowing, but in an environment where output and so income growth are expected to slow at some stage and where domestic demand will itself eventually need to slow, it would seem prudent for bankers and households to take this into account.

The counterpart to above-trend domestic demand growth has for a while been, and is likely to continue to be, an increasing negative contribution to output growth from net trade. This will tend to increase the pressure on, and so – other things being equal – raise credit risks in those parts of the corporate sector which are exposed to external competition; for example, manufacturing, where output has recently been falling. Whether adjustment to these imbalances, including possibly via sterling's exchange rate (Chart 146), occurs smoothly over time or abruptly will be important to the management of risks in the corporate and financial sectors.

For the economy as a whole, these developments have entailed growing net external liabilities from cumulative current account deficits. It is potentially helpful in this respect that the composition of the UK's external balance sheet would seem to imply falling net external liabilities if sterling were to depreciate, as it has recently against the dollar<sup>35</sup>.

**Chart 146:**

### Sterling real effective exchange rate<sup>(a)</sup>



Sources: ONS and Thomson Financial Datastream.

(a) Exporters' real exchange rate measure: the relative price of tradeable goods and services in common currency.

<sup>34</sup>: See for example the Minutes of the Monetary Policy Committee meeting 9-10 May, and 5-6 June 2001.

<sup>35</sup>: See Senior, S and Westwood, R (2000): 'The external balance sheet of the United Kingdom: implications for financial stability?' *Bank of England Quarterly Bulletin*, November, pp 351-364.

## VIII UK banking sector

Against the background of developments in the international and domestic environments discussed in Sections I – VII, this section discusses the potential implications for the UK financial system. The banking system has exposure to market risk and sizeable claims on overseas counterparties and borrowers, and would therefore be directly affected by any further deterioration in the world economy and associated asset market movements. For UK-owned banks, exposures to the UK private sector are also especially significant<sup>36</sup>. While Section VII highlighted possible areas of stress, in general the financial position of the UK corporate and personal sectors appears relatively robust. Published data paint a picture of a domestic banking system both profitable and well capitalised, but, looking forward, the operating environment now seems likely to be more difficult than it did six months ago.

### Credit risk<sup>37</sup>

One of the challenges in undertaking macroprudential analysis of the UK banking system is how and where to make distinctions between UK-owned banks and UK-resident banks, where the latter also include foreign banks operating in the UK via subsidiaries or branches – at end-March 2001, they accounted for just over 55 per cent of total UK-resident banks' assets<sup>38</sup>. A focus on the UK-owned sector is important given its central role in domestic financial intermediation. However, a wider perspective on UK-resident banks, and so including foreign-owned banks, is also needed, given London's significance in international financial markets<sup>39</sup>. The pattern of the two groups' exposures differs quite materially, although data limitations make some direct comparisons difficult (see Box 6).

UK-resident banks' lending has continued to grow rapidly, at around 15 per cent per annum, in recent months. A modest slowing in domestic lending has been offset by strong lending to overseas residents<sup>40</sup>, so that the overall banking sector's balance sheet has been growing faster than both M4 (broad) money and M4 lending, which by contrast are the focus of the Bank's analysis of the banking data for monetary policy purposes (Chart 147)<sup>41</sup>.

<sup>36</sup>: Though this will vary by bank; some individual UK-owned banks, notably HSBC and Standard Chartered, have an especially large proportion of their assets in overseas operations.

<sup>37</sup>: The analysis in this sub-section is confined to *on-balance sheet* exposures and therefore excludes counterparty risk on off-balance sheet contracts. Securitised assets are not included.

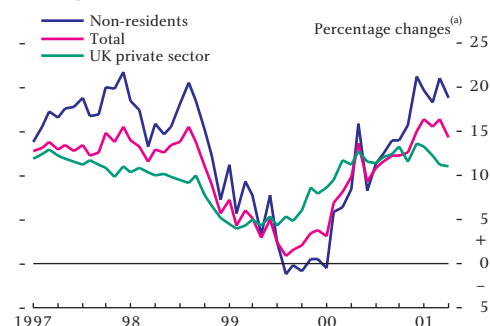
<sup>38</sup>: See also Box 6 in the December 2000 *Review*, p.84-5.

<sup>39</sup>: Foreign banks also have a 30 per cent share of UK residents banks' lending to the UK private sector.

<sup>40</sup>: Lending to the UK private sector and to non residents accounted for 37 per cent and 44 per cent of total lending respectively as at end-April 2001. These data are unconsolidated and include lending to subsidiaries and branches — see Box 6 for details.

<sup>41</sup>: See also Andrews, P and Power, J (2001) 'Explaining the difference between the growth of M4 deposits and M4 lending: implications of recent developments in public finances', *Bank of England Quarterly Bulletin*, Summer, p.183-188.

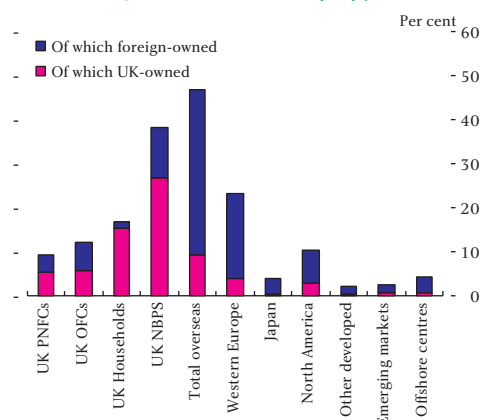
**Chart 147:**  
UK-resident bank and building society lending



Source: Bank of England.

(a) Twelve-month growth rates, all currencies. Claims on non-residents include lending to banks outside the UK banking sector and exclude official transactions by the Bank of England.

**Chart 148:**  
UK banking sector assets by type<sup>(a)</sup>



Source: Bank of England.

(a) As per cent of total assets. Data for end-December 2000. See Box 6 for definitions. Excludes lending to UK public sector and to other UK banks. NBPS: non-bank private sector.

## Box 6: Measuring UK banks' on-balance sheet exposures

It is difficult to measure on a consistent basis the on-balance sheet exposures<sup>1</sup> of UK-owned banks and of the total UK banking sector (UK-resident banks), because data are drawn from a variety of sources. This Box sets out the approach adopted in this *Review*.

### Domestic exposures

Data used here for UK-owned and UK-resident banks cover on-balance sheet claims on the UK non-bank private sector. Figures for inter-bank exposures are excluded from Charts 148 and 149 because they include intra-group flows, which are not strictly exposures, but cannot be separated. Exposures to UK residents of the foreign offices of UK-owned and UK-resident banks are also excluded.

### Overseas exposures

**UK-owned banks** – Data (Charts 149, 150 and 151) are collected on a worldwide consolidated basis (ie exclude intragroup flows), and cover on-balance sheet claims only. Because local currency claims of local offices are not reported by type of counterparty, exposures to banks cannot be completely differentiated from exposures to other counterparties. And because no exposures (other than local currency claims of local offices) are reported by currency breakdown, cross-border exposures in domestic currency cannot be distinguished from those denominated in other currencies.

The measure of overseas exposures used in Charts 149, 150 and 151 is calculated as follows (using the United States as an example):

- Outstanding exposures to US-located entities (excluding local currency exposures of UK-owned banks' US offices). Broken down by counterparty: bank; public sector; and non-bank private sector;
- *minus* 'outward risk transfers'<sup>2</sup> – exposures to US-located entities that are owned or guaranteed by a non-US-owned group. Split by bank/non-bank;

- *plus* 'inward risk transfers'<sup>3</sup> – exposures to US-owned or guaranteed entities located in a third country. Split by bank/non-bank<sup>4</sup>;
- *plus* gross local currency exposures of UK-owned banks' US offices to US-located counterparties. No counterparty breakdown is available. (These are the exposures listed in Chart 149 as 'counterparty unidentified').

**UK-resident banks** – Data (Chart 148) differ from those used for UK-owned banks in two significant ways:

- Data include only the claims of UK-located offices. So they include cross-border intra-group flows, which make up about half of total non-resident exposures.
- The data do not incorporate the two 'risk transfer' items explained above, because these items are not collected by the Bank for UK-resident banks.

These data are further divided into claims of UK-owned and foreign-owned banks. But the UK-owned banks' overseas exposures in Chart 148 are measured on a completely different basis from that used in Charts 149 to 151.

**Proxies for expected loss:** This risk-adjusted measure is used to rank UK-owned banks' claims on individual emerging market economies (Chart 152). The method used is described in the June 2000 *Review*<sup>5</sup>; it is based on the secondary market spread on US dollar-denominated sovereign bonds.

**Capital:** Chart 149 shows *UK-owned* banks' exposures as a proportion of total regulatory capital of the worldwide consolidated group. Chart 148 shows *UK-resident* banks' exposures as a proportion of total assets rather than capital. This scaling has been chosen because foreign-owned banks' UK branches are not separate legal entities, and so do not hold capital (although subsidiaries do).

1: When referring to 'exposures', no adjustment is made for provisions.

2: An 'outward risk transfer' occurs where repayment is effectively guaranteed by residents of other countries. Such guarantees may arise when the borrower is a branch of a bank whose head office is located in a different country, or when a third party located in a different country from the original borrower guarantees, under the terms of a formal, legal and irrevocable agreement, to repay the claim should the original borrower fail to do so. These criteria do not currently include risk mitigation mechanisms such as credit derivatives. Amounts due under repo are reported as a claim on the country of the counterparty and not risk transferred to the country of the issuer of the security.

3: The counterpart to each outward risk transfer is an equal 'inward risk transfer' to the country of residence of the guarantor. Such inward risk transfers represent a contingent liability of those countries. The total of inward risk transfers differs from the total of outward risk transfers by the amount of net cross-border transfers of risks to or from the UK.

4: These risk transfers mean that there is a small amount of double-counting in Charts 149 and 150: claims on the foreign-owned UK private sector may be included under both domestic exposures and the region where their parent is located. To give some idea of the magnitude involved, total overseas exposures, excluding all risk transfers, would be 393 per cent of capital as opposed to 429 per cent.

5: Buckle, S, Cunningham, A and Davis, EP (2000) 'A possible international ranking for UK financial stability', *Financial Stability Review*, Issue 8, June, pp.94-104.

The stocks of UK-resident banks' exposures are shown in Chart 148, illustrating the sector's substantial overseas claims and differentiating between UK-owned and foreign-owned banks. These data are, however, unconsolidated, so overseas exposures (and domestic interbank lending) are inflated by intra-group lending. Chart 149 shows UK-owned banks' overseas exposures on a consolidated basis as a proportion of capital, comparing claims on UK-resident counterparties with total overseas claims (at least 28 per cent of which are to overseas banks)<sup>42</sup>. Claims on UK households (80 per cent of which are via mortgages) have a dominant share of UK-owned banks' portfolios. But overseas exposures are nevertheless substantial; total claims (including interbank lending) on Western Europe and North America, for example, are both larger than claims on UK companies.

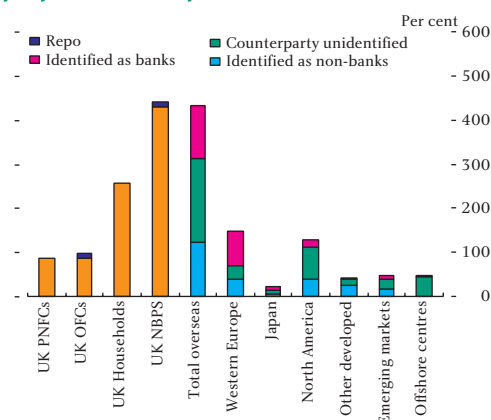
Chart 150 illustrates one crude measure of the relative significance of these exposures by showing the proportion of claims on different sectors which, if written off, would reduce UK-owned banks' regulatory capital by 10 per cent. This is an arbitrary yardstick, and the measure takes no account of off-balance sheet business or indirect effects; and no account of risk correlations. It is, for example, implausible that severe problems in Japan, however unlikely, would have no material second-round effects. But these data do perhaps provide one rough benchmark against which to judge the importance, via direct exposures, of different classes of on-balance-sheet lending business.

#### Overseas exposures

Claims on the United States account for just over 25 per cent of UK-owned banks' total claims on overseas residents, equivalent to about 112 per cent of their total capital<sup>43</sup>. Claims on the US non-bank private sector are particularly significant. In 2000 Q4, UK-owned banks' US exposures declined somewhat (by 2 per cent to £203 billion), in spite of stronger interbank lending (identified claims on banks rose by 16 per cent), and in sharp contrast to the increase in exposures to Western Europe (Chart 151). Portfolio investments in the United States were slightly weaker than in the previous quarter. While UK-owned banks' total claims on Japan decreased by around 10 per cent in the second half of 2000, identified claims on Japanese banks rose by 8 per cent.

The share of UK-owned banks' total overseas exposures accounted for by EMEs has been declining in recent years, and this continued – to reach around 12 per cent – in 2000 Q4. But on a risk-adjusted basis<sup>44</sup>, claims on most of the larger EMEs have

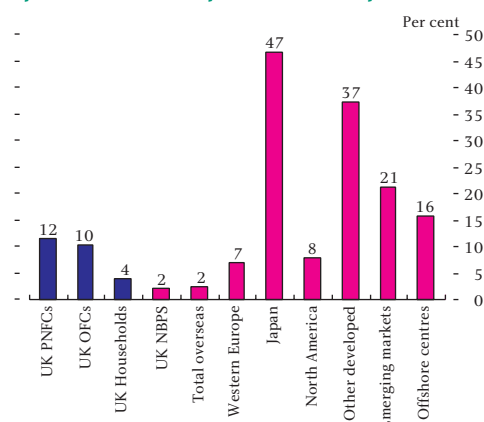
**Chart 149:**  
UK-owned banks' exposures as a proportion of capital<sup>(a)</sup>



Source: Bank of England.

(a) Data for end-December 2000. See Box 6 for definitions. Excludes lending to UK public sector and to other UK banks. NBPS: non-bank private sector.

**Chart 150:**  
Percentage loss, by exposure type, equivalent to ten per cent of capital<sup>(a)</sup>



Source: Bank of England.

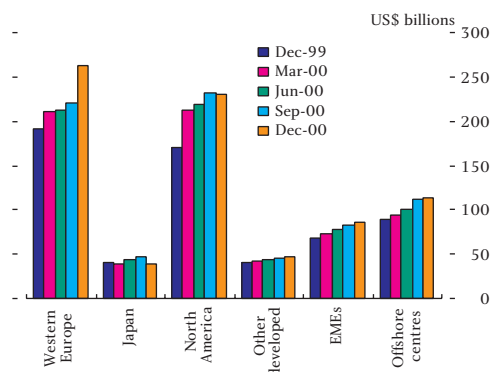
(a) Data for end-December 2000. See Box 6 for definitions. For each type of exposure, the percentage loss which would have to occur before 10 per cent of bank capital was at risk. NBPS: non-bank private sector.

<sup>42</sup>: For these data, claims of non-resident subsidiaries and branches are included only in the figures for overseas claims. See Box 6 for details.

<sup>43</sup>: See Box 6 for calculations of total capital.

<sup>44</sup>: See Buckle, S, Cunningham, A and Davis, EP (2000) 'A possible international ranking for UK financial stability', *Financial Stability Review*, Issue 8, June, pp.94-104.

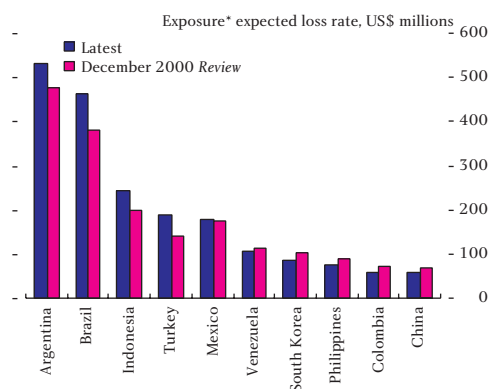
**Chart 151:**  
**UK-owned banks' consolidated overseas claims<sup>(a)</sup>**



Source: Bank of England.

(a) See Box 6 for definitions.

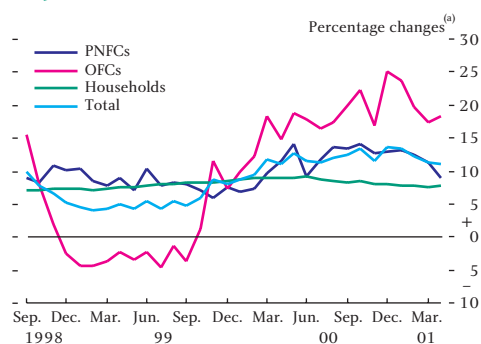
**Chart 152:**  
**UK-owned banks' estimated expected default loss on claims on EMEs<sup>(a)</sup>**



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

(a) Expected loss rate proxied using simple yield spread model, as described in Buckle et al (2000) 'A Possible International Ranking for UK Financial Stability,' June 2000 Review.

**Chart 153:**  
**Bank and building society lending to the UK private sector<sup>(a)</sup>**



Source: Bank of England.

(a) Twelve-month growth rates, all currencies.

risen since the December 2000 Review (Chart 152), most obviously on account of the difficulties in Turkey (up around 30 per cent), where spreads have widened sharply. As discussed in Section V, from a financial stability point of view it is the potential implications for the international financial system of developments in Argentina which are of most interest. UK-owned banks' risk-adjusted claims on Argentina have risen by around 10 per cent since the December Review – a small reduction in unadjusted claims being outweighed by a proportionately larger increase in spreads. On this measure, UK-owned banks' risk-adjusted claims on Brazil, which might be affected by any adverse developments in Argentina, have increased in recent months by around 20 per cent, largely reflecting increased volumes of business with Brazilian counterparties.

#### Domestic exposures

Charts 148 and 149 illustrate the importance of lending to the UK private sector in UK banks' portfolios (especially UK-owned banks). Lending growth has remained strong (Chart 153). Foreign-owned banks (which hold 30 per cent of loans outstanding) have accounted for a large share of this (Chart 154). Their lending increased by nearly 20 per cent in the year to 2001 Q1, down from 25 per cent in 2000 Q4. Annual growth in UK-owned bank lending has been more moderate, at about 10 per cent. Within this, lending by small UK-owned banks (with assets generally under £1 billion) has accelerated over the past year to 13 per cent (Chart 155)<sup>45</sup>.

Lending to *other financial companies* (OFCs), both UK- and foreign-owned, provides one obvious channel through which any downturn in international capital markets could affect the UK banking sector, since some of these firms, such as securities dealers, have direct market exposures; securities dealers account for about half of loans outstanding to this sector. As Chart 153 indicates, loan growth has moderated since the previous Review, coinciding with the deterioration in asset market conditions discussed in Section II. But it remains strong. Lending by overseas banks (which account for about half of loans outstanding to OFCs) has increased very rapidly, with the four-quarter rate peaking at over 40 per cent in 2000 Q4, moderating somewhat to 30 per cent in 2001 Q1. German banks have been particularly active. However, risks to banks may be substantially mitigated because much of this lending is in the form of reverse repo and therefore collateralised.

<sup>45</sup> For the Bank's approach to peer group analysis, see Box 6, on pp. 84/5 of the December 2000 *Financial Stability Review*. The peer groups are now: mortgage banks (Abbey National, Alliance & Leicester, Bradford & Bingley, Halifax and Northern Rock); commercial banks (Bank of Scotland, Barclays, Co-operative Bank, HSBC Bank, Lloyds TSB, Royal Bank of Scotland and Standard Chartered); new entrants (egg, Legal & General, Marks & Spencer, Sainsbury's, Standard Life and Tesco); other large UK-owned (3i, Close Brothers, Lazards, NM Rothschild, Schroder & Co, and Singer & Friedlander); small UK-owned banks (all other UK-owned institutions); and foreign-owned peer groups on the basis of parent-group nationality. The peer groups are composed dynamically, ie they change over time as banks enter and exit the UK banking sector, or change ownership.



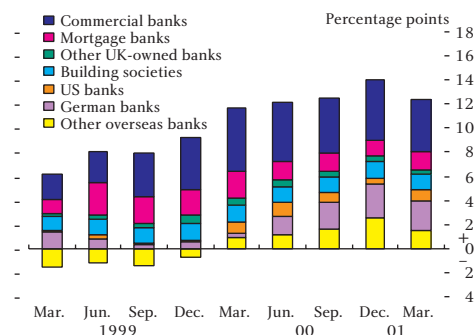
The discussion in Section VII of the financial performance of *UK-resident corporates* gave a generally reassuring picture of current aggregate corporate sector credit quality, notwithstanding some specific concerns. Nevertheless, risks have increased somewhat given rather less favourable economic prospects. In line with the weakening of companies' total external financing in recent months, bank lending growth slowed to 8.9 per cent in April, from a recent peak of 14 per cent in October 2000 (Chart 153). Bank contacts suggest that, whilst lending to large corporates with access to wholesale markets has moderated (reflecting in part a downturn in M&A-related activity), lending to mid-cap and small firms remains buoyant.

The corporate sector's aggregate utilisation of committed bank lines has risen since October last year, consistent with the possibility that corporates are tending to switch financing away from the capital markets in response to less favourable financing conditions (Chart 156). Bank data suggest that spreads on banks' corporate lending have tended to widen in recent months, although this may in part simply reflect a tendency for administered loan rates to lag falls in the Bank's repo rate. Contacts suggest a mixed picture: whilst banks report a widening in spreads on lending to large corporates in response to a perceived increase in risk as market conditions have deteriorated, spreads in the middle-corporate market are said, if anything, to have narrowed as a result of competition for business.

Concerns registered by bankers over the large corporate market have largely been centred on the *telecoms* sector. Some UK-owned banks have been active in the sector, lending to both UK and overseas-owned companies. In total they have accounted for over 20 per cent of syndicated lending to telecom companies over the past year, and have taken about 7 per cent of the bond underwriting market. Banks say that, with effective syndications, risks are manageable given their limits on these exposures.

Previous *Reviews* have drawn attention to developments in the *commercial property* market, prompted by strong lending to a sector where UK banks have in the past occasionally registered large losses. As reported in Section VII, lending has recently grown very strongly. Chart 157 breaks down property advances by lender peer group: mortgage banks' and German banks' advances have been growing particularly quickly. There are also indications that lending to the commercial property sector by some building societies has grown quickly. Bank contacts have registered some concerns that competition for business may be prompting some lenders to ease lending criteria aggressively. According to the latest De Montfort University survey<sup>46</sup>, in 2000 there was a tendency for lenders to accept higher loan-to-value ratios (LTVs)

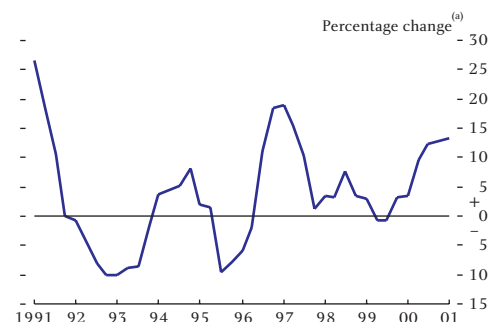
**Chart 154:**  
Contributions to growth in bank and building society lending to UK private sector<sup>(a)</sup>



Source: Bank of England.

(a) Calculated from four-quarter growth rates, all currencies.

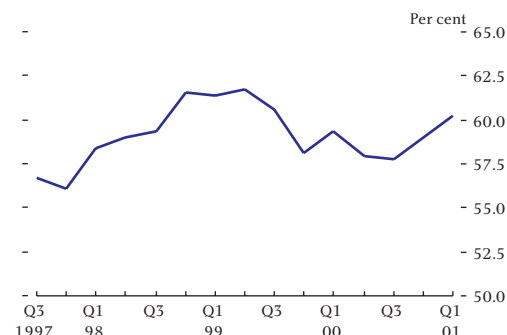
**Chart 155:**  
UK-owned small banks' lending to UK private sector



Source: Bank of England.

(a) Four-quarter growth rates, all currencies.

**Chart 156:**  
Corporate utilisation of bank facilities<sup>(a)</sup>



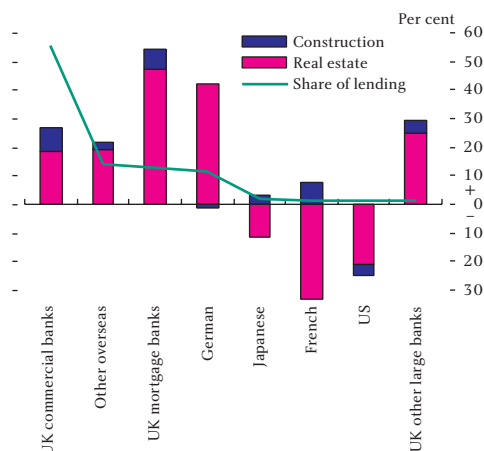
Source: Bank of England.

(a) Outstanding loans and advances to UK-resident corporates in all currencies as a percentage of facilities granted.

46: De Montfort University (2001) 'The UK Commercial Property Lending Market 2000: Research Findings', April.



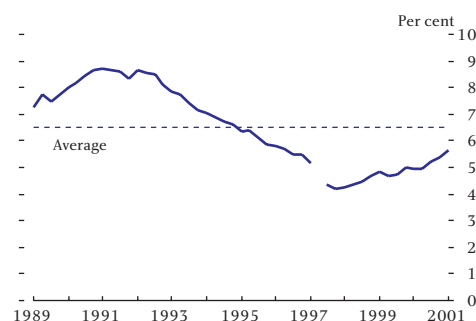
**Chart 157:**  
Lending to real estate and construction,  
year to 2001 Q1<sup>(a)</sup>



Source: Bank of England.

(a) Only includes peer groups accounting for more than one per cent of lending to real estate and construction. Based on four-quarter growth rate.

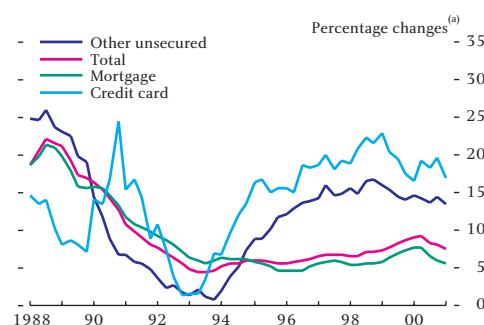
**Chart 158:**  
UK-resident banks' advances to commercial  
property<sup>(a)</sup>



Source: Bank of England.

(a) All currency advances, as a percentage of the stock of advances to UK residents. There is a break in the series because of a reclassification in the available data for that quarter.

**Chart 159:**  
Bank and building society lending to  
households



Source: Bank of England.

(a) Quarterly annualised data, seasonally adjusted.

for central London property than was the case in 1999, although in general LTV's were still below the levels seen in the late 1980s. The survey also reported a slight narrowing in margins during 2000, although recent anecdotal comments have indicated a small increase in 2001. While loans outstanding to property companies remain a smaller proportion of total bank lending than in the early 1990s (Chart 158), a differential growth rate of about 10pp would, if it persisted, cause the share to rise quite rapidly. As discussed in Section VII, the property market itself appears to remain sound at present, with speculative activity still apparently limited. But any material deterioration in economic conditions could cause demand to weaken, impairing property values and the performance of loan portfolios.

Although, as noted in Section VII, the impact of foot-and-mouth disease on GDP growth is likely to be modest, banks nevertheless seem likely to see some deterioration in asset quality as a result of the crisis. Losses on their agricultural lending should be limited, given that exposures are small (less than one per cent of total lending) and are generally secured on land, whilst compensation arrangements are available to directly-affected farmers. However, loans to the tourist industry in regions badly hit by the crisis, and to businesses dependent on it, may be more seriously affected. Banks generally seem to anticipate some increase in arrears in the months ahead, requiring them to support businesses, where appropriate, through temporary difficulties.

Although recent months have seen a modest slowing, bank and building society lending to the *household sector* nevertheless remains strong, growing at 7.7 per cent in the year to April (Chart 159). Growth in banks' loan portfolios would have been stronger still were it not for the effect of securitisations (see Box 7). *Consumer credit* (and especially credit card lending) continues to grow rapidly; outstandings have now increased by almost 70 per cent in the past four years.

In the *mortgage market*, income multiples have continued to rise and are high by historical standards – perhaps to be expected given relatively low debt servicing costs. Backward-looking indicators of asset quality are good (see below). If there were to be a sharp downturn in financial market activity (and City employment), perhaps triggered by a further equity market adjustment, there might be questions about the sustainability of property values in London and the South-East, where prices remain historically high compared with the rest of the country. However, relatively low LTVs – the result of recent rapid increases in house prices as much as any tightening in lending criteria – offer lenders some protection.

Bank contacts do not indicate any material deterioration in the performance of their retail books, although some have aired general concerns about the rapid increase in consumer debt over

## Box 7: Securitisations and UK lending growth

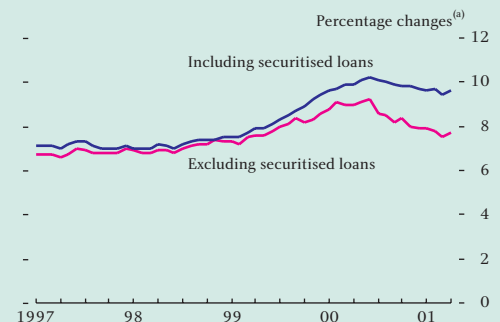
Securitisations are potentially attractive to banks. They free up existing capital and funding to support new lending; and can improve liquidity to the extent that holdings of less liquid longer-term assets are reduced. For many years the Bank has, therefore, published bank lending data on two bases: excluding and including securitisations<sup>1</sup>. Recently the two series have begun to diverge materially. In Q1 2001, the twelve-month rate of growth in UK-resident banks' lending including securitisations was 13.8 per cent, compared to 12.5 per cent excluding such loans. This poses questions about which issues the two series help to illuminate.

The difference between the two series was largely accounted for by securitisations of household loans, especially mortgages (Charts A and B). US-owned banks have for years regularly securitised tranches of their UK credit card books. More recently, the UK mortgage banks, and to a lesser extent the large UK commercial banks, have become more active in this market, accounting for the bulk of securitisations over the past year (Chart C). In consequence, the amount of mortgages securitised by banks since 1998 Q1 is now equivalent to three per cent of the current stock (ten per cent for credit cards). An illustration of the potential for further growth is provided by the US market, where at end-March 2001 the stock of outstanding securitised mortgages was equivalent to 11 per cent of the total mortgage stock. So there could be a widening differential between growth in loans originated by banks in the UK and growth in their on-balance sheet exposures.

The analysis in Section VIII focuses primarily on bank lending excluding securitised assets, on the grounds that – provided the special purpose vehicles used are truly bankruptcy remote, and there is no recourse from SPV investors to the originator – growth in on-balance sheet assets is most relevant in assessing bank sector credit exposures. But data on lending adjusted for securitisations are also of interest for a number of reasons. First, residual credit risk still attaches to securitised assets: originators often retain a first-loss tranche. Second, inclusion of securitised assets indicates the rate at which banks are originating loans, which may in turn yield information about terms and conditions in the market. When forming a view on future loan quality, growth in lending including securitised assets is probably the better comparator against previous lending cycles. Third, in some circumstances heavy use of securitisation could have implications for the average quality of banks' remaining loan portfolios, to the extent that it is better quality assets that are securitised.

<sup>1</sup>: Data also include loan transfers. These can be outward or inward transfers, respectively onto or off banks' balance sheets. The data will therefore understate 'securitisations' to the extent of inward loan transfers. In practice these are small.

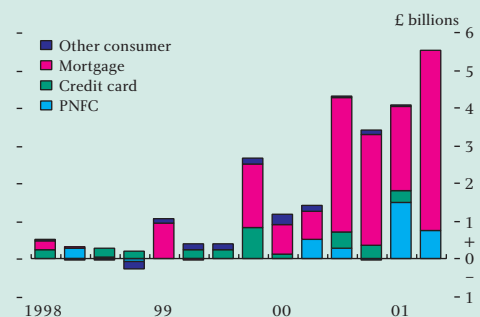
**Chart A:**  
Bank and building society lending to households



Source: Bank of England.

(a) Twelve-month growth rate, seasonally adjusted. Sterling lending.

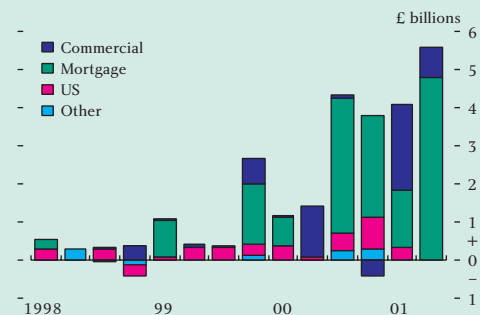
**Chart B:**  
UK resident banks' securitisations<sup>(a)</sup>



Source: Bank of England.

(a) For 2001 Q2, chart shows securitisations already announced or carried out.

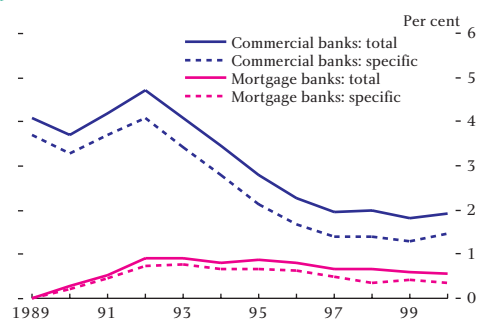
**Chart C:**  
Securitisations by peer group<sup>(a)</sup>



Source: Bank of England.

(a) For 2001 Q2, chart shows securitisations already announced or carried out.

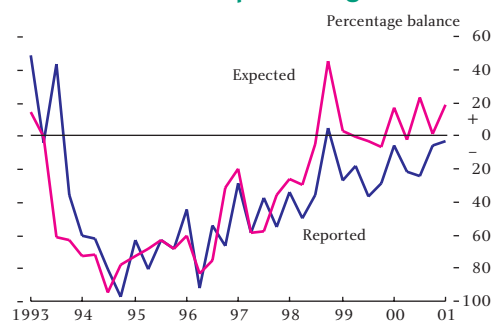
**Chart 160:**  
**Commercial and mortgage banks' provisions<sup>(a)</sup>**



Source: Published accounts.

(a) As a proportion of loans and advances. Total and specific provisions as defined in published accounts.

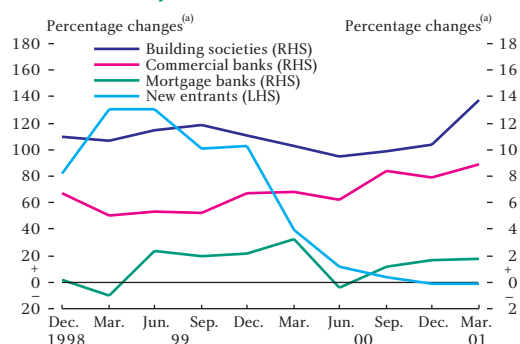
**Chart 161:**  
**Value of banks' non-performing loans<sup>(a)</sup>**



Source: CBI/PWC Financial Services Survey.

(a) Reported/expected indicate answers to the question: 'Excluding seasonal variations, what were/are the trends for the value of non-performing loans over the next three months?' Balance of those replying 'more' less those replying 'less'.

**Chart 162:**  
**Household deposits**



Source: Bank of England.

(a) Four-quarter growth rates.

recent years and suggested that intense competition in the credit card market in particular may be forcing some lenders to relax lending criteria. The analysis of Section VII suggested that the sector as a whole should be well able to finance the accumulated debt at current interest rates. But if household debt continues to grow rapidly, exposures may become vulnerable when or if domestic demand growth returns to trend. In general, however, lenders seem confident in their credit risk management systems and in their ability to anticipate problems.

*Loan quality, provisions and write-offs*

Data for the past six months do not suggest any generalised deterioration in asset quality. Backward-looking data indicate, in fact, that loan quality remains strong, despite robust lending growth and intense competition for business. Non-performing loans, which have fallen as a proportion of total loans and advances for most major UK banks since the early 1990s, continued to fall in 2000. While those banks actively pursuing a strategy of increasing their domestic consumer credit lending did tend to have to raise associated provisions, the gross charges made by the major banks for bad and doubtful debts fell in aggregate by 8 per cent. Write-offs (net of recoveries) increased<sup>47</sup>, but the stock of provisions against total lending showed only a modest rise (Chart 160).

The recent performance of banks' domestic loan portfolios may partly reflect improvements in risk management. But a primary factor is almost certainly the general buoyancy of UK economic conditions in recent years. Similarly, the quality of international exposures has recently benefited from improving conditions in key emerging markets (except in Latin America)<sup>48</sup>. Banks nevertheless seem to expect some underlying deterioration in asset quality in 2001. The CBI/PWC Financial Services Survey (Chart 161) has indicated a progressively less positive picture, and a small balance of respondents now expect the value of non-performing loans to increase over the next quarter. Bank of England contacts also indicate that a modest deterioration in the performance of their loan portfolios is possible – particularly so for corporate lending, reflecting general concerns about the economic outlook, the vulnerability of particular sectors (eg in manufacturing) and specific problems such as foot-and-mouth. On household lending, although some banks express unease about the rapid build-up in debt, it is not generally expected that this will manifest itself in a major deterioration in asset quality. On the whole, banks may have a 'bias to tighten' credit criteria, particularly on their corporate lending. But there is less evidence of plans to increase forward-looking general provisions in response to a possible pick-up in expected losses given a prospective economic slowdown.

<sup>47</sup>: By over 7 per cent, almost entirely due to Standard Chartered.

<sup>48</sup>: In 2000, Standard Chartered and HSBC, which have the largest EME presence of the UK-owned banks, both released significant amounts of provisions – mainly on their south-east Asian exposures – as conditions there improved.

(During 2000, general provisions fell relative to both specific provisions and loans outstanding.)

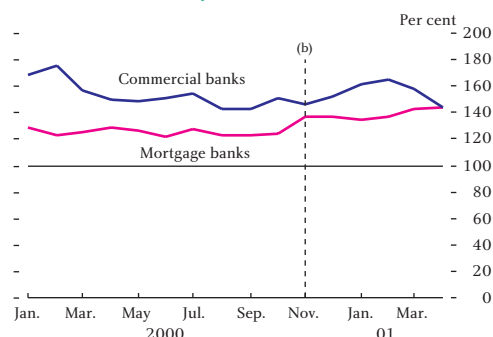
## Funding and liquidity

Since the previous *Review*, the major UK banks have continued to make increasing use of asset securitisations – typically of mortgages, credit card receivables and corporate loans – to reduce funding requirements and make more efficient use of capital. To the extent that it reduces holdings of longer-term assets, securitisation can improve liquidity. Commercial banks have securitised £1.8 billion of assets since September 2000 and mortgage banks £4.2 billion, with more in prospect<sup>49</sup>. See Box 7.

Net of securitisations, the assets of UK-resident banks and building societies grew at just over 14 per cent in the year to April. Deposits from non-residents – partly from overseas offices of UK-resident banks – played an important role in financing this growth, accounting for half the increase in total liabilities. UK-owned banks, however, are more reliant on funding from the UK private sector (around 50 per cent of total deposits) and in particular on households (around 30 per cent). Since the turn of the year, growth in household deposits has clearly strengthened (Chart 162), with commercial banks and, in particular, building societies benefiting from an apparent switch from equity-based savings products. New entrants' share of household deposit flows, on the other hand, remained weak, with a net outflow in two of the past three quarters.

Shifts in the mix of funding between retail and wholesale sources are one factor behind the slight rise and fall in the major banks' sterling stock liquidity ratio over the past six months or so (Chart 163)<sup>50</sup>. An alternative measure of banks' ability to absorb shocks to liquidity is their holding of all-currency tradable assets<sup>51</sup> as a proportion of total assets (Chart 164). This liquidity ratio has risen for all UK-owned bank peer groupings since the December *Review*, with the exception of new entrant banks. They have reduced tradable asset holdings whilst increasing loans and advances, so that their traded asset ratio is now similar to that of commercial and mortgage banks. (Box 8 gives a longer-term perspective, showing the upward trend in this ratio for the UK banking sector as a whole over the past ten years.)

