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Financial Stability Review

December 2002

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. There is an 'FSR alert service' to inform readers by e-mail shortly before a new issue of the *Review* is going onto the website. For a summary of the main financial stability issues, two sections of the *Review* are available in htm format with hyperlinks to this and earlier *Reviews* where appropriate. The *Financial stability themes and issues* section is at: www.bankofengland.co.uk/fsreview/themesandissues and the *Financial stability conjuncture and outlook overview* is at: www.bankofengland.co.uk/fsreview/overview. (The Bank's website also has details of job opportunities at the Bank of England at www.bankofengland.co.uk/jobs.)

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December 2002

- | | | |
|---|---|--|
| <p>3 Financial stability themes and issues</p> <p>7 The financial stability conjuncture and outlook</p> <p>82 Strengthening financial infrastructure</p> <p>103 Bank capital: Basel II developments
Patricia Jackson, Head, Financial Industry and Regulation Division, Bank of England</p> <p>110 The impact of the new Basel Accord on the supply of capital to emerging market economies
Simon Hayes and Victoria Saporta, International Finance Division, and David Lodge, Financial Industry and Regulation Division, Bank of England</p> | <p>115 Fallacies about the effects of market risk management systems
Philippe Jorion, Professor of Finance, University of California at Irvine</p> <p>128 Dynamic provisioning: issues and application
Fiona Mann and Ian Michael, Financial Industry and Regulation Division, Bank of England</p> <p>137 Renewing confidence in the markets
Sir David Tweedie, Chairman, International Accounting Standards Board</p> <p>142 Is there still magic in corporate earnings?
Fabio Cortes and Ian W Marsh, G10 Financial Surveillance Division, and Michael Lyon, Domestic Finance Division, Bank of England</p> | <p>153 The economics of insolvency law: conference summary
Bethany Blowers, Domestic Finance Division, Bank of England</p> <p>157 Fixing financial crises
Andrew G Haldane, Head, International Finance Division, Bank of England</p> <p>162 Modelling risk in central counterparty clearing houses: a review
Raymond Knott and Alastair Mills, Market Infrastructure Division, Bank of England</p> <p>175 UK interbank exposures: systemic risk implications
Simon Wells, Financial Industry and Regulation Division, Bank of England</p> |
|---|---|--|

The financial stability conjuncture and outlook

Overview: risks to financial stability 9

I. The international environment 16

1. Global market developments 16
2. The United States 22
3. Europe 30
4. Japan 37
5. Emerging market economies 42
6. The international financial system 48

II. The UK environment 59

1. The macroeconomic background 59
2. The corporate sector 60
3. The household sector 67

III. The UK financial system 71

1. The UK life insurance sector 71
2. The UK-owned banking system 73





themes and issues

During the past six months, financial systems around the world have withstood sharp declines in equity markets, higher market volatility, and a deterioration in the macroeconomic outlook. In this uncertain environment, there have been occasional signs of fragility and a retreat from risk-taking. This issue of the Bank of England's *Financial Stability Review* explores the factors contributing to changing appraisals of risk, and considers various public and private sector initiatives designed to strengthen risk management.

The Bank's regular assessment of *The financial stability conjuncture and outlook* is complemented for the first time by a separate article reviewing developments *Strengthening financial infrastructure*. Perhaps the most important of these in the past six months has been the successful launch of continuous linked settlement (CLS) in foreign exchange markets, which can greatly reduce foreign exchange settlement risk. The article considers efforts generally to make financial systems more robust and initiatives to improve crisis management – two of the three key aspects of the Bank of England's financial stability work, along with the surveillance of risks.

The greater resilience of banks in most industrial countries is attributable partly to larger buffers of capital compared with the 1980s and early 1990s. Encouraging internationally active banks to hold more capital was one of the objectives of the original (1988) Basel Accord. Central banks and supervisors have been working to amend the Accord to make it more sensitive to risk. The article by Patricia Jackson, *Bank capital: Basel II developments*, describes the current state of play. The Basel Committee on Banking Supervision set out its latest proposals on 1 October. These modified earlier proposals in the light of comments, the results of quantitative impact studies which sought to assess the likely effect of the proposals on minimum capital, and concerns about the potential procyclicality of the new approach. The latest proposals are currently being tested in a third quantitative impact study.

One concern has been that, if Basel II increased capital requirements for loans to certain classes of borrower, it could increase their cost of funds. In *The impact of the new Basel Accord on the supply of capital to emerging market economies*, Simon Hayes, Victoria Saporta, and David Lodge consider whether emerging market (EME) borrowers are likely to be materially affected. The

themes and issues



Financial Stability Review
December 2002

authors argue that the regulatory capital charge will not rise – and may indeed fall – for lending to a number of emerging markets. In any case, banks seem already to price their loans to reflect the perceived creditworthiness of their customers rather than being based on regulatory capital requirements; Basel II is simply likely to bring the regulatory charge more into line with existing practice. The authors also point out that bank finance is only one of several sources of credit for EMEs, and that the new Accord will not apply to the others.

Another concern about Basel II has been that the adoption of risk-based requirements could amplify market volatility at times of financial crisis. In an invited article, *Fallacies about the effects of market risk management systems*, Professor Philippe Jorion investigates whether value-at-risk (VaR) methods of risk measurement for trading books do in fact increase market volatility in crisis periods. His answer is reassuring. He finds that asset price volatility over the 1990s, when the techniques were introduced, was lower than previously, not higher as is sometimes suggested. Also, rather surprisingly, the markets which in 1987 used portfolio insurance – another risk management tool – declined less than the markets in which it was not used. Jorion also notes that the existing Basel VaR capital requirements are calculated in such a way as to react slowly to changing market conditions.

Basel II is designed to make regulatory capital requirements more responsive to risk. Similarly, there have been proposals to make accounting frameworks reflect more clearly the risky nature of banks' lending. Fiona Mann and Ian Michael explore one such proposal in *Dynamic provisioning: issues and application*. The advocates of dynamic provisioning argue that it would encourage the build-up of a buffer, in the form of an 'expected loss reserve', against potential losses. It might also reduce a distortion in the measurement of banks' income over time which arises because margins set to cover expected losses are treated as profit. The approach would reduce both profits in times of boom (when many riskier loans are taken on) and losses in recessions (when the losses inherent in holding a portfolio of loans tend to crystallise). But the authors point out that all of the various ways in which a dynamic provisioning approach might be implemented in practice raise practical issues which would need to be overcome.

The interaction between accounting practices and assessments of risk and return has also been prominent in the recent debate about deficiencies in financial reporting in the corporate sector. In the second invited article in this issue, *Renewing confidence in the markets*, Sir David Tweedie, Chairman of the International Accounting Standards Board (IASB) sets out his view of the issues at stake. He argues that fears about the quality of financial reporting have undermined investor confidence, in turn



damaging economic prospects. Good financial reporting requires clarity of accounting standards, sound auditing practices and an effective enforcement framework. Accounting standards must be based on clear principles, rather than detailed guidance, to avoid manipulation and a 'rule-book mentality'. There is growing international consensus around this view, and the IASB has agreed with the US Financial Accounting Standards Board to work to remove major differences between international and US standards. New standards need to be developed too, to reflect how a modern economy works. Reported earnings are likely to become more volatile as a result, but it is better to confront investors with the reality that the financial performance of complex companies in today's environment is bound to fluctuate.

In the same area, but focusing more on how accounts are used by investors and analysts to assess firms' earnings prospects, Fabio Cortes, Ian Marsh, and Michael Lyon ask, *Is there still magic in corporate earnings?* It had often been suggested, in the United States in particular, that audited reported earnings were not necessarily the best basis for equity valuation. However, alternative measures – for example, *pro forma* earnings – appear to have excluded systematically certain recurring expenses, so exaggerating earnings and sometimes giving an excessively rosy view of likely future cash-flows. The authors review some of the academic analysis of this subject, which indicates that items often excluded from *pro forma* earnings statements do in fact contain information useful in forecasting cash flows. They also explore the use of national-accounts-based measures of aggregate corporate earnings as a way of checking the implications of firm-level accounting data.

The accounting framework used in the corporate sector is a vital part of the 'infrastructure' on which companies – and those who invest in or lend to them – depend. Clear principles and an understanding of the economic significance of accounting data enable better assessments of likely risks and returns. But, however good the accounting framework, occasionally some firms will still face insolvency. In these circumstances, insolvency and bankruptcy law are important, as they affect both the stability and the efficiency of the financial system. To explore the *Economics of insolvency law* further, the Bank held a conference on 27 September, reported here by Bethany Blowers. As well as the Bank's general interest in promoting effective management of financial problems, to avoid them having systemic implications, it has had a long-standing practical involvement in pre-insolvency workouts via its role in the 'London Approach'.

Some of the same risk management issues arise in an international context. There has been an active debate for some time about the best means of resolving international financial crises. In *Fixing financial crises*, Andrew Haldane reports a conference hosted by the Bank on 23-24 July on the subject of

themes and issues



the role of the official and private sectors in resolving sovereign debt crises. Amongst the specific topics discussed were the role of the IMF, and the pros and cons of collective action clauses and the IMF's proposal for a sovereign debt restructuring mechanism (SDRM).

The articles outlined above are primarily about how to improve the resilience of the framework within which financial intermediaries operate. Market-driven initiatives along these lines include the development of central counterparties (CCPs) in financial markets. In *Modelling risk in central counterparty clearing houses: a review*, Raymond Knott and Alastair Mills consider what academic studies have revealed about risks in this key part of the financial infrastructure. CCPs originally arose to protect market participants from counterparty risk in exchange-traded derivatives markets, but they also now have an important presence in cash and OTC derivatives markets. In helping to manage counterparty risk for market participants, CCPs are themselves exposed to various risks – and their position at the centre of a web of financial exposures raises issues about possible contagion. The article notes that margins alone may not be sufficient to protect CCPs from extreme, but rare, events. As a consequence, the level of additional default resources needs to be carefully considered.

CCPs raise questions about the systemic significance of different networks of exposures. So do interbank wholesale markets. In *UK interbank exposures: systemic risk implications*, Simon Wells explores a possible approach to measuring the direct impact on other banks of the sudden and unexpected failure of a single institution, in the unlikely event that such a failure were to occur. Data limitations make it impossible to put together a complete map of interactions between banks; but, using a stylised framework, some progress can be made in investigating the patterns of potential spill-overs. The article is part of the Bank's continuing work to understand more fully the links between financial institutions and the systemic risk they pose.

The financial stability conjuncture and outlook

Overview: risks to financial stability

Since the June 2002 *Review*, the UK and international financial systems have faced a deterioration in the macroeconomic outlook, sharp declines in equity markets, unusual volatility in a range of asset prices, and increases in credit risk. Nevertheless, banking systems in general have withstood these pressures better than in previous downturns. The rise in market indicators of risk associated with some major banks in early October has since been partially reversed. But the rapid shifts in market sentiment have illustrated the fragility of confidence. In some cases, financial institutions need to restore their resilience to future shocks by, for instance, raising new capital or improving their core profitability – and this is precisely what a number of banks and insurers are doing.

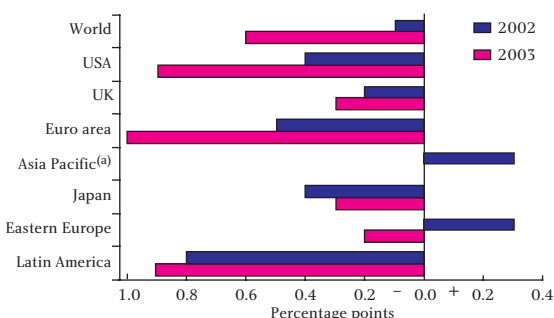
External deficits remain large in the United States and, to a lesser extent, the United Kingdom, and are accompanied by significant domestic imbalances and risks. Most notably, the accumulation of household debt in the UK, the USA and some other countries has continued, accompanied by further increases in house prices. Also, many non-financial companies have been responding to financial pressures by cutting expenditure and rearranging their finances so as to reduce gearing.

As usual, this *Review* looks at the international and UK financial systems and the links between them – notably via UK-owned banks' direct overseas exposures (equal, in total, to around ten times their Tier 1 capital), and their exposures through, and to, international financial markets.

The financial environment

Forecasts of GDP growth for 2002 and, more markedly, 2003 have been revised down for most regions of the world since June (Chart A), reflecting weaker-than-expected demand. The large falls in equity markets between June and early October (Chart B) were accompanied by some sharp increases in market indicators of credit risk. Although these changes have since been partly reversed, there seems to have been a widespread re-appraisal of corporate prospects around the world, perhaps in part a reaction to past over-optimism. In marked contrast to the early months of the year, equity prices, interest rates and bond yields in some currencies have been more volatile over the past six months

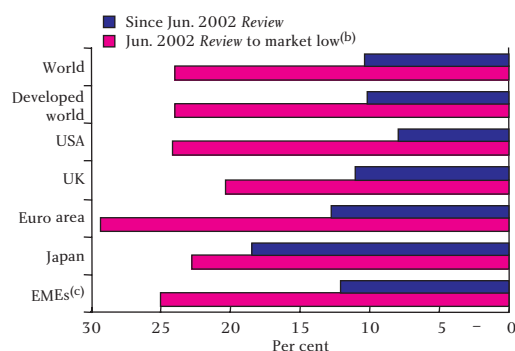
Chart A:
Percentage points revision in Consensus forecasts since June 2002 *Review*



Source: Consensus Economics Inc.

(a) Includes Japan.

Chart B:
Percentage change in world equity indices since June 2002 *Review*^(a)



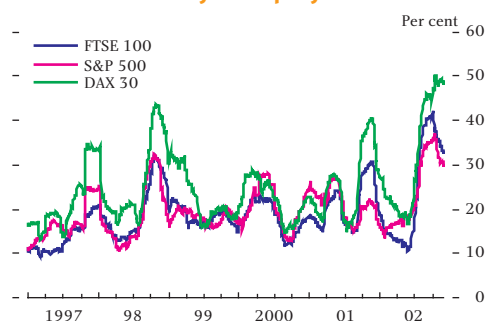
Source: MSCI.

(a) Denominated in US dollars.

(b) Market low for each index between Jun. 2002 *Review* and 27 Nov. 2002.

(c) Emerging market economies.

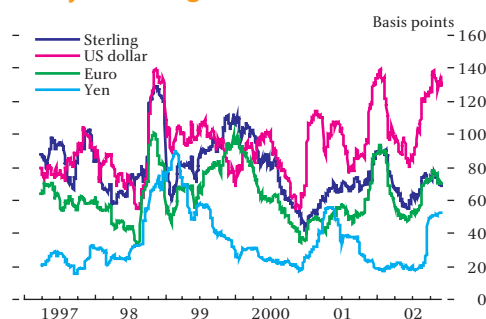
Chart C:
Historical volatility of equity indices^(a)



Sources: Thomson Financial Datastream and Bank calculations.

(a) Annualised volatility calculated as standard deviation of daily log returns over a 60-day rolling window (individual observations equally weighted).

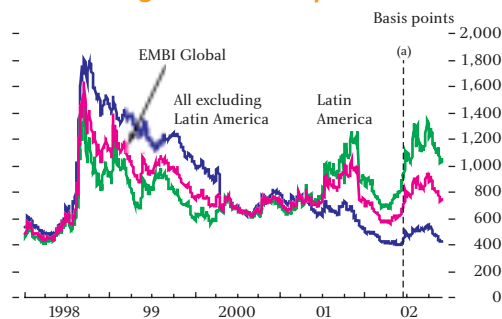
Chart D:
Historical volatility of ten-year government bond yield changes^(a)



Sources: Bloomberg and Bank calculations.

(a) Annualised volatility calculated as standard deviation of daily changes over a 60-day rolling window (individual observations equally weighted).

Chart E:
EME sovereign US\$ bond spreads



Source: JP Morgan Chase & Co.

(a) Jun. 2002 *Review*.

(Charts C and D). But exchange rates between major currencies have been relatively stable, notwithstanding the widening US current account deficit, and their expected volatility (as derived from option prices) has been relatively low. This may reflect broadly similar changes in market sentiment across the industrial countries.

Emerging markets

Despite the predominantly global nature of recent financial market developments, some country-specific exposures have apparently become more risky over the past six months. There have, for example, been increased market concerns about exposures to Latin America, where credit spreads on sovereign debt have risen markedly (Chart E). In particular, there has been a sharp deterioration in market sentiment towards Brazil. From the time of the June 2002 *Review* up to the elections at the end of October, the Brazilian real depreciated by around 27% against the US dollar and the spread on sovereign debt increased by 484 basis points, raising concerns about debt sustainability. Asset prices and the exchange rate have recovered somewhat since the elections, but a further improvement in market sentiment, and a rapid recovery in growth will be required to ensure the sustainability of public sector financing. Other countries in the region, including some with strong trade links to Brazil or large external financing needs, have also seen increases in the spreads on their sovereign debt. Concerns about debt sustainability extend beyond Latin America. Market sentiment towards Turkey was weak for much of the period since June; but market reaction to the elections in November and the faster growth of output have helped strengthen Turkish asset prices and the exchange rate.

Corporate sector financial prospects

Equity prices have fallen more than can be accounted for easily by changes in short-run economic forecasts and the falls in the rate of growth of earnings that they imply. Part of the explanation may be that longer-term prospects for corporate earnings growth have also been marked down. In addition, there seems to have been some increase in the risk premium on equities, perhaps reflecting greater uncertainty about corporate earnings and possibly a more general unwillingness among investors to take on exposure to risk.

Greater uncertainty about earnings would not be surprising. WorldCom's filing for Chapter 11 protection on 21 July confirmed, in dramatic fashion, that many of the problems highlighted by Enron were not unique to that company. Further evidence of this emerged subsequently, although the deadline in August by which US chief executives had to sign off personally their company accounts did not precipitate any major downward revisions in stated earnings. Overall, however, investors may have become more sceptical about the reliability of corporate

accounts, the effectiveness of corporate governance arrangements and the appropriateness of management incentives. Measures have since been taken to strengthen corporate governance and to tighten up accounting standards (as described in the accompanying article about strengthening the financial infrastructure). And, since August, US companies may have become more conservative in preparing their earnings statements and forecasts.

In contrast to the position in much of 2000 and 2001, the stock market correction since June has not been concentrated in the TMT sector. The changing assessments of, and attitudes to, risk have led, unsurprisingly, to sharper falls in equity prices (Table A) and rises in credit spreads for those industry sectors and individual companies with high gearing and uncertain earnings prospects. For example, industries containing firms with high balance-sheet or operational gearing (eg the motor industry, energy trading, and aviation) have suffered, as have those where demand has been particularly weak. Other forward-looking market indicators of corporate prospects such as credit spreads (Chart F) may also reflect somewhat higher business failure rates in many countries, an increase in bond default rates (Chart G) and the lower-than-usual recovery rates on defaulted bonds in some industries, especially telecoms.

Parts of the corporate sector have been directly exposed to the decline in equity markets. Some company sponsors of defined-benefit pension funds will, over time, have to cover valuation deficits. Insurance companies heavily invested in equities have been hit, especially those life-insurance firms that have guaranteed minimum nominal returns on savings products or that, for some other reason, have materially mismatched assets and liabilities. And investment banking revenues have suffered from the decline in equity issuance and M&A activity.

Overall, there is little evidence of a generalised tightening in the supply of credit, but since the summer there has been some selective tightening in wholesale markets and in the domestic markets of some countries. This probably reflects banks' judgements about where risks have risen most, rather than losses of capital or funding difficulties. Credit spreads have increased most for low-rated companies; and credit conditions have become more difficult for firms close to the boundary between investment-grade and sub-investment-grade, with decreased access to bond markets and conditions on other borrowing becoming more onerous. For a period during the summer, corporate bond market issuance around the world was particularly low, and in the high-yield market it remained difficult for some sectors into the autumn.

Table A:
Selected world sectoral equity indices

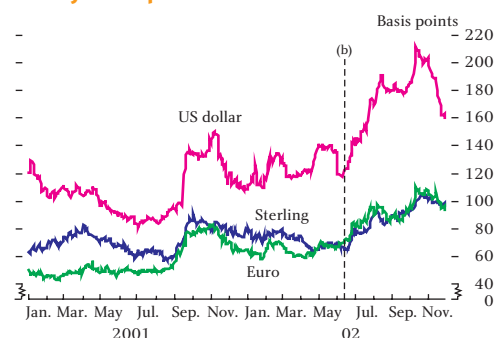
Per cent	Change since Jun. 2002 Review	Change from Jun. 2002 Review to total market low ^(a)	Change since total market peak ^(b)
Total market	-10.7	-23.2	-43.2
Airlines	-16.1	-29.4	-28.4
Autos	-13.1	-24.7	-30.4
Banks	-11.4	-26.4	-15.6
Consumer cyclicals	-11.4	-23.8	-29.6
Consumer non-cyclicals	-7.0	-10.6	-2.0
Information Technology	-6.7	-35.6	-77.0
Insurance	-14.0	-27.9	-17.9
Investment banks	-5.3	-28.5	-46.2
Media	-22.2	-34.9	-66.7
Oil and gas	-13.0	-17.5	-5.4
Telecom services	-0.5	-20.3	-70.2

Source: Thomson Financial Datastream.

(a) Low between Jun. 2002 Review and 27 Nov. 2002 (9 Oct. 2002).

(b) Peak in total market price index (27 Mar. 2000).

Chart F:
**Aggregate investment-grade corporate
bond yield spreads^(a)**

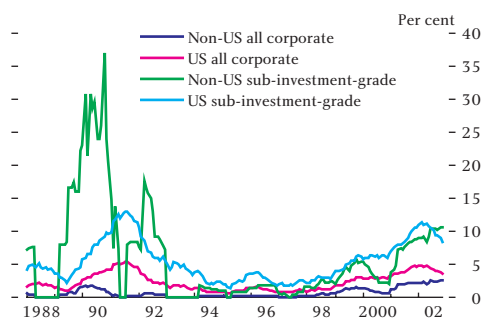


Source: Merrill Lynch.

(a) Asset swap spread; ie option-adjusted spread over London Inter-Bank Offered Rate of a matched floating rate bond.

(b) Jun. 2002 Review.

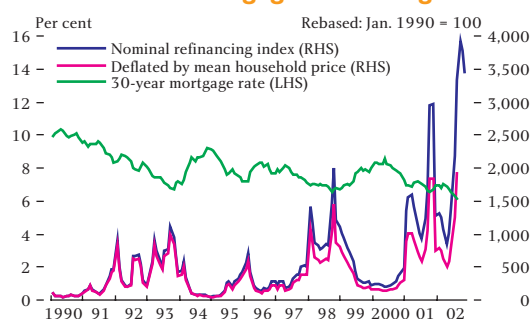
Chart G:
Moody's US and international corporate bond default rates^(a)



Source: Moody's Investors Service.

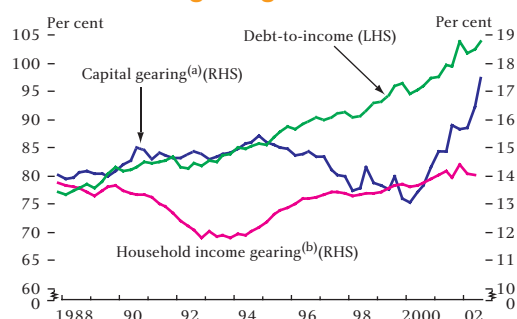
(a) Trailing one-year default rate calculated as the number of defaulting issuers during the preceding twelve months, divided by the number of Moody's-rated issuers at the start of the period.

Chart H:
US households: mortgage refinancing



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

Chart I:
US households: gearing ratios



Sources: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2002 H1 and Bureau of Economic Analysis, Department of Commerce.

(a) Total credit market instruments divided by gross total assets.

(b) Debt-servicing ratio calculated by Federal Reserve (incorporates interest payments and partial repayment of principal).

Companies have reacted to these pressures in a variety of ways characteristic of cyclical slowdowns: by selling assets, reducing expenditure (including on investment), cutting trade credit, lowering dividends, and, where necessary, repaying debt with the proceeds of new equity. The range of financing routes provided by capital markets has widened over recent years, with financial innovation making the system more resilient and somewhat less reliant on bank lending as a backstop. Many borrowers have been able to mitigate financing risks to some extent by extending the maturity of their debt (at a price), and by using assets as collateral for various forms of borrowing, including via securitisation. In addition, while the issuance of convertible bonds has declined, leveraged buy-outs, which bring in new equity and reduce the gearing of the issuing company, have enabled some highly indebted firms to strengthen their balance sheets.

Household sector financial prospects

There appear to be fewer worries at present about financial risks in lending to households, although the outlook for household creditworthiness differs across countries, reflecting, for example, variations in debt-income ratios and prospects for income growth. Unemployment rates have generally been relatively stable, and low real and nominal interest rates have helped to constrain income gearing. In the United States, extensive mortgage refinancing (Chart H) at lower interest rates has slowed the rise in household debt servicing costs, and real estate price increases have raised the value of homeowners' collateral. In general, banks have reported fewer signs of deteriorating credit quality on household than on industrial and commercial lending.

Nevertheless, looking ahead, developments in household balance sheets in some countries pose some significant downside risks. As discussed in previous *Reviews*, both the income and capital gearing of US households have reached unusually high levels in the past couple of years (Chart I). There is a possibility that, given the falls in equity prices and increased uncertainty about retirement incomes, many households might conclude that their debt is now excessive and that they need to save more. If this were to happen abruptly, the resulting decline in demand could raise unemployment and thus reduce the creditworthiness of both households and companies. In several European countries and Japan, however, the picture is rather different and household borrowing has not grown so rapidly. Another uncertainty concerns the creditworthiness of the new borrowers who have taken advantage of banks' expansion into sub-prime lending markets in several countries. Banks are still evaluating whether their credit risk pricing models for these markets are robust in the face of recent macroeconomic changes. The benefits to lenders of using stress tests, based on different macroeconomic scenarios, to supplement risk models, based on historical asset price correlations, have become more evident.

The impact on the international financial system

Given the developments discussed above, it is not surprising that banks exposed to corporate credit risk have to date been under greater pressure than those reliant more on retail business. The effect has been greatest for some of the largest, most complex banks, which tend to have the greatest exposures to larger companies, amongst which credit problems have so far been concentrated. This deterioration in credit quality might have been expected in the aftermath of a rapid expansion in corporate lending followed by a sharp and widespread economic slowdown, and it may continue for a while even without any further bad macroeconomic news; and bank provisions may lag further behind.

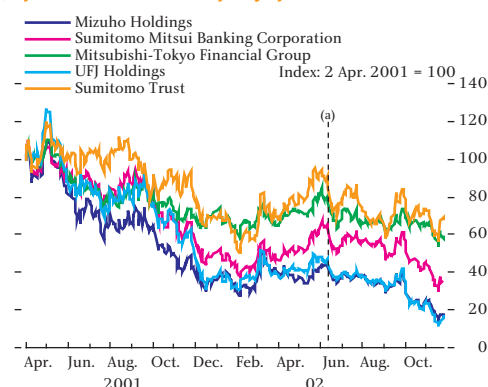
Despite problems in some parts of banks' portfolios, published capital ratios amongst banks in the developed economies appear generally healthy. Moreover, equity market developments may have encouraged people to hold more of their wealth in bank deposits, thus helping banks' liquidity and funding costs. But profitability before provisions has tended to vary according to business line, and banks in some European countries – notably Germany – face difficulties in maintaining a competitive rate of return. Some banks (of various nationalities) have been hit by losses on Latin American exposures. Moreover, as relative stock market performance (Chart J), recent assessments of non-performing loans and various other indicators all show, the Japanese banking system continues to face deeper problems than those of other industrial countries.

Some market credit risk indicators for banks increased sharply in August and October (Chart K). A number of large, complex and internationally active banks were downgraded by rating agencies – but primarily on account of the outlook for profits, rather than immediate concerns about their financial position. The sharp rises in their bond spreads and credit default swap prices – although now partially reversed – suggest that the changing attitudes to risk discussed above were reflected in perceptions of the financial as well as the non-financial corporate sector.

At the same time, a number of factors have been at work tending to increase the robustness of the international financial system. Large banks have been using credit risk transfer instruments to a greater extent to manage their exposures, and those to market counterparties have been reduced by the greater use of collateral. Several internationally active insurance companies raised new capital, strengthening their balance sheets. Meanwhile, there have been continuing improvements in financial market infrastructure, notably in the past six months the launch of Continuous Linked Settlement, which promises to make foreign exchange settlement safer.

Chart J:

Japanese banks' equity prices

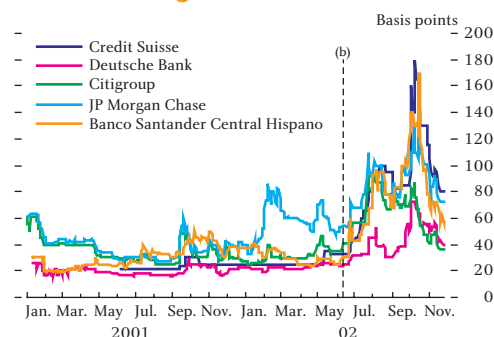


Source: Bloomberg.

(a) Jun. 2002 Review.

Chart K:

Five-year senior credit default swap prices for selected large banks^(a)



Sources: CreditTrade and JP Morgan Securities Ltd.

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

(b) Jun. 2002 Review.

Chart L:

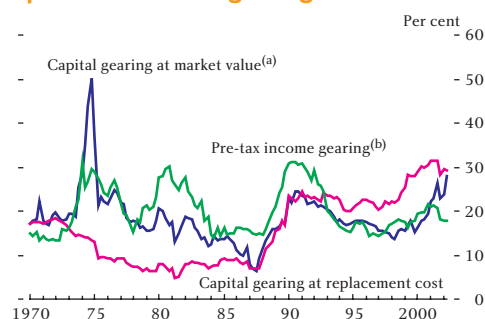
Classification of large UK-owned banks' assets^(a)



Sources: FSA regulatory returns and Bank of England.

(a) Figures for the ten largest banks at the date shown.