**Chart 163:**  
Stock of sterling liquidity as percentage of estimated five-day outflows<sup>(a)</sup>

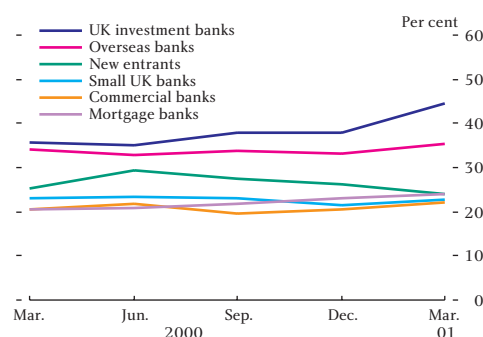


Source: FSA.

(a) For definition, see Chaplin, Emblow and Michael (2000), 'Banking System Liquidity: Developments and Issues', December 2000 *Review*, p. 101.

(b) December 2000 *Review*.

**Chart 164:**  
Tradable assets as percentage of total assets<sup>(a)</sup>



Source: Bank of England.

(a) See footnote 51.

**49:** Total securitisations by mortgage banks since 1998 are equivalent to 4.2% of the current stock of loans outstanding to the UK private sector. For commercial banks, the equivalent figure is 0.9 per cent. Abbey National securitised £2.2 billion of mortgage assets in May 2001 and has announced a further £2.6 billion securitisation for June.

**50:** For a discussion of the stock liquidity ratio, see 'Banking system liquidity: developments and issues' Chaplin, Emblow and Michael, *Financial Stability Review*, Issue 9, December 2000.

**51:** Tradable assets: notes and coin, balances with the Bank of England, treasury bills, eligible bills, other bills, gilts, commercial paper, claims under gilt repo, claims under other repo, certificates of deposit, other public sector investments, investments in bank and building society debt, UK debt securities, overseas debt securities.

## Box 8: Development and use of macroprudential indicators

The international financial crises of the 1990s, together with the rapid growth of capital flows and the increasing interdependence of financial markets, underlined the data needs of both policymakers and market participants in assessing international financial stability. The IMF has been co-ordinating work exploring whether a set of standardised economic and financial indicators, known as macroprudential indicators (MPIs), can be developed and regularly promulgated to help meet these needs<sup>1</sup>.

The Bank's work draws on a mixture of monetary and financial data, and data collected by the Bank for the Financial Services Authority (FSA). Using monetary returns in the MPI framework is relatively simple, although they are submitted largely on a non-consolidated basis covering only UK operations and so could be used to address only one set of questions. By contrast, the data collected for microprudential supervision have the potential advantage of being submitted on a consolidated and unconsolidated basis, but regrettably in this context, are not always easy to aggregate. In particular, some of the reporting requirements are customised and there have been changes over time.

Two MPIs for UK-owned banks, based upon those used in an IMF survey and using *unconsolidated* monetary and financial data, are shown below.

**Chart A:**  
**UK-owned banks' leverage ratio<sup>(a)</sup>**

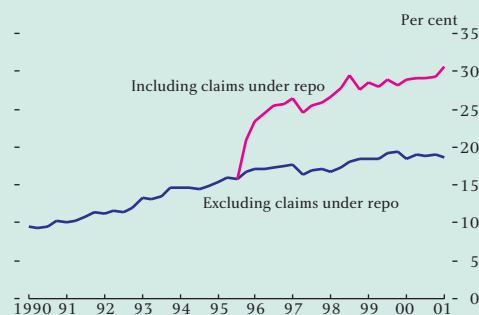


Source: Bank of England.

(a) Calculated from ratio of total assets to capital. Capital defined as: shares and other equity; subordinated loan capital; and reserves. This definition proxies the Basel definition of Tier I and Tier II capital.

On a simple measure, leverage – which makes sense only for UK-incorporated banks, and is therefore presented here for UK-owned banks – has risen over the past decade but fallen since the late 1990s (Chart A). Whether this implies an increase in risk compared with a decade ago will depend upon, *inter alia*, the type and quality of banks' assets and the extent to which risks are hedged by off-balance sheet instruments. Further Bank development of MPIs will aim to aggregate FSA microprudential data to monitor such risk-adjusted exposures.

**Chart B:**  
**Tradable assets as a percentage of total on-balance sheet assets for UK-resident banks<sup>(a)</sup>**



Source: Bank of England.

(a) Tradable assets defined as those which are readily tradable in normal market conditions. The extension of the data to include claims under repo from 1995 Q4 leads to a step change in the percentage.

The proportion of tradable assets to total assets increased during the 1990s (Chart B), reflecting the increasing importance of tradable instruments within most financial systems<sup>2</sup>. If a bank encounters liquidity difficulties, such assets can be used to generate funds, provided asset markets remain liquid, potentially providing valuable time for a longer-term solution to be put in place.

The Bank welcomes further MPI developments within the international arena and will continue to contribute actively to initiatives to improve the global dissemination and use of financial stability data. It will aim to develop its own MPIs, using both monetary data and aggregated FSA data.

<sup>1</sup> See IMF, 'Macroprudential Indicators of Financial System Soundness', ([www.imf.org/external/pubs/ft/op/192/index.htm](http://www.imf.org/external/pubs/ft/op/192/index.htm)), and E. Philip Davis, 'Financial Market Data for International Financial Stability', available at [www.bankofengland.co.uk](http://www.bankofengland.co.uk).

<sup>2</sup> For a more detailed discussion of these developments, see 'Banking system liquidity: developments and issues' Chaplin, Emblow and Michael, *Financial Stability Review*, Issue 9, December 2000.



## Market risk

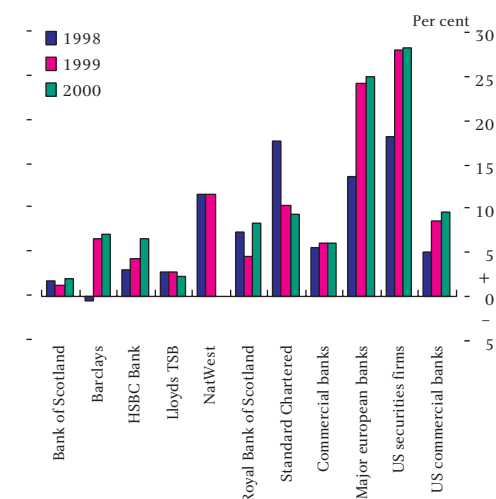
Earlier sections have highlighted some risks in world asset markets and potential exposures faced by banks and other financial intermediaries actively involved in trading activity. UK banks are exposed to these risks through their business with internationally active banks and other intermediaries, and are also, in many cases, directly exposed via their own trading positions in securities and foreign exchange markets. Lack of detailed published information on banks' trading positions makes it extremely difficult to assess how significant these exposures might be for the banking system as a whole at any point in time. However, some indicators suggest that, for the major UK-owned banks, market risk is relatively small compared with their exposure to credit risk, and significantly less than for those banks more orientated towards investment banking markets. The consequence of this is that, as Chart 165 indicates, trading income accounts for a relatively low share of commercial banks' revenues compared with major European banks and US securities firms<sup>52</sup>. Similarly, measured by Value-at-Risk (VaR)<sup>53</sup>, the major UK-owned banks' market risk exposure has fallen since 1998, and is low relative to capital – for example, compared with the major US securities houses (Chart 166).

Regulatory capital requirements might also provide a useful indicator of the banking system's market risk exposure. As a proportion of Tier One capital, UK-owned commercial banks' capital requirements for their trading books<sup>54</sup> have decreased since 1998, and remain much lower than banking book requirements, which have grown since 1999 (Chart 167).

## Capital, profitability and business risk

The major UK banks have remained both profitable and well-capitalised in historical perspective (Chart 168), although profitability fell in 2000, reflecting in part continued strong competition in their core retail markets and resulting pressures on spreads, which have tended to decline<sup>55</sup>. In this context, the recent restructuring of mortgage interest rates by a number of lenders may turn out to be an important milestone confirming existing trends. Survey evidence suggests that in 2000 Q1, business confidence in the banking industry fell to its lowest

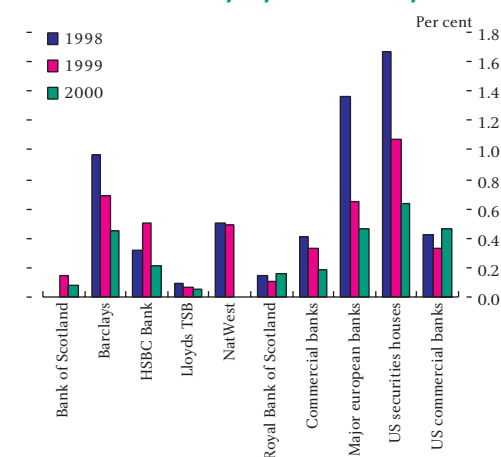
**Chart 165:**  
Trading income as a proportion of total income<sup>(a)</sup>



Source: Published accounts.

(a) See footnote 52 for composition of groups.

**Chart 166:**  
Value-at-risk as a proportion of capital<sup>(a)</sup>



Sources: Published accounts and Bank calculations

(a) Published VaRs adjusted for comparability purposes to a ten-day holding period and a 99 per cent confidence interval. For composition of groups, see footnote 52. 'Capital' is total shareholders' funds.

52: 'Major European banks' in Chart 21 are Credit Suisse, Deutsche Bank and UBS. 'US securities houses' are Goldman Sachs, Merrill Lynch and Morgan Stanley. 'US commercial banks' are Bank of America, Citigroup and Chase Manhattan (JP Morgan Chase & Co in 2000).

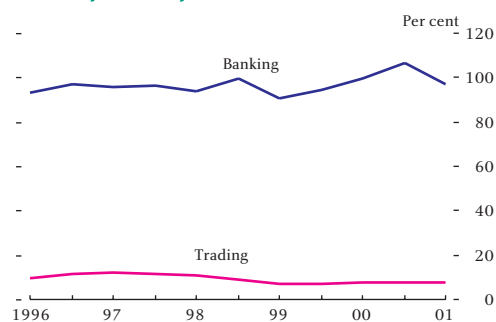
53: Bank of England contacts suggest that the major UK-owned banks recognise the limitations of VaR as a measure of exposure, particularly in times of extreme market volatility, and make use of stress tests in their market risk management procedures. For a survey of what major international banks do in this area, see Bank for International Settlements, Committee on the Global Financial System 2001: A survey of stress tests and current practice at major financial institutions.

54: Trading book capital requirements cover counterparty risk, large exposure risk, foreign exchange risk, commodity position risk, equity position risk and interest rate risk.

55: See December 2000 *Review* p.80-81.



**Chart 167:**  
**Commercial banks' trading and banking book capital requirement<sup>(a)</sup>**

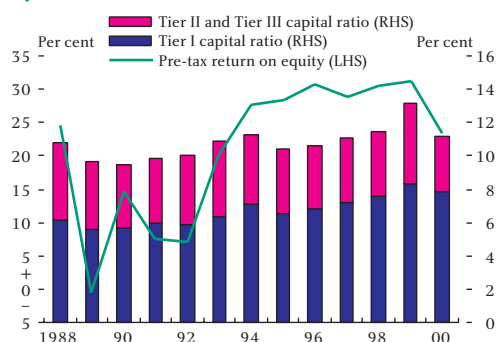


Source: FSA.

(a) As a proportion of Tier I capital. Unconsolidated returns are used to estimate 2001 Q1 data.

level since 1998, and average loan spreads were reported to have fallen markedly over the quarter, a trend which some bankers expect to intensify. However, the pattern of responses across the financial services sector (with building societies much more optimistic than securities dealers, for example) suggests that weakness in equity markets in 2001 Q1, and general concerns about the general economic outlook, were the primary factors affecting confidence.

**Chart 168:**  
**Commercial banks' profitability and capitalisation<sup>(a)</sup>**



Sources: BBA and published accounts.

(a) Barclays, Midland/HSBC Bank, Lloyds/Lloyds TSB, RBS Group, NatWest from 1988 to 1999.

## IX Developments in the financial infrastructure

This section looks at the progress of some key initiatives designed to reduce risks in the international financial system and to improve the arrangements for handling crises if they arise.

### International Monetary Fund

#### *Private sector involvement in country crisis resolution*

The December *Review* reported that the international official community had endorsed private sector involvement (PSI) as integral to the resolution process for countries in financial crisis. However, only limited progress has been made in turning the concept of PSI into an operational framework. Some argue that the framework should evolve through ‘case-law’ as PSI is applied in specific circumstances. Others would prefer it to be based on clearly articulated principles, so that investors would have a clear idea of what process would be followed when a sovereign was unable to service its debt in full or on time. They argue that this would enable risk to be assessed and priced more accurately. A possible reconciliation of the two views might involve a framework with firm presumptions but sufficient flexibility to deal with individual cases posing major systemic risks.

At its April 2001 meeting, the International Monetary and Financial Committee (IMFC) agreed that, where possible, PSI should rely on voluntary, market-oriented approaches but that there might be cases where concerted action was needed<sup>56</sup>. The IMF was asked to articulate the circumstances in which concerted action would be appropriate. The IMFC also called for progress by the Annual Meetings in September 2001 on practical issues involved in applying the PSI framework, including an improved basis for assessing debt sustainability, prospects for regaining market access, the risk of contagion and comparability of treatment between official and private creditors. Progress on these issues would make a helpful contribution to the overall effectiveness of crisis prevention and management.

#### *Financial Sector Assessment Programme*

The IMF Board agreed in December 2000 that the Financial Sector Assessment Programme (FSAP) – a joint initiative with the World Bank, introduced in May 1999 to help countries enhance their resilience to crises and cross-border contagion, and to foster growth by promoting deeper and more robust financial systems – should become a key part of monitoring financial systems in the IMF’s surveillance process. Assessments aim to identify the strengths, risks and vulnerabilities in a financial system, and the links between the financial sector and the macroeconomy; ascertain development needs; and help national authorities to design appropriate policy responses. The Board

<sup>56</sup>: The IMFC’s communiqué can be found at [www.imf.org/external/np/cm/2001/010429b.htm](http://www.imf.org/external/np/cm/2001/010429b.htm).

**Table 18: ROSC modules completed and published by 31 May 2001**

	Total completed	Total published
Data Dissemination	13	11
Fiscal Transparency	27	26
Monetary and Financial Policy Transparency	24	14
Banking Supervision	24	14
Insurance Regulation	8	5
Securities Market Regulation	8	5
Payments Systems	6	5
Corporate Governance	6	5

Source: IMF, World Bank and Bank estimates.

decided to permit voluntary publication by national authorities of the detailed Reports on the Observance of Standards and Codes (ROSCs) included in FSAP reports and also of the Financial System Stability Assessments derived from the FSAP exercise (which address issues relevant to IMF surveillance, including risks to macroeconomic stability stemming from the financial sector and the capacity of the sector to absorb macroeconomic shocks). The IMF and the World Bank are aiming to complete up to 30 assessments per year. The United Kingdom will itself be the subject of an FSAP in 2002.

In addition to the ROSCs prepared as part of the FSAP process, the IMF and the World Bank are producing ROSCs on other key standards. By end-May 2001, some 116 had been completed and 85 published on the IMF and World Bank websites<sup>57</sup> (Table 18).

### **Standards, codes and good practice guidelines**

As discussed in the December *Review*<sup>58</sup>, the international community has embarked on a programme of developing standards and codes covering a number of areas of economic and financial policy<sup>59</sup>. Implementing these standards (see above) should help to increase policy transparency and improve institutional and market infrastructure, thereby encouraging less crisis-prone financial systems.

#### *IMF/World Bank public debt guidelines*

On 21 March 2001, the IMF and the World Bank published joint Guidelines for Public Debt Management<sup>60</sup> covering both

<sup>57</sup>: [www.imf.org/external/np/rosc/index.htm](http://www.imf.org/external/np/rosc/index.htm) and [www.worldbank.org/ifa/rosc.html](http://www.worldbank.org/ifa/rosc.html).

<sup>58</sup>: Clark, T A and Drage, J (2000) 'International standards and codes', *Bank of England Financial Stability Review*, December.

<sup>59</sup>: A compendium of these standards and codes is available at [www.fsforum.org/Standards/Home.html](http://www.fsforum.org/Standards/Home.html).

<sup>60</sup>: These can be found at [www.imf.org/external/np/mae/pdebt/2000/eng/intro.htm](http://www.imf.org/external/np/mae/pdebt/2000/eng/intro.htm).

domestic and external public debt as well as contingent liabilities. Against a background of weak national balance sheet structures contributing to recent country crises, effective implementation of the guidelines could, by improving debt management policies, help to strengthen a country's ability to withstand internal and external shocks.

#### *Good practice guidelines for foreign exchange trading*

A new set of good practice guidelines for foreign exchange trading, agreed by 16 major commercial and investment banks, was launched on 22 February, following a recommendation made (in April 2000) by the Financial Stability Forum Working Group on Highly Leveraged Institutions. The trading principles are to be incorporated in the collaborating banks' codes of conduct and have been endorsed by the bodies responsible for foreign exchange market standards in the main financial centres. The principles include: heightened emphasis on market risk and credit management issues during times of volatility; standards for best execution (of orders) for the customer; guidelines for handling suspected false information; and outlawing of manipulative practices and exploitation of electronic dealing systems to generate artificial price behaviour. These principles should help to promote orderly conditions in the foreign exchange market and, in particular, are intended to protect emerging market economy currencies from alleged abusive behaviour.

#### *Standards of risk management controls for central counterparties*

In February 2001, the European Association for Central Counterparty Clearing Houses (EACH), an association of some 16 European central counterparties (CCPs) formed in 1991, published standards of risk management controls for CCPs. EACH will not police the standards but supports disclosure of risk controls. The standards cover membership requirements, margining and financial resources. The Bank welcomes this initiative given the importance of CCPs being able to manage the financial, legal and operational risks they incur.

#### *Core principles for systemically important payment systems*

The Basel Committee on Payment and Settlement Systems' (CPSS) principles governing the design and operation of systemically important payment systems were approved by the central bank Governors of the Group of Ten (G10) countries in January 2001<sup>61</sup>. Central banks world-wide, including the Bank of England, have adopted the Core Principles as a guide for the development and oversight of payment systems. A corresponding initiative in the field of securities settlement is at the consultation stage and will be covered in subsequent *Reviews*.

<sup>61</sup>: 'Core Principles for Systemically Important Payment Systems: Report of the Task Force on Payment System Principles and Practices', Bank for International Settlements, January 2001 ([www.bis.org](http://www.bis.org)). Also see Sawyer, D and Trundle, J (2000) 'Core Principles for Systemically Important Payment Systems', *Bank of England Financial Stability Review*, June.

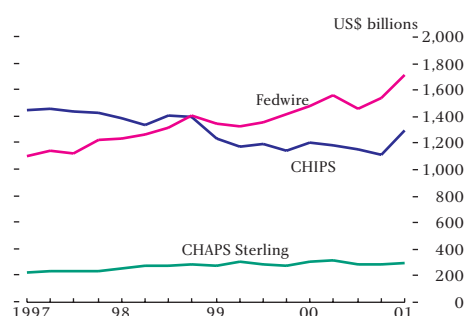
## Developments in market infrastructure

As well as the development of 'principles' covering various parts of the payments and settlements infrastructure, there have been some important recent developments in systems themselves.

### CHIPS finality

On 22 January 2001, the Clearing House Inter-Bank Payments System (CHIPS), the US dollar payment system operated by the New York Clearing House, moved from traditional, net end-of-day settlement to a process involving repeated settlements, throughout the day, of batches of bilaterally and multilaterally offsetting payments. One key objective, potentially significant for financial stability, is to minimise the liquidity impact of a member default by providing intraday finality of CHIPS payments, but without the liquidity 'cost' of real-time gross settlement (RTGS). Thus, the economic benefit of netting is preserved, whilst avoiding the uncertainties which end-of-day net settlement may produce.

**Chart 169:**  
**CHIPS, Fedwire and CHAPS transactions<sup>(a)</sup>**



Sources: New York Clearing House, Board of Governors of the Federal Reserve System and APACS.

(a) Quarterly, average daily value.

CHIPS' previous settlement arrangements, post 1990, were supported by collateral held to assure end-of-day settlement in the event of the largest net debtor (or two largest since 1997) being unable to settle in a timely fashion. In the new system, participants prefund their CHIPS accounts and an algorithm searches for transactions, the net settlement of which can be accommodated using funds on account. To facilitate this, CHIPCo maintains an account on the books of the Federal Reserve Bank of New York. The prefunded amounts average less than US\$2 billion per day, against gross payments averaging US\$1.2 trillion (Chart 169). Amounts still unsettled at the end of the day are settled on a multilateral net basis, provided participants in a debit position send the necessary additional funds to CHIPS.

### Spread of use of central counterparties in major markets

The introduction of a CCP to a market enables *multilateral netting of exposures* (which typically reduces the scale of the exposures) and of *settlement obligations*<sup>62</sup>. This may help cushion the impact of a default if the risks initially concentrated on a CCP are mitigated effectively through margin or dispersed through a default fund or insurance arrangements. As CCPs expand their activities, it is vital that they have the means and incentive to manage the risks they incur effectively.

Recently, a consortium of banks (OTCderivNet) reached agreement with the London Clearing House (LCH) to provide strategic direction and funding for the development of LCH's SwapClear product (central clearing of swaps trades). On 14 March, LCH announced that an initial tranche of

<sup>62</sup>: Central counterparties are discussed in more detail in Hills, B, Rule, D, Parkinson, S and Young, C (1999), 'Central counterparty clearing houses and financial stability', *Bank of England Financial Stability Review*, June.

4,250 existing swaps trades (with a notional principal in excess of US\$250 billion) involving the then eight banks in the consortium had been entered into SwapClear. Four more banks joined on 4 April. SwapClear may come to form a significant part of LCH's clearing activities, with significant implications for the value of transactions it clears and so for the risks it bears and redistributes.

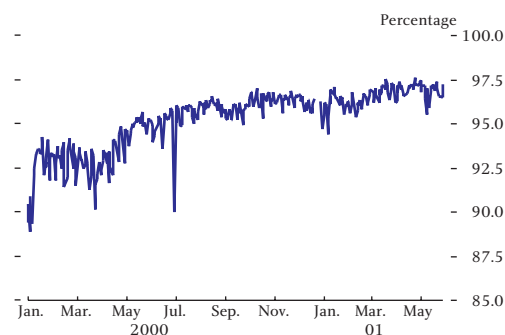
The launch on 26 February of EquityClear, the LCH service for the London Stock Exchange (LSE), is similarly important for UK domestic markets. It covers trades on SETS (the Stock Exchange Electronic Trading Service) and SEAQ (the Stock Exchange Automated Quotation) auctions. Many market participants see its main advantage as the facilitation of settlement netting, which is expected next year.

#### *Reductions in settlement cycles*

The gap between trade and settlement is one reason why the failure of a large participant could destabilise securities markets, particularly in volatile conditions. Shortening this gap shortens exposure to counterparty default and reduces the probability of having to replace a trade, potentially at a price disadvantage. Risk is reduced overall, however, only if the incidence of settlement failure does not rise.

The standard settlement period for trades in equities and corporate debt conducted on the LSE, the Irish Stock Exchange and Tradepoint moved from T+5 to T+3 (settlement three business days after trade date) on 5 February 2001. This brings the United Kingdom into line with what is seen increasingly as a minimum standard for developed financial systems (a 1989 report by the Group of Thirty<sup>63</sup>, a private sector group concerned with the working of the international financial system, recommended T+3 for equity settlement by 1992). Both the LSE and CREST, the settlement system for UK equities, corporate bonds and gilts, reported a smooth transition, with no material rise in settlement fails (Chart 170). The United States still plans to move to T+1, although the Securities and Exchange Commission recently moved the target date from 2002 to 2004 in recognition of the work required.

**Chart 170:**  
**CREST deliveries settled on due date**



Source: CRESTCo.

## **Regulatory and legal developments**

Authorities and participants are collaborating to improve both the effectiveness of regulation and the certainty and clarity of the legal framework, especially cross-border.

#### *Basel Capital Accord*

The Basel Capital Accord proposals<sup>64</sup> are a prime example. Their main aim is to align regulatory capital more closely with the

<sup>63</sup>: 'Clearance and Settlement Systems in the World's Securities Markets', Group of Thirty, March 1989.

<sup>64</sup>: 'Consultative package on the Basel Accord', Bank for International Settlements, January 2001. An article summarising the proposals 'Bank capital standards: the new Basel Accord' by Patricia Jackson, appeared in the Spring 2001 *Bank of England Quarterly Bulletin*.



underlying risks than in the 1988 Accord. The Basel Committee on Banking Supervision (BCBS) is expected to release the final version of the new Accord by the end of 2001 for implementation in 2004, so it is too early to analyse any impact on banks' behaviour.

#### *EU Directive on winding-up credit institutions*

Effective crisis management requires an effective framework for insolvency proceedings, not least because that affects incentives during any pre-insolvency negotiations. It is therefore welcome that, 16 years after first being proposed, the EU Directive of 4 April 2001 on the reorganisation and compulsory winding-up of credit institutions (banks) has completed its legislative passage. Currently, if a bank with branches across Europe has to be wound up, the authorities in each Member State where the bank is represented can open separate insolvency proceedings. This can lead to conflicts of jurisdiction and unequal treatment of creditors. There can also be divergent approaches if a bank has to be reorganised. Under the Directive, the winding-up process will be subject to a single bankruptcy proceeding initiated in the Member State where the bank has its registered office and governed by that home state's bankruptcy law. This should ensure a clearly established procedure, equally valid for all creditors, for the division of assets. A parallel EU measure for the reorganisation and winding-up of insurance undertakings was finalised in March.

The need for workable insolvency procedures was highlighted by the Asian crises. The World Bank, working with a number of international organisations and insolvency experts, has developed a draft set of Principles and Guidelines for Effective Insolvency and Creditor Rights Systems, on which it is seeking feedback. It has also developed a 'diagnostic template' for conducting insolvency assessments and plans to produce ROSC modules (see above) in respect of the insolvency regimes of six to eight countries during the coming year.

#### *EU requirement for use of International Accounting Standards*

Several recent developments aim to promote transparency of risk and risk management which, by aiding pricing, should, in the longer term, help to make markets more resilient to shocks. For example, on 13 February the European Commission proposed a Regulation that would require all EU listed companies on a regulated market to prepare consolidated accounts in accordance with International Accounting Standards (IAS) by 2005. The Regulation is a priority under the Commission's Financial Services Action Plan, which aims to create a fully integrated single market in financial services.

#### *Draft EU Collateral Directive*

On 27 March 2001, the European Commission proposed a Directive that would create a uniform EU legal framework for the

provision of securities and cash as collateral. To date, the 1998 Settlement Finality Directive is the only piece of European legislation protecting cross-border provision of collateral in the context of financial transactions<sup>65</sup>. Relevant national rules are often inconsistent, resulting in uncertainty about the enforceability of collateral. The creation of a clear, uniform, pan-EU legal framework should contribute both to the efficiency and stability of the EU financial system. The proposal is another Financial Services Action Plan priority.

#### *US Commodity Futures Modernization Act*

Progress was made in a similar area in the United States on 15 December 2000, when Congress passed the Commodity Futures Modernization Act. The main benefit for financial stability will come from provisions, based on recommendations made in a 1999 President's Working Group report, which give legal certainty that swap transactions will continue to be enforceable in accordance with their terms. Given the size of swap markets, this development is very welcome.

#### *Highly leveraged institutions*

Following the 1998 turmoil in financial markets, legislation was introduced in the US Congress to require US hedge funds with net assets of more than US\$1 billion, to publish quarterly risk reports. Since the December *Review*, the US Congress has voted down the proposal and has decided not to proceed with the hedge fund disclosure legislation. This probably reduces the chances of similar measures being introduced elsewhere.

#### *Electronic transfer of title in CREST*

Currently, there is a short lag between settlement of transactions through CREST and the updating of registers to confer full legal title. This lag introduces a low likelihood, but potentially high impact risk of intervention by a Court between settlement and registration. On 23 February 2001, HM Treasury published a consultation document<sup>66</sup> including draft new Uncertificated Securities Regulations intended to replace the 1995 Regulations which set up the legal structure for CREST. The planned new Regulations, expected to be passed through Parliament later this year, will implement Electronic Transfer of Title, removing the lag between settlement and registration, so that transfers through CREST immediately convey full legal title to securities.

#### *Abolition of Minimum Funding Requirement for UK pension funds*

On 7 March 2001, the Chancellor of the Exchequer announced that the Minimum Funding Requirement (MFR) for pension funds would be abolished. This followed concerns that the MFR

---

<sup>65</sup>: The June 1999 *Review* described the preparations to implement the EU Settlement Finality Directive.

<sup>66</sup>: 'Modernising Securities Settlement: A proposal for consultation' HM Treasury, February 2001 ([www.hm-treasury.gov.uk](http://www.hm-treasury.gov.uk)).

had distorted pension schemes' investment decisions<sup>67</sup> and adversely affected gilt market liquidity, which is a key medium for the risk management of financial intermediaries. The Government plans to legislate to replace the MFR with, *inter alia*, a 'long-term scheme-specific funding standard'. The Department for Work and Pensions is consulting the pensions industry and other interested parties. Abolition of the MFR is likely to affect investment patterns and liquidity and, hence, risk distribution. It may reduce demand for gilts from pension funds and encourage them to invest in a wider range of assets, including non-government sterling bonds; the full effects will probably not be felt until the MFR is replaced. Of course, the MFR was not the only influence on pension fund investment in the gilt market. The increasing maturity of fund liabilities, relatively price-insensitive demand from insurance companies wishing to hedge guaranteed annuity embedded option liabilities, and declining gilt supply have also been important factors.

#### *Financial Reporting Standard 17*

Although abolishing the MFR should extend the scope for portfolio diversification, increases might be limited by Financial Reporting Standard (FRS) 17 on the treatment of pensions and retirement benefits (published by the Accounting Standards Board in November 2000). FRS 17 will not be applied until June 2003 so the full effects might not be felt for some time, but disclosures will be required in the notes to accounts from June 2001. The standard aims to make pension costs in company accounts more transparent and, in so doing, may make reported company net worth more volatile. Deficits and (recoverable) surpluses arising on defined benefit schemes are treated as assets and liabilities for the sponsoring company and reflected on its balance sheet. Substantial surpluses and deficits can arise because the value of scheme assets could fluctuate more than liabilities. Any pension scheme deficits will have to be deducted from 'distributable reserves', lowering dividend cover and possibly forcing a company to pass on, or lower, dividends. Key issues are how investors would react, and what knock-on effects there might be on company behaviour. If investors reacted unfavourably, some companies might aim to reduce variability in pension fund valuations by ensuring pension schemes invest in low-risk bonds. There is potential, therefore, for FRS 17 to affect asset allocation and, conceivably, market dynamics.

---

<sup>67</sup>: For a description of the effects of the MFR on pension fund behaviour and bond yields, see the November 1999 *Review*, p. 87, and the November 2000 *Bank of England Quarterly Bulletin*, p. 334.



# Financial flows via offshore financial centres

## as part of the international financial system

Liz Dixon, International Finance Division, Bank of England

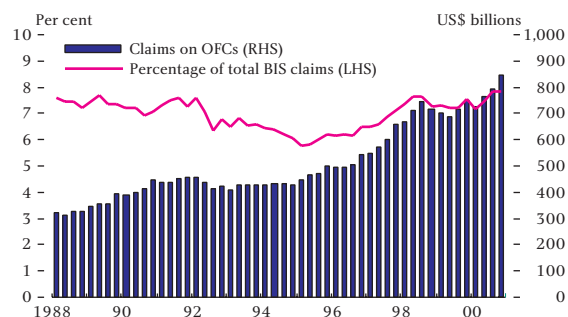
Offshore financial centres (OFCs) have become an important part of the international financial system. Cross-border bank lending to entities domiciled in OFCs is around US\$850 billion, double the amount ten years ago. The Bank of England has therefore been exploring whether financial flows through OFCs can provide insights into developments, and so potential risks, in the international financial system. It seems they may be able to do so, although there are issues about data availability. This article reports on some of the work to date.

**BANKS' ON- AND OFF-BALANCE SHEET** exposures to counterparties in other countries provide one linkage through which economic and financial shocks can be transmitted. For this reason, the Bank monitors aggregate cross-border banking exposures and uses this information to try to assess potential risks to stability<sup>1</sup>.

According to the Bank for International Settlements (BIS), approximately 8 per cent (US\$850 billion) of cross-border lending is to institutions located in so-called offshore financial centres. These claims have almost doubled since 1990 (Chart 1) mirroring the growth in global cross-border banking activity which, with an interruption following the collapse of Long Term Capital Management (LTCM), has been rapid since the mid-1990s. Some individual OFCs have, in the process, become large international financial centres (Table 1). A substantial proportion of internationally active banks' off-balance sheet business, which is not covered by internationally compiled data, may also be conducted via affiliates located in OFCs.

This article is *not* concerned with the money laundering, tax competition or supervisory and regulatory issues which have sometimes been associated with some offshore activity. Instead, it focuses on whether the ability of OFCs to respond rapidly to the changing needs of international

**Chart 1:**  
**External business of BIS-area banks with OFCs**



Source: BIS.

markets means that data on OFC-intermediated business might provide an early indication of interesting developments in global finance. Because financial intermediation undertaken by entities based in many OFCs is almost entirely 'entrepôt', the pattern of financial flows through them may occasionally give a clearer reading of developments than data on flows through other international financial centres, such as London and New York, where activity related to the domestic economy is greater. Interpreting the available data entails looking at the types of financial transaction that lie behind the aggregate statistics; and considering what other financial activities, not captured by banks' balance sheet data, might involve intermediation via entities located in (or at least legally domiciled in) OFCs.

<sup>1</sup>: For example, see Buckle, Cunningham and Davis, 'A possible international ranking for UK financial stability' in the June 2000 *Bank of England Financial Stability Review*.

## What is an offshore financial centre?

An OFC may be defined as a jurisdiction in which transactions with non-residents far outweigh transactions related to the domestic economy. They have developed by offering an attractive tax, legal and/or regulatory environment. In particular, the absence of inheritance, wealth, withholding or capital gains taxes can make the environment in OFCs very favourable to, for example, internationally mobile individuals. Zero or low direct taxes can make it attractive for companies conducting business with non-residents to incorporate in OFCs. In a similar vein, the corporate legal environment may facilitate speedy adoption of new financial products or allow greater flexibility in restructuring and refinancing options. Political and economic stability and the presence of high quality professional (eg legal and accounting) and supporting services are also important in attracting business from other major financial centres.

A number of important OFCs are small island states, with few domestically owned financial institutions, a large number of 'brass-plate' institutions and little non-financial economic activity. The Cayman Islands and the British Virgin Islands are obvious examples (Table 2). But the distinction between OFCs and other financial centres is not clear-cut. Some countries – such as Hong Kong and Singapore – have a significant volume of entrepôt business alongside

domestically orientated financial intermediation. The term 'OFC' is, furthermore, sometimes also used in connection with special tax and/or regulation zones

**Table 1:**  
International financial centres ranked by banks' external assets: end-2000

US\$ billions	External assets
United Kingdom	2,095
Japan	1,199
Germany	975
United States	951
<b>Cayman Islands</b>	<b>782</b>
Switzerland	740
France	640
Luxembourg	510
Hong Kong	450
Singapore	424
Netherlands	290
Belgium	285
<b>Bahamas</b>	<b>276</b>

Source: BIS.

**Table 2:**  
Scale of international banking activities in selected financial centres

	GDP (latest available)	BIS banks' locational claims (end-2000)	
	US\$ billions	US\$ billions	Multiple of GDP
Bahamas	5.6	172	31
Bermuda	2.4	32	13
British Virgin Islands	0.3	25 <sup>(a)</sup>	86
Cayman Islands	0.9	482	518
Crown Dependencies	4.6	234 <sup>(b)</sup>	51
Luxembourg	19.3	245	13
Hong Kong	159	193	1.2
Singapore	85	221	2.6
United Kingdom	1,442	1,508	1.0
United States	9,152	2,096	0.2

Sources: BIS, World Bank, CIA and Bank of England.

(a) Banking data include claims on other jurisdictions in the British West Indies.

(b) Jersey, Guernsey and the Isle of Man. Banking data are total liabilities of banks and building societies to non-residents converted from sterling at the end-2000 rate of US\$1.4950/£.



that are established within the borders of a country to attract non-resident business (for example Labuan in Malaysia, or the International Financial Services Centre in Dublin).

The focus here is on the activities of the small island centres whose financial activities are almost exclusively *entrepôt*. Unless otherwise stated, aggregate data for OFCs include countries defined by the BIS as OFCs *but not* Hong Kong and Singapore<sup>2</sup>.

### Data sources

The BIS international banking statistics give only a partial picture of financial flows through OFCs – based on the on-balance sheet exposures of banks operating in the BIS area ('BIS banks') – but they nevertheless provide the most comprehensive source of timely information. BIS banks report two separate sets of quarterly international banking statistics: *locational data* and *consolidated data*. The *locational data*, on which Chart 1 and Table 1 are based, provide quarterly information about all on-balance sheet financial claims and liabilities *vis-à-vis* non-residents, including positions with foreign affiliates (branches and subsidiaries) of the reporting firm. The *consolidated data* cover only the assets side of the balance sheet and are compiled net of intragroup positions of banks whose head office lies within the BIS reporting area. Both series split claims between the bank and non-bank sectors, and the consolidated data further split the non-bank data between claims on the public and private sectors. Additionally, the BIS publish information that enables the consolidated data to be adjusted for reallocations of risk arising from the use of cross-border guarantees. Box 1 explains the main conceptual differences between the two series.

Other important sources of data on cross-border capital flows are commercial databases such as Capital Data's Bondware and Loanware and the TASS hedge fund database. The Capital Data databases contain borrower and instrument details on bonds, international equities and syndicated loans. Bondware covers a wide range of bonds (including fixed and floating rate, collateralised and convertible obligations) and international equities. The database provides information on, *inter alia*, a borrower's nationality, sector and credit rating, and on the

maturity, coupon, collateral and pricing of the instrument. Loanware provides a similar range of information on syndicated loans, commercial paper and other related banking instruments.

The TASS hedge fund database has details of assets under management, and the performance and strategies of around 2600 hedge funds managing over US\$200 billion. TASS estimate that their database covers over half of global assets under hedge fund management (estimated to be between US\$350 billion and US\$400 billion).

The other main sources of data on OFCs are the Edwards report (1998) and the KPMG report (2000) which were the culmination of reviews of financial regulation in the UK Crown Dependencies, Overseas Territories and Bermuda. They provide a snapshot (rather than a time series) view of activity, and clearly cover only a limited set of jurisdictions.

### Financial intermediation via OFCs

The three main kinds of financial activity conducted by entities based in OFCs are banking, fund management and insurance. Table 3 presents some estimates of the scale of these activities in four major OFCs.

Large numbers of foreign banks – banks with little or no presence in an OFC's domestic banking sector – are licensed in OFCs. The Cayman Islands, with 450 licensed banks and external assets of around US\$780 billion, is one of the world's largest banking centres. More than 200 banks are licensed in the Crown Dependencies. Banks incorporated in onshore jurisdictions often establish affiliates in OFCs to act as booking centres (that is, to serve as a registry for transactions arranged and managed in another country) and to provide private banking, trust and fund administration services to high net worth individuals. And some multinational corporates set up in-house offshore banks to handle foreign exchange operations or to facilitate the raising of finance.

OFCs are also large centres for the establishment and administration of mutual funds, with around US\$400 billion of assets under management. Mutual fund assets are however estimated at around

<sup>2</sup>: Aruba, Bahamas, Bahrain, Barbados, Bermuda, Cayman Islands, Lebanon, Liberia, Netherlands Antilles, Panama, Vanuatu and West Indies UK (comprising Anguilla, Antigua and Barbuda, British Virgin Islands, St Kitts and Nevis, and Montserrat). Claims on the Crown Dependencies – Jersey, Guernsey and the Isle of Man – are not included because the BIS statistics treat the Crown Dependencies as part of the United Kingdom.

## Box 1: The BIS international banking statistics<sup>1</sup>

The key difference between the BIS locational and consolidated data turns on the concept of residence. The *locational* statistics are concerned with the financial claims and liabilities of bank offices – both domestic and foreign-owned – operating within the boundaries of BIS reporting countries. Positions are recorded on a gross (unconsolidated) basis, and therefore include positions *vis-à-vis* foreign affiliates, so are consistent with national accounts, balance of payments and external debt statistics.