Chart M:
Capital and income gearing of UK PNFCs

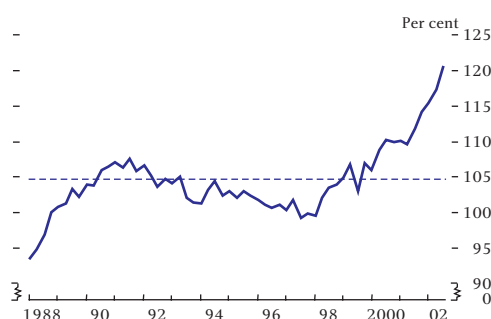


Sources: ONS and Bank of England.

(a) PNFCs' net debt divided by the market valuation of PNFCs.

(b) PNFCs' interest paid divided by profits before tax and interest. Data are seasonally adjusted.

Chart N:
UK household sector debt as a percentage of income^{(a)(b)}

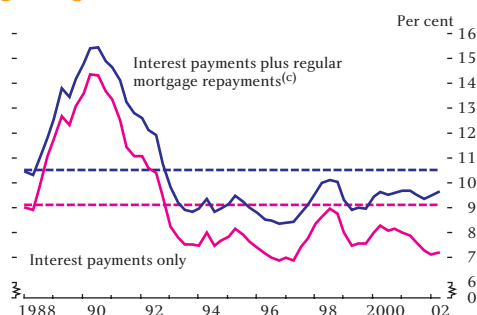


Sources: ONS and Bank of England.

(a) Debt is total liabilities. Income is household post-tax income.

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

Chart O:
Measures of UK household income gearing^{(a)(b)}



Sources: ONS and Bank of England.

(a) Payments as a percentage of household post-tax income.

(b) Dashed lines indicate average of series from 1988.

(c) See page 82 of the Jun. 2002 *Review* for how this series is constructed.

The UK economy

Despite its substantial international exposures, the domestic economic environment remains of central importance for the UK financial system (Chart L).

As the November *Inflation Report* noted, output growth in the United Kingdom has continued to recover from a cyclical trough around the turn of the year. On its central projection, four-quarter UK GDP growth is expected to pick up further to a little above long-run trend rates by early 2003, before settling around trend thereafter¹. To date, as in other countries, there have been more signs of financial stress amongst companies than households. The sectors where there have been particular concerns include energy and telecoms (although domestically owned banks' direct exposures to these industries in the UK appear to be relatively small).

Overall, however, there has recently been a moderate recovery in profits, and a stabilisation of income gearing (Chart M) and liquidity. These developments may reflect the response of firms to pressure on their balance sheets and a reassessment of risk by providers of finance (as discussed above). Corporate liquidation rates have also remained relatively low. The FRS17 accounting standard has, however, drawn attention to the impact of equity price falls on the financial position of defined-benefit pension funds. This has been a particular issue for those firms where pension underfunding has coincided with high conventional capital gearing.

Lending to households, both secured (on property) and unsecured, has continued to grow rapidly (Chart N) without, so far, any signs of a significant increase in defaults by borrowers or in saving to reduce their debt. Low nominal interest rates and continuing growth of personal disposable income have kept income gearing relatively low (Chart O). The outlook is, however, difficult to assess because of the uncertain dynamics of the housing market. As the November *Inflation Report* pointed out, one of the risks to the Monetary Policy Committee's central projection is that the exceptional rate of house price increases might continue for a while yet, leading ultimately to a more abrupt adjustment in both the housing market and consumers' balance sheets. In such circumstances, lenders who are, for example, more exposed to recent new borrowers with high loan-to-value ratios might face a deterioration in the quality of their portfolios.

The UK financial system

UK-owned banks, like others, have faced increased financial market turbulence and uncertainty about the macroeconomic outlook. But their business mix, focused on the UK retail market,

1: November 2002 *Inflation Report*, pages 52–62.

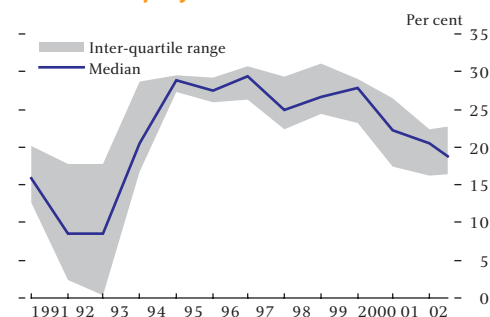
combined with the greater resilience of the UK economy recently, has in most cases helped to cushion the impact. They appear, generally, to remain both profitable and well capitalised. The return on equity of the ten largest UK-owned banks on average fell slightly in the first half of 2002, but was still higher than in the early 1990s (Chart P). Published Tier 1 capital ratios increased slightly. The apparent robustness of the large UK-owned banks is reflected in their credit default swap prices, which remain lower than those of either foreign banks or many other UK companies (Chart Q).

On backward-looking measures, the quality of the large UK-owned banking sector's overall assets has not deteriorated materially. Typically, provisions have not grown as rapidly as loan portfolios so that provisioning ratios have fallen (Chart R). Bank contacts suggest, however, that the asset quality of foreign loan portfolios has deteriorated relative to domestic portfolios and that, within domestic portfolios, lending to households has performed better than lending to large non-financial firms. Looking forward, the uncertain outlook for household borrowers is potentially important given the scale of retail exposures. For mortgages, however, there is less evidence of lending at high loan-to-value ratios than during the early 1990s downturn. However, unsecured lending to households – about a fifth of household debt – has grown particularly rapidly. So has lending to the commercial real estate sector, against a background, according to some bank contacts, of some recent rises in vacancy rates and a rise in loan-to-value ratios over the past few years. Both areas therefore merit close monitoring.

In the insurance industry, pressures on the life funds have increased further in the past six months. This has largely been the result of the falls in equity prices. Around 40% of UK life insurers' assets were held in equities at the end of 2001. The risk of contagion to the financial system more generally is, however, probably limited. Direct credit exposures of major UK-owned banks to the sector are small, though links via the ownership of life insurers may be more significant.

Overall, then, the recent financial market turbulence and increases in risks have been weathered successfully by most, though not all, classes of UK financial intermediary. If some of the risks discussed above were to crystallise, however, the position in future could be less comfortable.

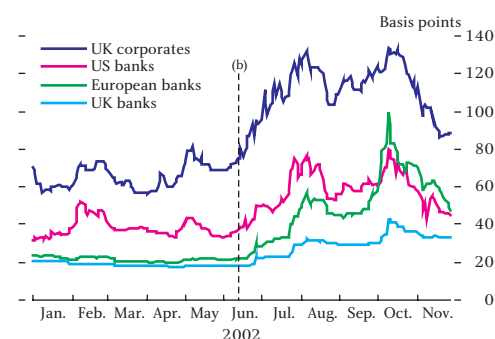
Chart P:
Large UK-owned banks' twelve-month return on equity^(a)



Source: Published accounts.

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

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

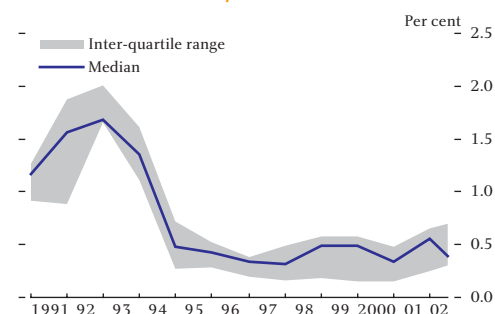


Sources: JP Morgan Securities Ltd, CreditTrade and published accounts.

(a) Data are available for seven large UK-owned banks, 18 other FTSE-100 companies, 15 continental European and seven US banks. Individual company data are weighted by 2001 assets.

(b) Jun. 2002 *Review*.

Chart R:
Large UK-owned banks' provisions for bad and doubtful debts/customer loans^(a)



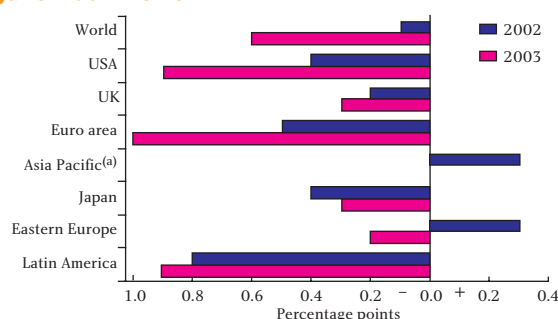
Source: Published accounts.

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

I The international environment

1 Global market developments

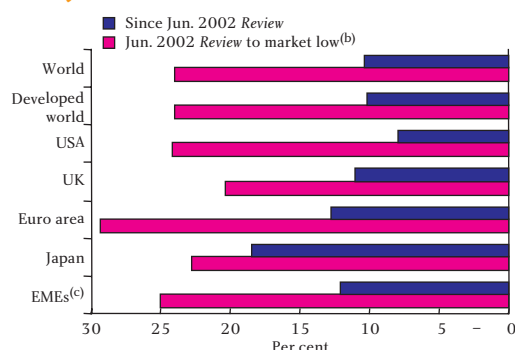
Chart 1:
Percentage points revision in Consensus forecasts for real GDP growth since June 2002 Review



Source: Consensus Economics Inc.

(a) Includes Japan.

Chart 2:
Percentage change in world equity indices since June 2002 Review^(a)



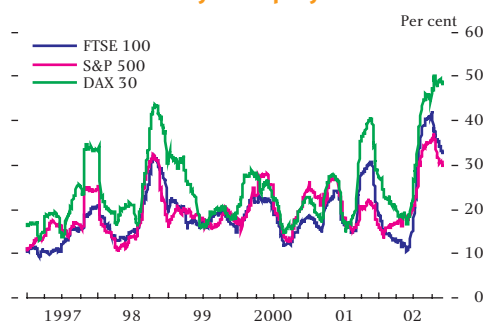
Source: MSCI.

(a) Denominated in US dollars.

(b) Market low for each index between Jun. 2002 Review and 27 Nov. 2002.

(c) Emerging market economies.

Chart 3:
Historical volatility of equity indices^(a)



Sources: Thomson Financial Datastream and Bank calculations.

(a) Annualised volatility calculated as standard deviation of daily log returns over a 60-day rolling window (individual observations equally weighted).

Since mid-2002, expectations of Gross Domestic Product growth around the world have mostly been revised downward for both 2002 and 2003 (Chart 1). The recovery in the world economy has remained patchy, and there are downside risks to the global outlook, as discussed in the November 2002 *Inflation Report*. Nevertheless, a mild recovery is still the consensus forecast. The change in expectations has been accompanied by falls in yield curves for government securities, suggesting that there may have been a downward adjustment in global demand and inflation expectations.

Financial markets

There have been large and sharp price movements in many financial asset markets, with several markets exhibiting exceptionally high actual and expected price volatility. WorldCom's filing for bankruptcy on 21 July – involving US\$104 billion of assets, the largest corporate bankruptcy ever – persuaded many that the problems highlighted by Enron's earlier bankruptcy had not been unique to that company. Investors became preoccupied by widespread concerns about the integrity of company accounts and business practices, which were to some extent allayed subsequently by US Chief Executive Officers certifying their accounts in August, in response to a Securities and Exchange Commission request.

Equity markets

Stock markets worldwide fell sharply in July and September 2002, and, despite some recovery more recently, remain considerably below their levels at the time of the June 2002 Review (Chart 2). From that time to the market low, the UK index, for example, was down about 20% and the German market around 40% (in US dollar terms). To put that in perspective, the standard deviations of percentage changes in those indices¹ are around 7 percentage points and 14 percentage points respectively. At the end of the period, the falls were 11% and 22% respectively.

Equity market price volatility, both actual and expected (as implied by options prices), has been very high for broad indices, reaching levels similar to those last seen during the market turbulence of 1998 (Chart 3). Increased volatility suggests that, as macroeconomic and corporate news has emerged, there have been rapid changes in investor sentiment and significant increases in perceived uncertainty.

1: Measured over time periods of the same length as that from the June 2002 Review to the market low (reference period for measurement: 1 Jan. 1988 to 27 Nov. 2002).

The volatility of *individual* stock prices has also been exceptionally high. For S&P 500 stocks, the dispersion of individual stock price volatilities began to rise sharply in July (Chart 4). Intraday volatility has been unusually high too. There have been a number of instances of utility stocks, for example, moving down by 30% to 60% in a day.

Interest rate markets

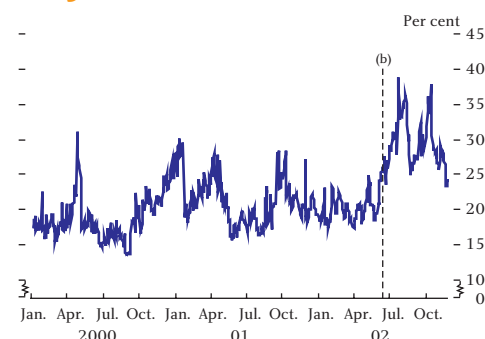
Dollar, euro and sterling nominal yield curves have fallen, by around half a percentage point at short maturities, and the US dollar yield curve is still unusually steep (Chart 5). US and UK swap spreads widened from June to October, perhaps reflecting a perceived increase in banking system credit risk, and declined thereafter; credit default swap prices for several major banks rose sharply in the late summer (Chart 6).

Market participants suggest that there have been periods since June 2002 when there have been substantial flights to quality and liquidity. Investors increased holdings of liquid assets (money market instruments, including short-dated government securities) and government bonds as they sold shares. This view is supported by survey data on US portfolio managers' asset holdings. In government bond markets worldwide, yield change volatility, measured on a daily basis, has risen since July 2002, and in the United States has returned to highs of recent years (Chart 7). Some of the sharp movement caused by changes in economic fundamentals may have been amplified by technical factors. For example, around mid-October, a rebound in the equity market was accompanied by a rise of 63 basis points in ten-year yields over six trading days – 4.5 times the standard deviation for six-day movements since 1988 – brought about partly by the activities of convexity hedgers² in the mortgage-backed-securities market.

Credit markets

Given lower equity prices and increased equity market volatility, the perceived risk of default on corporate sector liabilities is likely to have increased. Indeed, credit spreads for investment-grade issuers widened substantially after mid-2002, especially in the United States, where spreads are some 37 basis points higher (Chart 8), having been 89 basis points higher in October. Sub-investment-grade spreads also increased, typically by larger amounts (Chart 9), as have spreads in the commercial paper market at lower grades. Some spreads have narrowed since mid-October, but in general have remained above their levels in June. The dispersion of credit spreads has also widened significantly, suggesting a selective tightening of credit conditions. Some companies have indeed found it hard to access capital markets, for reasons explored further in Section I.6 below.

Chart 4:
Dispersion of implied volatilities for S&P 500 members^(a)

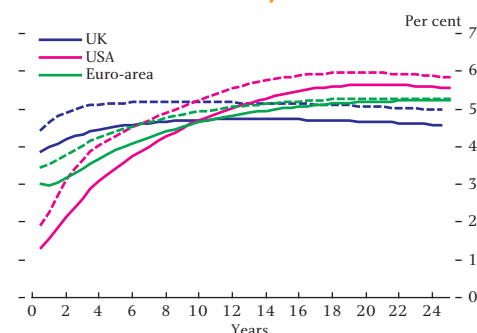


Sources: Bloomberg and Bank calculations.