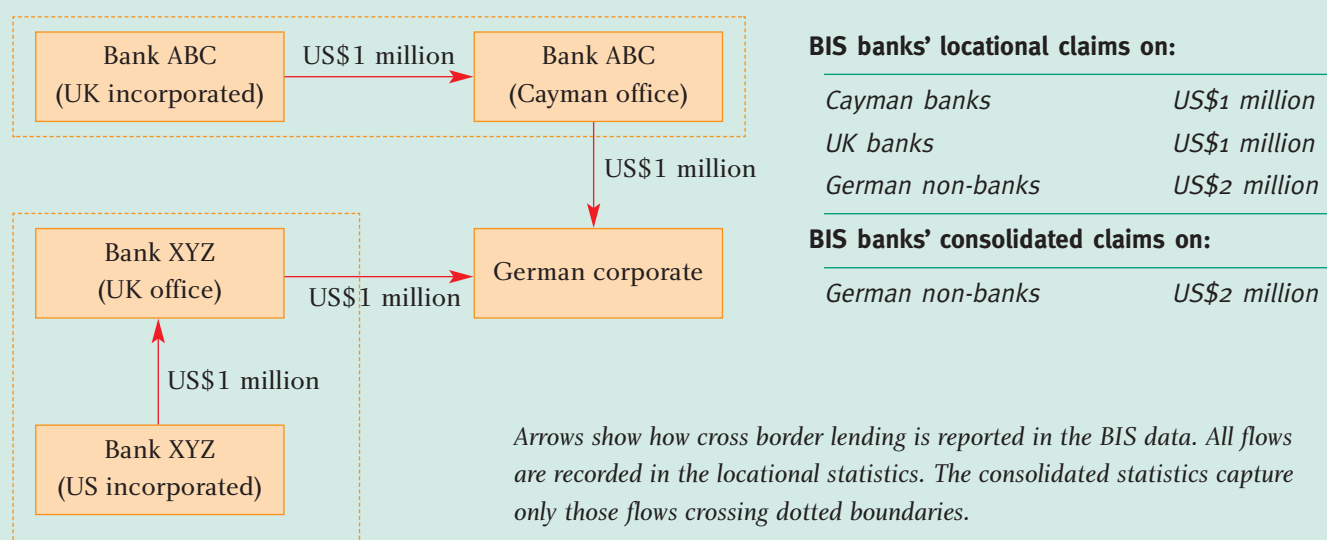
The *consolidated* data mainly comprise the cross-border financial claims of banks whose head offices are domiciled within the BIS reporting area, including the exposures of their foreign affiliates (subsidiaries as well as branches). These data are reported on a worldwide consolidated basis with inter-office positions netted out. The data also include international claims of BIS-area offices of non-BIS area banks reported on an unconsolidated basis, and the unconsolidated claims of foreign branches and subsidiaries of BIS-area banks on their home country.

Figure A illustrates how these differences are manifested in the published statistics. In this example, a UK-incorporated bank (Bank ABC) has routed a US\$1 million cross-border loan to a German corporate via its branch office in the Caymans. In the locational data, each leg of the loan is recorded. So UK-resident banks' claims on Cayman-resident banks and Cayman-resident banks' claims on German-resident non-banks both increase by US\$1 million.

In the consolidated data, the intrabank flow is consolidated out, so the data show only a UK bank claim on the ultimate recipient of the funds (the German corporate). Similarly, a loan from the London branch of a US bank (Bank XYZ) to a German corporate is recorded in the locational data as a UK bank claim on a German non-bank (plus an interbank claim from the US on the UK if the funds originated in the US), but as a US bank claim on Germany in the consolidated data.

Since 1999, a variant of the consolidated data (but not the locational data) has been published which reports information on the reallocation of claims via risk transfer instruments to the country of ultimate risk. The latter is defined as the country where the ultimate guarantor of a claim is legally resident. For example, if a UK bank loan to the German subsidiary of a US company is guaranteed by its parent in the US, the consolidated data will show a claim on Germany, whereas the *ultimate risk* data will take account of the guarantee and show the loan as a UK bank claim on the US. If the loan had been made by a US-resident bank, a cross-border exposure would be recorded in the consolidated series but not in the ultimate risk series. At present, some but not all types of risk transfer technique are covered in the BIS data; in particular transfers via credit derivatives (or via credit insurance) are not captured. This will have become a more significant gap in the data as the credit derivatives market has grown (Box 2).

**Figure A: Flows of funds and the BIS locational and consolidated data.**



<sup>1</sup> See BIS (2000) for further detail

**Table 3:**  
**Financial activities conducted in major OFCs**

US\$ billions (unless stated otherwise)	Bermuda	British Virgin Islands	Cayman Islands	Crown Dependencies
BIS locational claims <sup>(a)</sup>	32	25	482	21
BIS consolidated claims <sup>(a)</sup>	29	26	257	9
<b>Banking<sup>(b)</sup></b>				
Total assets	17	3	782	364
Number of licensed banks	3 banks	13 banks	450 banks	216 banks
<b>Fund management<sup>(b)</sup></b>				
Funds under management	37	55	196	103
Number of funds	1,301 funds	1,684 funds	2,298 funds	n/a
<b>Hedge fund activity<sup>(c)</sup></b>				
Assets under management	13	33	44	2
Number of funds	136 funds	204 funds	367 funds	31 funds
<b>Company incorporation and SPV activity</b>				
Number of special or no tax companies, '000s <sup>(b)</sup>	11	250	35	46
Collateral backed bonds	4	1	115	38
<b>Insurance<sup>(b)</sup></b>				
Insurance assets	132	n/a	10	33
Gross annual premia	30	0.25	n/a	9

Sources: BIS, Edwards (1998), KPMG (2000), TASS Research, Capital Data, Bank of England and Bermuda Insurance Institute.

(a) End-2000. Data for BVI include claims on other jurisdictions in the British West Indies. Data for Crown Dependencies are claims of UK-resident banks only.

(b) Data are for latest available period. Data taken from Edwards report are converted from sterling at the end-1997 rate of US\$1.6597/£.

(c) End-March 2001.

US\$12 trillion worldwide<sup>3</sup> so that OFCs account for only a small proportion of the total.

Hedge funds legally domiciled in OFCs hold around half of the hedge fund assets reported to TASS, with the British Virgin Islands and the Cayman Islands being the most popular locations. Management of hedge funds is often conducted in or near to major international financial centres (such as London or New York), but the funds themselves are frequently registered in OFCs.

Some OFCs – in particular, Bermuda – have extensive international insurance sectors comprising life assurance and reinsurance companies and also captive (in-house) insurance companies. Bermuda's insurance business originally developed in the 1960s

because of a favourable regulatory and legal environment. It is now a big centre with insurance assets totalling over US\$130 billion<sup>4</sup>, over 30 per cent of the world's captive insurance companies and some of the largest catastrophe reinsurers in the world.

In many OFCs, the low costs associated with setting up a company, coupled with a favourable tax environment, makes them attractive to company incorporation. For example, it has been estimated that 45 per cent of the world's international business corporations (which are used exclusively as offshore vehicles) are incorporated in the British Virgin Islands (KPMG (2000)). One of the most rapidly growing uses of such companies in recent years has been as special purpose vehicles (SPVs) which are used by non-financial corporations to lower the costs of

3: Investment Company Institute, [www.ici.org](http://www.ici.org).

4: Bermuda Insurance Institute, [www.bermuda-insurance.org](http://www.bermuda-insurance.org).

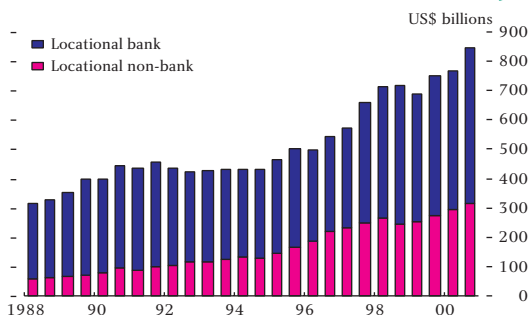
raising finance, and by financial institutions for securitisations. Around one quarter by number of international securitisations are conducted via OFCs (including the Crown Dependencies).

The BIS data can be analysed in several different ways: for example, by the OFC in which the borrower is domiciled, by the type of borrower and by the country of the lender<sup>6</sup>. As Charts 4 and 5 show, the rapid growth in the mid-1990s can largely be attributed to increased lending to non-banks and, in particular, to non-banks domiciled in the Cayman Islands. The Cayman Islands account for around 60 per cent of total consolidated and locational claims on OFCs. A further 20 per cent of locational claims on OFCs are claims on entities based in the Bahamas, but the islands' share of consolidated claims on OFCs is only 5 per cent. This suggests that financial intermediation conducted via the Bahamas is of a quite different nature to that conducted via the Caymans. As the following section shows, the data reflect the prevalence of intragroup booking activity in the Bahamas. The most rapid growth has been in claims on entities based in Bermuda and the

### Interpreting the data on financial flows through OFCs

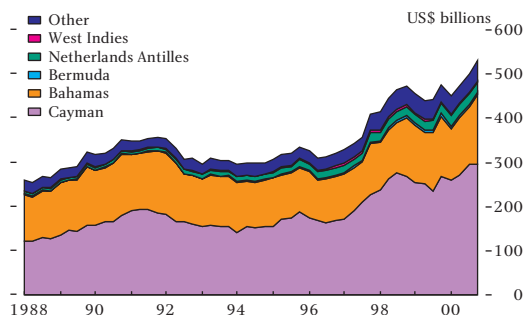
How far can available data be used to track the significance of intermediation via OFCs? As already noted, BIS-bank cross-border (locational) lending to institutions located in OFCs almost doubled between end-1990 and end-2000 to around US\$850 billion. BIS-banks' gross consolidated claims on entities based in OFCs rose even more rapidly, increasing by 160 per cent over the decade to US\$424 billion. Locational and consolidated claims both grew particularly strongly between 1995 and 1998 but fell in early 1999 in the aftermath of the Russian and LTCM crises<sup>5</sup> (Charts 2 and 3).

**Chart 2:**  
Locational claims on OFCs bank/non-bank split



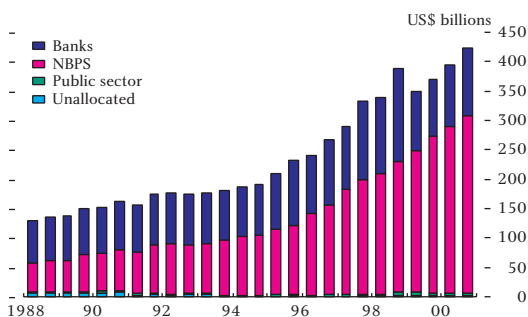
Source: BIS.

**Chart 4:**  
BIS banks' locational claims on OFC resident banks



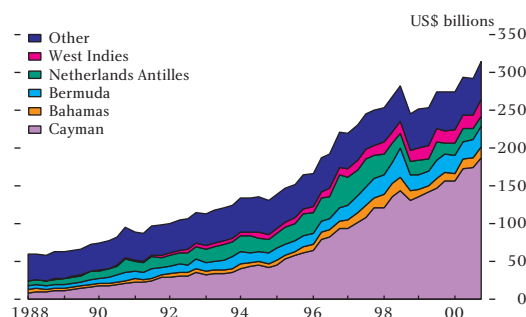
Source: BIS.

**Chart 3:**  
Consolidated claims on OFCs by sector



Source: BIS.

**Chart 5:**  
BIS banks' locational claims on OFC resident non-banks



Source: BIS.

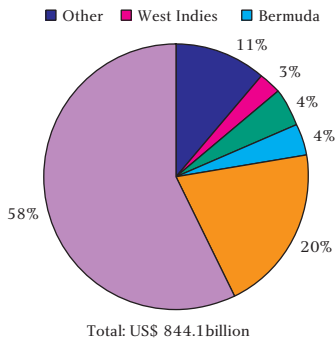
5: The consolidated claims data are distorted by a statistical break in early 1999. For this reason, the article focuses primarily on locational data.

6: The breakdown of the locational data by creditor country is not, at present, published by the BIS.

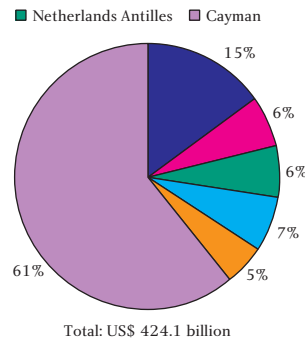
**Chart 6:**

**BIS banks' total claims on individual OFCs**

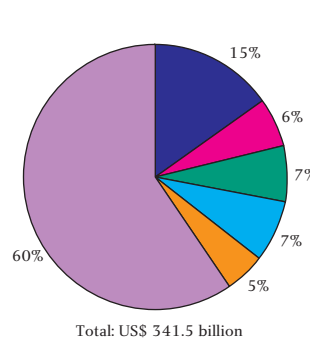
**Chart A: Locational**



**Chart B: Consolidated**



**Chart C: Ultimate risk**



Source: BIS.

West Indies (predominantly the British Virgin Islands), albeit from a lower base.

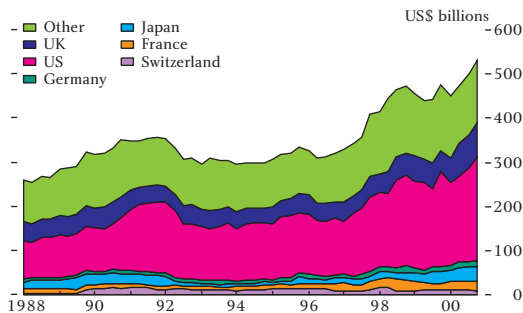
When monitoring the pattern of exposures in the international financial system generated by activity in onshore jurisdictions, consolidated claims provide an estimate of overall bank exposures to a country. The rationale for looking at exposures in this way is that the ultimate risk of a claim on a given country lies with an enterprise resident in that country and hence sensitive to the health of the domestic economy<sup>7</sup>. But this is not the case for OFCs. The small size of OFCs' domestic economies makes it highly unlikely that the ultimate risk of a claim on an OFC arises from domestic economy activity. The ultimate risk data support this hypothesis. Approximately one-quarter of consolidated claims on entities based in OFCs are guaranteed by an entity in another country. There is no clear pattern to the geographic distribution of these guarantees so the market shares of individual

OFCs in the ultimate risk series are broadly similar to those in the consolidated data (Charts 6a-6c).

Banks operating in the US account for around one-third of all locational claims on OFC based banks, but only 13 per cent of locational claims on non-banks and 7 per cent of total consolidated claims (Charts 7 and 8). Japanese and German banks, on the other hand, have a larger share of consolidated claims on OFC domiciled entities than of locational claims (Charts 9a-9b). Indeed, the stock of German banks' consolidated claims is markedly larger than their locational claims. Japanese banks account for much of the growth in, and over one quarter of the stock of, locational claims on the non-bank private sector: one possible explanation for this growth is Japanese banks' SPV activity. These differences may reflect an increased tendency on the part of US banks to route intrabank flows through OFCs for tax or other reasons. But they might also

**Chart 7:**

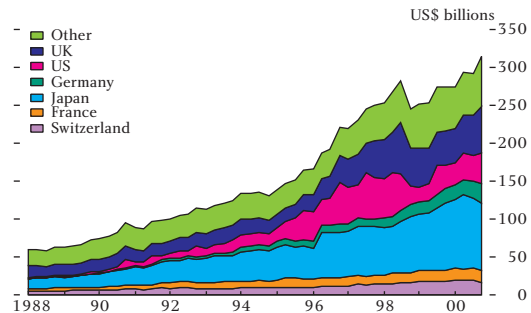
**BIS banks' locational claims on OFC banks by creditor country**



Source: BIS.

**Chart 8:**

**BIS banks' locational claims on OFC non-banks by creditor country**



Source: BIS.

7: For example, see Buckle, Cunningham and Davis (2000).

Chart 9:

BIS banks' total claims on OFCs by nationality of creditor

Chart A: Locational

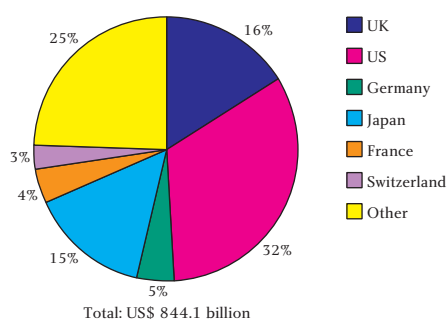
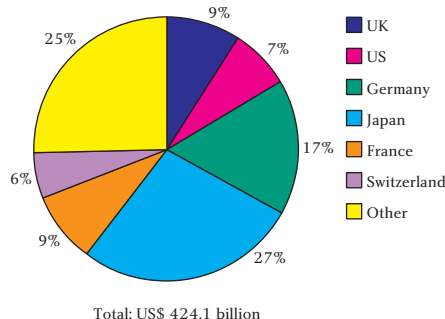


Chart B: Consolidated



Source: BIS.

suggest that intermediation via OFCs of banks headquartered outside the US is conducted through their US affiliates.

Useful information can potentially be derived from analysis of changes in banks' balance sheet exposures, particularly if used in conjunction with other data sources and market intelligence. Some examples are considered in the following sections.

(i) Banking

Almost two-thirds (US\$500 billion) of BIS-banks' locational claims on OFCs are claims on the banking sector. Whereas claims on non-banks domiciled in OFCs rose by 275 per cent during the 1990s, claims on banks were broadly stable until the mid-1990s but then rose by around 50 per cent between 1997 and 2000 (with a pause in growth in late 1998 and early 1999).

The existence of private banking services means that some offshore banks have large balance sheets in their own right. For example, banks in the Crown Dependencies take deposits from non-bank non-residents and place them (probably immediately) in the interbank market, either in London or elsewhere (Table 4).

Many of the banks licensed in OFCs are, however, 'brass-plate' – that is, they have no physical presence in the OFC and conduct their operations out of New York, London or elsewhere. And a comparison of the consolidated and locational claims suggests that up to 80 per cent of the interbank flows via offshore banks may simply be activity between institutions within the same banking group (Chart 10)<sup>8</sup>. In the Bahamas, which is used as a booking centre by many banks, around 85 per cent of all cross-border intermediation is estimated to be intra-banking group activity. Banks route their cross-border lending via

Table 4:

Aggregate balance sheet of banks<sup>(a)</sup> in the Crown Dependencies: end-2000

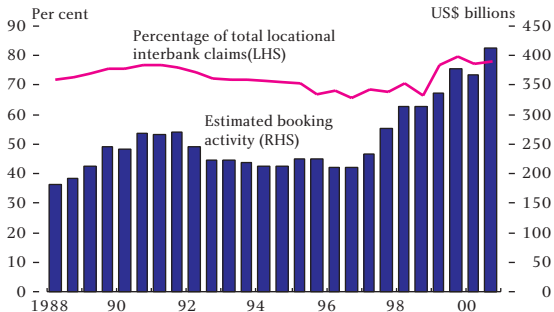
Liabilities		Assets	
US\$ billions			
Deposits	315	Loans and advances	301
Domestic residents	81	Domestic residents	32
UK residents	51	UK residents	159
Other non-residents	182	Other non-residents	110
<i>o/w from banks</i>	<i>59</i>	<i>o/w to banks</i>	<i>273</i>
Other liabilities	49	Other assets	63
Total liabilities	364	Total assets	364

Source: Bank of England.  
(a) Includes building societies.

<sup>8</sup>: Differences in reporting population and breaks in series mean that the two series are not directly comparable.



**Chart 10:**  
**Estimated intragroup bank booking activity via OFCs<sup>(a)</sup>**



Source: BIS.

(a) Booking activity defined as locational claims on banks less consolidated claims.

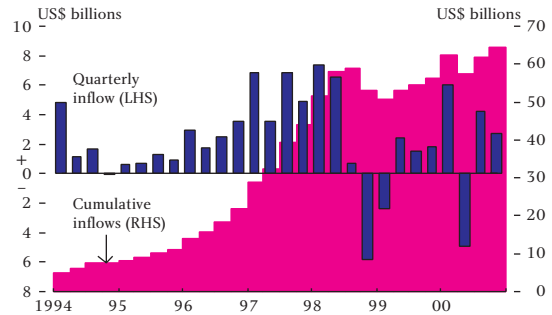
offshore centres partly because OFCs offer a tax-efficient way to co-ordinate activities conducted across many jurisdictions. Such activity should be relatively well insulated from the sovereign risk of the OFC because it could, if necessary, be rerouted through other financial centres at relatively little cost<sup>9</sup>.

## (ii) Hedge funds

The development of hedge funds provides an example of how monitoring financial flows through OFCs could occasionally signal a change in financial activity and prompt further investigation. At first glance the similarity between the cumulative inflows into hedge funds reporting to TASS and locational claims on OFC non-banks is striking. Around US\$60 billion (excluding asset revaluations) flowed into hedge funds between 1994 and the third quarter of 1998 (Chart 11). Investors withdrew over US\$8 billion in the immediate aftermath of the LTCM crisis. Inflows resumed within six months but at a somewhat moderated rate. Cumulative inflows since the LTCM episode have been around US\$25 billion. (The US\$5 billion outflow in the second quarter of 2000 probably reflected the closing down of the funds of Tiger Investment Management and the restructuring of Soros Fund Management.)

How might the growth in hedge fund activity be reflected in international banking system claims on OFCs? Hedge funds' investment strategies often involve leverage. If a fund resident in an OFC achieves its desired leverage ratio by borrowing from a lender (whether a bank or prime broker<sup>10</sup>) that reports data to the BIS, this will be reflected in an increase in

**Chart 11:**  
**Quarterly investor flows<sup>(a)</sup> into hedge funds**



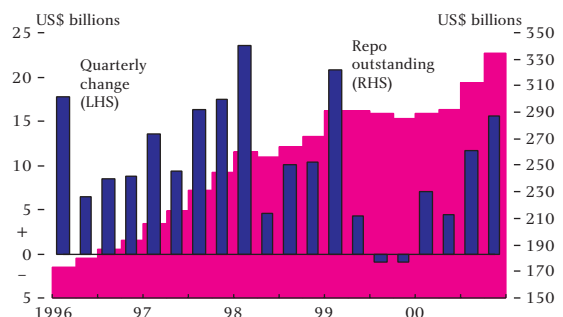
Source: TASS.

(a) Flows are money flowing into/out of the industry. Revaluation effects are not included.

claims on the OFC in which the hedge fund is domiciled. The amount of leverage individual hedge funds use depends on their investment strategies, and information about LTCM and anecdotal evidence suggests that hedge fund leverage rose sharply in the lead up to the LTCM episode, falling thereafter.

With the data available, it is hard to draw clear conclusions about the behaviour of particular groups of financial intermediaries, still less of individual firms. But the increase in aggregate BIS claims on OFCs, alongside anecdote and data showing rapid growth in hedge fund assets and the sharp rise in reverse repo lending by UK-resident banks to non-residents (Chart 12), are consistent with the kind of geared positions that were being built up during the mid to late-1990s. This is perhaps enough to suggest that, as part of official surveillance of potential financial stability risks, a macroprudential approach

**Chart 12:**  
**UK banks' claims under repo transactions with non-residents<sup>(a)</sup>**



Source: Bank of England.

(a) Gilt repo introduced in January 1996.

<sup>9</sup>: Reflecting this, Moody's assigns offshore banks a rating ceiling that is significantly higher than the country's sovereign ceiling (Moody's (1997)).

<sup>10</sup>: Some large prime brokers are securities dealers rather than banks and so are not covered by the BIS banking data.

to analysing banking system data can usefully complement – and inform – market intelligence work.

**(iii) Securitisations**

Hedge funds are not the only non-bank financial institutions located in OFCs to which BIS-area banks lend. The growth in the use of special purpose vehicles for securitised financing might also be reflected in flows of funds to OFCs.

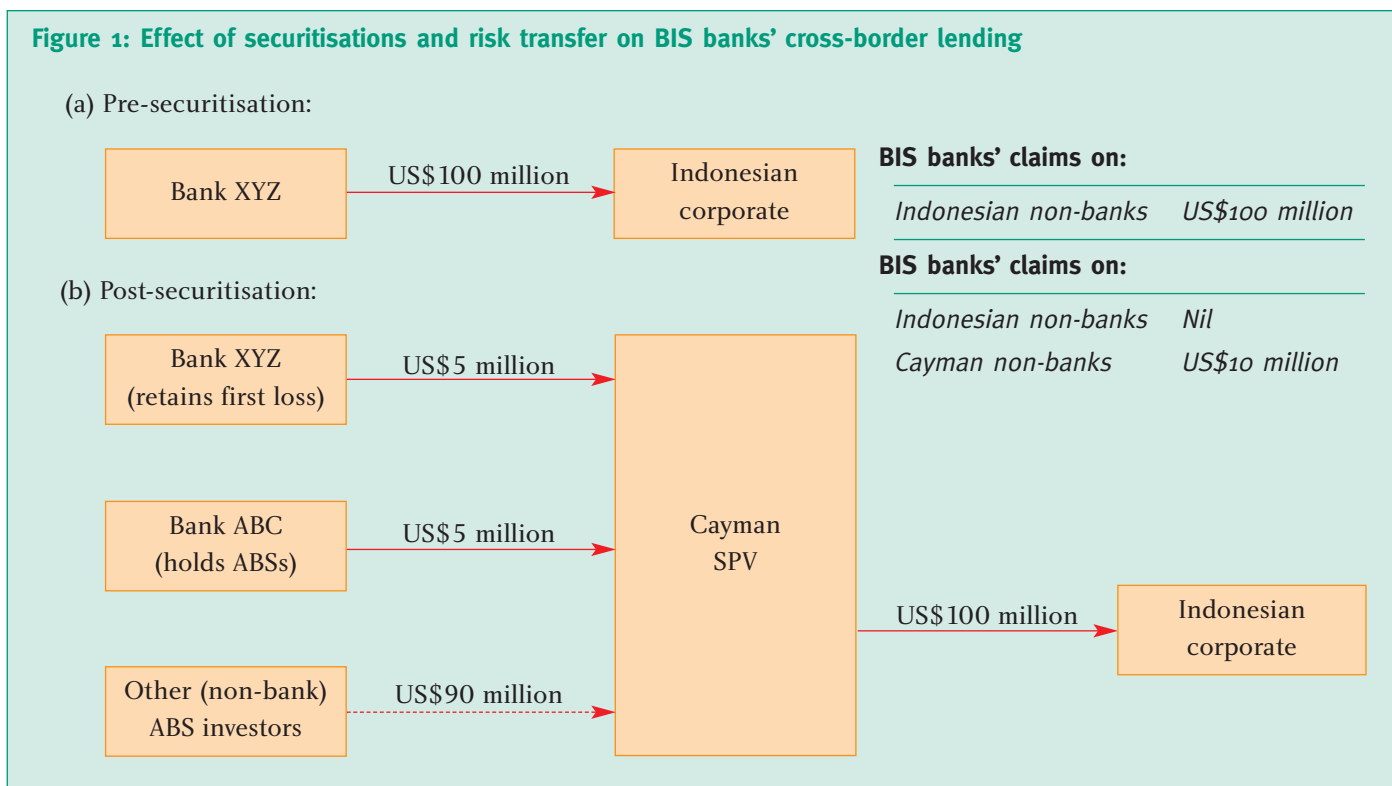
The use of SPVs for secured borrowing by non-financial corporations<sup>11</sup>, whether via loans or publicly issued bonds, will be directly reflected in the BIS data: banks extending finance to such vehicles will record their claim as an exposure to the non-bank private sector in the OFC where the SPV is incorporated.

Asset backed securities (ABSs) are typically issued to move loans *off* a bank’s balance sheet; but a securitisation through an SPV located in an OFC could nevertheless lead to an increase in banking system claims on OFCs. How? First, if the originating bank provides (funded) credit enhancement<sup>12</sup> to the SPV, it will have a claim on the SPV on its balance

sheet. This will be recorded as cross-border lending to the OFC where the SPV is registered, not as a claim on the (onshore) jurisdiction where the loans originated. Second, if other banks purchase some proportion of the ABSs issued, these purchases will also be recorded as a claim on the SPV, and hence lead to an increase in claims on OFCs.

The flows of funds arising from SPVs might be interesting from a financial stability perspective because they represent transfers of risk. Take, as an example, the case of a US bank that securitises a loan to an Indonesian corporate via an SPV located in the Cayman Islands (Figure 1). Prior to the securitisation, the ultimate risk of the loan is borne by the US bank; this would be reflected in the BIS statistics (both locational and consolidated series) as a US claim on the Indonesian non-bank sector. Post-securitisation, the loan becomes an asset of the Cayman SPV and the credit risk is transferred to the purchasers of the asset-backed securities. If the originating bank retains the most junior tranche of the securitisation and/or other BIS banks buy some of the ABSs, a proportion of the ‘loan’ will continue to be captured in the total cross-border lending figures. But it will now be

**Figure 1: Effect of securitisations and risk transfer on BIS banks’ cross-border lending**



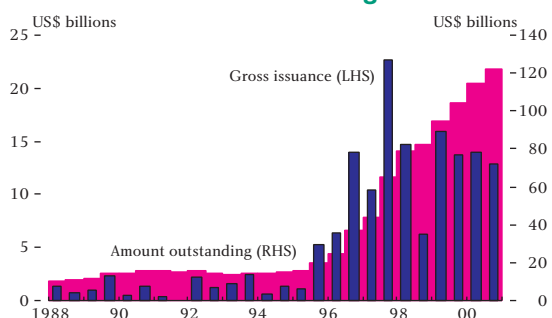
<sup>11</sup>: A typical example of a corporate financing SPV might be an entity created by a shipping company to raise finance for a ship. The company transfers ownership of the ship to the SPV to use as collateral against its borrowing – so the SPV’s balance sheet comprises only the ship and the loan used to finance it – then the SPV leases the ship back to its parent company using the rental income to service the loan. By ringfencing assets in this way, the company can benefit from cheaper financing.

<sup>12</sup>: If credit enhancement is provided via a credit derivative, it will not be reflected on-balance sheet.

recorded as an exposure to a Caymans-based non-bank, not as lending to Indonesia. The SPV's claim on the Indonesian corporate is not reflected in the BIS statistics because the SPV is not a bank. Moreover, holdings of ABSs by investors other than BIS banks will also not be captured in the BIS data. So the securitisation may give the impression that the indebtedness of the Indonesian corporate sector has fallen. The reality, however, is that the level of Indonesian corporate debt is unchanged<sup>13</sup>, but it is now more difficult to identify who bears the credit risk.

Whether or not this is significant to macroprudential surveillance clearly depends on the scale of such securitisation activity. In fact, anecdotal evidence and capital issues data suggest that it has increased rapidly in recent years. According to Capital Data, amounts outstanding of securities backed by some form of collateral issued by OFC-domiciled entities increased from around US\$10 billion in 1990 to around US\$115 billion at end-2000<sup>14</sup>. Gross half-yearly issuance peaked at US\$22 billion in the second half of 1997 (Chart 13) but has subsequently stabilised at a somewhat lower level. The concomitant increase in claims on OFCs is consistent with some of the credit risk associated with the underlying loans being retained on the originating bank's balance sheet and/or being transferred to other BIS banks via their purchases of ABSs. In particular, the increase in Japanese banks' claims on the Cayman Islands coincides with their efforts to restructure their balance sheets by securitising loans via SPVs

**Chart 13:**  
**Securities with collateral backing issued via OFCs<sup>(a)</sup>**



Source: Capital Data.

(a) Including, *inter alia*, receivable and mortgage backed securities, collateralised bond obligations (CBOs) and collateralised loan obligations (CLOs).

located there. Anecdotal evidence (BIS (2000a)) also suggests that Japanese investors, including other banks, purchased most of the securities issued by the SPVs.

Data on capital issues, when put alongside BIS international banking statistics, can therefore provide some insight into the pattern of global flows of funds. Even if the result is a puzzle, it may help to identify puzzles that are worth exploring in market intelligence work. But the increasing number of ways in which risk can be transferred – some of which do not involve flows of funds – make the task more complex (Box 2). This remains a challenge for further work and raises issues about what data should be collected by the international agencies.

## Conclusions

Data on financial intermediation via entities based in offshore financial centres may occasionally be able to provide some insight into developments in international finance because the information contained in them is not obscured by the 'noise' of the domestic economy. The rapid growth in cross-border bank lending between 1995 and 1998 – which may have been linked with the growth in macro hedge fund activity – is one possible example. Banks' balance sheet data can, however, give only a partial picture of the range of financial intermediation conducted via OFCs. Insurance companies, institutional investors and high net worth individuals all have substantial exposures to institutions located in OFCs, but there are no sources of timely data that will enable a complete risk assessment of their activities. Moreover, recent innovations in risk management techniques and increased use of off-balance sheet instruments – such as credit derivatives – mean that risk transfers are increasingly occurring without flows of funds. Nevertheless, a macroprudential approach to analysing banking system exposures to entities based in OFCs can be a useful complement to market intelligence work in analysing potential risks to the international financial system.

<sup>13</sup>: Information on the true level of corporate indebtedness is available from debtor-side statistics, such as the World Bank Global Development Finance statistics, but is subject to a long time lag.

<sup>14</sup>: This is likely to understate the total volume of such issuance owing to the scarcity of information on private placements.

## Box 2: Limitations of existing data sources

Increasingly, flows of risks are not reflected in balance sheet positions or indeed even accompanied by flows of funds. Often, the risks to institutions are off-balance sheet or contingent in nature.

Perhaps the clearest example is the use of derivatives, which are associated with substantial reallocations of risk but small flows of funds (option premiums or margin payments only). The BIS estimated the notional value of OTC derivative contracts outstanding at end-June 2000 to be US\$94 trillion. The market value of these contracts was estimated to be US\$2.6 trillion. About one-third of these contracts were with counterparties who did not themselves contribute to the survey (ie they were non-banks, or they were domiciled outside the BIS area, or both). No geographical breakdown of derivatives exposures is available at present but this residual is likely to include firms based in OFCs. Hedge funds, in particular, may be active participants in OTC derivatives markets. Onshore companies that are prohibited from derivatives trading may establish affiliates offshore to undertake trading for them. Given the size of these off-balance sheet positions and their growth in recent years, current efforts to assemble better information on these exposures are important from the viewpoint of assessing potential systemic risks.

Credit derivative activity, in particular, is weakening the relationship between flows of funds and risk transfers. The article *'The credit derivatives market: its development and possible implications for financial*

*stability'* in this Review explores some of the financial stability issues associated with this rapidly growing phenomenon. Anecdotal evidence suggests that reinsurance companies – including those in OFCs – are becoming established as active sellers of credit derivatives, as well as purchasers of credit-linked notes, building on their presence in the related credit insurance market. Such movements of credit risk from the banking system to the wider financial system cannot be detected by monitoring banks' balance sheet data or capital market issuance data.

Against this background, the Committee on the Global Financial System (CGFS), which has a close policy interest in the BIS international banking statistics, have proposed that the consolidated statistics be developed to make them more consistent with banks' own risk management systems (BIS (2001)). In particular, they have recommended that the statistics be restructured so that they more fully reflect contingent sources of borrowed funding – including off-balance sheet contracts – and hence credit risk. An additional area of data that could contribute to the efficacy of macroprudential surveillance would be information on financial intermediation via special purpose vehicles.

The insurance industry, more generally, is characterised by risk transfers and contingent financial liabilities. This is another area in which OFC-based entities are active. But at present there are no aggregate data on the financial positions of insurance companies, offshore or onshore.

### References

- 1: Bank for International Settlements (2000), *'Guide to the international banking statistics'*, July 2000.
- 2: Bank for International Settlements (2000a), *'BIS Quarterly Review'*, November.
- 3: Bank for International Settlements (2001), *'BIS Quarterly Review'*, March.
- 4: Buckle, S, Cunningham A, and Davis EP (2000), *'A possible international ranking for UK financial stability'*, Financial Stability Review, June.
- 5: Edwards, A (1998), *'Review of financial regulation in the Crown Dependencies'*, The Stationary Office, November 1998, [www.official-documents.co.uk/document/cm41/4109/4109.htm](http://www.official-documents.co.uk/document/cm41/4109/4109.htm).
- 6: Financial Stability Forum (2000a), *'Report of the Working Group on Offshore Centres'*, 5 April 2000, [www.fsforum.org](http://www.fsforum.org).

- 7: Financial Stability Forum (2000b), *'Report of the Working Group on Highly Leveraged Institutions'*, 5 April 2000, [www.fsforum.org](http://www.fsforum.org).

- 8: Jackson, P et al. (1999), *'Capital requirements and bank behaviour: the impact of the Basel Accord'*, Basel Committee on Banking Supervision Working Paper No. 1, April.

- 9: KPMG (2000), *'Review of financial regulation in the Caribbean Overseas Territories and Bermuda'*, The Stationary Office, November, [www.official-documents.co.uk/document/cm48/4855/4855.htm](http://www.official-documents.co.uk/document/cm48/4855/4855.htm).

- 10: Lemay, Y, Levey D, Mahoney, CT, and Truglia V (1997), *'Offshore banking centres and country risk'*, Moody's Special Comment, December.

- 11: TASS Investment Research Limited (2001), *'The TASS+ Asset Flows Report'*, February.

# The credit derivatives market: its development and possible implications for financial stability

David Rule, G10 Financial Surveillance Division, Bank of England

Bank failures have often arisen from excessive credit exposure to particular borrowers or groups of borrowers that were vulnerable to the same shocks. The further development of markets for transferring credit risk could, therefore, improve the stability and efficiency of the financial system. The credit derivatives market, in particular, has recently been growing rapidly: the notional principal outstanding is probably approaching US\$1 trillion globally. But it is by no means fully mature; and has not been tested during an economic slowdown, when credit events tend to be bunched, in the US and Europe. The full realisation of the potential benefits therefore lies somewhere in the future. Broadly, the market can be divided into two parts: an inter-dealer market in credit default swaps on individual companies and sovereigns, based on standard ISDA documentation; and transactions designed to transfer credit risk on portfolios of bank loans or debt securities, on which the risk is usually tranching. These portfolio transactions appear to be facilitating a net transfer of credit risk from banks to non-banks, principally insurance companies. Financial stability authorities need to track the scale and direction of this risk redistribution and more data is probably needed. This article describes the instruments and explores how different market participants use them. It then raises some questions about the markets for participants and the authorities to consider<sup>1</sup>.

**MARKETS IN** credit risk transfer have the potential to contribute to a more efficient allocation of credit risk in the economy. They could enable banks to reduce concentrations of exposure and diversify risk beyond their customer base. Liquid markets could also provide valuable price information, helping banks to price loans and other credit exposures. They might allow institutions other than banks to take on more credit risk, so that the immediate relationship banks have with end-borrowers need not mean they are excessively exposed to them.

A number of primary and secondary markets in debt instruments bearing credit risk are well established. Investment grade and, increasingly in North America and Europe, sub-investment grade borrowers are able to issue debt securities directly through international and domestic bond markets. Bank loans to companies are distributed through initial syndication and can be sold through the secondary loan market, including to non-banks. The development of securitisation techniques has allowed banks to sell portfolios of all

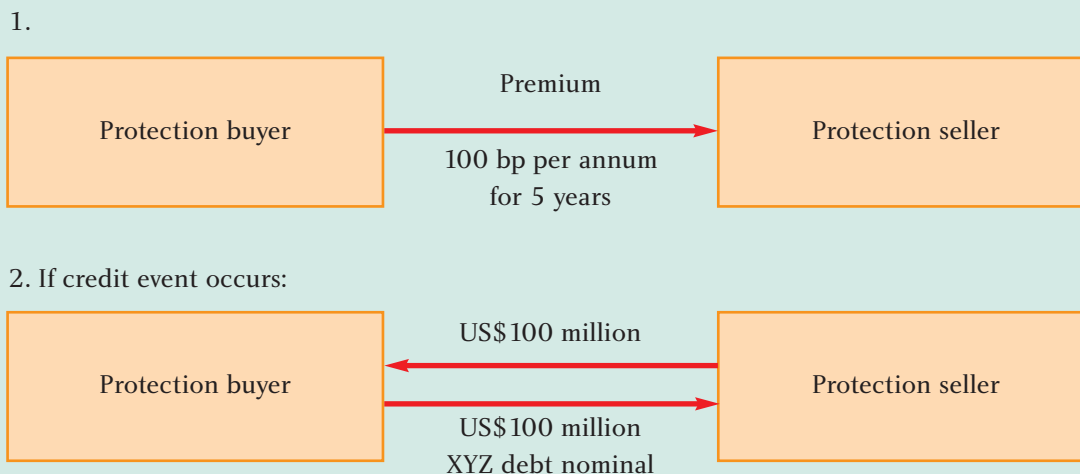
kinds of loans (eg mortgage, credit card, automobile) provided investors can be shown that the aggregate cashflows behave in a reasonably predictable manner.

All of these markets, however, require the taker of credit risk to provide funding, either directly to the borrower or to the bank selling the debt, in order to buy an underlying claim on the borrower. Credit derivatives differ because credit risk is transferred without the funding obligation. The taker of credit risk provides funds *ex post* only if a credit event occurs. Credit derivatives therefore allow banks to manage credit risk separately from funding. They are an example of the way modern financial markets unbundle financial claims into their constituent elements (credit, interest rate, funding etc), allowing them to be traded in standardised wholesale markets and rebundled into new composite products that better meet the needs of investors. In the case of credit derivatives, the standardised wholesale market is in single-name credit default swaps and the new composite products include portfolio default swaps,

<sup>1</sup>: This article is based, in part, on discussions at a series of meetings held with market participants and observers in London, New York and Boston between January and June 2001. The author is also grateful to Greg Fisher, Anne-Marie Rieu, Alison Emblow and Paul Tucker for contributions and comments.

**Diagram 1:**

**Single name credit default swap (CDS): example of 5 years, US\$ 100 million *Company XYZ* priced at 100 bp per annum**



basket default swaps, synthetic collateralised debt obligations (CDOs) and credit-linked notes.

### I Credit derivatives – the instruments

There is no universally-accepted definition of a credit derivative. The focus in this article is on single-name credit default swaps and the structured portfolio transactions put together using them.

#### *Single-name credit default swaps*

In a credit default swap (CDS), one counterparty (known as the ‘protection seller’) agrees to compensate another counterparty (‘the protection buyer’) if a particular company or sovereign (‘the reference entity’) experiences one of a number of defined events (‘credit events’) that indicate it is unable or may be unable to service its debts (see Diagram 1). The protection seller is paid a fee or premium, typically expressed as an annualised percentage of the notional value of the transaction in basis points and paid quarterly over the life of the transaction. Box 1 describes single name CDS in more detail.

A CDS is similar, in economic substance, to a guarantee or credit insurance policy, to the extent that the protection seller receives a fee *ex ante* for agreeing to compensate the protection buyer *ex post*,

but provides no funding. Being a derivative, however, makes a CDS different. Both guarantees and credit insurance are designed to compensate a particular protection buyer for its losses if a credit event occurs. The contract depends on both the state of the world (has a credit event occurred or not?) and the outcome for the buyer (has it suffered losses or not?). A CDS, by contrast, is ‘state-dependent’ but ‘outcome-independent’. Cashflows are triggered by defined credit events regardless of the exposures or actions of the protection buyer. For this reason, credit derivatives can be traded on standardised terms amongst any counterparties<sup>2</sup>. The single name CDS market allows a protection buyer to strip out the credit risk from what may be a variety of different exposures to a company or country – loans, bonds, trade credit, counterparty exposures etc – and transfer it using a single, standardised commodity instrument. Equally, market participants can buy or sell positions for reasons of speculation, arbitrage or hedging – even if they have no direct exposure to the reference entity. For example, it is straightforward to go ‘short’ of credit risk by buying protection using CDS<sup>3</sup>. Standardisation, in turn, facilitates hedging and allows intermediaries to make markets by buying and selling protection, running a ‘matched’ book.

<sup>2</sup>: Unless they are subject to legal or regulatory restrictions on entering into derivatives transactions.

<sup>3</sup>: Although, in the case of physical settlement, those taking short positions still face the risk that they cannot buy deliverable debt to settle the contract following a credit event.



## Box 1: Single name credit default swaps

Protection buyer and seller need to agree the following terms and conditions:

1. the reference entity, notional value and maturity of the transaction and the premium eg Company XYZ, US\$100 million, five years and 100 basis points per annum.
2. the definition of a credit event
3. the compensation that the protection seller will pay the protection buyer should a credit event occur
4. whether settlement occurs by the protection buyer delivering the agreed notional value of the reference's entity's debt against payment by the protection seller of its face value in cash ('physical settlement'); or, alternatively, by the seller paying a net cash amount ('cash settlement').
5. which debt obligations of the reference entity may be delivered to the protection seller in the case of physical settlement or used to value a cash settlement

Market practice in the great majority of transactions is to agree these items using trade confirmations that refer to the 1999 International Swaps and Derivatives Association (ISDA) Credit Derivatives Definitions<sup>1</sup>, designed for use in transactions governed by the ISDA 1992 Master Agreement for OTC derivatives transactions. The ISDA Definitions include six types of

credit event: bankruptcy, obligation acceleration, obligation default, failure to pay, repudiation/moratorium (relevant to sovereigns), and restructuring. Counterparties can, of course, agree to exclude items from this list and 'restructuring' in particular has proved controversial in recent months (as discussed below). Other than bankruptcy, these credit events need not affect all of a reference entity's obligations eg a company may fail to pay interest on its subordinated debt but continue paying on its senior debt. Hence, the counterparties must also agree 'reference obligations'. Normally, this is defined as senior<sup>2</sup>, unsecured 'borrowed money' in G7 currencies. However, CDSs are also traded on subordinated debt and on wider payment obligations – for example, if the protection buyer wants to hedge exposures to the reference entity relating to trade credit or counterparty risk.

If a credit event occurs, the protection seller normally compensates the buyer for the difference between the original face value of the debt and its market value following the credit event<sup>3</sup>. Much less frequently, counterparties trade 'digital' or 'binary' CDSs, in which the seller agrees to pay a fixed cash sum. Standard single-name CDSs are usually settled physically. In the less common case of cash settlement, the protection buyer receives a cash amount equal to the notional principal less the current market value of the reference obligations. This market value is based on a poll of dealers.

<sup>1</sup>: Available from ISDA ([www.isda.org](http://www.isda.org)).

<sup>2</sup>: An obligation is senior if in a bankruptcy of the borrower the creditor would rank *pari passu* with other general creditors. By contrast, a subordinated obligation is, either by statute or contractual agreement, paid out only when general creditors have been satisfied in full.

<sup>3</sup>: The debt will normally be accelerated (ie the principal becomes due for immediate repayment) following a credit event, so that the compensation is equivalent to the difference between the face value of the debt and what proportion can be recovered from the borrower. For this reason, the value of CDSs is unaffected by movements in the level and term structure of market interest rates that change the market value of deliverable bonds and loans prior to a credit event. The exception is restructuring – a credit event that may not accelerate the borrower's debt (see below).

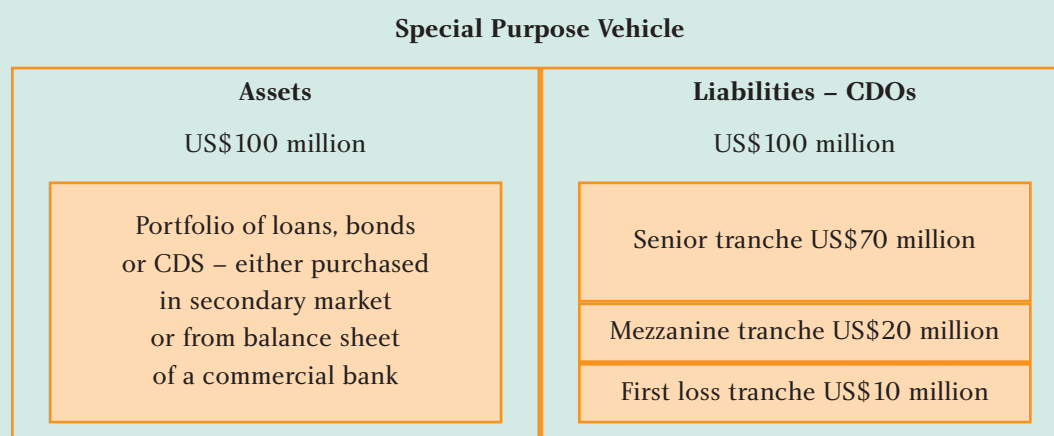
### *Portfolio transactions*

Just as CDS can be used to unbundle credit risk, they can also be combined to create new portfolio instruments with risk and return characteristics designed to meet the demands of particular protection buyers and sellers. This use of CDS to construct portfolio instruments is part of the evolution of the market in collateralised debt obligations (CDOs). In its simplest form, a CDO is a

debt security issued by a special purpose vehicle (SPV) and backed by a diversified loan or bond portfolio (see Diagram 2).

The diversification of the portfolio distinguishes CDO transactions from asset-backed securitisation (ABS) of homogenous pools of assets such as mortgages or credit card receivables, a more established technique. The economics of CDOs is that the aggregate

**Diagram 2:**  
**Example of collateralised debt obligations (CDOs)**



cashflows on a diversified portfolio have a lower variance than the cashflows on each individual credit; the lower risk enabling CDOs to be issued at a lower average yield. Because these are structured deals, they do not have standardised features in the same way as a single-name CDS. But transactions can be distinguished according to three characteristics.

**1 Whether protection is funded or unfunded and sold directly or via an SPV?**

The original CDO structure involved the transfer of the underlying bonds or loans to an SPV, which then issued CDOs backed by the cashflows on this portfolio. Most CDOs are still funded transactions of this type. Increasingly, however, CDSs are used to transfer the credit risk to the SPV leading to so-called ‘synthetic’ CDOs. Alternatively, the protection buyer enters into a ‘portfolio CDS’ – a CDS referenced to a portfolio of companies or sovereigns rather than a single name – directly with the seller, or embeds a portfolio CDS in a so-called credit-linked note (CLN) issued directly to the seller, avoiding the use of an SPV altogether. These variants are summarised in the table below:

	Via SPV	Direct
<b>Funded</b>	CDO	CLN
<b>Unfunded</b>	Synthetic CDO	Portfolio CDS

Entering into a portfolio default swap directly with the protection buyer is the simplest of these structures. But it exposes both parties to potential counterparty risk and, if the protection buyer is a

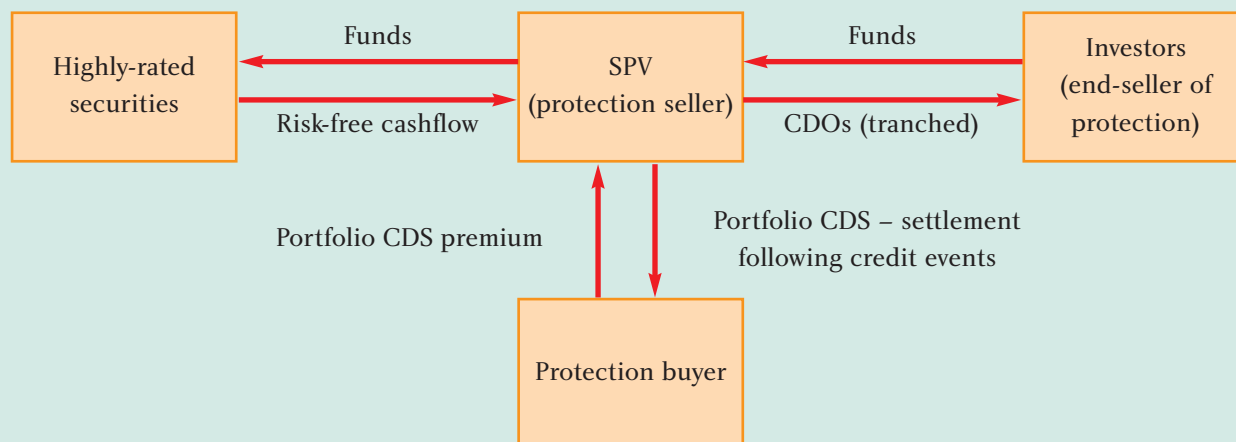
bank, it will only obtain a lower regulatory capital requirement if the protection seller is also a bank (see Box 2). A CLN protects the buyer against counterparty risk on the seller but not vice versa. It can be an attractive option if the protection buyer (issuer) is, for example, a highly-rated bank and the seller (investor) is a pension or mutual fund, with funds to invest. Some investors may also have regulatory or contractual restrictions on their use of derivatives but not purchases of securities such as CLNs.

CLNs, however, still involve the protection seller taking counterparty risk on the buyer<sup>4</sup>. Partly for this reason, most CDOs continue to involve an SPV. In a typical synthetic structure, the SPV issues CDOs to the ‘end-sellers’ of protection and invests the proceeds in high-quality collateral securities, such as G7 government bonds, bonds issued by government-sponsored agencies, mortgage bonds (Pfandbrief) or highly-rated asset-backed securities (see Diagram 3). The end-sellers receive the return on the collateral, often swapped into a floating rate, together with the premium on the default swap. Principal and/or interest payments are reduced if credit events occur on the reference portfolio. In this case, the bank/sponsor has a claim on the SPV under the CDS, backed by the collateral, which is typically cash-settled. This structure has advantages for the protection buyer and the end-sellers:

- It reduces counterparty credit risk for both parties. Both have potential claims on the SPV that are at

<sup>4</sup> In some legal jurisdictions it may be possible to protect the principal repayment on the notes by giving the noteholders security over highly-rated bonds in a collateral account.

**Diagram 3:**  
**Synthetic collateralised debt obligations**



least partly backed by the collateral securities. The SPV should be remote from the bankruptcy of either party.

- The CDOs can be structured so that they are high yielding but the principal is protected by the value of the collateral securities ('principal-protected notes'). Some insurance companies find this type of investment attractive (see below).
- If a bank has bought protection against its loanbook, some regulators may allow a lower regulatory capital requirement on the underlying loans if the counterparty is an SPV that is restricted to holding OECD government bonds.

**2 How the risk and return on the portfolio is tranching to give different protection sellers obligations with varying degrees of leverage?**

The risk on portfolio transactions is usually divided into at least three tranches. For example, a US\$100 million portfolio may have US\$10 million first loss, US\$20 million mezzanine and US\$70 million senior pieces. If there is a US\$15 million loss on the portfolio following a series of credit events, the seller of protection on the first loss tranche loses US\$10 million and the seller on the mezzanine US\$5 million. In effect, the holder of the first loss (or 'equity') tranche has leveraged the credit risk on the underlying portfolio by ten times whereas the holder of the senior piece may have a much lower risk security. Typical market practice at present is to tranche the risk so that the senior position is Aaa/AAA-rated and the mezzanine position Baa2/BBB-rated.

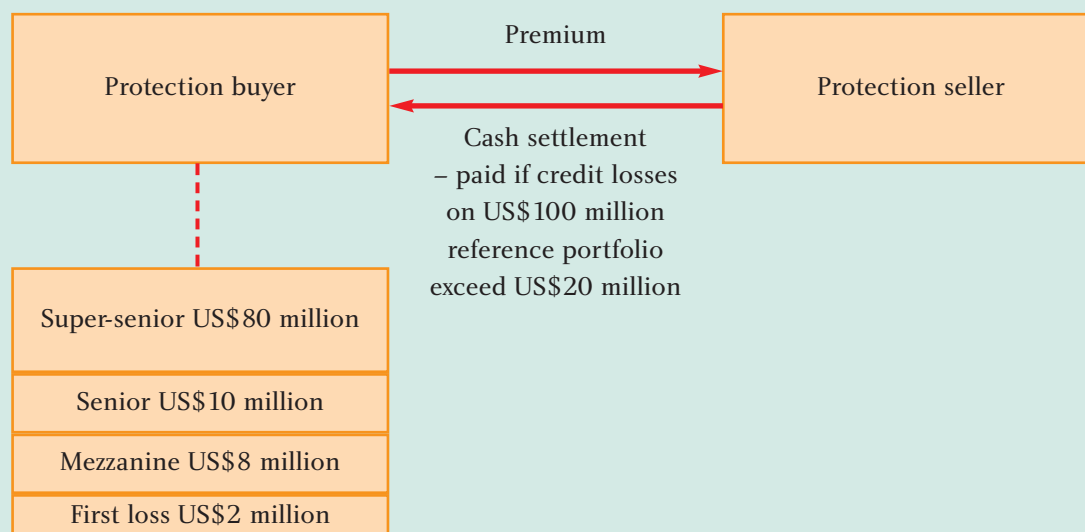
Tranching can be achieved in different ways depending on the structure of the transaction. If the risk on the entire portfolio is transferred to an SPV (whether through sales of the underlying asset or a series of CDSs), it can issue securities with varying degrees of seniority. If, however, protection is purchased directly from sellers, tranching must be included within the contractual terms of the portfolio CDS or credit-linked note.

More senior tranches of CDOs are more likely, in practice, to be unfunded than first loss or mezzanine tranches. This is partly because the amounts involved are larger and partly because protection buyers prefer to avoid counterparty risk on equity and mezzanine tranches because of the greater likelihood that these tranches will bear losses. Recently, a hybrid structure has been popular with European banks. It involves an SPV selling protection to a bank on the mezzanine/senior tranche of risk on a portfolio against issuance of trancheds CDOs. The bank separately buys protection directly on a so-called super-senior tranche using a portfolio CDS. This might specify, for example, that the protection seller will compensate the buyer if credit events on the reference portfolio lead to losses in excess of 20% of the portfolio value over the life of the transaction (Diagram 4).

Monoline insurers (see below) are said to be important sellers of protection on super-senior tranches, often via back-to-back transactions with another bank or securities firm in order to obtain a reduced capital requirement for the bank protection

**Diagram 4:**

**Portfolio default swap – example of US\$ 80 million super- senior tranche**



buyer<sup>5</sup>. Super-senior tranches are intended to be almost free of credit risk – they rank higher than senior tranches, which are often AAA-rated. Annual premia are correspondingly low, ranging between 6-12 basis points, depending on market conditions. But the notional value of the exposures can be very large. For example, super-senior tranches on large diversified portfolios of investment grade credits may cover the last 90% of losses on transactions of US\$ billions in size.

Basket default swaps allow protection sellers to take leverage in a slightly different way. A 'first-to-default' basket is a CDS that is triggered if any reference entity within a defined group experiences a credit event. Typically the transaction is settled through physical delivery of obligations of the entity that experienced the credit event. For example, an investor might enter into a US\$100 million first-to-default basket on five European telecoms, receiving a spread significantly higher than that for a single-name CDS on any one of the names in the basket; although less than selling US\$100 million protection on each company individually because the exposure is capped at US\$100 million. The more risk averse can sell protection on second or even third-to default baskets, which are triggered only if a credit event occurs on

more than one name in the basket over the life of the transaction.

### 3 The nature of the reference portfolio

Commercial banks can use the CDO structure to transfer the credit risk on loans that they have originated. These are known as collateralised loan obligations (CLOs) or sometimes 'balance sheet' transactions because the primary motivation is to remove risk from the balance sheet of the commercial bank. For example, it may want to reduce particular concentrations in its loanbook or to lower its regulatory capital requirements or to 'free up' lines to counterparties. CLOs are generally large transactions – often billions of dollars. Reference portfolios are usually loans to large, rated companies but recent transactions have included loans to mid-sized companies. Growth of CLOs began in 1997, following JP Morgan's BISTRO programme.

Another use of the structure is by fund managers to gain leverage for high-yield, managed investment portfolios. Such transactions – known as collateralised bond obligations (CBOs) or sometimes 'arbitrage' CDOs – are much more common in the US, where sub-investment grade bond and secondary loan markets are more developed, than in Europe. Typically, an investment bank will find investors

<sup>5</sup> The so-called 'carrier' bank or securities firm standing between the bank (protection buyer) and the monoline (protection seller) will have a capital requirement against the credit risk on the underlying portfolio. Buying protection directly from a monoline would not reduce the risk weighting (see Box 2). But the capital requirement may be lower if the carrier bank is able to convince its regulator that its 'hedged' position can be held in its trading book. Alternatively, the 'carrier' bank may have excess regulatory capital and therefore be unconstrained by the capital requirement.

willing to purchase mezzanine and senior tranches and the fund manager (known as the 'collateral manager') will retain a share of the 'first loss' risk and so the 'equity'. Whereas CLOs are not actively managed – portfolios are typically static other than the replacement of maturing loans with others of similar characteristics – collateral managers are permitted to trade managed CBO portfolios in order to maximise yield for the equity investors. The exception is if the CBO breaches defined covenants – such as interest cover or ratings requirements. In this case, any excess return on the portfolio is redirected from the equity holders to pay down the higher ranking tranches in order of seniority. CBO tranches are more likely to be fully funded than CLOs because the collateral manager typically needs cash to invest. But collateral managers are nonetheless often permitted to buy and sell protection using CDS as part of a CBO portfolio.

A third use of CDOs – also known as 'arbitrage' transactions – is to repackage static portfolios of illiquid or high yielding securities purchased in the secondary market. Examples of securities that have been repackaged in this way include asset-backed securities, mortgage-backed securities, high-yield corporate bonds, EME bonds, bank preferred shares and even existing CDOs. Intermediaries have also used CDS to create entirely synthetic tranches of exposure to reference portfolios (see below). For example, an intermediary might buy protection from a customer using a portfolio CDS designed to replicate the mezzanine tranche of a CDO referenced to a portfolio of European companies. It then hedges its position in the single name CDS market.

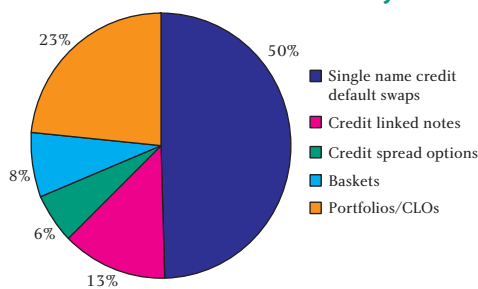
## II Market size

The credit derivative market has been growing rapidly but is probably still small relative to other OTC derivative and securities markets. Comprehensive, global data do not exist. The best sources are the British Bankers' Association's 2000 survey<sup>6</sup> of its members and the quarterly statistics on outstanding derivatives positions of US commercial banks and

trust companies published by the Office of the Comptroller of the Currency (OCC)<sup>7</sup>. The BBA survey suggests that the global credit derivatives market<sup>8</sup> increased in size (measured by notional amount outstanding) from around US\$151 billion in 1997 to US\$514 billion in 1999, with the market expected to continue growing over 2001 and 2002. Market participants estimate that the market continues to double in size each year. The OCC data show that US commercial banks and trust companies had notional credit derivatives outstanding world-wide of US\$352 billion at end-March 2001. Based on market participants' estimates of their market share compared to securities dealers and European banks, this is consistent with an overall market size of around US\$1 trillion. According to the BBA survey, around half the market was in single name CDS (Chart 1). Another source of data on portfolio transactions is the volume of transactions rated globally by the major agencies. Moody's rated 138 CBOs in 2000, of which 12 were synthetic, and 51 CLOs, of which 32 were synthetic. The value of CBOs was around US\$48 billion and of CLOs US\$72 billion, suggesting that around US\$50 billion of portfolio default swaps were agreed in 2000<sup>9</sup>.

By contrast, data from the Bank for International Settlements (BIS)<sup>10</sup> show the largest derivatives markets in terms of notional principal were those related to interest rates (US\$65 trillion); foreign exchange rates

**Chart 1:**  
**Breakdown of credit derivatives by instrument<sup>(a)</sup>**



Source: BBA.

(a) Based on notional values.

6: 'Credit Derivatives Report 1999/2000' British Bankers' Association 2000.

7: Available at [www.occ.treas.gov](http://www.occ.treas.gov).

8: Credit default swaps, portfolio swaps and baskets, credit-linked notes and credit spread options. Total return swaps and asset swaps have been excluded from the BBA data because credit derivatives are defined here as credit default swaps and other instruments based on them.

9: 2000 CDO Review/2001 Preview Moody's Investor Services, January 19, 2001.

10: The BIS derivatives survey in 2001 will provide more information about the size of credit derivatives markets.

(US\$16 trillion); and equities (nearly US\$2 trillion). According to the OCC data, credit derivative exposures comprised less than 1% of US commercial banks and trust companies' notional derivative exposures at end-March 2001. Although notional principal is only a loose guide, these figures suggest that using derivatives to trade credit risk remains small relative to their use to trade interest rate, foreign exchange and equity risk.

The notional value of credit exposure being transferred through the market is also only a fraction of the debt held by US and European banks and by bondholders in the international and US domestic bond markets. Because one or more transactions with intermediaries will often occur between an initial protection buyer and a final protection seller, the figure of US\$1 trillion is an upper bound on the actual value of exposure being transferred through the market. For comparison, the value of non-government debt outstanding in the international bond market was nearly US\$5 trillion and in the US domestic bond market US\$6<sup>1</sup>/<sub>2</sub> trillion at end-December 2000; and bank balance sheets totalled around US\$5 trillion for US banks and €12 trillion for euro area banks at end-December 2000<sup>11</sup>.

Market participants say that about 500 to 1000 corporate names are traded actively in the single-name CDS market, although trades have occurred on up to 2000 names. Most of these companies are rated by the major agencies. Markets in single name CDS on sovereigns are typically more liquid than companies, but only about 10-12 sovereigns are traded – mostly emerging market economies – with less frequent trades in some G7 sovereigns such as Italy and Japan. The BBA survey found that 20% of reference entities were sovereigns and 80% companies. Market participants suggest that the proportion of emerging market sovereign trades was higher in 1997-98 at the time of the Asian crisis. Demand to buy protection on sovereigns is often from banks or other investors willing to extend credit to borrowers in a particular country but not to increase their country exposure beyond a certain limit – known as 'line buying'.

The BBA survey reveals that in 1999 just under half of global trading was taking place in London. New York accounted for about the same proportion, with the

remainder trading of local names in regional centres, principally Tokyo and Sydney.

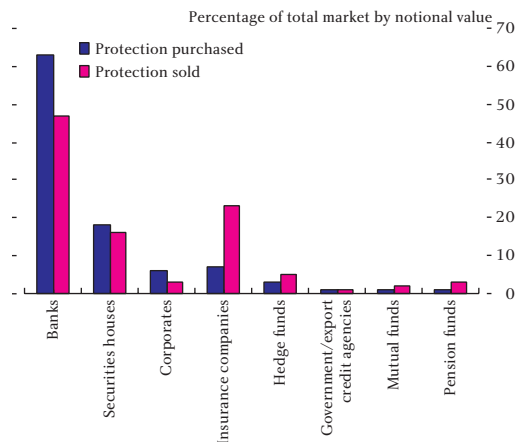
### III Market Participants

A stylized structure of the credit derivatives market includes end-buyers of protection, seeking to hedge credit risk taken in other parts of their business; end-sellers of protection, usually looking to diversify an existing portfolio; and, in the middle, intermediaries, which provide liquidity to end-users of CDS, trade for their own account and put together and manage structured portfolio products.

The BBA survey gives some idea of which institutions fall into these three categories (Chart 2). By far the biggest players are the intermediaries, including investment banking arms of commercial banks and securities houses and therefore split between these two categories in Chart 2. They are thought to run a relatively matched book but are probably, in aggregate, net buyers. OCC data show that this is the case for the large US banks (Chart 3). End-sellers include commercial banks, insurance companies, collateral managers of CBOs, pension funds and mutual funds. End-buyers are mainly commercial banks but also hedge funds and, to a lesser extent, non-financial companies.

Participants suggest that the market has continued to grow and develop rapidly since the BBA survey. It is difficult to draw any firm conclusions yet about how it will work in a steady state. At present, however, the single name CDS market appears to be relatively

**Chart 2:**  
Breakdown of market participants showing protection bought and sold

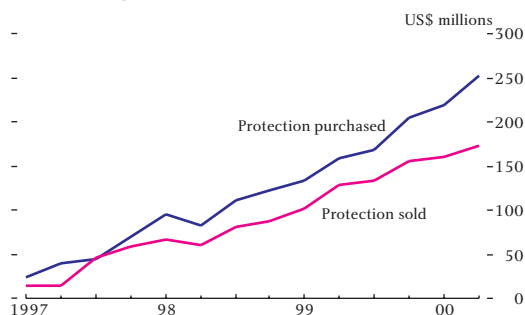


Source: BBA.

11: Sources: Capital Data, BIS, US National Information Centre, ECB.



**Chart 3:**  
**US banks credit derivatives: notional principal outstanding**



Source: Office of the Comptroller of the Currency.

concentrated among a number of large intermediaries – mainly US and European wholesale banks and securities houses. And the market appears to be facilitating a net transfer of credit risk from the banking sector to insurance companies and investment funds, mostly through portfolio transactions. What motivates these different groups of market participants?

#### *Commercial banks*

Compared to loan sales and securitisation, credit derivatives can be an attractive way for commercial banks to transfer credit risk because they do not require the loan to be sold unless and until a credit event occurs. This makes it easier to preserve the relationship with the borrower and is simpler administratively, especially in some European countries where loan transfers are complex, although the borrower's consent may still be needed to transfer the loan if physical settlement is agreed following a credit event. Use of credit derivatives also allows a bank to manage credit risk separately from decisions about funding. Securitisation can be an expensive source of funds for banks with large retail deposit bases, although market participants say that buying protection using CDS is often more expensive than selling loans in the secondary market, perhaps reflecting concerns about moral hazard (see below).

Lending to customers is typically one of a bundle of banking services including deposit taking and liquidity management, access to payment systems and other ancillary services such as foreign exchange and derivatives. The use of credit derivatives is part of a wider trend among some of the largest banks to

separate out these services so that they can be priced appropriately. Any credit risk is, in principle, valued according to its marginal contribution to the risk and return on the banks' overall credit portfolio. If the credit risk does not fit with the portfolio, any additional cost of selling the debt or purchasing protection using credit derivatives must be recouped from the bank's other business with the customer. Banks may also purchase credit derivatives, alongside purchases of loans and bonds in the secondary markets, to manage their portfolio actively. For example, they might sell protection where they can bear the risk at a lower cost than the market price because it diversifies their portfolio across industry sectors or regions in which they do not have many customers.

In spite of these potential advantages, the OCC data for US banks show that only the largest appear to use credit derivatives on any scale at present. In the data, it is impossible to separate the activities of commercial banks as intermediaries from their purchases of protection to hedge risk on their loanbooks. For example, the notional credit derivatives exposures of JP MorganChase, an important intermediary, comprised 64% (around US\$227 billion) of the aggregate for all 400 US banks and trust companies at end-March 2001. But outside JP MorganChase, Citibank and Bank of America, the notional exposures of the remaining 396 US banks that use derivatives was only US\$18.4 billion. This suggests that regional US banks are making only modest use of credit derivatives, whether purchasing protection on their loanbooks or selling protection to diversify their credit portfolios. It may be that the European banks are more significant end-buyers of protection. For example, 29 of the 51 CLOs and 21 of the 32 synthetic CLOs rated by Moody's in 2000 involved European banking portfolios. The total value of risk transferred was US\$48 billion, of which 90% was through credit default swaps<sup>12</sup>.

An important motivation for banks has been regulatory. The 8% Basel minimum regulatory capital requirement on corporate exposures is higher than the economic capital requirement on many investment grade exposures, giving banks an incentive to transfer the risk to entities not subject to the same regime. This may help to explain why most CLOs to

<sup>12</sup>: 2000 CDO Review/2001 Preview: Moody's Investor Services, January 19, 2001 and 2000 CDO Review and Outlook for 2001: The European market matures Moody's Investor Services, January 25, 2001.

## Box 2: Credit derivatives – bank regulatory treatment

Regulatory recognition of risk transfer by banks using credit derivatives has been and remains important to the growth of the market. It is no coincidence that more CLO transactions occur towards the end of the year, before financial and regulatory reporting dates. At present, bank regulators do not have a common, internationally-agreed approach to how credit derivatives affect bank capital requirements. The market has developed since the 1988 Basel Accord and national regulators have been free to apply the Accord's framework for off-balance sheet transactions in slightly different ways. Nonetheless, most have followed approaches similar to those developed by the UK and US authorities. The following describes the UK treatment.

The UK FSA<sup>1</sup> treats unfunded CDS held in the banking book in order to hedge loans or other credit exposures in a similar way to guarantees. Protection buyers may choose to replace the risk weighting of the protected asset with that of the credit protection seller. But under the current Basel Accord, only protection sold by other banks and regulated securities firms gives a lower risk weight (20%). For example, a bank with an 8% required capital ratio buying protection on a £100 corporate loan from another bank could reduce its capital requirement from £8 to £2. Unfunded protection purchased from non-banks, such as insurance companies, would leave the capital requirement unchanged. Funded protection through an issue of credit-linked notes is, however, treated as collateralised with cash and therefore has no capital requirement. First-to-default baskets are treated as providing protection against one asset in the basket only, which can be chosen by the bank.

Where banks sell protection using CDS, they must hold the same capital as if the CDS had been settled and the underlying asset was on their balance sheet (direct credit substitute). Banks selling protection using first-to-default baskets are usually required to hold capital against all the names in the basket.

Since July 1998 the FSA has allowed bank intermediaries trading credit derivatives to include positions in their trading book, provided they can be

hedged and market-makers and screen-quoted prices exist. Under the trading book treatment, single-name CDS attract a capital charge for the specific risk on the reference asset only. Credit-linked-notes are treated as a position in the note itself with an embedded CDS. The treatment of basket products is similar to that in the banking book.

The **changes to the Basel Accord**<sup>2</sup> proposed by the Basel Committee on Banking Supervision (BCBS) in January 2001 include a harmonised treatment of credit derivatives. Protection provided by non-banks of high credit quality, such as many insurers, could also reduce the risk weight of a bank's underlying exposure, provided the CDS includes defined credit events that broadly mirror those in the ISDA definitions. In contrast to the current rules in the UK and the US, maturity mismatched hedges would be recognised provided that the residual maturity of the hedge is one year or more. Hedges denominated in a different currency from the underlying exposures would also be recognised.

There are two approaches available to banks for calculating their capital requirements – the 'standardised approach' based on external ratings, and the 'internal ratings based (IRB) approach' based on internal ratings set by the lending bank with reference to the probability of default. For buyers of protection, the banking book treatment for exposures protected using CDS under the standardised approach would be calculated according to the following formula:

$$r^* = (w \times r) + ((1-w) \times g)$$

$r^*$  is the effective risk weight of the position, taking into account the risk reduction from the CDS

$r$  is the risk weight of the underlying obligor

$w$  is a residual risk factor, set at 0.15 for credit derivatives

$g$  is the risk weight of the protection provider

<sup>1</sup>: See *Guide to Supervisory Policy* available at [www.fsa.gov.uk/pubs/supervisor](http://www.fsa.gov.uk/pubs/supervisor).

<sup>2</sup>: Available at [www.bis.org/publ/bcbsca.htm](http://www.bis.org/publ/bcbsca.htm).

The risk weights of the obligor ( $r$ ) and the protection provider ( $g$ ) would depend on their external ratings. Thus, for example, if the protection provider was an AAA-rated insurer (20% weighted) and the underlying exposure was to a B-rated corporate (150% weighted), a bank with a required capital ratio of 8% would see its capital requirement on a £100 protected exposure decrease from

$$150\% \times 8\% \times £100 = £12.00 \text{ to}$$

$$(0.15 \times 150\%) + (0.85 \times 20\%) = 39.5\%.$$

$$39.5\% \times 8\% \times £100 = £3.16.$$

The 'w' factor is intended to capture any residual risk that protection bought using CDS might be unenforceable, leaving the bank with an unprotected exposure to the underlying obligor.

A similar formula, using probability of default (PD) rather than risk weights, is proposed for banks using the foundation IRB approach. Banks using the 'advanced IRB approach' would be permitted to use their own methodology to estimate probability of default for exposures protected by CDS.

The treatment for protection sellers would be unchanged, except that the risk weight (or PD) on the

reference asset would depend on the external or internal rating of that asset.

The treatment of portfolio and basket products is still under consideration by the Basel Committee.

The proposed changes to the Basel Accord would also affect the specific risk capital charge applied to trading book positions that are hedged by credit derivatives. They would allow an 80% specific risk offset for positions protected using CDS or credit linked notes, provided the reference asset, maturity and currency of the underlying exposure are exactly matched. This offset would be applied to the side of the hedged position with the higher capital charge. If maturities or currencies are mismatched but the reference assets are identical, only the higher of the specific risk capital charges for the two sides of the hedge would apply.

The Basel Committee has consulted interested parties on the entirety of its proposed changes to the Accord. For the most part, the proposed treatment of credit derivatives has been welcomed, although some have questioned certain elements. For example, ISDA argues that the 'w' factor is unnecessary and criticises the relative sizes of the 'w' factors for credit derivatives and bank guarantees<sup>3</sup>.

<sup>3</sup>: See ISDA's comments at [www.bis.org/bcbs/ca/isda.pdf](http://www.bis.org/bcbs/ca/isda.pdf).

date have referenced portfolios of loans to companies of relatively high credit quality.

The proposals to reform the Basel Accord announced in January 2001 may have important consequences for the market (see Box 2). The intention is that, by aligning capital requirements more closely with economic risk, the proposals will reduce the purely regulatory motive for portfolio transactions so that transfers of high quality corporate loans might decrease. But, importantly, the Basel Committee on Banking Supervision decided that credit risk modelling has not progressed far enough to recognise default correlations in setting bank capital requirements. Banks may still therefore have an

incentive to transfer the risk on portfolios to protection sellers able to adjust their capital requirements to reflect greater diversification<sup>13</sup>.

#### *Non-financial companies*

Judging from the Bank's regular contacts with UK companies and market intermediaries, corporate involvement in the credit derivatives market remains limited to a handful of large multinationals. Intermediaries do, however, see potential for a number of applications as the market matures. For example, companies could use CDS to buy protection against credit extended to customers or suppliers – an example might be the extension of so-called 'vendor finance' to telecom operators by telecom

<sup>13</sup>: Unless supervisors actively take account of portfolio diversification when setting required bank capital ratios under Pillar 2 of the Basel proposals.

equipment manufacturers, where CDS might usefully be used to reduce the size and/or concentration of the resulting credit exposures<sup>14</sup>.

#### *Insurance companies*

Insurance companies are net sellers of protection and their participation in the market seems to be increasing. An insurance company can sell protection both through investment in securities such as CDOs or credit-linked notes on the asset side of its balance sheet and, on the liabilities side of its balance sheet, by entering into single-name or portfolio default swaps, writing credit insurance or providing guarantees.

The greater prominence of insurers is clearly an important explanation for the increasing volume of portfolio transactions. Many insurance companies have regulatory or legal restrictions on their ability to enter into derivatives contracts. But most life and general insurance companies can invest in credit-linked notes and CDOs alongside equities, bonds and other asset classes. EU insurance companies, in particular, are said to have been significant investors in CDO tranches in order to gain greater exposure to the US high yield market as part of the diversification of their portfolios since European Monetary Union. These are often structured as 'principal-protected' notes in order to meet the requirements of some insurance regulators to treat them as bonds rather than equities for capital adequacy purposes. For example, contacts say that German insurance companies have been major investors in principal-protected equity and mezzanine tranches of CDOs. Some insurance companies are said to have begun by investing in senior tranches of CDOs and then added higher-yielding mezzanine tranches as they became more familiar with the asset class.

Significant participation on the liabilities side of the balance sheet appears currently limited to a relatively small number of large, international property and casualty insurers and reinsurers, together with specialists such as monolines and Bermudan reinsurers. US insurance regulators<sup>15</sup> agreed in 2000 to treat transactions using

derivatives that replicate the cashflows on a security, such as a corporate bond, in the same way as the replicated asset. The agreement has been implemented in a number of states, including New York, where insurance companies have been allowed to hold up to 10% of their investments in replicated assets since January 2001. This may give US insurance companies greater scope to sell protection using credit derivatives.

But some property and casualty and reinsurance companies clearly have entered the market on a relatively large scale since 1998/9. Their motivations are said to have included low premiums in their traditional property and casualty businesses, apparent opportunities because they are not subject to the same regulatory capital requirements as banks and the possibility that credit risk might further diversify portfolios. Portfolio default swaps and baskets are potentially attractive to these insurers because they are based on diversified portfolios and offer the potential for differing degrees of leverage depending on the tranche held. Some have gone beyond portfolio transactions and sought to put together a portfolio of single-name default swaps. A few are active traders and intermediaries. More typically, insurance companies are looking to put together a large and relatively static book of portfolio and perhaps single-name positions, using credit modelling and/or actuarial techniques to price the risk. Until recently, non-banks have found it difficult to put together such portfolios because they have been limited to acquiring (on the asset side of their balance sheets) bonds that companies decide to issue. Credit derivatives, in effect, reduce the transaction costs for non-banks of constructing a diversified credit book. Some large insurers appear to have focussed on super-senior or senior tranches, making use of their high credit ratings. Other companies, such as the Bermudan-based reinsurers, have reportedly been sellers of protection on mezzanine tranches of CDOs, baskets and on single names.