(a) Calculated as daily standard deviation across annualised call-option-implied volatilities of constituent members of S&P 500 index, where changes in index members are tracked daily.

(b) Jun. 2002 *Review*.

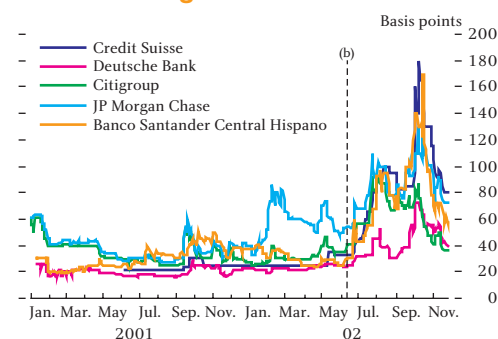
Chart 5:
Nominal interest rate spot curves^(a)



Sources: Reuters and Bank calculations.

(a) As at 27 Nov. 2002. Dashed lines represent curves as at Jun. 2002 *Review*.

Chart 6:
Five-year senior credit default swap prices for selected large banks^(a)



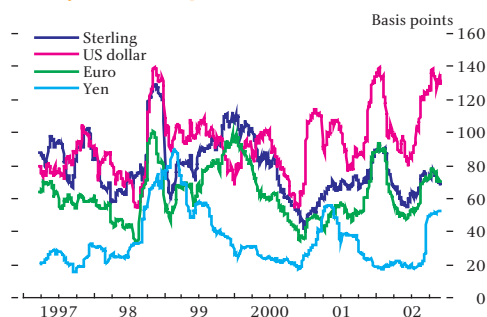
Sources: CreditTrade and JP Morgan Securities Ltd.

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

(b) Jun. 2002 *Review*.

2: See the *Financial Stability Review*, June 2002, Section 6.

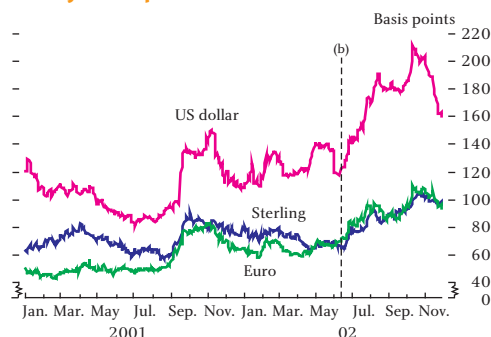
Chart 7:
Historical volatility of ten-year government bond yield changes^(a)



Sources: Bloomberg and Bank calculations.

(a) Annualised volatility calculated as standard deviation of daily changes over a 60-day rolling window (individual observations equally weighted).

Chart 8:
Aggregate investment-grade corporate bond yield spreads^(a)

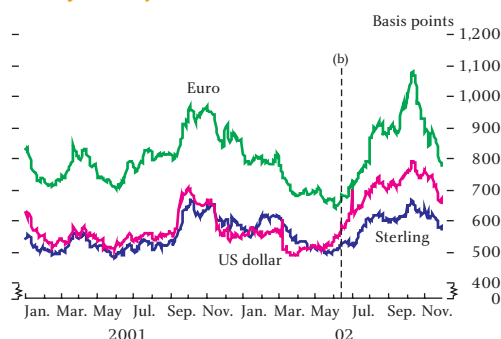


Source: Merrill Lynch.

(a) Asset swap spread; ie option-adjusted spread over London Inter-Bank Offered Rate of a matched floating rate bond.

(b) Jun. 2002 *Review*.

Chart 9:
Aggregate sub-investment-grade corporate bond yield spreads^(a)



Source: Merrill Lynch.

(a) Asset swap spread; ie option-adjusted spread over London Inter-Bank Offered Rate of a matched floating rate bond.

(b) Jun. 2002 *Review*.

For part of the summer, bond market liquidity was reported to be low.

Wide bond spreads suggest that lenders expect the recent high rate of bond defaults to continue. For US corporations, at both aggregate and sub-investment-grade levels, and for non-US (principally, European) corporations in aggregate, default rates on rated bonds have been high by historical standards (Chart 10). Some of the increase in credit risk probably reflects weakness of the balance sheets of those firms hit particularly hard by the recent slowdown, and hence is not surprising at this stage of the business cycle. To the extent that the increase reflects previous decisions by lenders to extend credit to less creditworthy borrowers, it may have been anticipated. Companies further down the credit quality spectrum have gained greater access to capital markets in recent years, and there was a burst of capital market activity two or three years ago. US companies have been defaulting at rates comparable to those around the 1990–91 recession, implying that they have experienced considerable stresses during the recent downturn. Also, recovery rates on bonds in default are reported to have been unusually and unexpectedly low, especially on telecom bonds. Ratios of downgrades to upgrades by ratings agencies for US and European corporations are high, and (granted that they are a lagging indicator) perhaps higher than would be expected in the early stages of an economic recovery.

The increases in volatility and the declines in market liquidity may, to some degree, have been amplified by the way in which some markets have functioned, and this 'supply side' issue of credit markets is discussed further in Section I.6 below.

Variation by region and industry sector

The equity market correction since the June 2002 *Review* has been global (Chart 2), with cumulative falls (measured in US dollars) to the cut-off date for data in this *Review* ranging from 8% to 18%. The losses were considerably greater up to each market's low point, ranging from 20% to 29%, but, since that trough, markets have rebounded by between 6% and 24%. The falls in the euro area (particularly Germany) were larger than in the United States. The correlations of weekly changes in prices between the S&P 500 index and UK, German, and French markets (in local currency) began to rise sharply from mid-year, reaching levels at or close to their highest point (in May 1999) of at least the past decade. High correlations suggest that the factors affecting equity markets have been predominantly global³.

3: In contrast, movements in real house prices have been less uniform across countries in recent years, with a corresponding variation in the impact on household wealth. *Inflation Report*, November 2002, page 12.

The relative stability of European exchange rates against the dollar also suggests that news over the past six months has affected most industrial countries to a similar degree. There have been concerns about the situation in the Middle East, reflected perhaps in higher-than-usual implied volatility of oil prices. Prices on forward rate contracts, however, have not shown sustained rises. The risk that foreign investors would cease to be willing to finance the large and persistent US current account deficit without a major realignment of the US dollar has not crystallised. Exchange rate volatilities (both historical and implied) among the US dollar, the euro, the yen, and sterling have remained moderate (Chart 11).

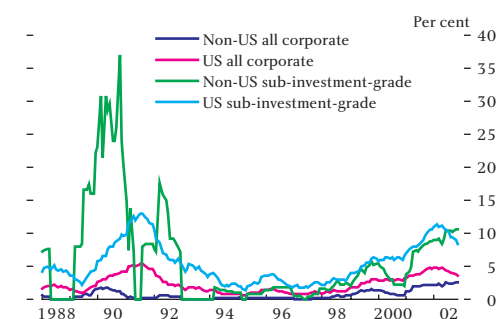
The relatively weak performance of continental European stock markets is surprising, since the concerns about accounting and corporate governance following the Enron and WorldCom scandals have been most prominent in the United States. But markets elsewhere probably also suffered from heightened concerns about the capacity of shareholders to exercise effective supervision of firms' management. Another factor may have been the generally higher gearing of European companies, particularly when cross-shareholdings have been netted out; the higher gearing would tend to make equity prices more volatile. In Japan, equity prices have fallen a little more than elsewhere, and the reasons have been somewhat different (Section I.4).

Sectoral differences have been marked (Table 1), with media, airlines, oil and gas, and insurance equity price indices among those falling by more than the broad world market index. Weaknesses in the utility (including energy trading), telecommunications, auto, media and aviation sectors were also reflected in widening spreads on investment-grade bonds, although these have fallen back from their peaks (Chart 12). More generally, the dispersion of sectoral spreads widened markedly up until early October 2002, but then reverted largely to the pattern prevailing at the time of the June 2002 Review (Chart 13).

The key factors causing sectoral differences (explored further in later sections) include a heavy reliance on debt finance (for instance, in telecoms, aviation, autos and energy), past over-investment (for instance, telecoms, IT), and the impact of equity market falls (for instance, life insurance and some investment banks).

Sectoral differences have also varied by region. Autos, airlines and oil and gas stocks have fallen by more in the USA than in the euro area, where media and financial stocks have tended to fall by more. In Europe, banks and insurers have experienced sharp equity price falls, especially in Germany. Worst hit has been reinsurance, particularly in continental Europe (discussed further in Section I.6). Life insurance companies have also been under pressure during the period, in both the UK and

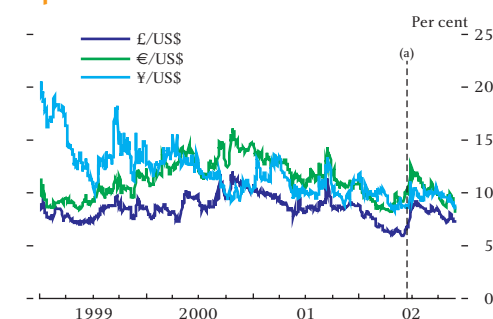
Chart 10:
Moody's US and international corporate bond default rates^(a)



Source: Moody's Investors Service.

(a) Trailing one-year default rate calculated as the number of defaulting issuers during the preceding twelve months, divided by the number of Moody's-rated issuers at the start of the period.

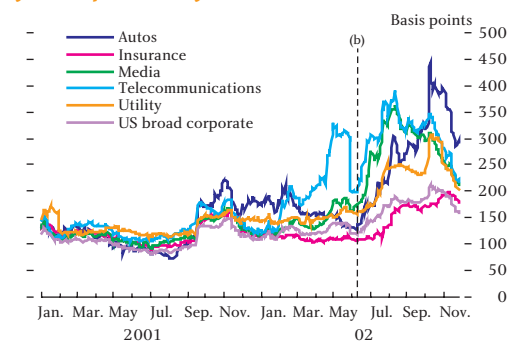
Chart 11:
Three-month US dollar exchange rate implied volatilities



Source: JP Morgan Chase and Co.

(a) Jun. 2002 Review.

Chart 12:
US dollar investment-grade corporate bond yield spreads by sector^(a)

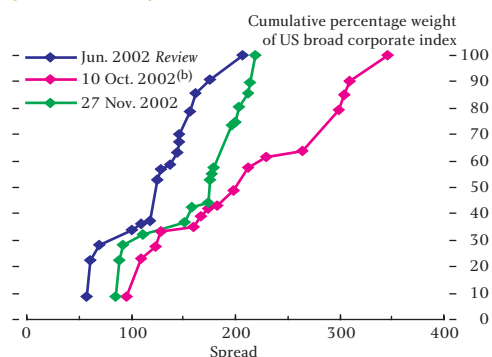


Source: Merrill Lynch.

(a) Asset swap spread; ie option-adjusted spread over London Inter-Bank Offered Rate of a matched floating rate bond.

(b) Jun. 2002 Review.

Chart 13:
Sectoral US dollar corporate bond yield
spreads: snapshot cumulative distribution^(a)



Sources: Merrill Lynch and Bank calculations.

(a) Asset swap spread (defined as the option-adjusted spread over London Inter-Bank Offered Rate of a matched floating rate bond) for major industry sectors against cumulative weight in US broad corporate index.

(b) Date of highest asset swap spread of US broad corporate index between Jun. 2002 *Review* and 27 Nov. 2002.

Table 1:
Selected world sectoral equity indices

	Change since Jun. 2002 <i>Review</i>	Change from Jun. 2002 <i>Review</i> to total market low ^(a)	Change since total market peak ^(b)
Per cent			
Total market	-10.7	-23.2	-43.2
Airlines	-16.1	-29.4	-28.4
Autos	-13.1	-24.7	-30.4
Banks	-11.4	-26.4	-15.6
Consumer cyclicals	-11.4	-23.8	-29.6
Consumer non-cyclicals	-7.0	-10.6	-2.0
Diversified industrials	-11.1	-24.3	-50.2
Information Technology	-6.7	-35.6	-77.0
Insurance	-14.0	-27.9	-17.9
Investment banks	-5.3	-28.5	-46.2
Media	-22.2	-34.9	-66.7
Oil and gas	-13.0	-17.5	-5.4
Pharmaceuticals	-1.2	-10.1	-17.9
Retail	-12.6	-23.8	-22.6
Telecom services	-0.5	-20.3	-70.2

Source: Thomson Financial Datastream.

(a) Low between Jun. 2002 *Review* and 27 Nov. 2002 (9 Oct. 2002).

(b) Peak in total market price index (27 Mar. 2000).

continental Europe. The large proportion of UK life insurers' asset portfolios held in equities has been an important factor, while significant equity holdings plus guaranteed returns have placed a strain on continental European life insurers (Section I.3). A number of large life insurers have had rights issues, and, in some instances, since their respective issues were launched they have performed better than the world insurance market index.

Some common themes

The financial market signals reviewed here are consistent with some deterioration in short-run macroeconomic prospects since the June 2002 *Review*, a perception of heightened uncertainty, particularly about the outlook for corporate performance, and perhaps some retreat from risk by lenders and investors. But there is also some evidence of an improvement in market sentiment from around the beginning of October.

The role of attitudes to risk can be illustrated by equity market data. Changes in equity valuations can be decomposed into movements due to changes in expected real cash flows to shareholders and in the rate at which those cash flows are discounted, comprising a real risk-free interest rate, and a risk premium attached to the share or market index in question⁴. Real interest rates are lower than in June, judging by prices for US Treasury inflation-protected securities (TIPS); that would have tended to increase, not reduce, the present discounted value of future cash flows to shareholders. Since the June 2002 *Review*, the revisions to near-term expected GDP growth in major economies, which have been almost consistently negative, have been accompanied by falls in forecasts of corporate earnings growth in the USA. It is possible that expectations about the true current level of corporate earnings and the long-run outlook may have deteriorated in the wake of the US accounting scandals, as concerns about accounting standards and corporate governance have increased. But it is difficult to explain the decline in equity prices to the early-October turning point solely in terms of the outlook for earnings.

Calculations using a simple dividend discount model demonstrate this. On the hypothetical assumptions that the S&P 500 had been 'fairly valued' at the time of the June 2002 *Review* and that there has been no change in the risk-free discount rate or risk premium since, the *long-run* annual growth rate of dividends (not just the rate over the next year) would have had to have fallen by half a percentage point to explain the drop in the S&P 500 index to its early-October turning point (Table 2). For the FTSE All-Share, the corresponding figure is close to one percentage point. These falls

4: See, for example, Box 3 in the June 1999 *Review* (pages 19–20), Box 1 in the June 2001 *Review* (pages 36–37) and pages 86–87 of the December 2001 *Review*.

are large given the revisions to short-run forecasts, so it is likely that the risk premium which investors demand for holding shares rose significantly between the June 2002 *Review* and early-October. As the markets have recovered, so have implied dividend growth rates. However, it is still likely that there has been a net increase in equity risk premia over the whole period, particularly in the UK, where the implied dividend growth rate remains 0.5 percentage points below its level in June.