Insurance companies also provide financial guarantees on the senior tranches of CDOs, a practice which is long established in the asset-backed and US

---

<sup>14</sup>: See the International Financial Markets section of the *Financial Stability Conjecture and Outlook*.

<sup>15</sup>: Insurance regulation in the United States is organised at state level. But regulators cooperate through the National Association of Insurance Commissioners. Its Spring 2001 National meeting included a discussion of US insurance companies' involvement in credit derivatives markets. See *Credit Derivatives*, Shanique Hall-Barber, pp 3-5, SVO Research, NAIC, Volume 1, Issue 2, 15 February 2001 available at [www.naic.org/1sv0/index.htm](http://www.naic.org/1sv0/index.htm).

municipal bond markets. Such credit 'wrappers' are used to improve the rating of the tranche (credit enhancement) in order to meet the needs of investors. They typically provide an unconditional and irrevocable guarantee that principal and interest payments will be made on the original due dates. But they do not provide cover for accelerated payment following default. A few AAA-rated insurers, known as 'monolines' because they specialise in credit insurance, dominate the market<sup>16</sup>, although some of the major property and casualty insurers have also begun to offer such policies. Monolines are also said to be the largest sellers of protection on super-senior tranches of CDOs. Annual accounts suggest that they, in turn, reinsure around 15-25% of their exposures.

#### *Pension/investment funds and hedge funds*

Similarly to insurance companies, pension and investment funds are also important investors in CDO tranches and credit-linked notes. The nature of the fund tends to determine the seniority of the investment. For example, leveraged debt funds might buy higher-risk, mezzanine tranches whereas senior tranches might be sold to pension funds.

A few hedge funds are also said to specialise in investing in the first loss and mezzanine tranches of CDOs. But hedge fund participation in credit markets appears to remain relatively small compared to, for example, equity markets. In particular, hedge funds are thought to be little involved in arbitraging CDS, loan and bond markets.

Hedge funds are, however, active users of single-name CDS in order to hedge other trades. Probably the most significant example is convertible bond arbitrage, where hedge funds use CDS to hedge the credit risk on the issuer of the bond. Traders say that CDS premia can spike upwards if a company issues convertible bonds, as funds seek to buy protection. They can, it is suggested, be relatively insensitive to the cost of hedging the credit risk, as their goal is to isolate the embedded equity option. Over the past year, hedge funds have become large end-buyers of protection on

some entities that have issued convertible bonds, typically lower-rated US companies<sup>17</sup>.

A particular category of investment fund manager is the collateral managers of CBO funds. Typically they invest in the first loss, equity tranches of the CBOs that they manage. The track record of the collateral manager is said to be a key consideration in attracting protection sellers for the mezzanine and senior tranches.

#### *Intermediaries<sup>18</sup>*

Most of the large global investment banks and securities houses have developed the capacity to buy and sell protection in the single name CDS market in order to provide liquidity to customers and trade for their own account. Many are bringing together their CDS and corporate bond trading desks with a view to encouraging traders to identify arbitrage opportunities between the two markets. This parallels moves to integrate, to a greater or lesser degree, government bond, swap and repo desks during the 1990s.

Intermediaries also use CDSs to manage credit risk in their other activities. In particular, they buy protection against counterparty risk arising in other OTC derivative transactions, such as interest rate swaps ('line buying'). In this context, CDSs are now established as an alternative to collateralisation. For example, an intermediary may prefer to buy protection from a third party than request collateral from a counterparty if it is a valuable corporate customer. The first collateralised debt obligation<sup>19</sup> with credit events linked to payments by counterparties on a portfolio of OTC transactions was issued at the end of 2000.

One role of the intermediaries is to bridge the different needs of protection sellers and buyers. An example is the legal or regulatory restriction in a number of countries against insurance companies using derivatives (except to hedge insurance business), so that these insurers cannot sell protection directly using ISDA documentation. They

---

**16:** The four largest monolines are Ambac Assurance Corporation, Financial Guaranty Insurance Company, Financial Security Assurance and MBIA Insurance Corporation.

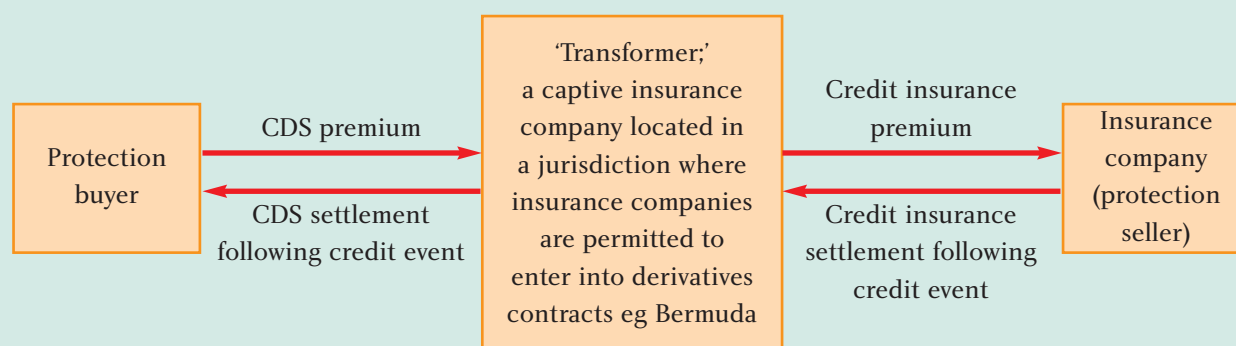
**17:** See Box 5 in the *Financial stability conjuncture and outlook* for a discussion of convertible bond issuance and convertible bond arbitrage.

**18:** Intermediaries include banks and securities houses. The distinction drawn here between commercial banks and intermediaries is functional rather than institutional. Indeed some of the largest players in the market are involved both as 'commercial banks', looking to buy and sell protection on a credit portfolio, and 'investment banks', acting as intermediaries and traders.

**19:** Alpine Partners LP, a US\$700 million CDO arranged by UBS Warburg.

**Diagram 5:**

**Use of a 'transformer' to convert a credit default swap into credit insurance**



can, however, sell insurance to other insurance companies against their credit exposures on nearly identical terms. Some intermediaries have therefore established captive insurance companies (known as 'transformers') in financial centres such as Bermuda that do allow insurers to enter into derivatives. The transformers typically sell protection to banks using CDS and simultaneously purchase back-to-back protection from insurers under insurance policies (Diagram 5).

Another, probably more significant, function of intermediaries is the bundling of single credits to create portfolios. As explained earlier, demand by insurance companies to sell protection on portfolios and investment funds to purchase CDOs and credit-linked notes has increased recently. It is apparently outstripping the supply from commercial banks looking to buy protection on their loanbooks. Intermediaries have responded by putting together synthetic CDOs and portfolio default swaps in which the sellers/investors specify the mix of credits that they want to hold. Moody's rated thirteen such synthetic transactions in 2000 but seventeen in Q1 2001 alone<sup>20</sup>. Traders say that demand from banks and securities houses to sell protection in order to hedge portfolio default swaps was one explanation for the general downward trend in premia in the single name CDS market in Q1 2001. Intermediaries might still be left net 'short' of credit risk ie protection bought exceeds protection sold. But it is possible that they will welcome this position as an offset to the inventory of corporate bonds that they typically carry from their

primary and secondary market activities. It might also be a natural hedge to the pro-cyclicality of investment banking revenues – for example, IPO and M&A activity tends to fall off during economic slowdowns when credit risk typically crystallises. A greater concern would be if an investment bank was unexpectedly net long of credit risk: for example, if it had constructed the hedges for a CDO before placing the transaction. Because of this balance of risks, portfolio transactions are typically only hedged after completion.

#### **IV Pricing, liquidity and relationship with other credit markets**

A single-name CDS is similar to an option exercisable if a credit event occurs<sup>21</sup>. The pay-off is the notional value of the CDS less the market value of the reference entity's debt following the credit event. Although the inclusion of credit events other than default complicates pricing somewhat, the key variables are the expected probability that the reference entity will default over the life of the CDS, the expected recovery rate on the debt and the required return on any economic or regulatory capital held by the protection seller against the risk of unexpected losses on the transaction.

In this sense, pricing single name CDS is little different to pricing loans or bonds. Most would be settled physically, so that the protection seller 'steps into the shoes' of the protection buyer following a credit event. In principle, therefore, the premium on a CDS should be similar to the credit spread on the reference entity's debt trading at par – or, more

<sup>20</sup>: *First quarter 2001 Global CDO Review*, Moody's Investors Services, April 13, 2001.

<sup>21</sup>: Strictly it is not an option because the protection buyer has an obligation not a right to settle the transaction following a credit event.



precisely, the spread over LIBOR if the fixed return on that debt is exchanged for a floating rate return in an asset swap. An important characteristic of the market is that counterparty exposures on outstanding CDSs could increase sharply if credit quality within the corporate sector were to deteriorate and large numbers of companies were to move close to default.

The development of the CDS market is bringing closer together different credit markets that have previously been segmented. For example, contacts say that in 1998 loans to the Republic of Turkey were priced about 150 basis points above LIBOR, bonds were about 500 basis points over LIBOR, political insurance cost 300 basis points, and CDS were priced at 550 basis points. Prices on these different instruments are unlikely to converge completely. For example, loans may contain covenants and clausings that allow lenders to take pre-emptive action to protect their positions more easily than bondholders; or banks may under-price loans in order to develop a relationship with the borrower in pursuit of other ancillary business. Both factors may mean loans still trade at lower credit spreads than bonds. But CDS have the potential to encourage arbitrage and increase transparency for three reasons:

- CDS offer a relatively 'pure' exposure to credit risk, which, in principle, makes them an attractive instrument to hedge credit risk embedded in other instruments; and may make their prices a benchmark against which those of other credit instruments can be compared.
- Although the CDS market remains smaller than the bond and loan markets, it is more standardised. CDS trading is concentrated at certain maturities, principally five years, whereas bonds and loans have different maturities and coupons. This may make it easier for intermediaries to hedge CDS positions and encourage tighter bid-ask spreads, and so foster liquidity.
- Liquidity in the CDS market is less constrained by whether the reference entity decides to issue debt or whether existing debt holders are prepared to sell or lend securities – although these are needed for physical settlement following a credit event.

### *Market structure and liquidity*

A number of large intermediaries publish indicative two-way CDS prices for the most-traded companies and sovereigns on their websites and on electronic data vendor screens. Trading in the inter-dealer market occurs through voice and internet-based brokers<sup>22</sup>. Services exist to provide reference prices for marking-to-market existing transactions, based on averages of prices supplied by dealers and/or on trade prices in the inter-dealer market. Traders say that liquidity in the single-name CDS market varies, with different entities and sectors having more activity at different times. In general, activity is said to increase when assessments of creditworthiness are changing, as banks look to hedge their risks and traders take positions. For example, telecoms reportedly became more liquid during 2000 H2. The corporate bond market is typically more liquid if a borrower has large, recent bond issues but CDS may be if the company is an infrequent issuer and/or long-term investors hold most of its debt.

The CDS market may also have greater liquidity for those looking to take a short position in a particular credit. In the bond market this means selling the bond short and borrowing it through reverse repo or stock borrowing. Especially in Europe, liquidity in the term stock borrowing (or repo) market for corporate bonds can be unpredictable, partly because not all holders are willing or able to lend securities. Taking a short position by buying protection using CDS can be more straightforward. Market participants say that the CDS market has had greater two-way liquidity than the bond market in some recent cases when a company's creditworthiness deteriorated sharply, such as Xerox and Pacific Gas and Electric.

Certainly market participants have been sufficiently confident in market liquidity that they have used CDS to take views on changes in creditworthiness, expecting to be able to close out the position and realise any mark-to-market profit by entering into an opposite trade in the future. A typical trade might be to take a view on the shape of the term structure of credit spreads. For example, a speculator may believe that the forward credit spreads implied by current premia on term CDS are too high or low. Such trading increases market liquidity for those buying protection to hedge credit exposures or selling protection as part of an investment portfolio.

---

22: Two of the main inter-dealer brokers are specialists called Creditex and CreditTrade.

In practice, market prices for CDS can be lower than, close to or higher than credit spreads on corporate bonds (the so-called 'default-cash basis'), both across different reference entities and for the same entity over time. Market participants say explanations for changes in this relationship include:

- Illiquidity in the term reverse repo (or stock borrowing) markets for corporate bonds can mean CDS premia move higher relative to credit spreads on bonds if demand to buy protection increases. This reflects the cost of taking a short position in bonds in order to arbitrage the two markets. Box 3 shows that this seemed to happen in the telecom sector in the second half of 2000.
- Some market participants (eg insurance companies or hedge funds) may not always have ready access to financing and prefer to take credit risk through an unfunded CDS than by purchasing a bond. Financing a bond position exposes the investor to some liquidity risk if its source of funding becomes more expensive or dries up. Demand to sell protection by such investors may reduce CDS premia relative to credit spreads on bonds.
- CDS may expose protection sellers to a little more risk than bondholders if they believe there is value in the option for the protection buyer to deliver various obligations of the reference entity following a restructuring. They may therefore require CDS premia to be a little higher.
- Compared to bondholders, protection sellers under CDS may require a premium because they have no contractual rights, such as covenants or information requirements, vis-à-vis the reference entity allowing them to monitor its creditworthiness or influence its decision-making.
- Protection sellers under CDS may be subject to different marginal tax rates than bondholders.
- Compared with bondholders, participants in the CDS market may require different liquidity premia against the cost of trading out of positions.

## V Some questions about the credit derivatives market

The first four sections of this article have described the credit derivative markets. Like many new markets – for example, the government bond repo or interest rate swap markets in the 1980s – questions have arisen about the structure of the instruments, the risks to participants and the consequent redistribution of risks around the financial system. The Bank has been following some of these issues as part of its surveillance of financial markets<sup>23</sup>. Given the current slowdown in the world economic outlook and the consequent rise in credit risk, market participants and the authorities need to understand and, where relevant, engage with them.

### *Will credit default swaps work for protection buyers when needed?*

Buyers of protection using CDS commit to making a series of payments in exchange for a much larger payment if something relatively unlikely occurs – most reference entities are investment grade companies or sovereigns and credit events are infrequent. Failed or delayed payment by sellers of protection could leave buyers exposed to unexpected credit or liquidity risks on loans, bonds, CDS or other exposures for which the CDS was a hedge. Market participants need to assess both the prospective ability of the counterparty to pay (counterparty credit risk) and the likely timing of any payment. They must also be confident in their legal right to enforce the contract if necessary (legal and documentation risks). In general, risks are likely to be lower in funded than unfunded structures, where payment must be claimed and, if necessary, enforced *ex post*.

### **(a) Counterparty credit risk**

Market participants manage counterparty credit risk on CDS in similar ways to other OTC derivative exposures: by monitoring the current (replacement cost) and potential future value of exposures, by setting limits, by taking collateral and by buying CDS protection on the counterparty. One particular consideration is that the value of, and hence the counterparty exposures associated with, CDS can increase sharply if a reference entity moves close to a credit event, meaning large margin calls may be needed if exposures are collateralised. Credit events are also more likely to occur in times of economic slowdown or financial crisis, when the protection

<sup>23</sup>: See, for example, *Recent developments in financial markets: some implications for financial stability*, speech by Deputy Governor David Clementi at the Banca d'Italia conference *International Banking and Financial Systems: Evolution and Stability* 9 March 2000. Available at [www.bankofengland.co.uk](http://www.bankofengland.co.uk).

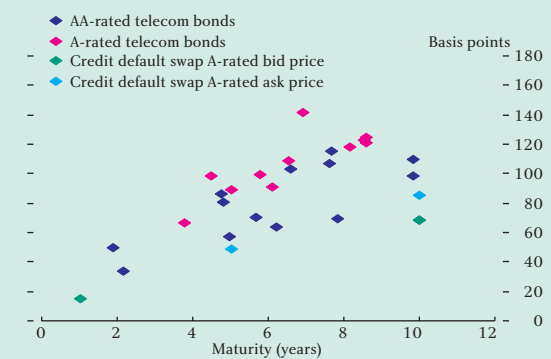
## Box 3: Telecom credit spreads in the bond and credit default swap markets

Charts A-C compare observed spreads over a government bond yield curve on euro bonds issued by a number of A and AA rated telecom operators with premia on single name CDS referenced to British Telecommunications, Deutsche Telecom and France Telecom between September 2000 and January 2001. Bid and ask prices for CDS are taken from quotes on CreditTrade, an interdealer broker.

Telecom credit spreads increased in both bond and CDS markets in the second half of 2000 as credit ratings were downgraded and investors reacted to large increases in debt to finance acquisitions and 3G licences<sup>1</sup>. For example, in September 2000, five year bond spreads and CDS premia for A-rated companies were in the range 50-100 basis points (Chart A). By November and January 2001 this had increased to 100-160 basis points (Charts B and C).

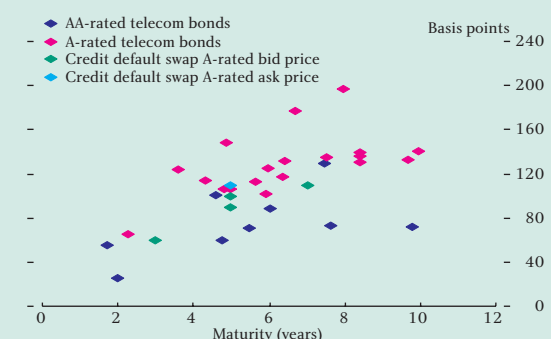
At the same time, CDS premia appear to have increased relative to credit spreads on bonds. In September, all bid and ask quotes on CDS were lower than bond credit spreads at the same maturity, including of AA-rated companies (Chart A). By November, CDS quotes were higher than credit spreads on AA-rated bonds (Chart B) and by January 2001 CDS premia were at similar levels to or higher than credit spreads on A-rated bonds. Contacts have suggested that the greater increase in CDS premia than bond spreads reflected demand from banks to buy protection against commitments to lend to telecom operators.

**Chart A:**  
Credit spreads on bonds issued by EU telecoms compared to credit default swap premia, on 15 September 2000



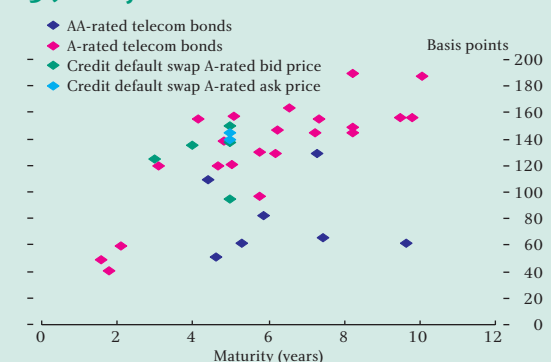
Sources: CreditTrade, Bloomberg and Bank calculations.

**Chart B:**  
Credit spreads on bonds issued by EU telecoms compared to credit default swap premia, on 22 November 2000



Sources: CreditTrade, Bloomberg and Bank calculations.

**Chart C:**  
Credit spreads on bonds issued by EU telecoms compared to credit default swap premia, on 23 January 2001



Sources: CreditTrade, Bloomberg and Bank calculations.

<sup>1</sup> See box in December 2000 *Review* (pp 41-43).

seller itself may become financially fragile. Some market participants say that they look carefully at the risk of correlation between the creditworthiness of reference entity and counterparty ('wrong way' risk) in order to limit this type of risk. For example, they might not purchase protection on Korean companies from Korean banks.

#### **(b) Willingness to pay**

Some market participants have expressed doubts about the willingness of some insurers to settle CDS promptly because they believe they face different incentives to banks and securities firms. Similar questions arise in relation to credit insurance and financial guarantees written by insurers.

In derivatives markets a reputation for timely payment benefits market participants because potential future counterparties are more likely to trade with them. In insurance markets, insurers also want to encourage new business – an incentive to pay promptly – but equally they want to discourage fraudulent claims – an incentive to challenge claims and delay payments<sup>24</sup>.

Monolines are said to have stronger incentives than multiline insurers because their ability to sell financial guarantees depends on maintaining a reputation for prompt payment. Some think multilines may give greater weight to their reputation in other insurance markets, where fraudulent claims may be a greater risk. But others say it is well understood that prompt payment is required in derivatives markets and insurers are unlikely to be concerned about associations between their behaviour in derivatives and insurance markets.

Insurance companies might also delay payments because they need some time to arrange their own liquidity – for example, they may need to draw-down contingent bank lines or claim on reinsurance.

In July 2000 Standard and Poor's introduced Financial Enhancement Ratings (FER) on insurance companies to assist investors in evaluating their willingness and ability to make timely payments. In order to qualify for a FER, insurers must indicate their willingness to pay first, according to the terms of

the obligation, and seek to resolve any problems subsequently<sup>25</sup>.

#### **(c) Legal and documentation risks**

If a protection seller were to dispute payment on a CDS, buyers must enforce the claim on the basis of the legal agreement underlying the transaction. Most CDSs are now made under the ISDA Master Agreement, using the standard 'short-form' confirmation and referring to the 1999 Credit Derivative Definitions. Market participants and lawyers have few doubts about the ability of a protection buyer to enforce payment following a defined credit event on the basis of a contract using this documentation under English or New York law.

One area of possible risk is that buyers may find that they cannot claim under the agreement in circumstances where they expected to be protected because of a misunderstanding of its detailed terms. This is related to the so-called 'basis risk' that a CDS on which an intermediary has sold protection is triggered whilst the corresponding hedge is not triggered because of differences in the wording of the agreements.

Use of a standardised contract is regarded as having reduced this risk considerably compared to the early days of the market when terms and conditions were negotiated bilaterally on each trade. But market participants may still be exposed to basis risk where they have outstanding pre-1999 trades. Furthermore the standardised documentation still leaves scope for mismatches – for example, whether restructuring is included as a credit event and on the 1998, 1999 or 2001 definition, different reference or deliverable obligations, cash or physical settlement etc – although such differences should be more transparent, leaving less room for the unexpected provided intermediaries check the terms of each transaction thoroughly.

Market documentation is also still evolving. Box 4 describes how it has been shaped by events in the market. The CDS market is still not mature and documentation is not yet fully tried and tested. The interest rate swap market was perhaps at a similar stage in the late-1980s.

---

<sup>24</sup>: It is standard practice in insurance to review the validity of a claim before paying.

<sup>25</sup>: *Standard & Poor's introduces criteria for insurer financial enhancement ratings*, Standard & Poor's, 18 July 2000.

## Box 4: Key events in the evolution of CDS documentation

### *1998 Russian default*

Prior to ISDA's agreement of the first 'long form' confirmation for CDS in early 1998, the terms of CDS were agreed bilaterally case-by-case. Russia's default on its debt in August 1998 revealed a number of ambiguities in these agreements. One dispute concerned a short delay in making payments on its debt by the City of Moscow. Some market participants had entered into CDS that did not include any specific provision for grace periods to allow for technical delays in making payment by the reference entity. The English courts ruled that the delayed payment was a credit event under the terms of these contracts and the protection seller should settle. The need to agree a common approach to grace periods encouraged market participants to agree the standard ISDA Credit Derivative Definitions in 1999.

### *Conseco debt restructuring*

In October 2000 a US insurance company, Conseco, agreed a restructuring of its bank debt involving an extension of maturities. Some of its bankers gave notice of a credit event on their CDS and delivered the company's long-dated bonds to the protection sellers. The banks' economic loss from extending the maturity of the bank loans was considerably less than the gain from buying the lower-priced bonds in the market and receiving their par value through the CDS. The protection buyers' contractual right to act in this way was not challenged but many market participants agreed that CDS should not include a delivery option of this potential value. One alternative was to exclude restructuring as a credit event altogether – and some market participants, particularly US bond dealers and investors, began trading on this basis. Another alternative might have

been to limit deliverable obligations following a restructuring to the restructured loans. But this would expose protection buyers to the risk of a squeeze if they did not hold the loans. Following negotiations in April 2001, through ISDA committees, a restructuring supplement to the 1999 ISDA Credit Derivative Definitions was announced in May<sup>1</sup>. It puts limits on the maturity of obligations that can be delivered following a restructuring notified by the protection buyer<sup>2</sup> and excludes restructurings of debt with less than four holders or where two thirds of the holders do not agree the restructuring.

### *National Power demerger*

In November 2000 the UK power company National Power demerged into two successor companies – Innogy, a UK energy business, and International Power, an international power business. The 1999 ISDA Definitions allow for the possibility that a successor to a reference entity may assume all, or substantially all, of its obligations. But cases where the obligations of a company are divided relatively equally between more than one successor company are more difficult. Under the ISDA Definitions the decision is made by a nominated 'calculation agent', after consultation with the parties. This agent is typically the protection seller. Clearer conventions may well be needed for such cases, given the potential for disagreement between protection sellers and buyers if the successor companies have differing creditworthiness. Intermediaries might also want a common approach across the market in order to avoid mismatched positions where, for example, protection sold is referenced to one successor company and protection bought to another. ISDA is examining this issue currently.

<sup>1</sup>: *Restructuring Supplement to the 1999 Credit Derivatives Definitions*, available at [www.isda.org](http://www.isda.org).

<sup>2</sup>: Deliverable obligations following a restructuring are limited to those with a maximum remaining maturity of less than the earlier of (i) 30 months from the date of the restructuring or (ii) the latest maturity of the restructured obligations. Although obligations will always be deliverable if they mature prior to the scheduled termination date of the CDS.

Partly this reflects the relative complexity of the instrument. Whereas most traded derivatives are based on a clearly-defined market price, credit events can be more ambiguous to define and observe. Protection buyers have a natural desire to broaden and protection sellers to narrow the definition of a credit event, so that achieving a standard contract that satisfies both sides in a transparent and predictable way is a difficult balance. Credit events on investment grade issuers are also infrequent and the market may take some time to evolve as market participants learn a little more from each major occurrence.

Another area of possible basis risk is the conversion of CDS into insurance contracts using 'transformers' (see above). Under English law, an insurer is liable to pay on an insurance contract only if the insured has suffered a loss. In the case of credit insurance, they must have an 'insurable interest' in the reference entity. Following a credit event, a transformer will have suffered a loss on the corresponding CDS with the intermediary, so its insurance claim should be valid. Some lawyers putting together these transactions have, however, been concerned that a court might conceivably decide that the transformer was an artificial construction and 'look through' to the intermediary, which might not have such an insurable interest. It has been suggested that one way to reduce this risk might be to have slightly different terms, amounts or payments between the CDS and insurance contract<sup>26</sup>. But this would make the insurance contract less economically effective as a hedge.

Other mismatches may arise because of differences between the standard terms of an ISDA Master Agreement and financial insurance contracts. For example, the ISDA Master Agreement provides for close-out of the transaction if either party experiences a default or early termination event, with the party for which the swap is an asset receiving a payment equal to its current market value. Insurance policies, by contrast, are not typically 'marked-to-market' and closed out in this way.

More generally, documentation of credit derivatives can be relatively complex, especially in the case of portfolio transactions. Market participants need

effective systems and controls to avoid documentation errors, such as entering the wrong name for a reference entity. The rapid growth of the market also creates its own risks. Intermediaries have developed large trading and structuring operations relatively quickly. Some may not yet have fully implemented plans to introduce information and processing systems. They need to ensure that back and middle offices keep pace with front offices. Some market participants have reported backlogs of unconfirmed trades and delays in signing ISDA Master agreements with new counterparties.

*To what extent might information asymmetries limit the development of the market?*

One of the greatest potential benefits of credit derivative markets is that they might facilitate a more efficient distribution of credit risk. There are gains from trade if protection sellers are able to bear risk at a lower cost than buyers because of the different composition of their existing portfolios or differing degrees of risk aversion/neutrality. Economic theory predicts that such risk sharing works most effectively if the risk is independent of the two counterparties. In particular, the buyer should neither know more about the probability of a credit event than the seller nor be in a position to influence the outcome. If both buyer and seller have access only to public information about the reference entity, the CDS premium in a competitive market should be fairly priced, reflecting the expected probability of a credit event and the expected recovery rate.

Where the reference entity is less well-known, however – for example, if it is unrated or has no publicly traded debt – its bankers are likely to have better private information about its creditworthiness than other market participants. Such asymmetries of information, which underlie banking activity, may limit gains from trade and so impede efficient risk sharing<sup>27</sup>.

Protection sellers may be concerned about adverse selection and moral hazard. Adverse selection arises where a protection buyer has hidden knowledge of the reference's entity's creditworthiness and an incentive to conceal unfavourable information from the protection seller in order to reduce the premium.

---

<sup>26</sup>: See *Deriving value for insurance companies* International Financial Law Review, April 2001.

<sup>27</sup>: See, for example, M Rothschild and J E Stiglitz *Equilibrium in competitive insurance markets: an essay on the economics of imperfect information*, Quarterly Journal of Economics, 90, 629-49, 1976.



Moral hazard exists where a protection buyer can influence the probability of a credit event after the CDS has been agreed through actions that cannot be observed by the protection seller. For example, if it is the reference entity's banker, it might observe deterioration in cashflow and decide whether or not to extend further credit.

Where restructuring is a credit event, its bankers have a clear influence over these decisions. In order to limit possible moral hazard in this case, ISDA has proposed to limit restructuring as a credit event to entities with more than four debt holders and where more than two-thirds agree to the restructuring (Box 4). In the case of CLOs, the bank that originated the loans and subsequently bought protection on them will often also be responsible for determining when a credit event has occurred and the severity of the loss. No public information may be available if the loans are, for example, to small or medium-sized companies.

Information asymmetries may be an important limitation on banks' use of credit derivatives because, in practice, the majority of their loan exposures are to unrated borrowers. One reason that European banks appear to have used CLOs to transfer risk to a greater extent than US banks may be that they have significant on-balance sheet exposures to large companies whereas in the USA such companies borrow through the capital markets to a greater extent.

A possible outcome is that protection sellers will require a premium against the additional risks. Indeed market participants say that the cost of buying protection using single name CDS is often higher than the equivalent cost of selling a loan in the secondary market. Another way sellers attempt to limit moral hazard is by requiring buyers to retain the first share of any losses. CLOs, for example, usually include a first loss tranche of 2-3% of the value of the portfolio. Some or all of this tranche is often retained by the bank that originated the loans and continues to collect payments from and monitor the credit quality of the underlying borrowers.

A further way of reducing problems of asymmetric information is to involve independent third parties in initial credit assessments, subsequent credit monitoring, verification of credit events and assessment of the severity of losses. For example, loss

severity can be tested against bids for the reference assets from other banks; and auditors may verify credit events. Selecting loans at random from the bank's portfolio may also decrease any moral hazard if bank loan officers are uncertain whether or not the risk on particular credits has been transferred. Some market participants have suggested that recognition of bank internal ratings by regulators following the implementation of the proposed changes to the Basel Accord would give protection sellers greater confidence in them, reducing information asymmetries. They thought this might make it less costly for banks to buy protection on first loss tranches.

A particular concern is that banks might try to reduce the cost of information asymmetry by giving protection sellers implicit assurance that they will provide compensation for any unexpectedly large credit losses. This might be more likely if a bank were motivated primarily by a desire to reduce the regulatory capital requirements against its loanbook rather than its economic exposure to credit risk. Even if a bank did not give any implicit or explicit assurances at the outset, it may in the event be unwilling to enforce the contract because of concerns that it might develop a poor reputation among investors, jeopardising future transactions.

All these factors are likely to make credit derivative transactions less straightforward where information is asymmetric. Gains from trade might be lower because the benefit of more efficient risk bearing must be greater than the cost of either preserving the buyer's incentives to act in the interests of the seller or compensating the seller for the risk that the buyer will not. Information asymmetries may be greatest where the reference entity's banker is the protection buyer. This might limit the value of the credit derivatives market to commercial banks, although it is difficult to assess how significantly.

#### *Possible risks in portfolio transactions (CDOs)*

As discussed above, the typical CDO comprises a portfolio of credit exposures (whether bonds, loan, single name CDS, portfolio CDS or a combination) on which the risk has been divided between a number of tranches, so that the first loss tranche is exhausted before the second loss tranche begins to bear losses etc. The risks on the different tranches depend on the loss distribution of the portfolio – the probabilities of losses of increasing severity given all the possible states of the world over the life of the transaction.

Box 5 shows how this loss distribution depends importantly on portfolio diversification.

The major rating agencies employ methods for measuring expected correlations of defaults on assets in portfolios and limiting concentrations in particular industries. For example, Moody's estimates a diversity score, which is considered to be the number of independent assets that have the same loss distribution as the portfolio<sup>28</sup>. Moody's assume that the probability of default for companies within the same industry sector or region is imperfectly but positively correlated: for example six exposures in the same industry might equate to a diversity score of three. A lower diversity score equates to a higher assumed 'tail' risk of large losses on the portfolio. In this case, the junior tranches of a CDO will be required to bear a higher proportion of potential losses in order to obtain a higher rating for the senior tranches.

The published rating of a CDO tranche is based on a rating agency's assessment of the *expected loss* on that tranche the average of losses across all possible states of the world weighted by their probability. The risk to the holder of the tranche, however, depends not just on the expected loss but also on the shape of the loss distribution. For example, in the two portfolios illustrated in Box 5, senior tranches bearing any losses in excess of 10% of the portfolio would have approximately the same expected loss and prospectively the same rating. But whereas the senior tranche on the uncorrelated portfolio carries a relatively high probability of a small loss, the senior tranche on the correlated portfolio carries a greater 'tail' risk of larger losses.

In general, the tranches of a CDO have a higher average rating than that of the individual credits in the portfolio, reflecting the benefits of diversification in reducing expected losses on the 'non-equity' positions. But investors need to be aware that lower expected losses are not inconsistent with the possibility of very high losses in certain, low probability scenarios. It is

possible that such tail risks are different on investment grade CDO tranches than on investment grade bonds issued directly by corporate and sovereign borrowers. The importance of portfolio effects might mean that loss distributions on CDOs are shaped differently and perhaps show more or less variation over different transactions than loss distributions on different corporate or sovereign bonds.

More analysis of actual losses on the different tranches of CDOs is needed before such conclusions can be drawn. Unlike corporate and sovereign rating histories, the history of CDO ratings is relatively short. Moody's first study of the credit rating migration of CDOs<sup>29</sup>, based on data from 1996 to 2000, found that CDO tranches have been relatively stable compared to corporate ratings but that they are much more likely to be downgraded than upgraded. With the US economy slowing and credit risk increasing in 2001 Q1, Moody's downgraded 40 CDO tranches and Standard and Poor's 10 tranches. No CDO tranches were upgraded by either rating agency<sup>30</sup>.

A concern is that some investors might rely too much on agency ratings, considering them a sufficient basis for their own risk assessment, and not give enough consideration to the possible variances, skews and tails of the loss distributions<sup>31</sup>. Lack of data makes assessment of these risks difficult.

#### *What effect might credit derivatives have on corporate and sovereign debt restructuring?*<sup>32</sup>

Unlike secondary markets in loans and bonds, credit derivatives need not involve transfers of the underlying borrower's debt until, in the case of physical settlement, a credit event occurs. This can be advantageous to both protection buyer (for example, if it wants to preserve a relationship with a borrower) and seller (for example, if it prefers to delay funding its position). But knowledge that debt will change hands following a credit event might affect the incentives facing a troubled company, its 'pre-credit event' creditors and its potential 'post-credit event'

<sup>28</sup>: See the June 1999 *Review* pp 107-109 'Moody's rating of collateralised bond and loan obligations' Jeremy Gluck, Moody's, New York.

<sup>29</sup>: *Credit Rating Migration of CDO Notes 1996-2000*, Moody's Investor Services, April 27, 2001.

<sup>30</sup>: *First Quarter 2001 Global CDO Review*, Moody's Investor Services, April 13, 2001; *Structured Finance Ratings Roundup Quarterly: First Quarter Performance Trends*, Standard and Poor's, 2 May, 2001.

<sup>31</sup>: The sensitivity of credit risk models to variations in the shape of the loss distribution was highlighted in some of the papers presented at a conference on credit risk modelling hosted by the Bank in Autumn 1998. See *Credit Risk Modelling*, Jackson, Nickell and Perraudin, June 1999 *Review*, pp 94-121.

<sup>32</sup>: See also P Brierley and G Vlieghe *Corporate Workouts, the London Approach and Financial Stability* November 1999 *Review*.

## Box 5: Credit risk on CDO portfolios

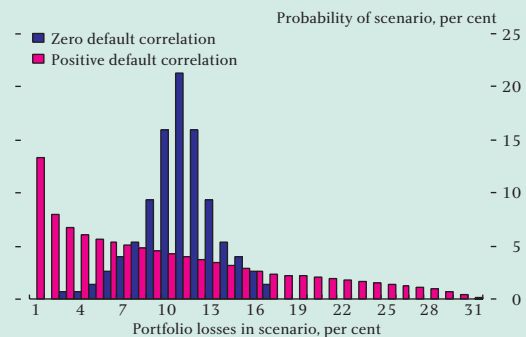
Similarly to debt issued by a single company, credit risk on CDOs depends on both the expected probability of default and the expected loss given default or recovery rate. A low expected recovery rate means the risk of a second loss position moves closer to that of a first loss position. Rating agency default statistics provide some basis for assessing these risks on the underlying credits within a CDO portfolio – although credit events on CDS, in particular restructuring, may be defined more widely than in the rating agency definitions of default.

In the case of CDOs, however, the number of exposures in the portfolio and the default correlation between them are also crucial. For example Chart A shows loss distributions for two portfolios with the same expected loss of around 10%. The shape of the distributions is, however, very different. The uncorrelated portfolio is centred on the expected loss<sup>1</sup> of 10%. The correlated portfolio includes a long tail of more severe potential losses.

Assume, for example, that the risk on these portfolios is divided into two tranches bearing the first 16% of losses (first loss) and any remaining losses (senior) respectively. Clearly the risk on the senior tranche is much greater in the correlated portfolio. At the extreme, if credit quality is nearly perfectly positively correlated across the portfolio, then the risk to the most senior tranche may be little different to that on the first loss tranche. Either nothing in the portfolio defaults and each tranche is free of losses or everything defaults and each tranche suffers a loss.

Lower default correlation (perhaps achieved via exposures to different industries in different countries) and a higher number of exposures in the portfolio mean the risks on the different tranches diverge. The first loss position becomes relatively more risky than the senior positions as the probability of a small loss increases and the ‘tail’ risk of a large loss decreases. Estimation of default correlation is thus absolutely essential to the risk rating and pricing of the different tranches. In general, default correlation increases empirically as the average credit quality of the reference portfolio falls.

**Chart A:**  
Loss distributions on illustrative portfolios of uncorrected and positively correlated credit exposures



Source: Bank calculations.

<sup>1</sup>: Defined as the average of losses across all scenarios weighted by their probability.

creditors in unpredictable ways. For example, a creditor's decision to support a debt restructuring or to seek bankruptcy might be influenced by whether it had bought protection using CDS that did or did not include restructuring as a credit event. Concerns about reputation may limit opportunistic behaviour. But, at the very least, an active credit derivative market might make it more difficult to identify and organise creditors in order to negotiate any debt work-out.

## **VI Credit derivatives markets and financial stability**

Credit derivatives are one of a number of markets for the transfer of credit risk. Development of these markets has clear potential benefits for financial stability because they allow the origination and funding of credit to be separated from the efficient allocation of the resulting credit risk. This is likely to involve the broader dispersion of credit risk, including to non-bank investors with long holding periods, such as insurance companies and investment funds. If banks hold more diversified credit portfolios, they will be less vulnerable to idiosyncratic or sectoral asset price shocks. If they can transfer credit risk more easily, the supply of credit to borrowers will be less dependent on their willingness and ability to take credit risk, perhaps making credit crunches less likely.

The basic credit derivative is the credit default swap. It is being used extensively as a building block to put together synthetic CDOs, continuing the development of the CDO market as a means of transferring portfolios of credit risk. Much of this risk appears to be moving from banks and securities dealers to insurance companies and investment funds.

A primarily inter-dealer market in single name CDS on large, rated companies and sovereigns has also developed. Although apparently smaller than bond and loan markets, it is sometimes more liquid. Factors encouraging market liquidity include the greater standardisation of CDS documentation in recent years, its being straightforward to take both long and short positions in CDS and CDS giving a relatively pure exposure to credit risk. A liquid market might also benefit financial stability by providing valuable price information. As market mechanisms develop to disseminate prices more widely, this has the potential to improve the allocation of credit, particularly in lending markets where history shows banks have often failed to price risk appropriately.

Credit risk transfer markets also present some challenges and may carry potential costs. Separating the exposure to credit risk from the direct relationship with the borrower might lessen capacity and/or incentives to monitor creditworthiness and complicate any restructuring of a borrower's debt. It might also make it more difficult for creditors, regulators and the monetary authorities to assess the actual credit exposures of banks and of the banking system as a whole. Although credit derivatives are probably more likely to disperse credit risk, there is also the possibility that they could deliberately or inadvertently concentrate it. Market participants can set limits on their own counterparty exposures but not on the aggregate exposures that the whole market might have to a particular counterparty. For this reason, detailed disclosure of on- and off-balance sheet positions could be more important for institutions that make extensive use of credit derivatives.

Continued growth of credit derivatives markets could contribute to further increases in off-balance sheet exposures amongst international banks, securities firms and potentially insurance companies. By the nature of the instruments, these exposures increase as credit risk grows within the economy, so that they may be higher during economic slowdowns. The scale of counterparty exposures relating to credit derivatives is probably too small to be a systemic issue at present. But the apparently high degree of concentration in the market raises questions for the future. Although the institutions involved are generally very large, the dominance of a few banks, securities houses, reinsurance companies and property and casualty insurers does not appear to be decreasing. Obtaining better data on the scale and nature of these inter-bank and bank-insurance company exposures should be part of the work programme of financial stability authorities globally.

On balance, however, the range of new credit risk transfer markets has the potential over time to increase the overall robustness of the global financial system.

# Corporate liquidations

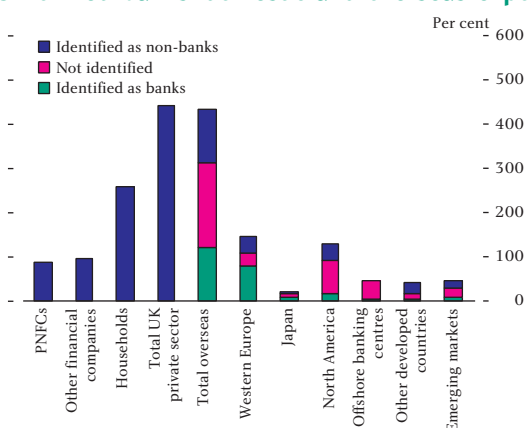
## in the United Kingdom

Gertjan Vlieghe, Monetary Assessment and Strategy Division, Bank of England<sup>1</sup>

Understanding the factors determining corporate liquidations is one ingredient of prudent banking. This article investigates these in a UK context. It suggests that the substantial rise in corporate liquidations during the recession in the early 1990s mainly reflected deteriorating company finances, including a marked build-up of indebtedness. In the subsequent recovery, however, rising GDP relative to trend and other macroeconomic factors seem to have had greater explanatory power than changes in company finances in accounting for the fall in the corporate liquidations rate to its currently low level.

**CHART 1 ILLUSTRATES** UK-owned banks' on-balance-sheet exposures to different sectors as a proportion of total regulatory capital. At end-December 2000, exposures of UK-owned banks to the private non-financial corporate (PNFC) sector represented 87 per cent of capital.

**Chart 1:**  
UK-owned banks' domestic and overseas exposures<sup>(a)</sup>



Source: Bank of England.

(a) Figures are a percentage of bank capital.

Given this, the treatment of these exposures from the point of view of provisions and capital cover is clearly important. Provisions have generally tended to be set to cover banks against losses that have crystallised, although there is of course an important debate about the use of anticipatory (ie forward-looking) provisions. To the extent that losses are expected at

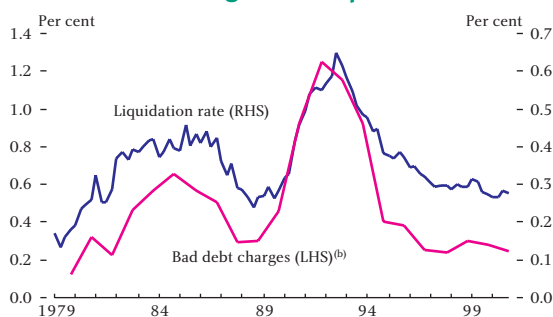
the time a loan is made, they should be reflected in the margin charged on the loan, with capital set to cover unexpected losses (Jackson and Lodge (2000)). To the extent that conditions affecting creditworthiness subsequently change, both any forward-looking provisions and capital cover against unexpected losses may need to be revised. It is encouraging that in recent years many large banks have made increasing use of internal models that incorporate a variety of indicators of the risk of credit deterioration to determine their economic capital. Such indicators include the probabilities associated with changes in credit ratings (transition matrices, see below), corporate bond spreads, equity price volatilities and measures of corporate gearing (see Nickell et al (2001a, b)). These internal models, which differentiate credit risk more precisely, will become a central feature of regulatory capital determination following the implementation of the proposed new Basel Accord (see Jackson (2001)).

Liquidation is an extreme form of credit impairment. In general, the process of credit impairment (or improvement) may be summarised by a transition matrix of ratings. Such a transition matrix may be based on ratings provided by rating agencies or credit grades that result from a bank's internal assessment procedure. A transition matrix gives the probability that a loan of any given rating (or internal grade) will have the same rating in the next period, will be

<sup>1</sup> The work reported in this article was undertaken while the author was in the Domestic Finance Division, as part of the work programme of the Bank's Financial Stability area on calibrating risks to financial stability.

downgraded or upgraded, or will go into default. The lower the initial rating, the higher the probability that the borrower will default in the next period. In some cases, default will be followed by corporate liquidation. In other cases, a debt restructuring may follow, which, if successful, allows the borrower to continue its activities and avoid liquidation. In any event, default will directly affect bank capital if it is unanticipated and therefore not already allowed for in banks' pricing and provisioning policies. The relationship between bank bad debt charges and corporate liquidations is illustrated in Chart 2.

**Chart 2:**  
**Bank bad debt charges and liquidations<sup>(a)</sup>**



Sources: ONS and Bank of England.

(a) Data for the liquidation rate and bad debt charges are quarterly to Q4 2000, and annual to 2000 respectively.

(b) Data are a percentage of bank assets.

Understanding the factors that determine corporate failures in the United Kingdom is, therefore, important for banks, regulators and the authorities. The growing use of risk-sensitive internal credit risk models should enable banks to make better assessments of the likelihood of default, particularly given a closer monitoring of transitions through the credit risk spectrum. In the rest of this article, we focus exclusively on corporate liquidations, but it needs to be borne in mind that this is only one manifestation of credit quality deterioration.

To analyse corporate liquidations we use the corporate liquidations *rate*, which is the number of liquidations divided by the stock of companies. A measure that takes into account the size of companies would be desirable from the perspective of measuring its importance to banks. But no aggregate data are available in the United Kingdom on the size of liquidated companies.

Chart 2 also shows that the corporate liquidations rate in the United Kingdom has been quite low since the mid-1990s. In that sense, under current

conditions, liquidations can be thought of as low probability but potentially high impact events. The analysis below focuses on probability – that is, the determination of the aggregate rate of corporate liquidations – rather than on the impact on banking system capital. The objective is to explain the behaviour of the liquidations rate over time by factors suggested by economic theory and previous empirical studies.

The article first discusses briefly the relevant previous economic literature on corporate liquidations, both theoretical and empirical. It then describes a time-series model in which the determinants of the aggregate corporate liquidations rate in the United Kingdom are estimated from a sample of quarterly data over the period 1975 Q1 to 1999 Q1. We explore the ability of the model to track the behaviour of corporate liquidations over time; the determinants of the substantial increase in liquidations in the late-1980s/early-1990s; and the subsequent decline to current low levels.

### Theory

The theoretical underpinning of the analysis is provided by a stylised version of Wadhvani's (1986) model, in the style of Scott (1981). A firm is assumed to go bankrupt when the sum of its current year profit,  $\pi$ , and the expected value of equity (excluding current profit),  $S$ , is negative, such that  $\pi + S < 0$ . This condition assumes that a firm has access to external capital and can borrow up to its net worth. If a firm is constrained at its current level of borrowing, the bankruptcy condition substitutes the liquidation value of the firm's assets for the expected value of equity.

If  $\pi$  is a random variable with cumulative normal distribution function  $F(\cdot)$ , mean  $\mu_\pi$  and standard deviation  $\sigma_\pi$ , the probability of bankruptcy (for firms able to borrow) is:

$$F\left[\frac{-(\mu_\pi + S)}{\sigma_\pi}\right].$$

The role of certain financial ratios in calculating the probability of failure, and hence the aggregate liquidations rate, emerges by noting that the variables can be normalised on assets,  $A$ . The probability of bankruptcy is then a function of profitability, as proxied by the mean rate of return on assets

$\left(\frac{\mu_\pi}{A}\right)$ , a measure of capital gearing  $\left(1 - \frac{S}{A}\right)$  and a measure of the variability of the rate of return



on assets ( $\frac{\sigma_{\pi}}{A}$ ).

The discussion so far ignores the effects of inflation. Inflation that is not expected at the time of entry into a debt contract will reduce the real value of a firm's fixed rate debt. However, expected inflation may also have real effects. Wadhvani (1986) notes that when expected inflation rises, firms with floating rate debt experience a negative cash flow effect as their interest payments increase by more than the output price, but the increase in the nominal value of their assets allows them to borrow more in order to offset this negative cash flow effect. As long as firms can borrow against the market value of their assets, expected inflation will be neutral, ie have no real effects. This applies only if firms have access to external capital on the same terms as internal funds, and depreciation is perfectly indexed. In fact, there is a large theoretical (as summarised in Freixas and Rochet (1997)) and empirical literature (eg Schiantarelli (1996)) that investigates whether or not firms are credit constrained and, if so, face an external finance premium in accessing external funds rather than internal finance. If firms are credit constrained, higher expected inflation will increase the probability of default through the negative cash flow effect from higher nominal interest rates – often referred to as the 'front-end loading effect' of inflation on debt. A change to a higher level of expected inflation<sup>2</sup> – and therefore a higher level of nominal interest rates – will then have real effects. The credit channel literature also suggests that higher nominal interest rates will have a greater effect on corporate real activity, other things being equal, the greater the reliance of the corporate sector on external finance – the so-called 'financial accelerator' effect.

### Empirical model

These theoretical considerations suggest that, in estimating an empirical model, the explanatory variables should include measures of the share of corporate profits in GDP and corporate indebtedness, together with indicators of both expected and unexpected inflation. Empirical studies often decompose the profit share into its short-run determinants, such as real input prices, real wages, real aggregate demand and the real interest rate. One motivation for using these

component variables rather than an aggregate profitability index is that changes in different components of profits may not affect all firms in the same way. A nominal interest rate term is included alongside the real interest rate to capture any cash flow effects of expected inflation.

Empirical studies differ in their definition of the real interest rate variable. Young (1995) argues that only unanticipated changes in the real interest rate matter, because the cost of capital goods fully takes into account anticipated changes in the real interest rate. However, distinguishing anticipated from unanticipated real interest rate changes requires a proxy for companies' inflation expectations at different horizons, which is difficult to estimate. This article therefore uses the short-term *ex post* real interest rate. This variable will reasonably capture unexpected changes in real interest rates (and therefore unexpected changes in inflation) if expected real interest rates are relatively stable. This argument is similar to that used in Bordo et al (2000), who argue that changes in the *ex post* real interest rate most likely reflect forecast errors in inflation.

A number of possible additional influences on corporate liquidations can also be identified. The birth rate of new companies is one, because empirical work has shown that young companies are more likely to fail than experienced companies (Altman (1993)). A zero–one dummy variable (*dum*) is included to capture the possible effect of the 1986 Insolvency Act: by introducing new methods of corporate reorganisation, such as administration and administrative receivership, the act may, *ceteris paribus*, have reduced the number of company liquidations subsequently. We also consider whether there is an additional role for non-residential real estate prices (*PROP*): given that property is often the main source of collateral for firms, a reduction in property prices may limit their access to further borrowing.

In estimating alternative equations for the liquidations rate, we compare specifications using the determinants of profits, which are assumed to be input prices, real wages and the deviation of real GDP

---

<sup>2</sup>: If credit constraints are exogenous, it does not matter whether the change in inflation is temporary or permanent: both will have real effects. However, it is likely that a permanent change in the inflation rate will eventually result in a change in credit constraints, ie lenders may change their lending behaviour and reduce credit constraints if they know that the nominal value of borrowers' assets will systematically increase at a higher rate.

from trend, with a direct measure of profits. The initial empirical model to be estimated is, therefore, the following<sup>3</sup>:

$$\Delta LQRT_t = \alpha_1 LQRT_{t-1} + \alpha_2(L)\Delta LQRT_t + \alpha_3 DEBT_{t-1} + \alpha_4(L)\Delta DEBT_t + \alpha_5 GDP_{t-1} + \alpha_6(L)\Delta GDP_t + \alpha_7 RM_{t-1} + \alpha_8(L)\Delta RM_t + \alpha_9 RW_{t-1} + \alpha_{10}(L)\Delta RW_t + \alpha_{11} I_{t-1} + \alpha_{12}(L)\Delta I_t + \alpha_{13} R_{t-1} + \alpha_{14}(L)\Delta R_t + \alpha_{15} NEW_{t-1} + \alpha_{16}(L)\Delta NEW_t + \alpha_{17}(L)\Delta PROP_t + c + dum$$

where  $\Delta$  denotes a first-difference,  $L$  the lag operator<sup>4</sup>,  $LQRT$  is the corporate liquidations rate,  $DEBT$  is the net debt-to-GDP ratio,  $GDP$  is the deviation of GDP from trend (obtained as the residuals of GDP at constant prices, regressed on a constant and time trend),  $RM$  is a measure of real input prices (material and fuel costs deflated by the GDP deflator),  $RW$  is real unit wages,  $I$  is the nominal rate of interest,  $R$  is a measure of the real interest rate,  $NEW$  is the birth-rate of new companies,  $c$  is a constant term and  $dum$  is the Insolvency Act dummy variable. The variables are included in log form, so that their coefficients represent elasticity estimates. The equation is estimated over the period 1975 Q1 to 1999 Q1.

### Estimation results

Results for the preferred specification are shown in Table 1. This model was selected following the procedure of Pesaran and Shin (1998). This procedure maximises a criterion of 'goodness of fit' by searching over all the combinations of variables, after it has been established that the causation runs from chosen right-hand-side variables to the dependent variable, rather than the reverse. This technique is generally preferred to a general-to-specific approach in the presence of cointegration<sup>5</sup>. As a robustness check, a general-to-specific approach was also considered and produced similar results.

Adjusted  $R^2 = 0.65$

Standard error of the equation = 0.063

Model  $F$ -Test = 19.2 ( $p$ -value = 0.00)

Test for autocorrelation:  $LM(4) = 2.74$  ( $p$ -value = 0.60)

**Table 1:**  
Preferred equation for corporate liquidations rate<sup>(a)</sup>

Variable	Coefficient	t-statistic
Constant	0.001	0.1
$ECM_{t-1}$	-0.26	-7.4
$\Delta LQRT_{t-1}$	-0.26	-3.6
$\Delta DEBT_t$	0.27	3.7
$\Delta GDP_t$	-4.37	-5.2
$\Delta R_t$	0.012	2.5
$\Delta R_{t-2}$	-0.034	-5.6
$\Delta I_{t-2}$	0.022	2.7
$\Delta NEW_{t-3}$	1.87	5.0
$\Delta NEW_{t-4}$	-1.51	-5.0
$\Delta PROP_{t-2}$	-0.66	-1.7

(a) Parsimonious equation in error correction form resulting from maximising the Schwartz Bayesian criterion (see Vlieghe (2001)).

The error-correction term ( $ECM$ ) gives the implied long-run equation for corporate liquidations ( $t$ -ratios in parentheses):

$$LQRT = 0.48*DEBT - 5.59*GDP + 0.068*R + 4.95*RW - 7.77 - 0.38*dum$$

(4.66)            (-4.35)            (8.30)  
(4.98)            (-21.7)            (-2.87)

As noted above, the coefficients in the equation represent long-run elasticities<sup>6</sup>, except for the coefficient on interest rates, which is a semi-elasticity. In other words, an increase in the debt-to-GDP ratio of 1 per cent will, *ceteris paribus*, raise the equilibrium corporate liquidation rate by 0.48 per cent. Similarly, a decrease in the level of GDP of 1 per cent away from its estimated trend level will increase the liquidations rate by 5.59 per cent; a rise in real

<sup>3</sup> This equation, and the following analysis, is based on the forthcoming Working Paper by Vlieghe (2001). Further details on the estimation are available from this source.

<sup>4</sup> The difference operator  $\Delta$  transforms a variable  $x_t$  into its first difference:  $x_t - x_{t-1}$ . The lag operator transforms  $x_t$  to its lagged value:  $x_{t-1}$ .

<sup>5</sup> Although individual variables follow a random walk (meaning they do not revert to a long-run average), they may still move together in the long run, i.e. be cointegrated. If variables follow a random walk but are cointegrated, standard statistical inference techniques, such as  $t$ -statistics to test whether individual variables are significant in the equation, have different distributions. The Pesaran and Shin (1998) procedure is one way of adjusting standard procedures to allow for the possibility of cointegration.

<sup>6</sup> The concept of the long run in error-correction models is specific to each equation. The long run is the level that the dependent variable is tending towards, but the actual data may deviate from this level because of factors that have only a temporary influence. The long-run horizon in this case is shorter than the 'long-run' often referred to in macroeconomics, where it is generally used to denote movements that are unrelated to business cycles.

interest rates of 1 percentage point will increase the liquidations rate by 6.8 per cent, and a rise in unit real wage costs of 1 per cent will increase the liquidations rate by 4.95 per cent.

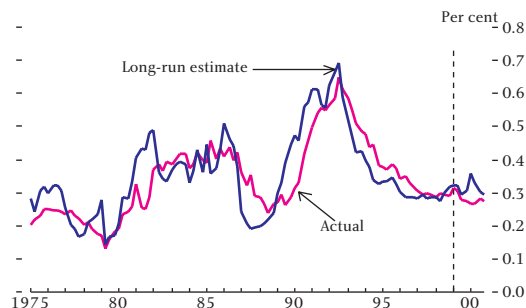
Summarising the results of the estimation procedure, input prices were not found to be significant; the nominal interest rate, the birth rate of new companies and property prices do not appear in the long-run equation but have significant and plausibly-signed short-run coefficients (property prices are significant only at the 10 per cent level); the positive coefficient on the nominal interest rate is consistent with other evidence (Wadhvani (1986), Young (1995)) of an adverse effect of rising inflation on company cash flows<sup>7</sup>; and, using a variety of tests, there is evidence of a long-run relationship between the company liquidations rate and the debt-to-GDP ratio, deviation of real GDP from trend, the real interest rate and real wages. The model fits the data quite well and passes each of the diagnostic tests for misspecification. Each of the variables in the preferred equation is statistically significant at conventional levels and the variables are also signed intuitively.

By plotting the actual corporate liquidation rate against the fitted long-run equilibrium, we can analyse the extent to which changes in the liquidations rate over time reflect changes over the long run in the macroeconomic environment or the financial structure of companies, or are instead a consequence of short-run dynamic effects. Short-run dynamic effects include past changes in the long-run variables that have not yet had their full effect, or changes in the birth rate of new firms, nominal interest rates or property prices.

The fitted long-run equilibrium of the liquidations rate is illustrated alongside the actual rate in Chart 3. Note that this extends the actual and predicted values to 2000 Q4, beyond the period used for the estimation, which ends in 1999 Q1 as indicated by the dotted line. This allows an assessment of the out-of-sample predictive ability of the preferred equation<sup>8</sup>.

Chart 3 shows that the actual level of corporate liquidations closely follows the long-run equilibrium

**Chart 3:**  
**Liquidations rate - actual and long-run estimate**



Sources: DTI and Bank of England.

(see also *Financial Stability Review*, December 2000, page 71). Deviations from the long-run equilibrium reflect the effect of the short-term variables (nominal interest rates, property prices, and the birth rate of new companies), the fact that the long-run variables have their full effect only with a lag, and the residuals. The variance of the equation residual is about one-fifth (0.22) of the variance of the long-run residual (ie the deviation of the liquidations rate from its implied long-run level), which implies that most of the deviation from the long-run level is accounted for by the short-run dynamics of the equation<sup>9</sup>.

The coefficient on the error-correction term in Table 1 indicates that the actual rate converges to the long-run solution at a rate of 26 per cent of the gap in each quarter. Three-quarters of the gap is therefore removed in five quarters. In 2000 Q4 the long-run solution to the model was only marginally above the actual rate.

One *caveat* of this reduced-form approach is that it is vulnerable to the Lucas critique: the structure of the economy may have changed over time in important ways. For example, the real interest rate may no longer need to increase by as much as in the past in order to stabilise inflation, given the new monetary policy regime in the United Kingdom since 1997. This would not only change the probability distribution of inflation, the output gap and the real interest rate, but it is likely to affect borrower and lender behaviour as well. All these changes would in turn result in different coefficients on the 'true' equation. However, the estimated equation shows no sign of

<sup>7</sup>: Since the nominal rate is only significant in differences, not levels, a move to a higher (or lower) expected inflation rate is estimated to have only a temporary effect on the liquidations rate.

<sup>8</sup>: The out-of-sample predictions in Chart 3 use actual data as the lagged dependent variable.

<sup>9</sup>: For the out-of-sample predictions, this ratio is similar at 0.18.

instability over the sample period<sup>10</sup>, and it has continued to fit the out-of-sample data well. This indicates that, so far, there is no evidence that those aspects of the structure of the economy that are relevant to the determination of the liquidations rate have changed substantially.

### Application to the 1990s recession and the subsequent recovery

The preferred equation can be used to decompose the factors responsible for the substantial increase in the corporate liquidations rate in the late 1980s and early 1990s, associated with the early 1990s recession in the United Kingdom. It can also be used to assess the factors responsible for the subsequent decline in liquidations as the economy recovered from recession (Table 2). During the period 1988 Q3 to 1992 Q3, the UK corporate liquidations rate nearly tripled from 0.238 per cent to 0.647 per cent (quarterly). The increase in corporate indebtedness prior to and during that period, perhaps associated with rapid output growth and financial liberalisation of the mid- to late-1980s, was the most important single explanatory factor. Falling GDP relative to trend, rising real wages and rising real interest rates following the subsequent tightening of monetary policy accounted for a significant part of the increase in liquidations, but they were less important, individually, than the rise in corporate sector indebtedness. Falling property prices also had some effect in raising liquidations, but it is interesting that, as the dummy effect suggests, the rise in liquidations was restrained by the adoption of the 1986 Insolvency Act.

These results can be compared with the factors accounting for the decline in liquidations recorded over the period 1992 Q3 to 1997 Q3<sup>11</sup>, during which the rate fell by 54.1 per cent. The rise in the profit share (implied by the fall in the real unit wage) was the single most important factor, with the recovery in GDP relative to trend and the falling real interest rate important to a similar degree in accounting for the reduction in the liquidations rate. Changing corporate sector indebtedness had little cumulative effect as indebtedness fell initially, but then rose again over this period.

**Table 2:**  
Contribution of variables to the change in liquidation rate

Time period	1988 Q3 to 1992 Q3	1992 Q3 to 1997 Q3
Change in liquidations (per cent)	171.3	-54.1
Contributions (pp):		
Debt to GDP ratio	67.3	-1.8
GDP from trend	51.0	-14.2
Real interest rate	21.8	-13.4
Nominal interest rate	-2.5	2.6
Birth rate of firms	-9.4	4.4
Property prices	9.6	-3.7
Real unit wage	42.8	-25.4
Insolvency Act dummy	-19.1	0.0
Residual	9.8	-2.7

Source: Vlieghe (2001).

Looking forward, this analysis might be useful in two ways. First, by making forecasts of economic and financial conditions, the path of future corporate liquidations can be forecast. Second, by making assumptions about the probability distribution of the economic and financial variables used in this model, banks and policy makers can map out the corresponding expected probability distribution of the liquidations rate. This could be estimated by using the historical distribution of the explanatory variables in calculating margins and provisioning levels. In addition, hypothetical scenarios could be examined for the purposes of stress-testing when calculating economic capital requirements.

### Conclusion

The UK banking sector inevitably has a substantial exposure to the UK private non-financial corporate sector and, historically, bad debt charges have moved with the corporate liquidations rate. This article has considered the behaviour of corporate liquidations in the United Kingdom. The implications for the financial sector depend on the extent to which

<sup>10</sup>: This is analysed in more detail in Vlieghe (2001).

<sup>11</sup>: 1997 Q3 represented the trough of the liquidations rate at the time this equation was initially estimated. The liquidations rate has subsequently reached a slightly lower point in 2000 Q1.

corporate failure is unanticipated and therefore not taken into account in banks' pricing and provisioning policies. It follows that banks (and other providers of finance) need to make provisions for an expected level of corporate failure that is not covered by the margin

charged on the finance. Furthermore, banks need to set aside economic capital to cover any unexpected defaults and to revise their provisioning for changes in expected defaults in the light of outturns relative to prior expectations.

---

## References

- 1: Altman, E (1993) 'Corporate Financial Distress and Bankruptcy' (2nd ed), Wiley & Sons, NY.
- 2: Bordo, M D, Dueker, M J and Wheelock, D C (2000) 'Aggregate Price Shocks and Financial Stability: An Historical Analysis', NBER Working Paper No. 7652.
- 3: Freixas, X and Rochet, J-C (1997) 'Microeconomics of Banking', MIT Press.
- 4: Jackson, P (2001), 'Bank Capital Standards: the New Basel Accord', *Bank of England Quarterly Bulletin* 41(1), Spring, pages 55–63.
- 5: Jackson, P and Lodge, D (2000) 'Fair Value Accounting, Capital Standards, Expected Loss Provisioning, and Financial Stability', *Bank of England Financial Stability Review*, June, pages 105–125.
- 6: Nickell, P, Perraudin, W and Varotto, S (2001a) 'Ratings Versus Equity-based Credit Risk Models: an Empirical Analysis', Bank of England Working Paper No 132.
- 7: Nickell, P, Perraudin W and Varotto, S (2001b) 'Stability of Ratings Transitions', Bank of England Working Paper No 133.
- 8: Pesaran, M H and Shin, Y (1998) 'An Autoregressive Distributed-Lag Modelling Approach to Cointegration Analysis', in Strom, S (ed) 'Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium', Cambridge University Press.
- 9: Schiantarelli, F (1996) 'Financing Constraints and Investment: A Critical Survey of the International Evidence', *Oxford Review of Economic Policy* 12(2), pages 70–89.
- 10: Scott, J (1981) 'The Probability of Bankruptcy: A Comparison of Empirical Predictions and Theoretical Models', *Journal of Banking and Finance* 5.
- 11: Vlieghe G W (2001) 'Indicators of Fragility in the UK Corporate Sector' forthcoming, Bank of England Working Paper.
- 12: Wadhvani, S (1986) 'Inflation, Bankruptcy, Default Premia and the Stock Market', *Economic Journal* Vol. 96, pages 120–138.
- 13: Young, G (1995) 'Company Liquidations, Interest Rates and Debt', *The Manchester School Supplement*, Vol 63, pages 57–69.

# Costs of banking system instability: some empirical evidence

Glenn Hoggarth and Victoria Saporta, Financial Industry and Regulation Division, Bank of England

There is now a substantial empirical literature on the causes of banking crises<sup>1</sup> but there have been fewer studies measuring the potential costs of financial system instability. Yet it is a desire to avoid such costs that lies behind policies designed to prevent, or manage, crises. This article presents some cross-country estimates of the fiscal costs of crisis resolution and of output losses during crises. Although varying markedly from crisis to crisis, over the past 25 years cumulative output losses during banking crises have, on average, been large – around 15 per cent to 20 per cent of GDP. Moreover, whether banking crises cause or are the result of recession they exacerbate subsequent declines in output, as well as often being costly to resolve.

**OVER THE PAST QUARTER OF A CENTURY**, unlike the preceding 25 years, there have been many banking crises around the world. Caprio and Klingebiel (1996, 1999), for example, document 69 crises in developed and emerging market countries since the late 1970s. In a recent historical study of 21 countries, Bordo, Eichengreen, Klingebiel and Martinez-Peria (2001) report only one banking crisis in the quarter of a century after 1945 but 19 since then.

This article considers the ways in which banking crises can impose costs on the broader economy and presents estimates of those costs. In particular, the article focuses on cross-country estimates of the direct fiscal costs of crisis resolution and the broader welfare costs, approximated by output losses, associated with banking crises.

## Costs of banking crises – an overview

A crisis in all or part of the banking sector may impose costs on the economy as a whole or parts within it. First, 'stakeholders' in the failed bank will be directly affected. These include shareholders, the value of whose equity holdings will decline or disappear; depositors who face the risk of losing all, or part, of their savings and the cost of portfolio reallocation; other creditors of the banks who may not get repaid; and borrowers, who may be dependent on banks for funding and could face difficulties in finding alternative sources. In addition, taxpayers may

incur direct costs as a result of public sector crisis resolution – cross-country estimates of these are shown below.

Costs falling on particular sectors of the economy might in some cases simply represent a redistribution of wealth, but under certain conditions banking crises may also reduce income and wealth in the economy as a whole.

A wave of bank failures – a banking crisis – can produce (as well as be caused by) a sharp and unanticipated contraction in the stock of money and result, therefore, in a recession (Friedman and Schwartz (1963)). Secondly, if some banks fail and others are capital constrained the supply of credit may contract, forcing firms and households to adjust their balance sheets and, in particular, to reduce spending. Output could fall in the short-run. This mechanism – working through the 'credit channel' – was highlighted by Bernanke (1983) who attributed the severity and length of the Great Depression in the United States to widespread bank failure. Moreover, if investment is impaired by a reduction in access to bank finance, capital accumulation will be reduced and thus the productive capacity, and so output, of the economy in the longer run will be adversely affected.

A weakened banking system can lead to a reduction in bank loans either because some banks fail or

<sup>1</sup> For example, see the literature review on leading indicators of banking crises by Bell and Pain (2000) and the references within.



because banks under capital pressure are limited in their ability to extend new loans. Under the Basel Accord (which is applied in over 100 countries) banks can lend only if they can meet the specified capital requirements on the new loans. Banks can, of course, reduce other assets to make room for bank lending but their scope to do so may be limited. Pressure on one or even several banks will only lead to a persistent reduction in the overall supply of credit, however, if other banks do not step in to fill the gaps and borrowers cannot turn to other sources of funding such as the securities markets.

One school of thought suggests that bank credit cannot easily be replaced by other channels because the intermediation function of banks is necessary for some types of borrower (see Leland and Pyle (1977) and Fama (1985)). Collecting information on borrowers over a lengthy period enables banks to distinguish between the creditworthiness of 'good' and 'bad' customers. Bank failures could lead to the loss of this accumulated information and impose costs on the economy in so far as the information has to be re-acquired. In addition the specificity of this information may make it difficult for some borrowers to engage with a substitute bank if theirs is unable to lend (Sharpe (1990) and Rajan (1992)). In practice, the special role played by bank credit is likely to vary from country to country, and its availability or not will be affected by the nature and extent of crisis. In most countries, too, households and small businesses at least are unlikely to be able to obtain finance from the securities markets.

There is some US evidence, although not clear cut, that in the early 1990s pressure on the banks in some states led to a reduction in the supply of loans and affected the real economy (see Kashyap and Stein (1994) for a survey). In practice though, because banking sector problems are most likely to occur in recessions, it is not easy to identify whether a reduction in bank lending reflects a reduction in the supply of or demand for funds (see Hoggarth and Thomas (1999) for the recent situation in Japan). A critical issue, covered below, is therefore whether reductions in output are caused by banking crises or *vice versa*.

There are other channels too through which difficulties in the banking system (if widespread) can affect the banks' customers and the economy more

widely. The banks' overdraft facilities and committed back-up lines for credit are one protection against liquidity pressures for customers, but Diamond and Dybvig (1983) also stress that by providing an instant-access investment (demand deposits) they provide another important mechanism. Most importantly, the payments system will not work if customers do not have confidence to leave funds on deposit at banks or, crucially, banks lose confidence in each other. A complete breakdown in the payments system would bring severe costs since trade would be impaired (see Freixas et al (2000)). In practice, the authorities are likely to take action before a complete loss of confidence occurs.

The overall impact of a banking crisis on the economy depends amongst other things on the manner and speed of crisis resolution by the authorities. For example, a policy of forbearance by regulators could increase moral hazard and harm output over an extended period, whereas a rapid clear out of bad loans might be expected to improve the performance of the economy over the longer term. That said, such longer-run benefits need to be weighed against any potential short-run costs of aggressive policy action; for example, its effect on confidence in the financial sector more broadly.

Since the costs of bank failure can emerge in a variety of different ways, we have adopted in what follows a broad measure of crisis costs.

### Measuring the costs of banking crises

There are a number of difficulties in measuring the costs of banking crises. First, defining a crisis is not straightforward. Caprio and Klingebiel (1996) cover 69 crises which they term either 'systemic' (defined as occasions when much or all of bank capital in the system is exhausted) or 'borderline' (when there is evidence of significant bank problems such as bank runs, forced bank closures, mergers or government takeovers). These qualitative definitions have been used in most subsequent cross-country studies, including those cited in this article<sup>2</sup>.

Even when defined, measuring the costs imposed by banking crises on the economy as a whole is also not straightforward. Most cross-country comparisons of costs focus on immediate crisis resolution. Such fiscal costs are reported in the next section. But they may

<sup>2</sup>: Therefore, on this definition a crisis occurs if and when banking problems are publicly revealed rather than necessarily when the underlying problems first emerge.

simply measure a transfer of income from current and future taxpayers to bank 'stakeholders' rather than the overall impact on economic welfare. The latter is usually proxied by the divergence of output – and in fact the focus is often output *growth* – from trend during the banking crisis period. Estimates of these costs are also reported below. However, these calculations estimate the output loss during the banking crisis rather than the loss *caused* by the crisis. Banking crises often occur in, and indeed may be caused by, business cycle downturns (see Gorton (1988), Kaminsky and Reinhart (1999), Demirgüç-Kunt and Detragiache (1998)). Some of the estimated decline in output (output growth) relative to trend during the period of the crisis would therefore have occurred in any case and cannot legitimately be ascribed to the crisis. In the final section below we discuss the results of some recent studies (by ourselves and others) which attempt, using time series and cross-section data, to separate declines in output during periods of banking crisis attributable to the crisis itself from declines due to other factors.

### Fiscal costs

Table 1 shows a summary of recent estimates of the fiscal costs incurred in the resolution of 24 major banking crises over the past two decades, reported by Caprio and Klingebiel (1999) and Barth et al (2000) (see Table A1 in Annex A for the individual country details). In the table a distinction has been made between banking crises alone and those which occurred in conjunction with a currency crisis (so-called 'twin' crises)<sup>3</sup>. A currency crisis is defined, as in Frankel and Rose (1996), as a nominal depreciation in the domestic currency (against the US dollar) of 25 per cent combined with a 10 per cent increase in the rate of depreciation in any year of the banking crisis period<sup>4</sup>.

Fiscal costs reflect the various types of expenditure involved in rehabilitating the financial system, including both bank recapitalisation and payments made to depositors, either implicitly or explicitly through government-backed deposit insurance schemes. These estimates may not be strictly comparable across countries and should be treated

**Table 1:**  
**Fiscal costs of banking resolution in 24 crises 1977-2000<sup>(a)</sup>**

	Number of crises	Non-performing loans (percentage of total loans) <sup>(b)</sup>	Fiscal costs of banking resolution (percentage of GDP)
All countries	24	22	16
Emerging market countries	17	28	17.5
Developed countries	7	13.5	12
Banking crisis alone	9	18	4.5
Banking and currency crises <i>of which</i>	15	26	23
Emerging market countries	11	30	25
Developed countries	4	18	16
Banking and currency crises with previous fixed exchange rate <i>of which</i>	11	26	27.5
Emerging market countries	8	30	32
Developed countries	3	18	16

Sources: Caprio and Klingebiel (1999), Barth et al (2000), IMF (1998) and IMF Financial Statistics various issues.

(a) See Annex A for country details.

(b) Data available for 16 countries only.

<sup>3</sup>: Although the term currency 'crisis' is used here as is common in the literature, how a large exchange rate depreciation should be viewed depends on its cause.

<sup>4</sup>: The latter condition is designed to exclude from currency crises high inflation countries with large *trend* rates of depreciation.

with a degree of caution. Moreover, estimates for the recent crises in east Asia may be revised, as and when new losses are recorded.

That said, the data do point to some interesting stylised facts (see Table 1 and Table A1 in Annex A). Resolution costs appear to be particularly high when banking crises are accompanied by currency crises. The average resolution cost for a twin crisis in Table 1 is 23 per cent of annual GDP compared with 'only' 4.5 per cent for a banking crisis alone. Moreover, all countries that had fiscal costs of more than ten per cent of annual GDP had an accompanying currency crisis. Similarly, Kaminsky and Reinhart (1999) find that bail-out costs in countries which experienced a twin crisis were much larger (13 per cent of GDP), on average, than those which had a banking crisis alone (5 per cent).

Whether the association of higher banking resolution costs with currency crises reflects a causal relationship is unclear. On the one hand, currency crises may be more likely to occur the more widespread and deeper the weakness in the domestic banking system, as savers seek out alternative investments, including overseas. On the other hand, currency crises may cause banking crises, or make them larger. A marked depreciation in the domestic exchange rate could result in losses for banks with large net foreign currency liabilities, or if banks have made loans to firms with large net foreign currency exposures, who default on their loans. Bank losses caused in this way may be particularly likely for countries that had fixed or quasi-fixed exchange rate regimes prior to the crisis; such regimes might have encouraged banks and other firms to run larger unhedged currency positions than would otherwise have been the case. Many banks made losses in this way in the recent east Asian crisis (see, for example, Drage, Mann and Michael (1998)). All the 6 countries in Table 1 that incurred fiscal costs of more than 30 per cent of GDP, previously had a fixed or quasi-fixed exchange rate in place.

The cumulative resolution costs of banking crises appear to be larger in emerging market economies (on average 17.5 per cent of annual GDP) than in

developed ones (12 per cent). For example, since the recent east Asian crisis, Indonesia and Thailand have already faced very large resolution costs – 50 per cent and more than 40 per cent respectively of annual GDP – whereas, in the Nordic countries in the early 1990s, notwithstanding widespread bank failures, cumulative fiscal costs were kept down to 11 per cent or less of annual GDP. The difference may be because developed countries face smaller shocks to their banking systems. Some data suggest that non-performing loans have been proportionately much larger in emerging market banking sectors (see Table 1)<sup>5</sup>. Alternatively, both the banking system and the real economy may have been better able to withstand a given shock because of more robust banking and regulatory systems, including better provisioning policies and capital adequacy practices. The difference in these fiscal costs of crisis may also reflect the greater importance of state banks within emerging markets (their share of total banking sector assets is around three times as large, on average, as in the sample of developed countries in Table 1)<sup>6</sup>, since they are more likely than private banks to be bailed out by governments when they fail.

As one might expect, everything else being equal, fiscal costs of banking resolution seem to be larger in countries where bank intermediation – proxied by bank credit/GDP – is higher. For example, during the Savings and Loans crisis in the United States in the 1980s, where intermediation by financial institutions is relatively low by the standards of developed countries, fiscal costs were estimated at 'only' 3 per cent of annual output. However, the problems were largely confined to a segment of the banking industry. In contrast, in Japan, where bank intermediation is relatively important, the resolution costs were estimated at 8 per cent of GDP by March 2001 and with the current stabilisation package might rise as high as 17 per cent of GDP<sup>7</sup>.