The risk premium could have increased for two reasons. First, increases in perceived risk are consistent with the periods of high implied volatility in many financial asset prices, the broader consequences of Enron and Worldcom, and the deteriorating outlook for some highly indebted firms. Secondly, there may have been a reduction in risk appetite, reflected in the falls in prices of historically more risky assets (Chart 14), and perhaps the selective tightening of credit conditions for firms perceived to be at a higher risk of default. Since the June 2002 *Review*, the implied risk-neutral probability of a 20% fall in the S&P 500 rose by 2.3 percentage points to 14.0%; and in the FTSE 100 by 6.2 percentage points to 16.1%.

The themes of weaker short-run macroeconomic prospects, heightened uncertainty, in particular about corporate earnings prospects, and reduced willingness to bear risk are taken up in succeeding Sections, in respect of both their local implications and the ways in which they influence intermediaries and investors operating in the international financial system.

Table 2:
Dividend growth rate required to explain S&P 500 and FTSE All-Share equity prices^(a)

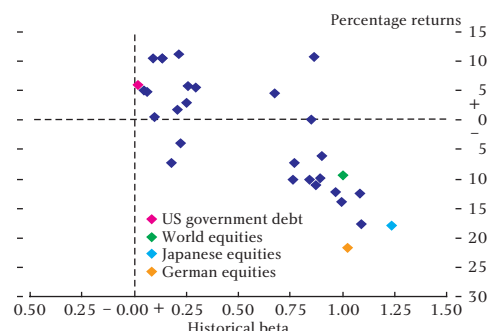
	S&P500 implied dividend growth rate Per cent	FTSE All-Share implied dividend growth rate Per cent
Jun. 2002 <i>Review</i>	3.5	2.5
Market low ^(b)	3.0	1.6
27 Nov. 2002	3.4	2.0

Sources: Thomson Financial Datastream and Bank calculations.

(a) Using an equity risk premium of 2.1% and 2.4% for the S&P 500 and FTSE All-Share, respectively. These were the implied equity risk premia at 12 Jun. 2002 under the assumptions of a real risk-free rate of 3% and dividend growth rates of 3.5% (USA) and 2.5% (UK).

(b) Low-point of each market between Jun. 2002 *Review* and 27 Nov. 2002. These were 9 Oct. 2002 (USA) and 24 Sep. 2002 (UK).

Chart 14:
Returns on asset classes since the June 2002 *Review* against risk^{(a)(b)}



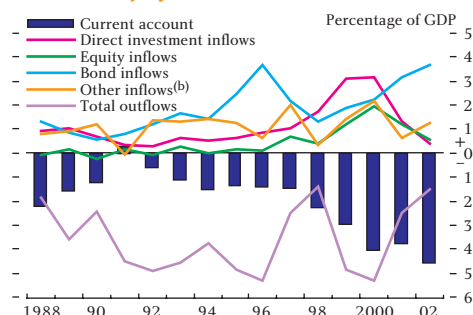
Sources: Bloomberg, MSCI, Merrill Lynch and Bank calculations.

(a) Percentage returns from Jun. 2002 *Review* to 27 Nov. 2002. Risk is measured by historical beta (a measure of the covariation of each market with the MSCI world equity index) and is calculated using monthly returns for each asset class since Jan. 1988.

(b) Asset classes included in this analysis are MSCI country equity indices (in US\$ terms), JP Morgan government bond indices (hedged into US\$), and Salomon Smith Barney US corporate bond indices.

2 The United States

Chart 15:
Balance of payments^(a)

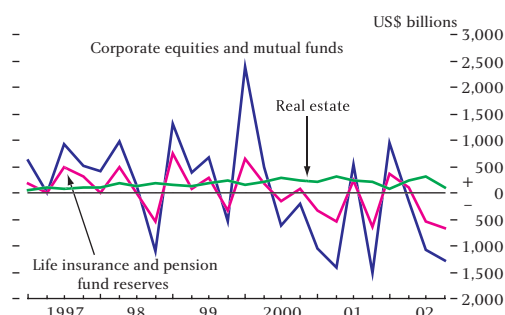


Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2002 Q3.

(a) Data are annual except for 2002 figure which is the average of Q1-Q3 annualised.

(b) Includes external transactions of the banking sector.

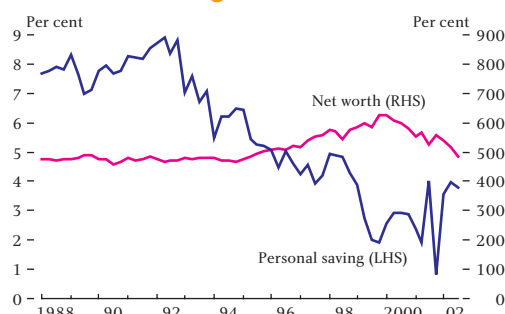
Chart 16:
Households: changes in main components of wealth^(a)



Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2002 Q3.

(a) Absolute change quarter on quarter.

Chart 17:
Households: saving ratio and net worth^(a)



Sources: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2002 H1 and Bureau of Economic Analysis.

(a) As a percentage of personal disposable income.

In the United States, uncertainties about corporate sector prospects have increased since the June Review, and, as discussed in Section I.1, have been reflected in higher credit spreads, greater market volatility and lower equity prices – despite some recovery in Q4. As noted earlier, market analysts' forecasts of GDP growth for both 2002 and 2003 have been revised down. Actual growth in the first three quarters of 2002 has mainly reflected continuing strong consumer spending, partly attributable to temporary stimuli which have further encouraged the growth of household debt.

The US current account deficit has remained large (Chart 15). Past Reviews have highlighted the risk that the financing of a large and growing external deficit could be vulnerable to any denting of confidence in long-run US growth prospects (and at end-September 2002 external holdings of US liabilities were US\$7.4 trillion, 70% of GDP⁵). This risk has not crystallised: while inward direct investment has continued to fall this year, foreign investors have generally shown an appetite for greater holdings of both public sector and corporate bonds (although purchases of the latter fell away sharply in Q3, consistent with the deterioration in market conditions described in Section I.1).

The non-bank private sector

The main domestic counterpart to the accumulation of external liabilities this year has been a widening public sector financial deficit. The non-financial business and household sectors have each been roughly in balance, after both being in deficit for much of the previous three years. However, the financial flows give only a partial picture of the financial health of the private sector, which is explored further below.

The household sector

The recent decline in share prices has reduced household sector net worth directly and indirectly through pension funds and other long-term saving vehicles. After allowing for share purchases and sales, the value of households' equity held directly and in mutual funds fell by over US\$5.3 trillion between end-1999 and end-September 2002⁶. This has been partly offset by the strength of the housing market; home equity (ie the market value of homes less mortgage debt) rose by nearly US\$1.7 trillion over the same period, over US\$1 trillion of this attributable to capital appreciation (Chart 16). Overall, however, the household sector's net worth fell by nearly 10%. Much of the

5: As a result of the latest quinquennial review by the US Department of Commerce, data have been significantly revised, leading to a US\$1.3 trillion reduction in estimated gross external liabilities and a US\$0.8 trillion fall in estimated net external liabilities as at end-2001.

6: These holdings represented about two-thirds of total equity holdings at end-1999, so the total fall in equity wealth – full data are available only annually – may have been over US\$8 trillion, about 19% of net worth or 23% of gross financial assets at end-1999.

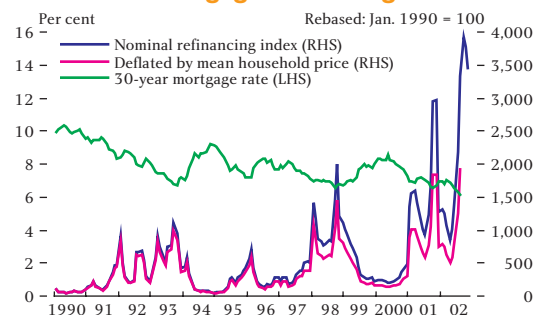
direct loss in equity wealth is likely to have been borne by wealthier households which account for a relatively small share of total spending. That may partly explain the only modest rise in the saving ratio (Chart 17).

Throughout the slowdown and the pick-up to date, households have continued to build up their gross debt with, in particular, the stock of borrowing secured by housing rising by nearly 30% between end-1999 and end-September 2002⁷. There have been further rises in the debt-to-assets ratio, mainly due to falling equity prices, and in the debt-to-income ratio (Chart 20). While long-run demographic influences have continued to boost housing demand, two other factors have also encouraged debt accumulation. First, declining mortgage interest rates (and swings in expectations regarding their future direction) have induced rounds of refinancing of fixed-rate mortgages, allowing mortgage equity withdrawal at low cost (Charts 18 and 19). Households have also made more use of home equity lines of credit (akin to floating-rate secured overdrafts) and to a lesser extent fixed-rate second mortgages. Second, households took advantage of a further round of special cheap credit offers by major car producers in 2002 Q3.

Overall, at end-September 2002 the stock of consumer debt to banks secured on housing was 16% higher than a year earlier. But unsecured borrowing from banks also rose 13% over this period, with credit card loans (about 15% of total household debt to banks) up by nearly a quarter. However, the sector's liquid assets in relation to debt fell only slightly, rises in interest-bearing deposits with banks were significantly greater than a slight fall in holdings of money market mutual fund shares.

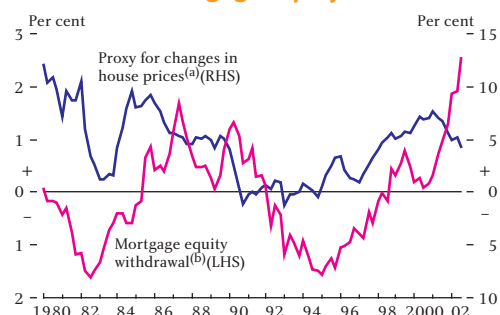
Income gearing is high given the low interest rates (Chart 20), and higher loan delinquency rates have accompanied a rise in personal bankruptcies. Defaults have been concentrated in credit cards (especially those provided by some smaller specialist lenders)⁸ (Chart 21). Market contacts suggest, however, that default rates have, in general, been no higher than anticipated and the FDIC (Federal Deposit Insurance Corporation) has noted that, overall, loan losses on this form of lending have been more than offset by higher net interest and fee earnings⁹. But a loss of consumer confidence in the pace of the recovery might be expected to induce a rise in saving, especially if accompanied by attempts to make up for recent wealth losses. Through its impact on demand, a sharp rise in saving would tend to depress already

Chart 18:
Households: mortgage refinancing



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

Chart 19:
Households: mortgage equity withdrawal

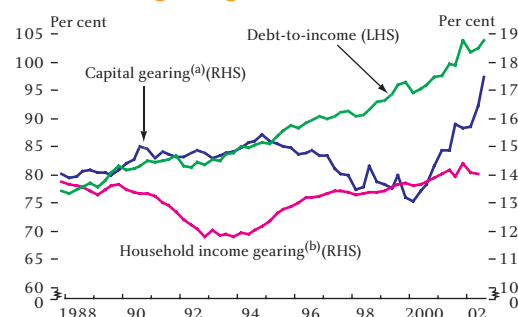


Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2002 H1 and Bank calculations.

(a) Year-on-year house price inflation is proxied by capital appreciation expressed as a percentage of household sector housing assets.

(b) Quarterly changes in mortgage debt minus quarterly flow of residential investment (as a percentage of personal disposable income).

Chart 20:
Households: gearing ratios



Sources: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2002 H1 and Bureau of Economic Analysis, Department of Commerce.

(a) Total credit market instruments divided by gross total assets.

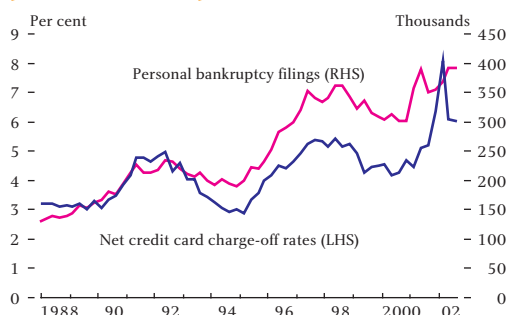
(b) Debt-servicing ratio calculated by Federal Reserve (incorporates interest payments and partial repayment of principal).

7: See Box 4, 'The structure of the US mortgage market' on pages 36-37 of the June 2002 Review.

8: While the proportion of non-performing credit card debt at end-September 2002 was lower than a year earlier, this reflected a significant increase in charge-offs during the first nine months of this year compared with the same period in 2001.

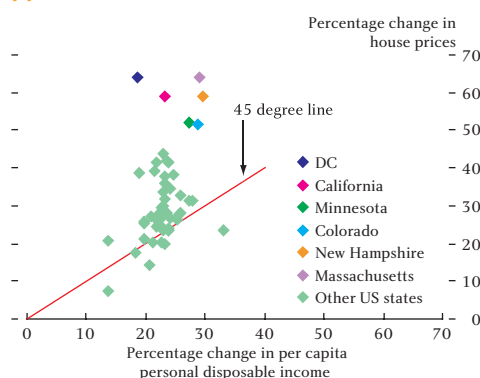
9: FDIC: Quarterly Banking Profile, Commercial Banking Performance, Third Quarter 2002.

Chart 21:
Commercial banks: credit card losses and personal bankruptcies



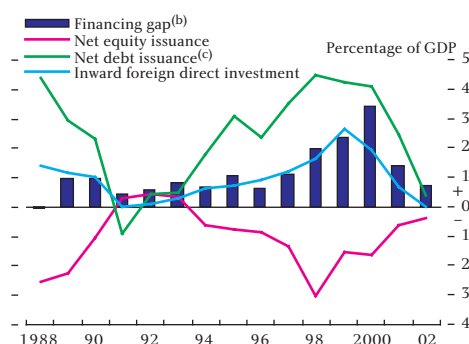
Source: Federal Deposit Insurance Corporation, 'Quarterly Banking Profile'.

Chart 22:
Changes in house prices and per capita personal disposable income by state, 1996-2001



Sources: Office of Federal Housing Enterprise Oversight and Bureau of Economic Analysis.

Chart 23:
Sources of corporate finance^(a)



Source: Board of Governors of the Federal reserve system: 'Flow of Funds Accounts of the United States', 2002 Q2.

(a) Data are annual except for 2002 which is H1 annualised.

(b) The financing gap is capital expenditure less the sum of US sourced internal funds and inventory valuation adjustment.

(c) Loans, bonds and commercial paper.

weak corporate earnings and employment conditions, so raising private sector credit risk generally.

House price increases have meant that mortgage equity withdrawal has had little overall impact on households' equity share in their homes. The cushion of home equity appears, overall, to provide protection to lenders against any future moderate weakening of house prices. Nevertheless, house price increases in recent years have been far from uniform across the country and, in some states, have been much greater than those in personal income (Chart 22). This suggests that in places some recent borrowers might be vulnerable to a market correction.

The non-financial corporate sector

Many large foreign banks have significant exposures to US firms (including their operations abroad), via cross-border lending or through their US-based affiliates. The financial health and financing of US companies (Chart 23) thus matters for the international banking system.