Fiscal costs incurred almost certainly depend on how crises are resolved (see Dziobek and Pazarbasioglu (1997)). Poor resolution might be expected to be reflected in crises lasting longer and/or becoming increasingly severe. In the meantime some fragile banks could 'gamble for resurrection' and thus

5: Some caution is needed in comparing non-performing loans across countries because of differences in accountancy standards and provisioning policies.

6: Data on state ownership are for 1997 from Barth et al (2000).

7: Resolution costs in Japan were already estimated at 3 per cent of GDP by 1996. The current financial stabilisation package introduced in 1998 allows for a further 70 trillion Yen (14 per cent of GDP) to be spent on loan losses, recapitalisation of banks and depositor protection. But by end-March 2001 only an estimated 27 trillion Yen (5 per cent of GDP) of this had been spent. The current 70 trillion Yen facility is scheduled to be reduced to 15 trillion Yen in April 2002.

eventually require more restructuring than would otherwise have been the case. That said, there is no clear statistical relationship between fiscal costs and crisis length for the sample of crises shown in Table 1. Frydl (1999) finds a similar result. Recent work by Honohan and Klingebiel (2000), however, suggests that the approach taken to restructuring is important. This analysis of a sample of 40 developed country and emerging market crises indicates that fiscal costs increase with liquidity support, regulatory forbearance and unlimited deposit guarantees.

As noted earlier, resolution costs may not always be a good measure of the costs of crises to the economy more generally. Large fiscal costs may be incurred to forestall a banking crisis or, at least, limit its effect. In this case, the overall costs to the economy at large may be small, and if the crisis were avoided would not be observed, but significant fiscal costs might have been incurred. Conversely, the government may incur only small fiscal costs, and yet the broader economic adverse effects of a banking crisis could be severe. For example, a banking crisis was an important feature of the Great Depression of 1929-33 and yet fiscal costs were negligible since there was little capital support for the failing banks and no deposit insurance. Hoggarth et al (2001) found only weak correlations and rank correlations between the fiscal costs in Table 1 and their estimates of output losses, reported below.

### Output losses

Cross-country comparisons of the broader welfare losses to the economy associated with a banking crisis are usually proxied by losses in GDP – comparing GDP during the crisis period with some estimate of potential output<sup>8</sup>. Using GDP as a proxy for welfare though has its problems. First, welfare costs should ideally reflect losses to individuals' current and (discounted) future consumption over their lifetime. But, in practice, this is extremely difficult to measure. Second, changes in the level (and growth) of income may have more impact on individuals' utility at lower income levels than higher ones. This also complicates cross-country comparisons of welfare losses.

There are also a number of issues in the construction of measures of output losses.

---

<sup>8</sup>: An exception is a study by Boyd et al (2000) which in a sample of mainly developed country crises includes a measure of losses based on the decline in real equity prices at the time of the crisis. The cross-country comparisons described below are dominated by emerging market countries where stock market prices are often unavailable.

<sup>9</sup>: Caprio and Klingebiel's (1996) extensive listing of crisis episodes seems to be the source of most subsequent studies.

### Measurement issues

#### *Defining the beginning and end of the crisis*

Everything else being equal, the longer a crisis lasts, the larger the (cumulative) output losses. The size of the measured cumulative loss will therefore be sensitive to the definition of the crisis period. Unfortunately, it is not straightforward to define either the beginning or end of a banking crisis.

#### *Defining the beginning of crisis*

Since one of the features of banks, given historic cost accounting, is that their net worth is often opaque, it is difficult to assess when and whether net worth has become negative. One possibility is to use a marked decline in bank deposits – bank 'runs' – as a measure of the starting point of a crisis. However, most post-war crises in developed countries have not resulted in bank runs, whilst many crises in emerging market countries have followed the announcement of problems on the asset side. Bank runs, when they occur, have usually been the result rather the cause of banking crises as defined in this article.

Demirgüç-Kunt, Detragiache and Gupta (2000) find, for a sample of 36 developed and developing countries over the 1980-95 period, that deposits in the banking system did not decline during banking crises. Since banking crises have sometimes followed reasonably transparent problems with the quality of banking assets, data on a marked deterioration in the quality of banking assets and/or increases in non-performing loans could, in principle, be used to pinpoint the timing of the onset of a crisis. In practice, such data are usually incomplete, unreliable or even unavailable. Another possible approach is to measure the beginning of a crisis as the point when bank share prices fall by a significant amount relative to the market. However, aside from the problem of deciding what is 'significant', bank share price indices are often unavailable for emerging market economies – the countries where most banking crises have occurred in recent years. Instead most studies – including those reported below – date the beginning of crisis on a softer criterion, based on the assessment of finance experts familiar with the individual episodes<sup>9</sup>.

### Defining the end of crisis

As to the end of a crisis, one possibility is to define it subjectively – say, for example, based on the expert judgement or ‘consensus’ view from a range of case studies. An alternative would be to define it endogenously, for example, at the point when output growth returns to its pre-crisis trend (see, for example, IMF (1998) and Aziz et al (2000)). It could be argued that this would, if anything, measure the end of the *consequences* of the crisis rather than the end of the crisis itself. Both approaches are nevertheless included in the estimates below.

Both could underestimate output losses since at the point when output growth recovers the *level* of output would still be lower than it would have been otherwise. If instead the end of crisis is defined as the point when the level of output returns to (the previous) trend, the length of the crisis would be longer and thus the losses during crisis higher. Finally, such estimates of output losses make no attempt to measure any possible longer-run losses or gains in output *after* the crisis has been resolved – for example if the trend growth rate were permanently lowered – but this would be difficult.

### Estimation of trend output during the crisis period

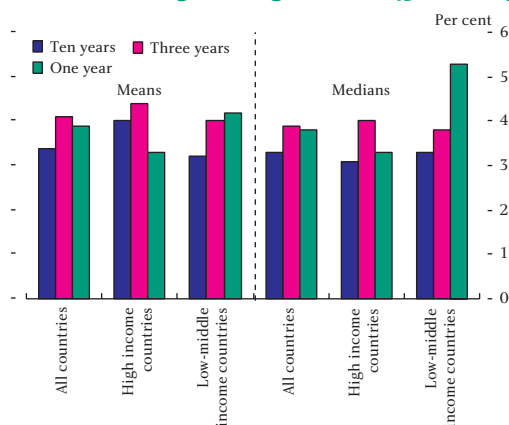
To measure the output loss during a crisis it is therefore necessary to measure actual output compared with its trend, or potential. The most straightforward way of estimating output potential is to assume that output would have grown at some constant rate based on its past performance (ie to estimate the shortfall relative to past trend growth). This is the approach used in the studies reported below. But this approach may overstate losses associated with crises if output growth fell to a lower trend during the banking crisis period. For example, estimates of losses associated with the Japanese banking crisis may be overstated if the growth in output potential in Japan has fallen since the early 1990s for reasons, such as an ageing population, unconnected to the crisis.

In producing comparable estimates of the shortfall in growth against trend in a large sample of countries a standardised approach to calculate trend growth,

based on past information, is necessary. The appropriate number of years to use in estimating the past trend is not clear cut. A number of studies have found that banking sector problems often follow an economic boom (see, for example, Kindleberger (1978), Borio, Kennedy and Prowse (1996), Logan (2000)). If output growth in the run up to the crisis was unsustainable, basing the trend growth on this period would over-estimate output losses during the crisis period<sup>10</sup>. On the other hand, a banking crisis may be preceded *immediately* by a marked slowdown in GDP growth (see Kaminsky and Reinhart (1999) for recent crises and Gorton (1998) for a more historical perspective).

As shown in Chart 1, the data from our sample of 43 banking crises discussed below suggest that crises have often come after a boom in developed countries but broke at the peak of one in emerging market economies<sup>11</sup>. Average GDP growth in the three years before crises was above its 10-year trend in two-thirds of the emerging market countries and three-quarters of the developed countries. For most emerging market crises, output growth was higher still in the year immediately prior to crisis. In contrast, in nearly all developed countries, output growth fell in the year before crisis.

**Chart 1:**  
Pre-crisis average GDP growth in 43 banking crises



Sources: International Financial Statistics and Bank calculations.

### Measuring output losses: levels versus growth rates

Perhaps the most obvious way of measuring the output loss – but one that does not appear to have

<sup>10</sup>: In addition, it would exaggerate the length of crisis and thus estimated losses on measures that define the end of crisis when output growth returned to its past trend. For example, the rate of output growth in Mexico has yet to return to its three-year average (8.5 per cent per annum) before the 1981-82 banking crisis.

<sup>11</sup>: Banking crises in transitional economies have been excluded from this sample because of their special problems of transforming from a government-owned to a market-based financial system.



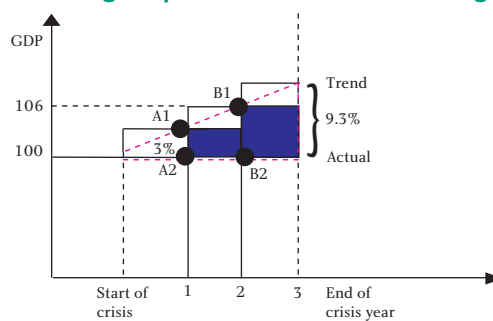
been used in recent research – is to sum up the differences in the level of annual GDP from trend during the crisis period. However, the IMF (1998), Aziz et al (2000) and Bordo et al (2001) measure output loss by summing up the differences in output *growth* rates between the pre-crisis trend and the actual rates during the crisis period. The output loss using the latter method approximates to the percentage deviation in the level of actual output at the end of the crisis period from where it would have been had output grown at its trend rate. All other factors being equal, however, this method will overstate losses associated with crises lasting for one year but understate losses associated with crises lasting for more than two years because it does not recognise the reduction in the output level in previous years (a formal explanation is given in Annex B). To see this, consider the example in Chart 2 where it is assumed that during a 3-year banking crisis period output is flat but that output would have grown by 3 per cent per annum in the absence of crisis. If output losses are calculated as the difference in the *level* of output from trend, output losses in the example in Chart 2 are 14 per cent of annual GDP – the whole area of the red triangle. But simply summing the difference between actual and trend output growth rates – the sum of the small white rectangles in Chart 2 – yields a cumulative output loss of only 9 per cent of annual GDP – the shaded blue rectangles in the chart are excluded from the calculation.

Thus, other things being equal, given that crises usually last for more than two years, estimates which sum up the differences in the *level* of actual output from its trend during the crisis period give a higher measure of output losses<sup>12</sup>. Below we show our own estimates of output losses based on accumulating losses in the level of output and these are compared with estimates from recent studies which are based on summing losses in output growth.

### Cross country estimates of output losses

Table 2 shows cross-country estimates from recent studies of the average output losses associated with past banking crises. The calculation method used in the IMF (1998), Aziz et al (2000) and Bordo et al (2001) studies are similar. All measure output losses as the cumulative difference between trend and actual *growth* during the crisis and so, as discussed

**Chart 2:**  
**Measuring output losses – levels versus growth rates**



Year	0	1	2	3	
Trend GDP	100	105 (3%)	106.1 (3%)	109.3 (3%)	
Actual GDP	100	100 (0%)	100.0 (0%)	100.0 (0%)	
Summing levels		1.5%	+ 4.5%	+ 8.0%	= 14.0%
Summing growth rates		3.0%	+ 3.0%	+ 3.0%	= 9.0%

Source: Bank calculations.

above, will (everything else equal) understate output losses. The trend growth is measured over a relatively short pre-crisis period – three years in the case of the IMF (1998) and Aziz et al (2000) and five years in Bordo et al (2001). The end of crisis is defined as the point when output growth returns to trend. The estimates of Hoggarth et al (2001), by contrast, measure output losses as the cumulative difference between the levels of actual output and its trend. Trend output growth is measured over a ten year period prior to the crisis, while the end-of-crisis year is determined, on the qualitative definition, by the judgment of experts.

There are some differences in the results from the various studies. Hoggarth et al's estimates of losses are somewhat higher than those from the other studies, suggesting that the effect of summing the differences in the level rather than the growth in output more than offsets the effect of using a longer, and usually lower, pre-crisis trend growth. To explore this further, we calculated estimates of the mean and median output loss estimates for the 43 crises included in Hoggarth et al on a number of different bases. The results are set out in Table 3. The estimates of Hoggarth et al (2001) based on summing differences in output levels (from Table 2) are shown in bold in the first column. The second column shows estimates where differences in output *growth* rates are summed during the crisis period and where the end of crisis is defined when output growth returns to its pre-crisis trend – the method used by the other

<sup>12</sup>: It will also yield a more accurate measure of output losses so long as the trend is not overstated.



studies reported in Table 2. This analysis confirms that measures that sum output levels are usually higher than those that sum growth rates. Also, using a three year pre-crisis period to calculate the trend

(rather than ten years) would, everything else being equal, increase the median estimates of cumulative output losses calculated using both summing methods<sup>13</sup>.

**Table 2:**  
**Recent studies of output losses associated with banking crises (percentage of GDP)<sup>(a)</sup>**

	Sample period	Number of crises	Average crisis length (years)	Average cumulative output losses (percentage of GDP)
<b>IMF (1998)</b>				
	1975-1997			
All		54	3.1	11.6
Single banking crises		22	3.0	7.5
Twin banking and currency crises		32	3.2	14.4
Developed countries		12	4.1	10.2
Emerging market countries		42	2.8	12.1
<b>Aziz et al (2000)</b>				
Twin banking and currency crises		45	2.4	9.0
<b>Bordo et al (2001)</b>				
Single banking crises	1973-1997 (56 countries)	26	2.6	6.2
	1973-1997	8	3.1	7.0
	1945-1971	0	n/a	n/a
	1919-1939	18	2.4	10.5
	1880-1913 (21 countries)	15	2.3	8.3
Twin banking and currency crises	1973-1997 (56 countries)	27	3.8	18.6
	1973-1997	11	3.7	15.7
	1945-1971	1	1.0	1.7
	1919-1939	15	2.7	15.8
	1880-1913 (21 countries)	9	2.2	14.5
<b>Hoggarth et al (2001)</b>				
	1977-1998			
All		43	3.7	16.9
Single banking crises		23	3.3	5.6
Twin banking and currency crises		20	4.2	29.9
Developed countries		13	4.6	23.8
Emerging market countries		30	3.3	13.9

Source: Bank calculations.

(a) Crisis start: all based on when a significant event is made public. Crisis end: IMF (1998), Aziz et al (2000), and Bordo et al (2001), when GDP growth returns to trend; Hoggarth et al (2001), based on judgment of experts. Trend output: IMF and Aziz et al, average three years before crisis; Bordo et al, average five years before crisis; Hoggarth et al, average ten years before crisis. Summing method: IMF, Aziz et al and Bordo et al, difference between summed trend and actual output growth rates; Hoggarth et al, difference between summed trend and actual output levels.

Twin crisis: IMF and Bordo et al, currency crisis within one year of banking crisis; Aziz et al, currency crisis within two years of banking crisis; Hoggarth et al, currency crisis within the banking crisis period.

<sup>13</sup>: This is particularly true for measures when the end of crisis date, and therefore the length of crisis, are dependent on the pre-crisis trend growth rate.

**Table 3:**

**Average mean cumulative output losses (per cent of GDP) in 43 banking crises on different assumptions (medians in brackets)<sup>(a)</sup>**

Summing method	Output levels		Output growth rates	
	Consensus opinion		Growth returns to trend	
Definition of end crisis				
Period used in measuring pre-crisis growth rates				
<b>All countries</b>				
Ten years	<b>16.9</b>	(9.2)	8.7	(6.6)
Three years	16.3	(9.9)	14.5	(10.4)
<b>Low-medium income</b>				
Ten years	<b>13.9</b>	(6.5)	8.3	(5.9)
Three years	13.9	(8.9)	14.9	(9.8)
<b>High income</b>				
Ten years	<b>23.8</b>	(12.8)	9.5	(9.2)
Three years	21.9	(18.0)	13.4	(15.1)
<b>Twin crises</b>				
Ten years	<b>29.9</b>	(22.2)	13.0	(10.9)
Three years	29.0	(26.3)	23.1	(16.1)
<b>Single banking crises</b>				
Ten years	<b>5.6</b>	(0.4)	4.9	(1.4)
Three years	5.3	(0.6)	7.1	(0.6)

Source: Bank calculations.

(a) Average of figures reported for individual countries in Table 2 shown in bold.

### Analysis of results

Overall, although there are marked variations in output losses across crises, as shown in Table A2 in Annex A, average estimated output losses suggested from all these studies are large. According to Bordo et al (2001) this is also true of crises before the Second World War<sup>14</sup>. The average estimates of cumulative output losses in years of banking crisis alone are similar across studies – in a narrow range of 6 per cent to 8 per cent of annual GDP. But as with fiscal costs discussed earlier, the average output losses during twin banking and currency crises tend to be much larger – in the range of 15 per cent to 30 per cent of GDP – and usually last longer. Again, however, the direction of causation is unclear. One interpretation is that exchange rate crises either lead directly to higher output losses – for example

through requiring a tightening in monetary policy – or do so indirectly through increasing losses for banks with foreign currency exposures or loans to sectors which themselves have large currency exposures<sup>15</sup>. The latter might be expected to be a problem particularly for emerging market banking systems for which external borrowing tends to be predominantly in foreign currency because of the cost of external borrowing in domestic currency. But causation may be the other way round, with *larger* banking crises causing a general flight from domestic assets and so putting pressure on the currency, which would be exacerbated if capital inflows are concentrated in the banking sector. Another possibility is that twin crises may be more likely to occur in the face of large adverse shocks that are themselves the main cause of the reduction in output

<sup>14</sup>: The exceptional period appears to have been the quarter of century after the Second World War when there was only one (twin) crisis in Bordo et al's sample of 21 countries and it yielded small output losses.

<sup>15</sup>: However, the cause properly defined of the output loss here is, in fact, whatever caused the exchange rate to depreciate in the first place.

**Table 4:**  
**Length of crises in years on different end-crisis assumptions in a sample of 43 crises**

	GDP growth returns to its pre-crisis trend		Consensus opinion
	Ten year trend	Three year trend	
All crises	2.1	3.2	3.7
High income	3.3	4.2	4.6
Low-medium income	1.6	2.7	3.3
Single banking crises	1.6	2.0	3.3
Twin crises	2.8	4.6	4.2

Source: Bank calculations.

(relative to trend). The leading indicator literature suggests that twin crises tend to occur against a background of weak economic fundamentals, with banking crises more often than not preceding currency crises which, in turn, exacerbate banking crises (see Kaminsky and Reinhart (1999)).

The results in Table 2 (confirmed in Table 4) indicate that, on average, and irrespective of the precise method for defining the end of crisis, banking crises have typically lasted *longer* in developed countries – by about 1½ years – than in emerging markets. Indeed, this is the main reason why Hoggarth et al (2001) find that on their preferred measure (reported in Table 2) – where output losses are calculated as the cumulative deviation of the *level* of output from trend – output losses (as a percentage of GDP) during banking crises are significantly larger, on average, in developed countries than in emerging market countries.

Why should banking crises last longer in developed countries? In general, financial systems in developed countries would be expected to be more robust to shocks than those in emerging market countries. On the one hand, this might mean that it usually takes a larger shock to cause a banking crisis in a developed economy, and that the crisis is harder to control and so longer lasting. This may be particularly likely if real wages are less flexible in developed than emerging market countries. On the other hand, given the greater strength of the financial system and real economy in developed countries, the effect of a banking crisis on the economy may be initially less dramatic, giving the authorities freedom to take less radical action. The share of bad loans in the banking system of emerging market economies at the time of

the crisis is usually much larger than it is the case in developed countries (as shown earlier in Table 1), making the crises initially more pronounced – banks are more likely to fail. Furthermore, the banking system is usually a much larger part of the financial system in emerging market economies than it is in developed economies, exacerbating the effect on the real economy. However, although crises in developed economies are likely to be less severe, initially, delay in resolving them is likely to increase sharply the long run loss in output. A recent example of this may be the drawn out Japanese banking problems, which have lasted since the early 1990s. In contrast, in lower income countries, speedier resolution mitigates the effects.

Output losses plainly vary a lot from crisis to crisis. Understanding why may help to indicate what measures are most successful in minimising the welfare costs of crises. Bordo et al (2001) investigated this issue. In a sample of 21 countries over the 1973-97 period, they found that banking crises were associated with much bigger output losses when liquidity support was provided and when the exchange rate was previously pegged. However, the opposite was true of banking crises in the late 19th century where liquidity support was associated with lower output losses. They argue that the difference may reflect a greater reluctance of some countries during the 1973-97 period to allow bank failures. This meant that support was in some cases given to insolvent banks as well as to those that were fundamentally sound but illiquid. This, they suggest, may have increased moral hazard and enabled some banks to gamble for resurrection.

## Separating out the banking crisis impact on output losses

All the estimates of output losses during crises reported above use the difference between the level (or growth) in output and its past trend. But to the extent that banking crises coincide with, or are indeed caused by, recessions these trend growth paths may overstate what output would have been during these periods in the absence of banking crises.

In an attempt to examine this, Bordo et al (2001) compared, for their sample of countries, the amount of output lost during recessions that are accompanied by banking crises with those which are not. They find that, after allowing for other factors causing recessions, cumulative output losses during recessions accompanied by twin and single banking crises over the 1973-97 period are around 15 per cent and 5 per cent of GDP respectively deeper than those without crises. There remains the possibility, though, that these results show partly that deeper recessions cause banking crises rather than *vice versa*<sup>16</sup>.

An alternative method – reported in greater detail in Hoggarth et al (2001) – is to make use of

cross-sectional data comparing the deviation in output from trend (output losses) for countries that have experienced banking crises with similar, neighbouring countries that at the time did not have a crisis<sup>17</sup>. Benchmark countries are needed that, in principle at least, are similar in all respects to the crisis countries other than that they do not face simultaneously a banking crisis.

Table 5 compares cumulative output losses in 29 systemic banking crises with output losses in pair countries (see Table A3 in Annex A for the individual country details)<sup>18</sup>. The definition of systemic employed is as in Caprio and Klingebiel (1996, 1999): all, or most, of the banking system's capital is exhausted.

Since comparator countries are not identical in every respect the results of the comparisons should be treated with caution. But the estimates suggest that declines in output (relative to trend) for crisis countries are, on average, much higher than for the chosen pairs, especially for high-income countries. For example, output gaps in the UK and Denmark (neither of which had a systemic banking crisis) in the early 1990s were far smaller than in Finland and

**Table 5:**  
**Output deviation below trend (losses) in systemic banking crisis and comparison countries (per cent of GDP) during the same period<sup>(a)</sup>**

	Sample size	Output losses (per cent of GDP)		
		All Countries	Systemic banking crisis countries	Non-banking crises pair countries
All	58	13	19	6
Developed countries	10	19	32 <sup>(b)</sup>	6 <sup>(b)</sup>
Emerging countries	48	11	16	6
Banking crisis alone	12	n/a	9	n/a
Banking and currency crisis	17	n/a	26	n/a
Currency crisis alone	14	n/a	n/a	18
Neither crisis	15	n/a	n/a	-5

Source: Bank calculations.

(a) Output losses are measured on the Hoggarth et al (2001) method reported earlier in Table 2.

(b) Statistically different at the 5 per cent significance level.

<sup>16</sup>: Bordo et al (2001) attempt to address this problem through using a two-stage estimation procedure.

<sup>17</sup>: A comparison is made of the deviation in output from trend rather than just differences in output because trend output may differ between the crisis and pair countries.

<sup>18</sup>: Since there is not always a clear line dividing countries that had banking problems from those that did not, pairs have been made only for the episodes from our sample of 43 crises that were outright systemic banking crises.

Norway (which did). Similarly, output remained close to trend in both Taiwan and the Philippines in 1997-98 – the ‘non-crises’ comparators – although it fell dramatically in Korea, Thailand and Indonesia. On average, the cumulative output losses for countries with banking crises were 13 per cent of GDP higher than in the non-banking crisis countries over the same period.

As mentioned above, evidence that output losses are higher in the presence of banking crises is not sufficient to prove that banking crises cause large output losses. An alternative interpretation is that causation runs in the opposite direction with deeper recessions (larger output losses) increasing the likelihood, and depth, of a banking crisis. To try to deal with this, Hoggarth et al (2001) investigated, where data allowed, a number of indicators of the future path of output growth to see whether the occurrence of crises can ‘explain’ shortfalls in actual output (from trend) against what would be accounted for by these conventional macroeconomic variables<sup>19</sup>. For each crisis and pair country the macroeconomic variables were measured as the difference between their value just (two years) before the crisis and their normal value based on their previous trend.

The results of two specifications for the whole sample are reported in Table 6. The dependent variable is the deviation in output from trend. This is measured over the same (banking crisis) period for both crisis countries and their pairs. Four macroeconomic variables were used in the estimation – output growth (DYP), the change in output growth (DDYP), inflation (DCP) and the growth in bank credit/GDP (DCRED). Dummy variables were also included in the estimation to capture whether or not there was a banking or a currency crisis. It emerged that banking crises significantly affected output in developed countries but in emerging countries currency crises, rather than banking crises, most affected output.

Equation (1) shows the results of regressing output losses on the two crisis dummies and the four macroeconomic variables. A likelihood ratio test was used which failed to reject the null hypothesis that the statistically insignificant variables in equation (1) should be excluded from the final specification. To check whether the results were sensitive to the choice

**Table 6:**  
**Explanation of the cross-country variation in output losses (per cent of GDP) in 29 systemic crisis and pair countries<sup>(a)</sup>**

Equation	(1)	(2)
CONST	-0.04 <i>-0.59<sup>(b)</sup></i>	-0.04 <i>-0.57</i>
BCH	0.29 <i>2.57<sup>**</sup></i>	0.30 <i>2.27<sup>**</sup></i>
CCL	0.22 <i>1.74<sup>*</sup></i>	0.28 <i>2.55<sup>**</sup></i>
DDYP	-5.80 <i>-2.12<sup>**</sup></i>	-5.14 <i>-2.40<sup>**</sup></i>
DYP	-4.76 <i>-1.46</i>	
DCP	-0.10 <i>-0.60</i>	
DCRED	-0.98 <i>-1.04</i>	
Adjusted R <sup>2</sup>	0.10	0.14
Log likelihood	-21.20	-23.94
Number of observations	48	58

Source: Bank calculations.

(a) For the purposes of this regression output losses (the dependent variable) is in decimals rather than percentage points.

(b) The t-statistics corresponding to the coefficient estimates above them are reported in italics.

\* Indicates significance at the 10 per cent level.

\*\* Indicates significance at the 5 per cent level.

BCH = 1 when there is a banking crisis in a high income country, 0 otherwise.

CCL = 1 when there is a currency crisis in a low income country, 0 otherwise.

DDYP = change in the annual average of growth in real GDP in the two years before the crisis period.

DYP = annual average real GDP growth in the two years before the crisis period less its trend before this period back to 1970.

DCP = annual average consumer price inflation in the two years before the crisis period less its trend before this period back to 1970.

DCRED = annual average growth in credit relative to GDP in the two years before the crisis less its trend before this period back to 1970.

of paired countries, the same procedure was carried out substituting alternative pairs for a sample of the comparison countries (the ‘paired’ countries shown in brackets in Table A3 in Annex A). This made little difference to the results.

Equation (2), the parsimonious relationship, suggests that part of the difference in output losses across the sample is due to pre-crisis macroeconomic variables. In particular, every 1 percentage point fall in output growth before a crisis adds 5 per cent to output losses during the crisis period. But the presence or

<sup>19</sup>: The pre-crisis period macroeconomic variables considered were real GDP growth, the change in real GDP growth, consumer price inflation, the growth in credit relative to GDP and the growth in the ratio of M2 to Mo.

not of banking crises in high-income countries (BCH) and currency crises in low-middle income countries (CCL) explain most of the difference in output losses in the sample. These estimates and the interpretation of the results should, however, be treated with caution. The sample of high income countries is small, while the interpretation of the results could be that deeper recessions (larger output losses) cause banking crises in developed countries and cause currency crises in emerging-markets rather than the other way around.

### Summary and conclusion

Theoretical studies and empirical work focussing on particular crises suggest that under certain conditions banking crises can impose large costs on an economy. Cross-country estimates of fiscal and output costs (both as a share of GDP) appear to bear this out. But the quantification of these costs, and the direction of causation, is far from straightforward.

The costs of banking crises are often measured in terms of their effect on fiscal expenditure. Cross-country estimates of fiscal resolution costs of banking crises tend to be bigger in lower income countries and those with higher degrees of banking intermediation. Countries with large fiscal costs of crisis have in the past often experienced a simultaneous currency crisis, especially those that had in place a fixed exchange rate regime.

However, resolution costs may simply reflect a transfer of income from taxpayers to bank 'stakeholders' rather than necessarily the cost to the economy as a whole. A better, albeit still imperfect, proxy for the latter is the impact of crises on output. However, a crucial issue in measuring output losses is deciding whether they are caused by the banking crises, and are thus costs of banking crises, or whether recession caused the crises.

The output losses associated with crises are usually measured as the cumulative difference in output, or output growth, during the crisis period from its pre-crisis trend<sup>20</sup>. Although varying markedly from crisis to crisis, cross-country estimates of output losses during banking crises are, on average, large – around 15 per cent to 20 per cent of annual GDP. Output losses are usually much larger in the event of a twin banking/currency crisis than if there is a

banking crisis alone, particularly in emerging market countries. Causation here is likely to run in both directions with larger banking crises causing currency runs which, in turn, may exacerbate banking problems, especially for banking systems with large net foreign currency liabilities. Crises have also typically lasted longer in developed countries than in emerging markets. Because of this, on some measures output losses during crises are larger in developed than in emerging market countries. One possible explanation of this is that emerging market economies must respond more quickly during banking crises because they usually incur much more widespread bad loan problems than developed countries.

Bordo et al (2001) have attempted to separate out the impact on output during the crisis period caused by factors other than banking sector weakness. They found that recessions are usually much deeper when accompanied by banking crises than when they are not, even when allowing for other factors that may have caused the recession. Using a cross-sectional rather than time series approach, Hoggarth et al (2001) compared output losses in a sample of systemic banking crises with neighbouring countries that did not at the time face severe banking problems. They found that banking crises but not currency crises significantly affect output in developed countries, while the opposite was true in emerging market countries. These results also seem to hold up after allowing for other factors that may have caused output to fall. However, in both these studies there remains the possibility of reverse causation, with larger recessions causing banking (or currency) crises rather than crises causing bigger recessions.

Since there are large differences in estimated output losses from crisis to crisis, a potential fruitful avenue for research is to explain these differences. In particular, from a public policy perspective, it would be useful to better understand what type of resolution measures are most successful in minimising the welfare costs of crises.

Summarising, it seems to be the case that regardless of whether banking crises cause or are produced by recession, they exacerbate subsequent output losses (and are often costly to resolve). Policies aimed at financial and monetary stability are therefore likely to be mutually reinforcing.

---

<sup>20</sup>: These estimates take no account of the possible output costs (or benefits) in the post-crisis period.



## References

- 1: Allen, F and Gale, D (1998), 'Optimal Financial Crises', *Journal of Finance*, 53, pages 1245–1284.
- 2: Aziz, J, Caramazza, F and Salgado, R (2000), 'Currency Crises: In Search of Common Elements', *International Monetary Fund Working Paper 00/67*, March.
- 3: Barth, J R, Caprio, G and Levine, R (2000) 'Banking Systems Around the Globe: Do Regulation and Ownership Affect Performance and Stability?', *Conference on Prudential Supervision: What Works and What Doesn't*, National Bureau of Economic Research Inc, January.
- 4: Bell, J and Pain, D L (2000) 'Leading Indicator Models of Banking Crises: A Critical Review', *Bank of England Financial Stability Review*, December, pages 113–129.
- 5: Bernanke, B (1983), 'Non-Monetary Effects of the Financial Crisis in the Propagation of the Great Depression', *American Economic Review*, 73, pages 257–76.
- 6: Bernanke, B (1986), 'Alternative Explanations of the Money Income Correlation', *Carnegie Rochester Conference Series in Public Policy*, 25, pages 49–99.
- 7: Bernanke, B and James, H (1991), 'The Gold Standard, Deflation and Financial Crisis in the Great Depression: an International Comparison', in *Financial Markets and Financial Crises: A National Bureau of Economic Research Report*, edited by R. Hubbard, Chicago University Press.
- 8: Bernanke, B, Gertler, M and Gilchrist, S (1996), 'The Financial Accelerator and the Flight to Quality', *The Review of Economics and Statistics*, 78, pages 1–15.
- 9: Bordo, M, Eichengreen, B, Klingebiel, D and Martinez-Peria, M S (2001), 'Is the Crisis Problem Growing More Severe?', *Economic Policy*, 32, pages 51–82.
- 10: Borio, C, Kennedy, N and Prowse, S (1996), 'Exploring Aggregate Asset Price Fluctuations Across Countries: Measurements, Determinants and Monetary Policy Implications', *BIS Economic Papers no 40*.
- 11: Boyd, J H, Gomis, P, Kwak, S and Smith, B (2000) 'A User's Guide to Banking Crises', *mimeo*, University of Minnesota.
- 12: Caprio, G and Klingebiel, D (1996), 'Bank Insolvencies: Cross Country Experience', *World Bank Policy and Research WP 1574*.
- 13: Caprio, G and Klingebiel, D (1999), 'Episodes of Systemic and Borderline Financial Crises', *mimeo*, World Bank.
- 14: Demirgüç-Kunt, A and Detragiache, E (1998), 'The Determinants of Banking Crises in Developed and Developing Countries', *IMF Staff Papers*, 45, pages 81–109
- 15: Demirgüç-Kunt, A, Detragiache, E and Gupta, P (2000), 'Inside the Crisis: An Empirical Analysis of Banking Systems in Distress', *IMF Working Paper 00/156*.
- 16: Diamond, D and Dybvig, P (1983), 'Bank Runs, Deposit Insurance and Liquidity', *Journal of Political Economy*, 91, pages 401–19.
- 17: Diamond, D (1984), 'Financial Intermediation and Delegated Monitoring', *Review of Economic Studies*, 51, pages 393–414.
- 18: Drage, J, Mann, F and Michael, I (1998), 'Issues For Policy-Makers Arising From the International Crisis', *Bank of England Financial Stability Review*, Spring, pages 69–85.
- 19: Dziobek, C and Pazarbasioglu, C (1997), 'Lessons from Systemic Bank Restructuring: a Survey of 24 Countries', *IMF Working Paper 97/161*.
- 20: Fama, E (1985), 'What's Different About Banks?', *Journal of Monetary Economics*, 15, pages 29–39.
- 21: Frankel, J A and Rose, A K (1996), 'Currency Crashes in Emerging Markets: Empirical Indicators', *NBER Working Paper 5437*.
- 22: Freixas, X and Rochet, J-C (1998), 'Microeconomics of Banking', MIT Press.
- 23: Freixas, X, Giannini, C, Hoggarth, G and Soussa, F (2000), 'Lender of Last Resort: What Have We Learnt Since Bagehot?', *The Journal of Financial Services Research*, 18, pages 63–84.
- 24: Friedman, M and Schwartz, A (1963), 'A Monetary History of the United States', Princeton University Press.
- 25: Fryd, E J (1999), 'The Length and Cost of Banking Crises', *IMF Working Paper 99/30*.
- 26: Gertler, M and Gilchrist, S (1992), 'Monetary Policy, Business Cycles and the Behaviour of Small Manufacturing Firms', *New York University Economic Research Report*, pages 92–108, New York.
- 27: Gorton, G (1988), 'Banking Panics and Business Cycles', *Oxford Economic Papers*, 40, pages 751–781.
- 28: Hall, S (2000) 'Financial Accelerator Effects in UK Business Cycles', Bank of England, *mimeo*, September.
- 29: Hoggarth, G and Thomas, J (1999), 'Will Bank Recapitalisation Boost Domestic Demand in Japan?', *Bank of England Financial Stability Review*, June, pages 85–93.
- 30: Hoggarth, G, Reis, R and Saporta, V (2001), 'Costs of Banking System Instability: Some Empirical Evidence', forthcoming Bank of England Working Paper.
- 31: Honohan, P and Klingebiel, D (2000), 'Controlling Fiscal Costs of Banking Crises', *World Bank Policy and Research Working Paper 2441*.
- 32: International Monetary Fund (1998), 'Financial Crises: Characteristics and Indicators of Vulnerability', *World Economic Outlook* (Chapter 4), May.
- 33: International Monetary Fund (1999), 'From Crisis to Recovery in the Emerging Market Economies', *World Economic Outlook* (Chapter 2), October.
- 34: Jaffee, D and Russell, T (1976), 'Imperfect Information, Uncertainty and Rationing', *Quarterly Journal of Economics*, 90, pages 651–66.
- 35: Kaufman, G (1994), 'Bank Contagion, A Review of the Theory and Evidence', *Journal of Financial Services Research*, 8, pages 123–150.
- 36: Kaufman, G (1998), 'Central Banks, Asset Bubbles, and Financial Stability', *Federal Reserve Bank of Chicago Working Paper 98–12*.
- 37: Kaminsky, G L and Reinhart, C M (1999), 'The Twin Crises: The Cause of Banking and Balance of Payment Problems' *American Economic Review*, 89, pages 473–500.
- 38: Kashyap, A, Stein, J and Wilcox, D (1992), 'Monetary Policy and Credit Conditions: Evidence from the Composition of External Finance', *American Economic Review*, 83, pages 78–98.
- 39: Kashyap, A and Stein, J (1994), 'Monetary Policy and Bank Lending', in *Monetary Policy*, edited by Mankiw, N G University of Chicago Press.
- 40: Kashyap, A, Lamont, O and Stein, J (1992), 'Credit Conditions and the Cyclical Behavior of Inventories: a Case Study of the 1981-82 Recession', *Quarterly Journal of Economics*, 109, pages 566–92.
- 41: Kindleberger, C (1978), 'Manias, Panics and Crashes: A History of Financial Crises', New York: Basic Books.
- 42: Leland, H and Pyle, D (1977), 'Information Asymmetries, Financial Structures and Financial Intermediaries', *Journal of Finance*, 32, pages 371–87.
- 43: Logan, A D (2000) 'The Early 1990s Small Banks Crisis: Leading Indicators', *Bank of England Financial Stability Review*, December, pages 130–145.
- 44: Lown, C, Morgan, D and Rohatgi, S (2000), 'Listening to Loan Officers: The Impact of Commercial Credit Standards on Lending and Output', *Economic Policy Review*, Federal Reserve Bank of New York, 6, pages 1-16.
- 45: Michael, I (1998) 'Financial Interlinkages and Systemic Risk', *Bank of England Financial Stability Review*, Spring, pages 26–33.
- 46: Rajan, R (1992), 'Insiders and Outsiders: The Choice Between Relationship and Arm's Length Debt', *Journal of Finance*, 47, pages 1367–1400.
- 47: Rajan, R (1996), 'Why Banks Have a Future: Towards a New Theory of Commercial Banking', *Journal of Applied Corporate Finance*, 9, pages 114–128.
- 48: Samolyk, K A (1994), 'Banking Conditions and Regional Economic Performance: Evidence of a Regional Credit Channel', *Journal of Monetary Economics*, 34, pages 259–278.
- 49: Sharpe, S (1990), 'Asymmetric Information, Bank Lending and Implicit Contracts: A Stylized Model of Consumer Relationships', *Journal of Finance*, 48, pages 247–66.
- 50: Stiglitz, J and Weiss, A (1981), 'Credit Rationing with Imperfect Information', *American Economic Review*, 71, pages 393–410.