High volatility of capital markets since spring 2002 partly reflects heightened concerns over the reliability of published earnings data, corporate governance issues and legal risks to firms following the failures of some major companies¹⁰. Uncertainty remains over the recovery of corporate earnings, and business confidence weakened in the second half of the year before recovering somewhat in November. Aggregate gross profits of non-financial firms have stagnated since 2001 Q4, following only a limited recovery from their trough in 2001 Q1.

Experience across sectors has varied. While retail earnings have benefited from strong private consumption, industries such as electronics & other electric equipment, motor vehicles & equipment, and transportation & communications, continue to make losses. Between end-1995 and end-2000, telecoms' liabilities rose rapidly, from around 6% to 10% of listed corporate liabilities¹¹. Subsequent stress in the sector has been a particular concern for banks and other creditors given much lower recovery rates on defaulted loans than were expected when the loans were made. Following the collapse of Enron, the energy trading industry has also contracted significantly; in restructuring their balance sheets to improve liquidity, some companies may have become more reliant on unsecured bank facilities, although drawings will be subject to maximum gearing and other covenants. The auto industry has also been under particular pressure recently. In addition to the uncertain prospects for

10: See the Article 'Strengthening financial infrastructure' in this issue of the *Review* for a discussion of progress in the USA and internationally in strengthening the oversight of corporate accounting and improving standards.

11: For a discussion of telecom debt, see page 41 of the December 2000 *Review*. Figures are taken from Compustat Global, whose sample includes all S&P companies and about a half of all actively traded US companies.

demand, the large auto companies have been adversely affected by the fall in equity prices because of the size of their defined-benefit pension obligations, and in degree by the cost of financing incentives granted to customers in order to maintain sales, given difficulties in adjusting labour force costs.

Depleted pension funds have also been a problem for other industries. The relevant accounting rules provide companies with some leeway in recognising the cost of additional net pension obligations¹² in their income statements, and in addressing any overall unfunded liability through higher contributions. Thus it is difficult to estimate the potential cash drain on the corporate sector as a whole. However, those companies with the largest pension fund deficits (and high medical and other benefit liabilities) are likely to find it harder to repair balance sheets.

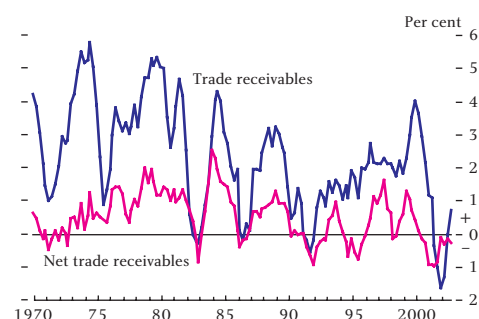
Sharp declines in equity prices have increased the cost to firms of raising equity capital. Moreover, sub-investment-grade companies in particular have seen a widening of credit spreads, which has raised the cost of debt finance despite a lower government (risk-free) yield curve. Concerns over counterparty credit risk, and regulatory and market pressure to curb the exaggeration of revenues (eg by some forms of vendor financing in the telecoms sector and by 'roundtripping' in energy trading), may also have contributed to a large contraction in intra-sector trade credit last year (Chart 24).

Firms have adjusted to these various pressures in a number of ways: by curbing investment and reducing inventories, by cost cutting (including lay-offs), by 'terming out' short-term debt, by restricting trade credit and by issuing new equity. However, unlike UK companies, US firms have been less willing to cut dividends (Chart 25). During 2002 Q2, non-financial companies were net issuers of equities for only the second quarter since the end of 1993, but in Q3 reverted to the trend of net buybacks. Reflecting these various adjustments, companies' short-term debt fell by more than their liquid assets in the first three quarters of 2002 (Chart 26).

In aggregate, there was little sign of significant distress borrowing from banks and the latest bankruptcy data indicate that the number of business filings in 2002 Q3 was lower than a year earlier, following sharp increases in 2001 (Chart 27). Credit problems have tended to be most acute amongst larger firms, judging by the tighter wholesale market credit conditions and by the loan books of the largest banks (which account for about three quarters of total bank lending to commercial and industrial companies) (Chart 28), although there has been some trickling down of problems at large companies to their smaller suppliers.

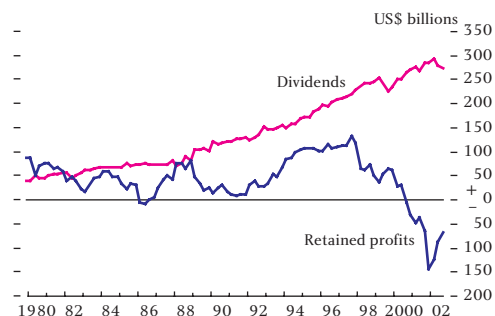
12: For example, either arising from an increase in the fund's liabilities due to, say, improvements in plan benefits or changes in actuarial assumptions, or from a fall in the fund's assets arising from lower than expected investment returns.

Chart 24:
Non-financial corporate sector: trade receivables^{(a)(b)}



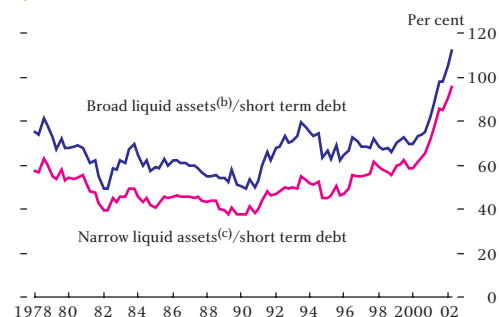
Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2002 Q3.
(a) Seasonally adjusted quarterly flows of trade receivables.
(b) As a percentage of non-financial corporate gross product.

Chart 25:
Non-financial corporate sector: profits and dividends



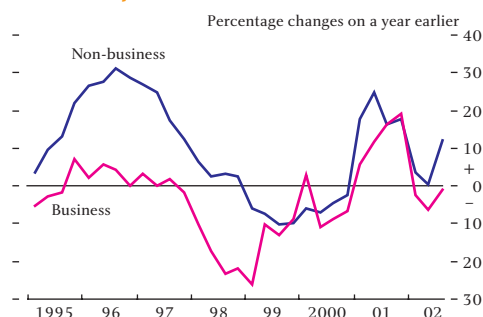
Source: Bureau of Economic Analysis.

Chart 26:
Non-financial corporate sector: ratio of liquid assets to short-term debt^(a)



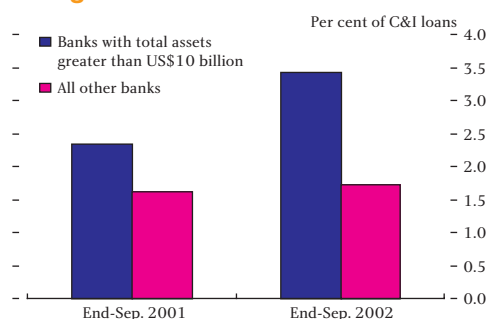
Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2002 Q3.
(a) Short-term debt comprises commercial paper and bank loans.
(b) Broad liquid assets comprise narrow liquid assets plus commercial paper, US government securities and municipal securities.
(c) Narrow liquid assets comprise currency, deposits and money market mutual fund shares.

Chart 27:
US bankruptcies



Source: US Administrative Office of the Courts.

Chart 28:
Commercial banks: non-performing C&I^(a) lending^(b)

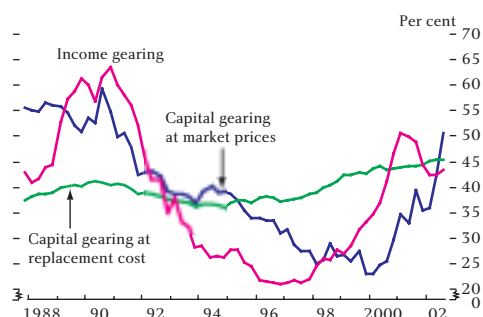


Source: Federal Deposit Insurance Corporation, Quarterly Banking Profile, 2002 Q3.

(a) Commercial and industrial.

(b) Loans 90 or more days in arrears or where full servicing is no longer expected.

Chart 29:
Non-financial corporate sector: capital and income gearing



Sources: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2002 Q2 and Bureau of Economic Analysis, Department of Commerce.

Overall, these adjustments slowed the rise in firms' capital gearing where net worth is measured at replacement cost, although it remains higher than it was during the early 1990s (Chart 29). Capital gearing with equity measured at market prices has continued to rise sharply, largely reflecting the decline in share prices.

The financial system

Non-bank financial institutions

A number of US life insurance companies have been downgraded as a result of credit losses and unfavourable market conditions. They are significant providers of credit to the corporate sector. Some have sustained credit losses from recent large corporate failures, either directly through their holdings of corporate bonds or indirectly through the provision of credit protection to banks and other lenders seeking to diversify or reduce credit risk. Falling interest rates and equity markets have also encouraged the early redemption of existing policies, although US companies generally have less direct exposure to equity markets than some of their European peers. US companies appear to have faced less difficulty in meeting contractual policy guarantees than their European counterparts, and there have been no signs of the liquidity problems that affected some US life companies in the early 1990s.

Another material source of capital to support credit risk in the US economy has been the finance company sector. As in the recession of the early 1990s, the growth rate of US finance companies' assets has fallen (although a rising rate of securitisation of assets has also contributed to the slower growth of on-balance-sheet lending) (Chart 30). After a sharp contraction in Q1, there was some resumption of growth in assets in the following two quarters. As discussed in the June 2002 *Review*, since end-2000, their dependence on the commercial paper market has declined sharply as they, like many non-financial companies, have sought to refinance liabilities at a longer term. In Q3, however, finance companies made net issues of commercial paper for the first time since 2000 Q4. Some of the largest finance companies are wholly owned but separately capitalised affiliates of major car manufacturers. While they typically make credit decisions independently, their earnings and capital rely ultimately on the ability of their parents to fulfil support agreements¹³. Despite a general strengthening of the finance company affiliates' balance sheets, the markets have shown growing concern about the earnings prospects and the large pension fund liabilities of their parent firms. Elsewhere in the finance company sector, credit losses have been a problem for some lenders with predominantly sub-prime books, and legal and reputational risks have been a factor depressing their share

13: For example, in the case of low interest rate credits to consumers, interest rate subsidies, or, more generally, formal undertakings to support an affiliate's earnings or capital structure.

prices. Market contacts suggest, however, that as with credit cards, underlying credit quality for the largest companies has not deteriorated unexpectedly.

Implications for US banks and their foreign bank counterparties

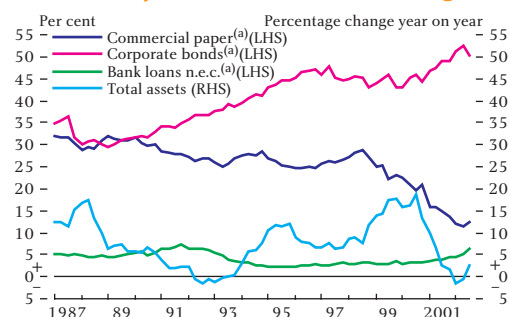
Despite weaknesses in parts of the corporate sector, the US banking sector's overall profitability has so far continued to be robust (although the earnings of some of the largest banks fell in Q3). A positively sloped yield curve has raised net interest margins and, for many banks, offset lower investment banking and other fee income (Chart 31). Despite higher loan loss provisions, mainly on exposures to large firms, a combination of good profitability and relatively slower growth in higher-risk-weighted assets has maintained strong published capital ratios. Compared with the early 1990s, more recent loan losses have been considerably lower and market confidence in the banking system – as revealed in the ratio of the market value of major banks' equity to the book value of their assets – significantly higher (Box 1).

In the six months to September, banks' balance sheets grew faster than in the previous six months, with a strong rise in deposits perhaps reflecting the fragility of capital markets. While banks' mortgage lending grew particularly strongly, the outstanding stock of loans to companies continued to decline. Banks increased their holdings of more liquid assets, including securities in trading accounts, their financing of customers' securities market activities and their interbank claims (Chart 32). The rise in banks' liquidity may reflect an expectation that some of the recent increase in their deposits may be temporary and is likely to be switched back into the capital markets once conditions in those markets improve.

The latest annual survey by bank regulators of large syndicated loans confirmed that problem corporate loans were concentrated in the telecoms sector. However, while the value of corporate 'classified' loans rose from their level a year earlier, they did so more slowly than previously (Chart 33). Moreover, banks' overall loan loss reserves remain above non-performing loans, although less so than before the current economic slowdown (Chart 34); contacts suggest that, even in the absence of adverse macroeconomic news, provisions could continue to increase given the usual lags in the provisioning process. Foreign banks and domestic non-banks were shown to hold a disproportionate share of classified credits (although, as some may have been acquired at below par, not all of the loss will have been borne by the current holder). The August Senior Loan Officer Survey indicated that, in general, banks' exposure to companies that had announced material revisions to previously issued financial statements was small. In general, banks have been requiring more collateralisation and tighter loan covenants. But the continued decline in corporate loans outstanding also reflects slack demand.

Chart 30:

Finance companies: assets and funding^(a)

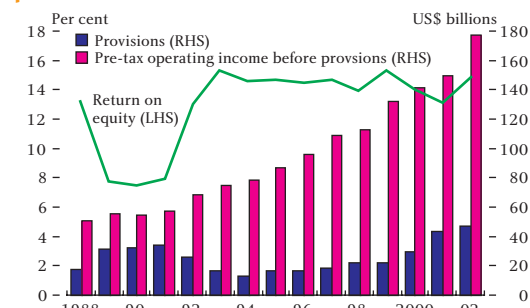


Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 2002 Q3.

(a) Funding as a percentage of total assets.

Chart 31:

Commercial banks: earnings and provisions^(a)

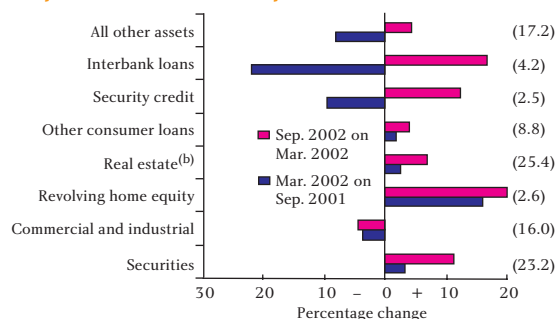


Source: Federal Deposit Insurance Corporation.

(a) 2002 data are Q1 – Q3 figures annualised.

Chart 32:

Commercial banks: changes in assets September 2001 to September 2002^(a)



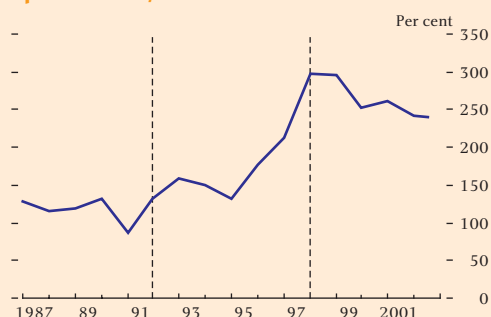
Source: Board of Governors of the Federal Reserve System, 'Assets and liabilities of Commercial Banks in the United States, H.8'.

(a) Data in brackets are weights of each asset group in total assets in Sep. 2001.

(b) Other than revolving home equity lines.

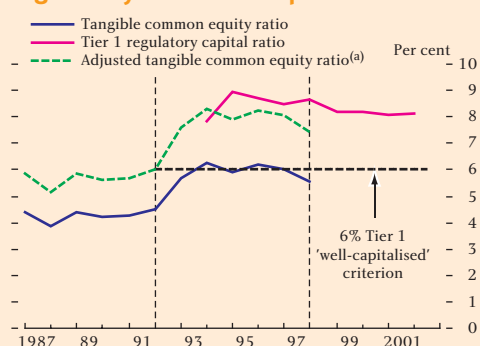
Box 1: The financial position of major US banks: a comparison with prior periods¹

Chart A:
Largest fifty US BHCs: market capitalisation/book value



Source: Board of Governors of the Federal Reserve System.

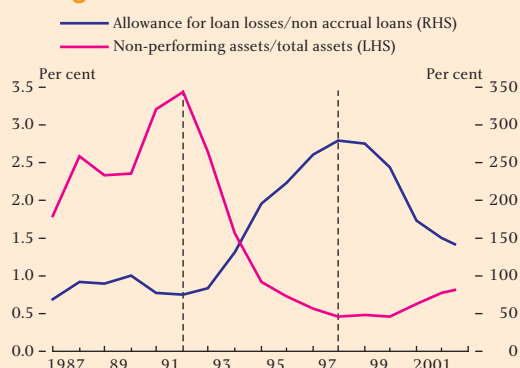
Chart B:
Largest fifty US BHCs: capital ratios



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

(a) This assumes risk-weighted assets are typically 75% of total assets, and broadly approximates to the Tier 1 regulatory capital ratio.

Chart C:
Largest fifty US BHCs: asset quality and coverage ratios



Source: Board of Governors of the Federal Reserve System.

Despite rising credit losses over the past three years, profitability, capitalisation and asset quality of major US bank holding companies (BHCs) are much stronger than in the period around the recession of the late 1980s and early 1990s. This is recognised in financial markets; the ratio of the market capitalisation of major banks to book value is significantly higher than ten years ago, despite recent declines in equity prices (Chart A). Robust earnings, reflected in the rise in retained profits, allowed banks to build up capital throughout the 1990s, leaving them in a strong position to absorb earnings shocks. While part of this build-up was initially mandated internationally by the 1988 Basel Accord and by the Federal Deposit Insurance Corporation Improvement Act (1991), in practice banks' capital has come to exceed regulatory minima by some margin (Chart B).

Between 1992 and 1998, banks built up their stock of reserves against loan losses (Chart C). Rising credit costs over recent years have caused the ratio of the allowance for loan and lease losses to non-accrual loans to fall sharply, although the aggregate coverage ratio for the largest 50 BHCs is still higher than a decade ago – 140% compared with ratios of below 100% a decade ago (Chart C). However, the ratio of non-performing assets to total assets is lower than in the 1990s recession (Chart C). Strengthened regulation and improvements in risk management systems and practices, the latter including the wider use of credit transfer mechanisms such as credit derivatives and securitisation, have also generally led to less concentration of risk within individual banks, and its wider dispersion both within and outside the banking system.

For banks, the early 1990s recession was characterised by significant problems in the commercial real estate market, especially in the north-east region. The risks from real estate exposure appear to have been significantly better managed since then. In contrast, in the most recent downturn, credit problems have tended to be concentrated in certain parts of the corporate sector, such as telecommunications, often involving large companies which have tended to borrow from the larger banks. While this has revealed some concentration risk, losses so far have not been great enough to dent capital seriously.

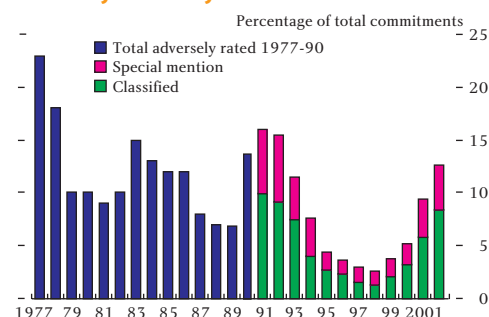
1: The peer group used in Charts A–C consists of the largest 50 US BHCs with changes in the peer group at end-1991 and end-1997. During the period shown, there has been consolidation in the US banking industry through mergers and acquisitions. This affects the panel of banking organisations included in each observation. Within each sub-period shown, the sample is based on the largest 50 institutions in the latest year, with an adjustment by the Board of Governors of the Federal Reserve System to prior years' data to reflect consolidation of those institutions with predecessors within that period.

In contrast to the early 1990s recession, banks' commercial real estate exposures have not so far been problematic in part, according to contacts, because of the introduction of stronger risk management following that earlier experience. However, that might change were the economy to falter. According to C B Richard Ellis¹⁴ the average national office building vacancy rate in central business districts rose from 10.4% in 2001 Q3 to 12.9% in 2002 Q3, and vacancies exceeded 20% in some cities – typically those where the shake-out in the high tech sectors has been greatest.

Overall, banks have been less affected by credit losses in the recent downturn than they were in the early 1990s recession. However, some have greater concentrations than others to large borrowers in troubled sectors such as telecoms, and the earnings of some of the large banks have been affected by a decline in investment banking earnings and losses in Argentina.

Uncertainties as to the potential costs of legal and regulatory action following the failures of Enron, WorldCom and other large firms remain. In contrast, those banks which are more dependent on domestic retail and small business banking, including those which have achieved a greater regional spread of risk over the past decade, have so far faced fewer problems. They would, however, be exposed to any renewed slowdown in activity, particularly if that were accompanied by a worsening in the quality of their claims on households and small to medium-sized companies. This range of experience has been reflected in the recent relative movements in credit default swap prices of major banks (Chart 35).

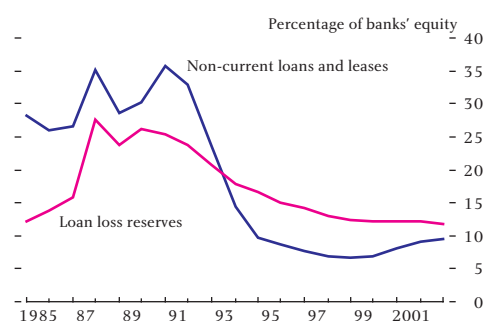
Chart 33:
Adversely rated syndicated loans^(a)



Sources: Board of Governors of the Federal Reserve System.

(a) Data are at end-March. 'Classified' loans include 'substandard', 'doubtful' or 'loss' categories, representing increasing degrees of expected loss to the lender. 'Special mention' loans may involve a future loss if potential weaknesses are not addressed.

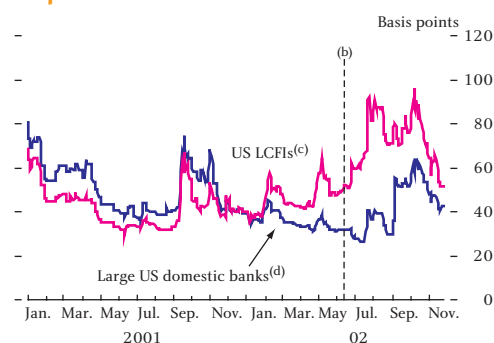
Chart 34:
Commercial banks' non-performing loans and loan loss reserves^(a)



Source: Federal Deposit Insurance Corporation.

(a) Data for 2002 are as at end-September 2002.

Chart 35:
Large US institutions' credit default swaps^(a)



Source: CreditTrade.

(a) Quotes for individual banks are weighted by total assets.

(b) Jun. 2002 *Review*.

(c) Bank of America, Citigroup, JP Morgan Chase & Co, Goldman Sachs, Lehman Brothers, Merrill Lynch and Morgan Stanley.

(d) Bank One, FleetBoston, Wachovia (from 22 Oct. 2001) and Wells Fargo (from 7 Nov. 2001).

14: C B Richard Ellis, Office Vacancy Index, Third Quarter 2002.

3 Europe¹⁵

Since the June 2002 *Review*, the macroeconomic outlook in Europe has deteriorated, and equity prices have fallen by more than elsewhere. During the autumn, market concerns emerged about the financial condition of some life insurers and of some German banks, but these have since abated.

Recent economic and financial developments

Many of the economic data released since the June 2002 *Review* have turned out weaker than expected. For Germany, France, Italy, the Netherlands and Switzerland, GDP growth in 2002 Q2 and Q3 fell short of June Consensus forecasts; and Consensus, IMF and OECD growth forecasts for 2002 and 2003 have been revised down significantly (Chart 36). ECB policy rates remained unchanged, until, as had been increasingly anticipated by market expectations, they were cut by 50 basis points on 5 December 2002¹⁶. Both short- and long-term market interest rates have declined by less than in US dollar markets.

European stock markets fell further than US and UK markets: many reached five-year lows in October; and even after subsequent rebounds, the Dow Jones Eurostoxx index remains 17% lower than in early June and less than half its March 2000 peak. The relative weakness of European markets could reflect several factors, including downward revisions to longer-term Consensus growth forecasts (especially for Germany, Italy and the Netherlands), the generally higher gearing of firms in many European countries, and greater reductions in investor risk appetite (perhaps reflected in selling by some European long-term savings institutions).

Share-price movements varied between countries and sectors: falling less in Italy, Spain and some smaller countries, but by more in Germany; and falling more for insurance and banking sectors than for non-financial companies (Chart 37).

The non-bank private sector

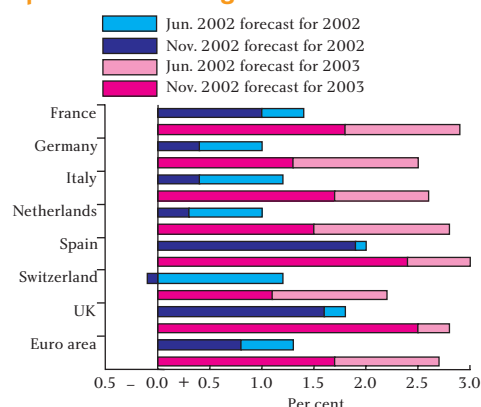
The non-financial corporate sector

The business outlook has weakened for European companies generally and German ones in particular. As illustrations, the German Ifo business sentiment index, which had been rising until May, has deteriorated steadily since then; and euro-area manufacturing and service sector purchasing managers' indices have also fallen, with prominent falls in the German components.

Corporate insolvencies have been increasing in Germany, the Netherlands, Denmark and Sweden. The extent of corporate vulnerability to adverse cash flow shocks will depend on

Chart 36:

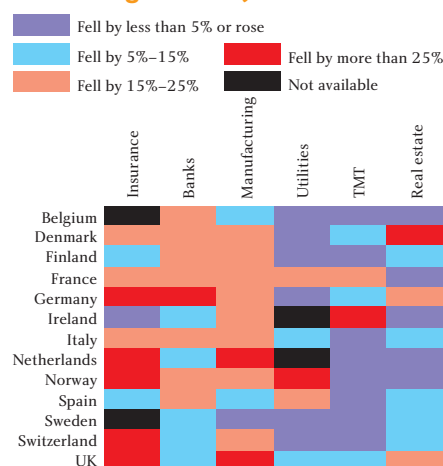
Expected real GDP growth



Source: Consensus Economics Inc.

Table 37:

Country and sector stock market price index changes since June 2002 *Review*^(a)



Sources: Thomson Financial Datastream and Bank calculations.

(a) In local currency terms.

¹⁵: Developed European countries other than the UK.

¹⁶: One week after the data cut-off, and therefore not reflected in the charts.

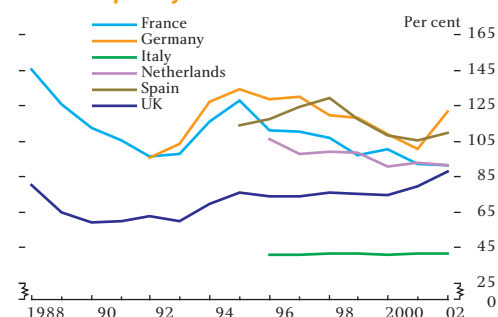
profitability, liquidity and (perhaps most importantly) gearing. Taking these in turn, analysts' earnings forecasts for listed European companies have generally been revised down since the June Review. On the positive side, private non-financial companies (PNFCs) in major European economies (other than Italy) seem to have more ample liquidity¹⁷ than those in the UK and the USA (Chart 38). Corporate income gearing declined during the late 1990s, as nominal interest rates fell, but has risen again recently as interest rates have stabilised while debt has increased more rapidly than income. Income gearing is highest, at 25%–30%, in France, Belgium and the Netherlands (Chart 39). Capital gearing at market value¹⁸ has risen sharply since 1999 as stock markets have fallen and debt has increased, and has for several years been highest in Germany, followed by Italy and the Netherlands (Chart 40). Recent loan growth in the Netherlands, has slowed somewhat in Italy and has remained low in Germany (Chart 41). High loan growth in Spain, Greece and Portugal, on the other hand, could partly reflect the lower starting point for capital gearing and, arguably, higher near- to medium-term growth potential. Moreover, corporate net worth can also be affected by asset prices via holdings of equities (eg held in pension funds or as cross-shareholdings) and via claims on other companies (eg loans or trade credit). Recent falls in asset prices have brought to light several examples of such vulnerabilities, typically through disclosure of investment losses.

Market-based credit spreads and credit ratings provide another indicator of corporate sector credit risk, but data are available for only a small number of large companies, and hence do not necessarily reflect the financial soundness of the broader corporate sector. Data on credit spreads from corporate bonds and credit derivatives prices suggest some increase in market concerns about credit risk, mainly for insurers, basic industries and cyclical services, including airlines and tourism (Chart 42). Indices of euro-denominated TMT (technology, media and telecommunications) sector investment-grade credit spreads have narrowed since the June 2002 *Review*, reflecting in part narrower spreads for several large TMT companies. However, the sharp rise and fall in technology spreads was driven largely by the spreads of 'fallen angels' initially widening, and later (when downgraded below investment grade) being excluded from the index ('survivor bias'). There have been some limited signs of sectoral strains for construction companies, automobile manufacturers, some airlines, shipping, and the energy sector. In 2002 Q2 and Q3, credit rating downgrades of European non-financial companies exceeded rating upgrades, both by number of companies and by value of debt (Chart 43).

17: Liquidity broadly defined and measured by holdings of cash, deposits, money market instruments (MMIs) and bonds over short-term loans and MMIs outstanding.

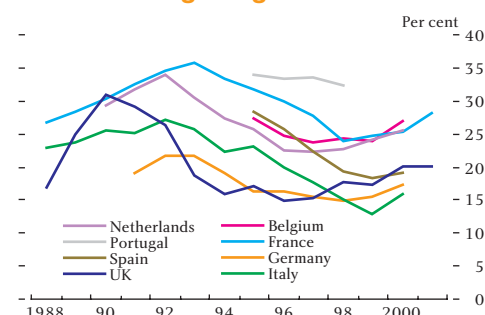
18: Capital gearing at market value for PNFCs is net debt (ie net of holdings of cash and deposits) divided by the market valuation of PNFCs.