## Annex A

**Table A1:**

**Selected banking crises: non-performing loans and costs of restructuring financial sectors**

Crisis countries	Years	Duration (years)	Non-performing loans (percentage of total loans) <sup>(a)</sup>	Bank credit/GDP per cent <sup>(b)</sup>	Fiscal and quasi-fiscal costs/GDP <sup>(c)</sup>	GNP per head (US\$ oos PPP) <sup>(d)</sup>	Currency crisis as well (pre-fix **) <sup>(e)</sup>
High income countries							
<b>Finland</b>	1991-93	3	9.0*	89.9 (89.9)	11.0	15.8	Yes**
<b>Japan</b>	1992-98	7	13.0	119.5 (182.5)	8.0(17) <sup>(f)</sup>	21.5	No
<b>Korea</b>	1997-		30-40	70.3 (82.2)	34.0	14.7	Yes**
<b>Norway</b>	1988-92	5	9.0*	61.2 (79.6)	8.0	17.3	No
Spain	1977-85	9	n/a	68.1 (75.1)	16.8	4.7	Yes
<b>Sweden</b>	1991	1	11.0*	50.8 (128.5)	4.0	17.2	Yes**
United States	1984-91	8	4.0*	42.7 (45.9)	3.2 <sup>(g)</sup>	15.2	No
Average		5.5	13.5	71.8 (97.7)	12.1	15.2	
Medium and low income countries							
<b>Argentina</b>	1980-82	3	9.0*	29.8 (33.0)	55.3	6.4	Yes**
<b>Argentina</b>	1995	1	n/a	19.7 (20.0)	1.6	10.5	No
<b>Brazil</b>	1994-96	3	15.0	31.7 (36.5)	5-10	6.1	No
<b>Chile</b>	1981-83	3	19.0	58.8 (60.2)	41.2	2.7	Yes**
<b>Colombia</b>	1982-87	6	25.0*	14.7 (14.7)	5.0	2.9	Yes**
<b>Ghana</b>	1982-89	8	n/a	25.2 (25.2)	6.0	0.9	Yes**
Indonesia	1994	1	n/a	51.9 (51.9)	1.8	2.5	No
<b>Indonesia</b>	1997-		65-75	60.8 (60.8)	50-55	3.0	Yes**
Malaysia	1985-88	4	33.0*	64.5 (91.8)	4.7	3.3	No
<b>Mexico</b>	1994-95	2	11.0*	31.0 (36.3)	20.0	7.2	Yes**
<b>Philippines</b>	1981-87	7	n/a	23.2 (31.0)	3.0	2.4	Yes
<b>Sri Lanka</b>	1989-93	5	35.0	21.3 (21.3)	5.0	1.9	No
<b>Thailand</b>	1983-87	5	15.0*	44.5 (48.5)	1.5	1.7	No
<b>Thailand</b>	1997-		46.0	118.8 (134.9)	42.3	6.2	Yes**
Turkey	1994	1	n/a	14.2 (15.3)	1.1	5.4	Yes
<b>Uruguay</b>	1981-84	4	n/a	33.4 (47.8)	31.2	4.6	Yes**
<b>Venezuela</b>	1994-95 <sup>(h)</sup>	2	n/a	8.9 (12.3)	20.0	5.6	Yes
Average		3.7	27.8	38.4 (43.6)	17.6	4.3	
Average all countries		4.2	22.4	48.1 (59.4)	16.0	7.5	
<i>of which: twin crises</i>		4.1	26.1	46.5 (56.5)	22.9		
<i>banking crisis alone</i>		4.3	17.7	50.8 (64.2)	4.6		

Sources: Non-performing loans and fiscal costs (unless otherwise stated) Barth, Caprio and Levine (2000) and Caprio and Klingebiel (1999). GDP and bank credit, IMF International Financial Statistics, 1999 Yearbook. Systemic crises (according to Barth et al (2000)) in bold, \*IMF, World Economic Outlook, May 1998, Chapter IV. (a) Estimated at peak. Comparisons should be treated with caution since measures are dependent on country specific definitions of non-performing loans and often non-performing loans are under-recorded.

(b) Average during the crisis period. Credit to private sector from deposit money banks (IFS code, 22d) and the figures in brackets include also credit from other banks (IFS code, 42d).

(c) Estimates of the cumulative fiscal costs during the restructuring period expressed as a percentage of GDP.

(d) In the year the banking crisis began.

(e) Exchange rate crisis is defined as a nominal annual depreciation of the domestic currency (against the US dollar) during the crisis period of 25 per cent or more together with a 10 per cent increase in the rate of depreciation from the previous year.

(f) Resolution costs in Japan were estimated at 3 per cent of GDP by 1996. The current financial stabilisation package introduced in 1998 allows for a further ¥70 trillion (14 per cent of GDP) to be spent on loan losses, recapitalisation of banks and depositor protection (the figure in brackets). But by end-March 2001 only an estimated ¥27 trillion (5 per cent of GDP) of this had been spent.

(g) Cost of Savings and Loans resolution.

(h) The apparent low degree of bank intermediation in Venezuela at the time reflects the impact of high inflation on the denominator (nominal GDP).

**Table A2:**  
**Accumulated output losses incurred during banking crises<sup>(a)</sup>**

Crisis countries	Date of crisis <sup>(b)</sup>	Duration <sup>(b)</sup> (years)		GAP1 <sup>(c)</sup> per cent	GAP2 <sup>(d)</sup> per cent	Currency crisis as well
High income countries						
Canada	1983-85	3	(0)	0.0 <sup>(e)</sup>	-10.5	No
Denmark	1987-92	6	(7)	22.3	31.9	No
<b>Finland</b>	1991-93	3	(3)	22.4	44.9	Yes
Hong Kong	1982-83	2	(4)	23.1	9.8	No
Hong Kong	1983-86	4	(1)	1.1	4.3	No
Hong Kong	1998	1	(1)	9.6	9.0	No
Italy	1990-95	6	(9)	18.2	24.6	Yes
<b>Japan</b>	1992-98	7	(7)	24.1	71.7	No
<b>Korea</b>	1997 <sup>(f)</sup>			6.7	12.8	Yes
<b>Norway</b>	1988-92	5	(6)	9.8	27.1	No
Spain	1977-85	9	(9)	15.1	122.2	Yes
<b>Sweden</b>	1991	1	(3)	11.8	3.8	Yes
United States	1984-91	8	(0)	0.0 <sup>(e)</sup>	-41.9	No
Average		4.6	(4.2)	13.4	23.8	
Medium and low income countries						
<b>Argentina</b>	1980-82	3	(3)	20.7	25.9	Yes
<b>Argentina</b>	1985	1	(1)	7.9	7.1	No
<b>Argentina</b>	1989-90	2	(2)	14.0	16.1	Yes
<b>Argentina</b>	1995	1	(2)	11.4	5.8	No
<b>Bolivia</b>	1986-87	2	(1)	0.6	0.4	No
<b>Bolivia</b>	1994 <sup>(f)</sup>		(0)	0.0 <sup>(e)</sup>	-26.8	No
<b>Brazil</b>	1994-96	3	(0)	0.0 <sup>(e)</sup>	-12.7	No
<b>Chile</b>	1981-83	3	(8)	41.4	24.3	Yes
<b>Colombia</b>	1982-87	6	(4)	6.7	31.4	Yes
Egypt	1991-95	5	(6)	10.0	22.8	No
<b>El Salvador</b>	1989	1	(1)	0.6	-1.3	No
<b>Ghana</b>	1982-89	8	(1)	5.5	-47.4	Yes
India	1993 <sup>(f)</sup>		(0)	0.0 <sup>(e)</sup>	-41.1	No
Indonesia	1994	1	(0)	0.0 <sup>(e)</sup>	-2.2	No
<b>Indonesia</b>	1997 <sup>(f)</sup>			24.5	20.1	Yes
<b>Madagascar</b>	1988	1	(0)	0.0 <sup>(e)</sup>	-3.1	No
Malaysia	1985-88	4	(3)	14.5	39.2	No
<b>Mexico</b>	1981-82	2	(18)	110.4	-0.2	Yes
<b>Mexico</b>	1994-95	2	(1)	9.5	5.4	Yes
Nigeria	1997	1	(0)	0.0 <sup>(e)</sup>	0.1	No
<b>Peru</b>	1983-90	8	(1)	12.5	94.0	Yes
<b>Philippines</b>	1981-87	7	(7)	35.2	111.7	Yes
<b>Sri Lanka</b>	1989-93	5	(1)	0.6	-10.0	No
<b>Thailand</b>	1983-87	5	(0)	0.0 <sup>(e)</sup>	-2.8	No
<b>Thailand</b>	1997 <sup>(f)</sup>			25.9	28.1	Yes
Turkey	1994	1	(1)	10.4	9.2	Yes
<b>Uruguay</b>	1981-84	4	(5)	42.0	64.1	Yes
<b>Venezuela</b>	1980-83	4	(6)	27.6	52.2	No
<b>Venezuela</b>	1994-95	2	(3)	14.7	10.6	Yes
<b>Zimbabwe</b>	1995 <sup>(f)</sup>		(1)	0.4	-3.3	Yes
Average		3.3	(2.8)	14.9	13.9	
Average all countries		3.7	(3.2)	14.5	16.9	
of which: twin crises		4.2		22.9	29.9	
banking crisis alone		3.3		7.1	5.6	

Source: Bank calculations.

(a) Crises in bold are judged as systemic by Barth, Caprio and Levine (2000).

(b) Caprio and Klingebiel (1999) definition of crisis. Figures in brackets assume end of crisis is when output growth returns to trend.

(c) IMF (1998) method. The cumulative difference between trend and actual output *growth* during the crisis period. Trend is the average arithmetic growth of output in the three-year prior to the crisis. End of crisis is when output growth returns to trend

(d) The cumulative difference between the trend and actual *levels* of output during the crisis period. Beginning and end of crisis is the Caprio and Klingebiel (1999) definition. The counterfactual path for output is based on a Hodrick-Prescott filter ten years prior to the crisis.

(e) Actual growth rate returns to trend during the first year of the crisis in Canada, the United States, Bolivia (1994-), Brazil, India, Indonesia (1994), Madagascar, Nigeria and Thailand (1983-87).

(f) Where crisis has not yet ended – Korea, Indonesia and Thailand on GAP1 plus Bolivia, India and Zimbabwe on GAP2 – costs are measured up to and including 1998.

**Table A3:****Accumulated GAP2 output losses incurred during banking crises for systemic crisis and comparison countries**

Crisis countries	GAP2 percentage	Currency crisis	Pair non-systemic banking crisis countries <sup>(a)</sup>	GAP2 percentage	Currency crisis
<b>High income countries</b>					
Finland 91-93	44.9	Yes	United Kingdom (Denmark)	19.6 3.9	No No
Japan 92-98	71.7	No	Korea <sup>(b)</sup> (United States)	6.1 -8.0	No No
Korea 97-	12.8	Yes	Taiwan	-1.9	No
Norway 88-92	27.1	No	United Kingdom (Denmark)	2.1 20.7	No No
Sweden 91	3.8	Yes	United Kingdom (Denmark)	4.5 0.5	No No
Average	32.1		Average	6.1	
<i>of which: twin crises</i>	20.5		<i>of which: currency crisis</i>	n/a	
<i>banking crisis alone</i>	49.4		<i>neither crisis</i>	6.1	
<b>Medium and low income countries</b>					
Argentina 80-82	25.9	Yes	Brazil	15.3	Yes
Argentina 85	7.1	No	Brazil	-5.0	No
Argentina 89-90	16.1	Yes	Chile	-17.1	No
Argentina 95	5.8	No	Chile	-4.2	No
Bolivia 86-87	0.4	No	Paraguay	7.1	Yes
Bolivia 94-	-26.8	No	Peru (Paraguay)	-149.5 4.7	No Yes)
Brazil 94-96	-12.7	No	Chile (Uruguay)	-8.6 -1.7	No No)
Chile 81-83	24.3	Yes	Brazil	44.3	Yes
Colombia 82-87	31.4	Yes	Costa Rica	57.1	No
El Salvador 89	-1.3	No	Guatemala	-3.7	Yes
Ghana 82-89	-47.4	Yes	Sierra Leone	89.6	Yes
Indonesia 97-	20.1	Yes	Philippines	-1.4	Yes
Madagascar 88	-3.1	No	Malawi (Mozambique)	-1.3 -4.9	No No)
Mexico 81-82	-0.2	Yes	Brazil	23.3	Yes
Mexico 94-95	5.4	Yes	Chile	-3.5	No
Peru 83-90	94.0	Yes	Ecuador	95.3	Yes
Philippines 81-87	111.7	Yes	Indonesia	26.6	No
Sri Lanka 89-93	-10.0	No	India (Pakistan)	-1.6 2.9	Yes No)
Thailand 83-87	-2.8	No	Philippines (Malaysia)	-86.3 25.0	Yes No)
Thailand 97-	28.1	Yes	Philippines	-1.4	Yes
Uruguay 81-84	64.1	Yes	Brazil	64.8	Yes
Venezuela 80-83	52.2	No	Brazil	34.2	Yes
Venezuela 94-95	10.6	Yes	Chile	-3.5	No
Zimbabwe 95-	-3.3	Yes	South Africa (Botswana)	-23.9 8.3	Yes Yes)
Average	16.2		Average	6.1	
<i>of which: twin crises</i>	27.2		<i>of which: currency crisis alone</i>	18.3	
<i>banking crisis alone</i>	0.9		<i>neither crisis</i>	-10.9	
Average all	19.0		Average all	6.1	
<i>of which: twin crises</i>	26.0		<i>of which: currency crisis alone</i>	18.3	
<i>banking crisis alone</i>	9.0		<i>neither crisis</i>	-5.2	

Source: Bank calculations.

**(a)** Alternative pairs used in the regression sensitivity analysis are shown in brackets. The summary statistics reported in the table, however, reflect averages across the pairs not shown in brackets.**(b)** Since Korea – a comparison country for Japan 1992-98 – had a crisis itself from 1997, its output loss was estimated over the 1992-96 period and then scaled-up by multiplying by 7/5.

## Annex B

### The relationship between output loss measures based on growth rates and levels

Recent research has measured output losses during crises by summing up the difference between a constant trend growth rate and actual growth rates observed during crises. This measure, denoted as G1, can be written as:

$$G1 = \int_{t_0}^T (\gamma - g(t)) dt,$$

where,  $t_0$  is the point at which the crisis started,  $T$  is the point when it ended,  $\gamma$  is the constant trend growth rate and  $g(t) = Y'(t)/Y(t)$  is the rate of change of output  $Y(t)$ <sup>1</sup>.

A more appropriate measure of output losses during crisis periods would be to cumulate the difference between the level of actual output and its trend level as a percentage of the trend level. Using the same assumptions as above, we can write this measure, denoted by G2, as:

$$G2 = \int_{t_0}^T \frac{Y(t_0) \exp(\int_{t_0}^t \gamma dv) - Y(t) \exp(\int_{t_0}^t g(v) dv)}{Y(t_0) \exp(\int_{t_0}^t \gamma dv)} dt$$

The above expression can be simplified to:

$$G2 = \int_{t_0}^T (1 - \exp(x)) dt,$$

where

$$x = \int_{t_0}^t (g(v) - \gamma) dv.$$

Evaluating G2 analytically is not straightforward, but so long as  $x$  is small and negative, ie actual output growth during the crisis is below its trend (in practice a valid assumption), we can use a Taylor's series expansion to approximate  $\exp(x)$  by  $1+x$ . This yields:

$$G2 \approx \int_{t_0}^T \left( \int_{t_0}^t (\gamma - g(v)) dv \right) dt \approx \frac{1}{2} (T - t_0) \int_{t_0}^T (\gamma - g(t)) dt = \frac{1}{2} (T - t_0) \times G1. \quad (1)$$

All other factors being equal, equation (1) shows, within approximation error, that measuring output losses by cumulating differences in growth rates rather than levels will yield: (i) lower estimates of losses for crises lasting longer than two years; (ii) bigger estimates of losses for crises lasting one year and (iii) roughly the same answer for crises lasting two years (see Chart 2 for a stylised example). The longer the length of the crisis the greater the gap between the two measures. Since crises usually last for longer than two years, everything else equal, cross-country estimates based on G2 are usually larger than those based on G1.

<sup>1</sup>: Since it is usually assumed that the end of crisis ( $T$ ) occurs when actual growth ( $g(t)$ ) returns to trend ( $\gamma$ ),  $G1 \geq 0$ .

# Market discipline and financial stability

Andrew Crockett, General Manager, Bank for International Settlements and Chairman, Financial Stability Forum

In this speech, delivered on 23 May 2001 at a conference on banking and systemic risk, hosted by the Bank of England<sup>1</sup>, Andrew Crockett argued that in the years ahead we should continue the search for a better balance between market and official discipline in the prudential framework.

**THE LAST** quarter of the 20<sup>th</sup> century saw a profound transformation of the global financial system. Advances in information technology and financial liberalisation underpinned a quantum jump in the role of market forces in shaping economic outcomes. By the end of the period, the transformation from a government-led to a market-led financial system, to use a famous phrase, was largely complete.

This period also saw the emergence of financial instability as a key policy concern. In response, efforts intensified to put in place an effective prudential framework. Banking supervision and regulation moved to centre stage in attempts to reform the 'international financial architecture'. And the thinking behind prudential policies experienced an equally significant paradigm shift. This has been crystallised in increasing efforts to work with, rather than against, the grain of market forces. Tangible examples of this shift include the growing reliance on institutions' own assessment of risks, on the qualitative aspects of risk control processes and on disclosure.

As a result, market discipline has come to play a greater role in ensuring financial stability. Today, I would like to examine in some detail the nature of this role, its strengths and limitations, with a view to drawing policy lessons. I will argue that more can and should be done to strengthen market discipline. At the same time, striking an appropriate balance between official and market discipline may call for a keener recognition of the comparative effectiveness of market forces and of the processes underlying financial instability.

The structure of my remarks is as follows. First, on the basis of historical experience, I will briefly explain

why it is important to rely on market discipline, but also why it would be imprudent to expect it to deliver, on its own, the appropriate degree of stability. Next, I will examine in detail the prerequisites for effective market discipline, the mechanisms through which it is exercised and its limitations. Finally, I will draw some lessons about future directions for policy and research. In the process, I hope to touch on several of the themes addressed in this conference.

## The importance of market discipline

In what follows I will use the term 'market discipline' in a broad sense, to denote internal and external governance mechanisms in a free-market economy in the absence of direct government intervention. So defined, the question of whether market discipline can, by itself, secure financial stability comes pretty close to asking whether the financial system, left to its own devices, is inherently stable.

The government-led financial system that prevailed from the end of World War II to at least the early 1970s was characterised by financial repression. To varying degrees across countries, a web of regulations on activities, balance sheets, financial prices, domestic and cross-border transactions hindered market forces. These arrangements secured a degree of financial stability. Episodes of overt financial distress were limited. But stability came at a high cost in terms of the allocation of resources that became larger over time. Sheltered from competitive forces, bloated cost structures proliferated. Criteria other than perceived risk/return trade-offs determined the allocation of scarce financial savings. Governments could easily finance their growing deficits through captive savings or the inflation tax. The great post-war

<sup>1</sup> The conference was organised in co-operation with the FSA, the US Board of Governors of the Federal Reserve System, the Federal Reserve Bank of New York and the US Office of the Comptroller of the Currency.



inflation found a fertile soil in this financial order. In turn, inflation was a clear symptom of lack of financial discipline.

The shift toward a market-led system was hastened by the consequences of inflationary tensions. But eventually market disciplines played a useful role in the successful fight against inflation. By being unforgiving of lax government policies, market forces underpinned the shift towards greater fiscal and monetary prudence. And they were instrumental in redirecting resources towards more productive uses, both within and across borders. However, even as inflation was coming down, and market forces were gaining ground, episodes of financial instability became more prominent.

To a considerable degree, the seeds of this instability had been sown in the previous regime. The rigours of competition exposed the hidden sources of fragility that had developed in the sheltered environment. Competition revealed high and rigid cost structures, the limited ability of bankers to manage and price risk, and the disruptive effects of ill-designed financial safety nets. In addition, efforts to bring inflation under control through higher interest rates added to the financial difficulties. The case of the Savings and Loan crisis in the United States is an obvious illustration of these points.

Even so, it is hard not to suspect that, to a significant degree, much of the observed instability is inherent in the behaviour of a liberalised environment. Episodes of instability in both industrial and emerging market countries, reflecting pronounced boom and bust cycles in the financial sector, have been too recurrent to be transitional phenomena. And the similarities with comparable episodes during the heyday of the Gold Standard and leading up to the 1930s, when financial markets had last been as unfettered, have been too strong. It was the widespread instability in that earlier period that had led to the establishment of safety nets and the strict regulation of the commercial banking industry. As I will argue later, by numbing market discipline ill-designed safety nets may have affected the timing, frequency and characteristics of financial instability. But they are hardly a necessary condition for its emergence.

Occasional episodes of financial instability may well be part of the price to pay for the undoubted long-run economic benefits of a free-market

economic system. There is in fact a long strand of economic thought that is consistent with this view. Schumpeter's process of creative destruction is probably the best-known example. But even pure equilibrium finance theorists such as Fisher Black may be hinting at the same conclusion. Reasoning by analogy with portfolio returns, they point to the existence of a positive association between the variability and the mean of economic growth.

At the same time, the price paid in recent years seems unnecessarily high. Surely costs often running in the double digits of GDP foregone can be avoided without giving up on sustainable growth! The policy task is to improve on this potential trade-off. Doing so requires strengthening the current efforts to put in place a prudential framework that enlists and underpins as much as possible the disciplining forces of markets. But in order to do so, we need to recognise their strengths and limitations. It is to these that I now turn.

## Strengths and limitations of market discipline

### General considerations

The disciplinary strength of market forces derives from the immense power of the price system to aggregate information. The views of economic agents, sharpened by profit maximising instincts, are reflected in the constellation of prices at which funds are allocated and risks exchanged. In turn, these prices are a powerful and economical mechanism to summarise and convey information about those views. Market forces can raise the cost or restrict the volume of funding for those activities with unattractive risk/return trade-offs. Together with the ultimate threat of the demise of the enterprise, these mechanisms can deter excessive risk taking.

But for market discipline to be fully effective in ensuring financial stability this way, four prerequisites have to be met. First, market participants need to have sufficient *information* to reach informed judgements. Second, they need to have the *ability* to process it correctly. Third, they need to have the right *incentives*. Finally, they need to have the right *mechanisms* to exercise discipline.

Let me consider each prerequisite in turn. In doing so, I will take it for granted that a series of essential infrastructural requirements for the efficient functioning of the economic system are met, not least legal and institutional underpinnings. Their

importance has been highlighted by a number of episodes of instability in emerging market countries.

First, then, information. Our economic system is arguably characterised by a chronic tendency to under-supply information relative to what is necessary for effective financial discipline. The costs of producing information are concentrated, while the benefits are diffused and not easily appropriated by its producers. Conflicts of interest abound between users and suppliers of funds, and they are especially important in 'bad states', when bad news needs to be communicated.

In part, this may derive from difficulties in identifying the relevant information, but to a large degree it reflects other factors. Competitive pressures among the would-be suppliers of information are too strong and heightened confidentiality considerations. Likewise, competition among suppliers of funds is arguably too strong and free-rider problems may be too pervasive to ensure effective information extraction. Consider, for instance, how little counterparties knew about the exposures of LTCM (Long Term Capital Management). And how little information is still available about the risk profiles of financial institutions generally.

The ability to process information relevant for financial discipline is severely hindered by the object of the evaluation. I am not referring so much to the well-known difficulty of portraying complex risks in a simple and reliable form. Rather, I have in mind the daunting difficulties in assessing valuations and risks.

Fundamental value is to some extent in the eye of the beholder. We can of course break it down formally into expected cash flows, a discount rate and a risk premium. But this does not take us very far. How can we measure the components of value? Past experience is a flimsy anchor for expectations of returns and risk premia. Paradigms about how the world works shape our observations. And these observations are rarely sharp enough to adjudicate unambiguously between competing beliefs. Just think of the debate surrounding the 'New Economy'. Under these conditions, it is easy to fall prey to shortcuts and cognitive biases. We may simply extrapolate current conditions, eagerly discount what is inconsistent with our theories, or allow waves of optimism and pessimism unduly to colour our perceptions.

But the real problem is not so much individual error or bias. If individual errors were uncorrelated, no major consequences would result. Rather, it is collective misjudgements, reflecting the interactions of individual behaviour. There are in fact several reasons why collective biases may and do arise – and it is here that ability to process information blends most clearly with incentives to use it.

One key reason is that valuations and risks are endogenous to the collective behaviour of economic agents. It is not so much what we individually believe that matters but, as Keynes taught us, what the majority thinks and how it acts. This is true not only of assets actively traded in markets, but of valuations generally. Prospects of future profits and high returns can sustain the economic expansion that, at least for a while, validates those expectations. Profiting from taking a contrarian view is risky, for these self-justifying movements can last for a long time and go a considerable distance. In the meantime, short-term profit opportunities are foregone, business may be lost and losses incurred.

A second reason is incentive structures that heighten further the tendency to conform behaviour to the prevailing norm, or 'herding'. Contracts that induce short horizons are one example. Arrangements that lessen pain in the case of collective, as opposed to individual, failure are another.

For much for the same reasons, the mechanisms through which discipline is exercised may not always operate with sufficient timeliness and gradualism. The cost of funding may not rise early enough to prevent financial imbalances from building up. Even when it does, it might not be that effective if agents feel that they can shift it onto others. Restrictions on the volume of funding are more effective, but they, too, may start biting too late.

And when discipline is exercised, it may not always be in ways consistent with financial stability. The same endogeneity of outcomes that can allow valuations to drift too far in an upward direction can operate in reverse. Individual efforts to cut losses can, collectively, exacerbate overall losses. Anticipations of defensive actions can induce generalised defensive action. Historically, bank runs have epitomised this type of instability. Experience shows that countries as a whole are subject to analogous forces. More recently, the LTCM crisis has illustrated that markets

can stop functioning for similar reasons. (The central banking community, through the Committee on the Global Financial System, has addressed these issues in its post-mortem examination of the LTCM crisis and continues to analyse the operation of markets in stressful periods.)

These limitations of market discipline can by themselves be sufficient to result in an excessive degree of financial instability. Ill-designed safety nets, by keeping benefits private while socialising costs without putting in place adequate safeguards, can add to the problems. They do so by numbing the incentives to gather and act on information in a responsible and prudent way.

Historically, the main effect of ill-designed safety nets has been to alter the characteristics and timing of financial instability. By weakening market discipline, safety nets allow the build-up of financial imbalances to proceed further. Liquidity constraints are relaxed; insolvency is permitted to grow. And they can prolong the pain once the imbalances unwind if they mask the need for decisive action. For instance, historical experience appears to indicate that the recent banking crises, especially those of purely domestic origin, have tended to occur later in the business cycle as compared with those in the Gold Standard period, when official safety nets were absent or less well developed. Financial crises now tend to break out once the recession is under way rather than close to the peak of economic activity.

### **The financial cycle**

Let me now bring together the various elements of the analysis into a highly stylised picture of the anatomy of financial instability in a liberalised financial system. I will intentionally abstract from the complexity of the problems that arise in practice and focus on their essential characteristics. And I will be primarily concerned with financial instability arising from exposures to common, rather than idiosyncratic factors. Of course, difficulties at individual institutions due purely to firm-specific factors can sometimes cause contagion and be a source of instability. But historically the more relevant and costly form of instability has been associated with common exposures. And these exposures have in no small measure been the consequence of endogenous forces amplifying fluctuations in economic activity, rather than being exogenous to them.

Financial instability often derives from what, at least *ex post*, can be described as a financial cycle. In a stylised financial cycle, there is an over-extension phase in which financial imbalances build up, accompanied by benign economic conditions. This phase is typically triggered by improved economic prospects, which in turn may be due to technological innovations, the implementation of reforms or indeed many other genuine factors that can underpin sanguine expectations. In this phase, asset prices are buoyant and their surge tends to feed, and be fed by, rapid credit expansion and easier access to all forms of external finance. Leverage, in overt or hidden forms, accumulates in balance sheets, masked in part by the favourable asset price developments. These developments distort real expenditure decisions, above all investment.

The trigger and timing of the reversal is essentially unpredictable. It can reside either in the financial sphere (eg an asset price correction) or in the real economy (eg a spontaneous unwinding of an investment boom). The process then moves into reverse. In cases where the over-extension is contained, checked by the market and official disciplinary mechanisms, the financial system can withstand the subsequent downturn smoothly. But if the over-extension goes too far, widespread financial strains and instability may follow.

This kind of financial cycle is easy to identify *ex post*. It can be purely domestic in nature, or it can be driven by international capital flows. Beyond the specific characteristics of each episode, its imprint can be found in most of the cases of widespread instability since the 1980s. These include, among others, the experience of the Nordic countries in the 1980s, Japan in the 1980s–1990s, and the financial crises of a number of East Asian countries. Identifying the cycle *ex ante*, however, is much harder. What is a sustainable growth rate for the economy? Just when is ‘far’ ‘too far’? I will return to this point later.

A close look at these cycles would reveal an intriguing aspect of risk perceptions. Economic agents can do a reasonable job of assessing and pricing the relative or cross-sectional risk of instruments, debtors and counterparties. Indeed, this is what most of the empirical academic literature on market discipline is about. However, they seem to be less well-equipped to measure and price the absolute, undiversifiable risk associated with overall economic developments.

Indicators of risk tend to decline during upswings and to be lowest at or close to the peak of the financial cycle, ie just at the point where, with hindsight, we can see that risk was greatest. Asset prices are buoyant, credit spreads narrow and loan loss provisions low. These indicators behave approximately as if risk fell in booms and rose only in downswings. And yet, there is a sense in which risk increases during upswings, as financial imbalances build up, and materialises in recessions.

The length of the horizon and paradigms concerning the forces driving economic processes are crucial here. Greater prudence would be instilled by longer horizons in conjunction with a view of economic processes that regarded the boom as sowing the seeds of the subsequent downturn. This would instil greater doubts about the continuation of unusually good times and mitigate some of the perverse incentives discussed before.

In practice, however, some aspects of existing practices and institutional arrangements do not appear very supportive of prudent behaviour. Several examples spring to mind. It is not uncommon for banks to measure risk over relatively short horizons, partly reflecting accounting conventions and the, often mistaken, belief that remedial action could be taken quickly at limited cost. Diversified shareholders with similarly short horizons can demand overly ambitious returns. Uncritical reliance on asset prices to measure risk can automatically impart excessive pro-cyclicality to institutions' own assessments; indeed, the typical assumption that asset returns follow a random walk, rather than being mean-reverting, adds to the possible bias. Nor is it unusual for contractual arrangements in the financial industry to have undesirable features, such as front-loading rewards in comparison with penalties, measuring relative rather than absolute performance or not seeking to adjust performance for risk. Obvious cases in point include the payment of fees up front, bonuses related to unadjusted profitability or the volume of business, and peer-group analysis of returns within the asset management industry.

### Policy implications

It is now time to summarise the argument so far, say a few words about how market discipline compares with official discipline and then draw some conclusions on the appropriate balance. I hope you will excuse me if I do not elaborate on the reasoning behind my

observations regarding official discipline. This is not the focus of my remarks today and my points will not be particularly controversial.

- Market forces are at their best when allocating resources among scarce uses through an assessment of *relative* risk/return trade-offs, and in exercising discipline over a cross-section of institutions. They are less well equipped in dealing with the evolution of system-wide risk over time. Short horizons play a key role here.
- The effectiveness of market discipline is tempered by a tendency for information to be under-supplied, by the underlying difficulties in assessing fundamental values and related risks, by entrenched incentive problems and by a certain lack of gradualism in enforcing mechanisms. It can be further undermined by ill-designed safety nets.

In contrast, by comparison with market forces:

- Official discipline is less well suited to deal with the detailed measurement of *relative* risk/return trade-offs and hence with the allocation of resources among alternative uses. And prudential authorities, like markets, so far appear to have had difficulties in dealing with changes in *system-wide risk over time*. This may have less to do with horizons than with the conception of their task and of the mechanisms underlying financial stability. I will return to this point shortly.
- Supervisors have access to privileged information. As regards the ability to process given information, however, they do not have an obvious advantage over markets.
- Prudential authorities face a different incentive structure from market participants. Its main advantage is the prudence it induces; the main disadvantage is that it may encourage excessive intervention and, under certain conditions, forbearance.
- The mechanisms through which official discipline is exercised can potentially be more gradual and effective than those of markets, especially in dealing with system-wide disturbances. For this to be so, however, they need to be underpinned by proper incentives and a clear understanding of the system-wide implications of disruptions.

This configuration of comparative strengths and weaknesses and the previous analysis of the nature of financial instability suggest two conclusions regarding the balance between official and market discipline.

First, the current well-established trend to strengthen the reliance of the prudential framework on market discipline is welcome and could be strengthened further. This is especially so with respect to the assessment of relative or cross-sectional risk, which holds the key to the allocation of resources at a point in time. This would have the added benefit of limiting incentives to engage in wasteful and potentially destabilising regulatory arbitrage.

Second, we should pay greater attention to the system-wide aspects of risk, especially to its evolution over time. Such a shift in perspective could help us make headway in an area where both market and official discipline appear to have been insufficiently effective. Recognition of the potential value of this shift is of more recent vintage. The scope for strengthening it is correspondingly greater, but requires much more work at the conceptual and practical level.

The first conclusion is very familiar and widely shared. It has found reflection in greater efforts to rely on financial institutions' own risk assessments and to improve disclosure about the risk profile of individual institutions. From this perspective, the revised Capital Accord is a major milestone. No doubt more can and will be done in this area, not least in terms of comparability of disclosures across different types of financial institution. Similarly, it is worth exploring further the use of market information in the monitoring of the financial condition of individual institutions.

The second conclusion is perhaps less familiar. On earlier occasions I have referred to a system-wide focus as 'macro-prudential' and compared it with a hypothetical micro-prudential perspective. This comparison can help to bring into sharper relief the shift in perspective I have in mind and its implications for the balance between market and official discipline.

Let me consider next the difference between the two stylised perspectives in terms of objectives and conceptions of economic processes. I will then highlight the implications of the macro-prudential

perspective for the use of policy instruments in three key areas, namely information provision, safety nets and the financial cycle.

In terms of objectives, a macro-prudential approach would explicitly seek to limit the costs to the economy as a whole from financial distress. Its micro-prudential counterpart would focus on the likelihood of failure of individual institutions, an objective probably best rationalised in terms of narrow depositor protection.

In terms of the conception of the mechanisms influencing financial stability, the macro-prudential approach would stress the endogeneity of system outcomes with respect to the collective behaviour of individual institutions. The micro-prudential approach would tend to view them as exogenous. It would thereby also play down the notion that individually rational decisions could lead to undesirable collective outcomes.

To highlight the contrast, think of the financial system as a portfolio of securities, ie the individual institutions. The macro-prudential perspective would focus on the *overall* performance of the portfolio; the micro-prudential vision would give equal and separate weight to the performance of *each* of its constituent securities. In the assessment of risk and calibration of prudential instruments, the macro-prudential approach would stress the correlations across securities and the systematic risk component; the micro-prudential approach would look at the volatility of each individual security and emphasise the idiosyncratic component. Finally, the macro-prudential approach would recognise how the structure of correlations and risks was endogenous to the decisions reflected in the pay-offs of the securities; the micro-prudential approach would treat the pay-offs as determined by 'nature'.

When considering policy towards information, a macro-perspective would stress not the risk profile of individual institutions but information about the correlation of exposures of institutions, ie their exposure to common factors. To some extent, efforts to develop indicators of financial crises and macroeconomic vulnerabilities, including countries' external debt or banks' aggregate country exposures, are helpful here. But what I have in mind more precisely is information based on some form of aggregation of inputs from firms' risk management



systems. What kind of information might have been helpful, for instance, in assessing the vulnerabilities which were building up before the 1998 market turbulence? Likewise, what kind of information could best capture the vulnerability of financial institutions to a downturn in economic activity, over and above the breakdown of their exposures by ratings?

This is a largely unexplored area. In considering this type of information, many issues would need to be addressed. Confidentiality is one. In contrast to VaR (value at risk) statistics, the information would need to be directional, such as that derived from stress tests. Effectiveness is another. Would making such information public be invariably stabilising? Issues of endogeneity and herding would be relevant here. Feasibility, complexity and costs are a third issue. We are only beginning to address these questions. The Bank for International Settlements Committee on the Global Financial System has taken some steps in this direction. Generally, more conceptual and empirical work needs to be done.

What is clear, however, is that further progress will in part depend on developments in firms' risk management and information systems. As financial institutions improve credit risk measurement, the raw material for aggregation will become more readily available. The same holds true for developments in the accounting field. For instance, if some variant of fair value accounting were to be implemented at some point, this would, in effect, help to integrate information about credit and market risk, which would be reflected in the variability of institutions' net worth. As discussed below, however, this would also raise issues of its own in the context of the financial cycle.

A macro-prudential paradigm also has implications for the structure of safety nets. In particular, by stressing that the prudential objective should not be to avoid the failure of individual institutions per se, but to focus on their systemic consequences, the macro-prudential paradigm can limit the risk of providing excessive protection. It thereby also holds the promise of a better balance between market and official discipline.

How exactly to put this general principle into practice, however, taking into account the interrelationship between the various elements of the safety net and political realities, remains an open

question. One appropriate step could be to ensure that specific means are in place to protect depositors in the event of failure, relieving public pressure to forbear and adding to the credibility of the exit threat. Targeted deposit insurance schemes can be useful in this context.

In dealing with the financial cycle, a key objective would be to ensure that adequate defences are built up in upswings so as to be relied upon when the rough times arrive. This would strengthen institutions' ability to weather deteriorating economic conditions, when access to external financing becomes more costly and constrained. Moreover, by leaning against the wind, it could reduce the amplitude of the cycle, thereby limiting the risk of financial distress in the first place.

The essence of any policy response would be to instil a measure of prudence or conservatism in relation to unfettered market perceptions of values and risks. This suggests, *inter alia*, that seen from this angle the implications of fair value accounting might be less helpful. Moreover, precisely because our state of knowledge about financial cycles is so limited and the timing of downturns is so hard to predict, in principle in-built stabilisers would appear preferable to discretionary action. This would not necessarily rule out discretionary adjustments in prudential instruments, but would at least counsel caution in their exercise. The proposed strengthening of the supervisory review pillar in the new Capital Accord could be very helpful here.

A range of instruments would seem worthy of consideration. These could include the more systematic use of stress tests, variants of forward-looking provisioning for prudential purposes, as well as the use of conservative adjustments in minimum capital requirements, collateral valuations and loan-to-value ratios. Each of them would need to be assessed carefully so as to establish strengths and weaknesses. The issues involved are complex. And we are only beginning to recognise and study them, both conceptually and empirically.

\*\*\*\*\*

Let me conclude by restating the main message of my remarks today. In the years ahead we will need to continue the search for a better balance between market and official discipline in the prudential



framework. Achieving an appropriate balance is crucial to reap the long-term benefits of a liberalised financial system while minimising its potential costs. Strengthening further the reliance on market discipline can improve on that balance. However, exactly how to do so calls for a keen recognition of the strengths and weaknesses of market discipline. To my mind, strengthening the macro-prudential orientation of the arrangements designed to secure financial stability holds part of the key to further progress.

I am aware that I have raised more questions than provided answers. This is inevitable at this stage. It is also highly desirable, though. I hope that I have convinced you that there are many challenging issues awaiting exploration. This is the nature of any scientific endeavour, and also the basis of all good policy making.

Let me also say, however, that the stakes are high. If we cannot do a better job of limiting financial instability in the future than we have done in the past, public support for a market-based financial system could well wane. Pressure for governmental intervention of ill-considered sorts would rise. And if that happened, both providers and users of financial services would surely end up losers.



## TO ORDER FUTURE ISSUES

To: Financial Stability Review, Bank of England HO-3, Threadneedle Street, London EC2R 8AH, United Kingdom

Please add my details to the Financial Stability Review mailing list

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Company/institution: \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Post/zip code: \_\_\_\_\_

Country: \_\_\_\_\_

The Bank will hold the personal details provided on this form for the main purpose of mailing future copies of the Financial Stability Review. However, we may also share this information with other parts of the Bank for the purpose of the Bank's business and related activities. Your information will not be disclosed to marketing firms.

You have the right to ask for a copy of the information held by us in our records. You also have the right to require us to correct any inaccuracies.

To help identify who reads the Financial Stability Review please tick the most appropriate description:

- |  |   |
|--|---|
| <input type="checkbox"/> central banker                      | <input type="checkbox"/> academic                       |
| <input type="checkbox"/> finance ministry                    | <input type="checkbox"/> journalist                     |
| <input type="checkbox"/> regulator                           | <input type="checkbox"/> market infrastructure provider |
| <input type="checkbox"/> other national public policy areas  | <input type="checkbox"/> financial market participant   |
| <input type="checkbox"/> international financial institution | <input type="checkbox"/> other – please specify         |