Chart 38:
PNFCs' liquidity



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

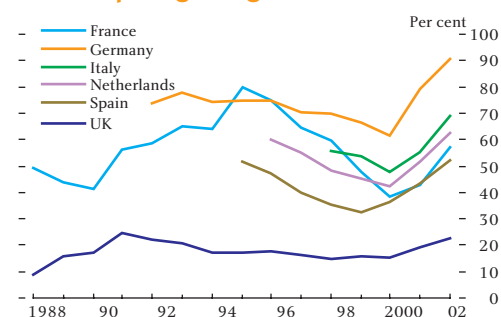
Chart 39:
PNFCs' income gearing^(a)



Sources: Eurostat and ONS.

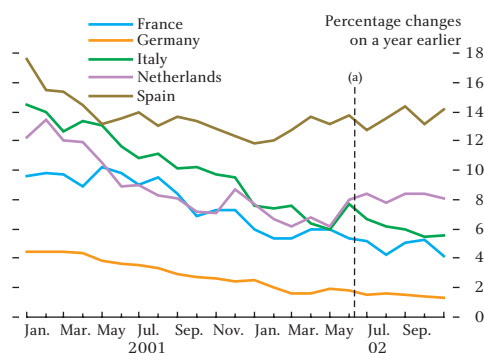
(a) Gross interest payments over gross operating surplus.

Chart 40:
PNFCs' capital gearing



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

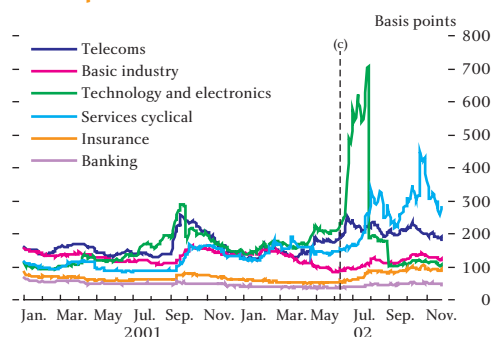
Chart 41:
Loans to euro-area residents



Source: European Central Bank.

(a) Jun. 2002 *Review*.

Chart 42:
Euro-denominated^(a) investment-grade credit spreads^(b)



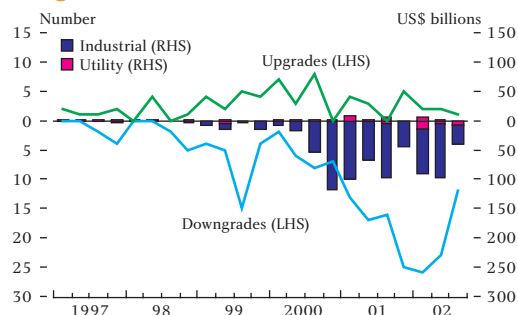
Source: Merrill Lynch.

(a) Euro-denominated issuance is dominated by European companies.

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

(c) Jun. 2002 *Review*.

Chart 43:
European non-financial sector ratings changes and value of debt affected^(a)



Source: Moody's Investors Service.

(a) Entities that have their debt downgraded more than once a quarter are counted only once for that quarter.

The June 2002 *Review* noted that there were then fewer concerns about corporate accounting, transparency and access to financial markets in Europe than in the USA. Since then some more evidence of such problems has emerged in Europe, but it remains limited. Vivendi Universal is now under investigation for alleged accounting irregularities. Meanwhile, euro-area companies' issuance of short-term securities has declined. That probably reflects the pressures on companies to reduce leverage in their balance sheets, a normal phenomenon at this stage of the business cycle.

Financial difficulties at European companies should, however, be kept in perspective. Major company insolvencies and debt restructuring cases have so far been few in number and largely concentrated in particular sectors (eg TMT and airlines) and countries (eg Germany and Switzerland). In European banks' reported loan losses and provisions, exposures to troubled US companies and emerging market economy (EME) borrowers have been more prominent. But given the large share of domestic corporate lending in European banks' total assets, and the increased vulnerabilities outlined above, the European non-financial corporate sector nevertheless represents a potential source of risk.

The household sector

The economic slowdown has dampened growth in real personal disposable incomes, though some countries (eg France) have cut taxes to try to offset this. Surveys suggest that, following the changeover to the euro, the level of prices is perceived to have increased by more than measured by official data¹⁹, and that could make households underestimate the real value of their current income. Expected future income, and perceived risks thereto, could also be affected by downward revisions to GDP growth forecasts, fears of rising unemployment, and concerns about the outlook for both public pensions (due to demographic and fiscal pressures) and private pensions (due to weak stock markets).

Most European households²⁰ are less directly exposed to falling share prices of listed companies than their US and UK counterparts (Chart 44). Mutual fund holdings have increased in Europe over recent years, but recently there has been a continuing shift towards money market and bond funds and away from equity funds, which have been less popular in Europe than in the USA or the UK. In some countries, for example France, Spain and Italy, households' direct equity exposure is predominantly to unlisted companies, where fluctuations in value are less easily observed and, therefore, perhaps less likely to affect household expenditure decisions as quickly.

19: Although households' perceptions of expected future inflation have fallen.

20: The data on household sector financial assets and debts include non-profit institutions in service of households.

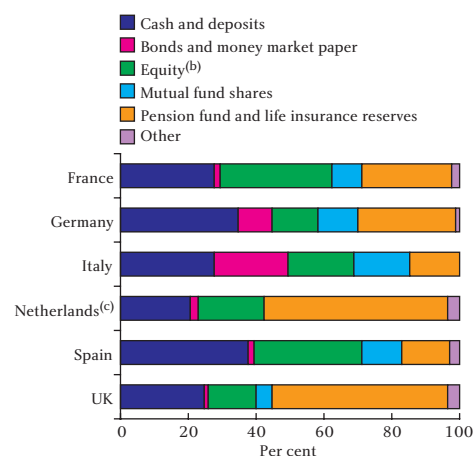
Households' capital market exposures have tended to be mainly indirect, via insurance and defined benefit pension fund reserves, typically because of tax incentives and household demand for lower-volatility returns. Such indirect equity market exposure is nevertheless potentially important; for example, if there were to be a prolonged period of poor underlying investment returns, confidence in the viability of a savings product or in the financial intermediary providing it might be dented. The risks for non-bank financial intermediaries offering such products are discussed below.

Household indebtedness has increased significantly in several countries, reflecting rapid growth in borrowing from banks. Both borrowers and lenders are exposed (on variable rate loans) to the risks arising from any sharp rise in interest rates, and to any deterioration in household incomes. Debt-to-income ratios are relatively high in the Netherlands, Germany, Portugal and Spain; and they have risen sharply in recent years in the Netherlands, Portugal and Spain (Chart 45). Data on household income gearing are less timely, but in 2000 it was highest in the Netherlands (12%) and Germany (7.5%). German household indebtedness has stabilised, as the savings rate has risen and loan growth has slowed. But in Ireland, the Netherlands, Spain and Portugal, loan growth remains well above the euro-area average.

The rise in household indebtedness may well be related to rising house prices²¹. The high and rising level of Dutch household debt is mainly accounted for by residential mortgages, on which interest is tax deductible. Dutch house prices rose rapidly in the late 1990s, and to moderate the associated growth in indebtedness and mortgage equity withdrawal, the authorities sought to confine tax advantages to main home mortgages, and to disqualify second homes and mortgage equity withdrawal to finance consumption. Since then, Dutch house price inflation has slowed.

Unemployment has increased in most European countries (with the exception of Italy), although from very different levels (Chart 46). In general, changes in unemployment have tended to lag changes in output, and households that have borrowed heavily could be vulnerable to the effects on income of rising unemployment. However, in most European countries, social safety nets and personal sector financial assets have provided some protection against such income shocks, and may have contributed to keeping banks' historical loss experience on personal sector lending low and manageable.

Chart 44:
Composition of households' financial assets^(a)



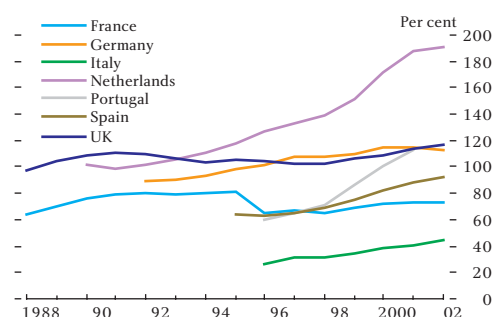
Sources: Deutsche Bundesbank, Banque de France, Banca d'Italia, Banco de España, Netherlands Central Bureau of Statistics and ONS.

(a) As of end-2001.

(b) Includes both listed and unlisted equity.

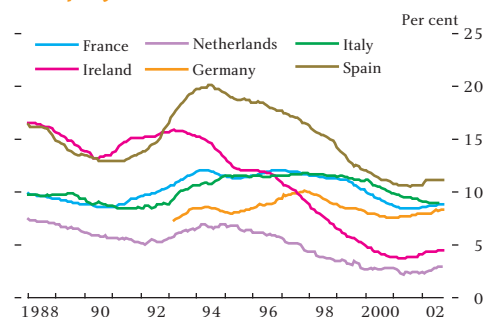
(c) Mutual fund shares included with equity.

Chart 45:
Household debt-to-income ratios



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

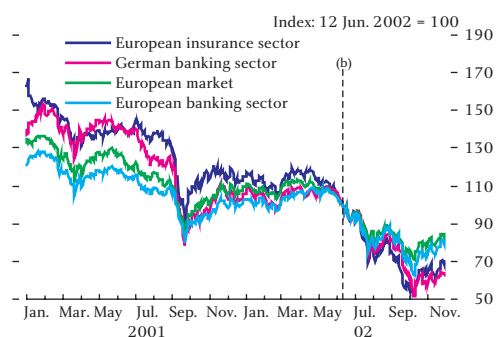
Chart 46:
Unemployment rates



Source: Thomson Financial Datastream.

21: As discussed in the box on 'International housing-market developments', November 2002 *Inflation Report*, page 12.

Chart 47:
European financial sector stock market indices^(a)

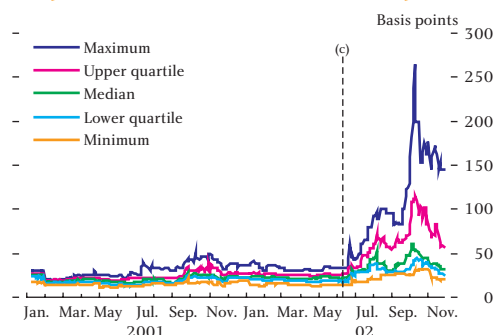


Sources: Thompson Financial Datastream and Bank calculations.

(a) Measured in euros.

(b) Jun. 2002 Review.

Chart 48:
European banks' credit default swaps^{(a)(b)}



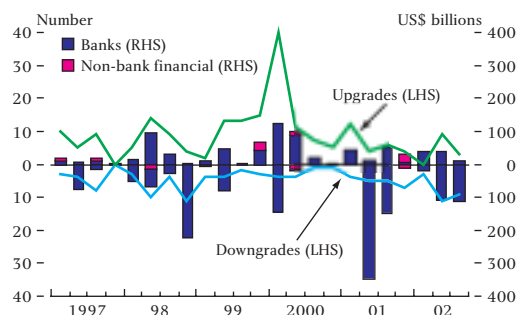
Sources: CreditTrade and JP Morgan Securities Ltd.

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

(b) Sample of 15 European banks.

(c) Jun. 2002 Review.

Chart 49:
European financial sector ratings changes and value of debt affected^(a)



Source: Moody's Investors Service.

(a) Entities that have their debt downgraded more than once in a quarter are counted only once for that quarter.

The financial system

Market concerns about some European financial institutions increased until early October, but have subsequently eased, as illustrated by their share prices (Chart 47) and credit default swaps (CDS) prices (Chart 48). For most European banks, the price moves have been broadly comparable to those for domestic non-financial companies. But share price falls and CDS price rises were greater for some institutions, notably life insurers or complex groups with significant insurance operations, some German and Swiss banks, and banks (of various nationalities) with significant exposures to Brazil. Several of these institutions have also had their ratings cut (or put on 'review'), and in both 2002 Q2 and Q3 financial sector ratings downgrades exceeded upgrades, both by number of firms and by value of debt (Chart 49). More positively, the market signals prompted remedial action by financial institutions, in terms of reducing risk exposures and bolstering capital. And, since mid-October, CDS prices have fallen and share prices have recovered somewhat.

Life insurance companies

European life insurers (and UK life insurers, as discussed in Section III) are potentially vulnerable to asset price falls insofar as they have sold products with guaranteed nominal returns and have invested in equities or other risk assets. Guaranteed interest rates (GIRs) occur in various forms: in long-term savings products, in guaranteed annuity rates (GARs), and often as options for the customer (eg guaranteed surrender values). In addition, they sometimes occur in combination with profit-sharing clauses which limit the ability of life insurers to retain excess returns from good years to make up for shortfalls in bad years. The resulting characteristics – long duration (especially for GARs) and complex optionality – make these products potentially difficult to match or hedge fully. As inflation and nominal interest rates have declined in recent years, typical GIRs have also been adjusted down (Table 3). This partly reflects implementation of the Third European Life Assurance Directive (1992), which laid down principles for the calculation of technical provisions and, in effect, limits GIRs to no more than 60% of long-term government bond yields. But many insurers still have older contracts in their portfolios carrying GIRs above current market interest rates. Life insurers' investment strategies have traditionally varied by country: French and Italian insurers have historically preferred bonds, while Nordic, Benelux and Irish insurers have invested relatively more in equities. Equities generated significant excess returns in the 1990s (Chart 50), although part of this will have been paid out to policyholders (because of profit-sharing clauses and competitive pressures) and shareholders, and invested in acquisitions. The latest three years of negative equity returns will have put pressure on some insurers' regulatory solvency ratios and reserving requirements. To strengthen their financial position, several insurers have

therefore raised new capital, either from parents or from capital markets, and/or reduced the risk profile of their assets by selling equities. In Germany, the insurers' association (GDV) has announced plans for a rescue fund to take over any insurer unable to meet its contractual obligations. The recovery in stock markets since mid-October has also eased the pressure on life insurers, and has helped lift their share prices, suggesting some easing of market concerns about the sector.

The position of life insurers is potentially relevant to overall financial system stability because of several possible spillovers. Weakened solvency ratios could in principle trigger forced selling of financial assets (eg equities), potentially pushing down market prices and weakening the financial position of other institutions. Bancassurance groups of various types (more common in continental Europe than in the UK) provide a potential channel for insurance losses to affect a related bank's capital and reputation. Several life insurers are internationally diversified, implying some risk of cross-border transmission of shocks, although the widespread use of locally capitalised subsidiaries may mitigate this. The broader confidence in long-term savings products could also potentially be affected.

General insurers and reinsurers have also suffered losses, both on investments and on underwriting business, eg because of flood damage. But rising premium rates have improved the prospective profitability of new business and allowed several insurers to raise capital from the market.

The banking system

Taken as a whole, the European banking sector still appears generally among the strongest in the world, both in terms of credit ratings for deposits and bonds, and in terms of financial strength ratings, reflecting strong capital positions and resilient profitability over an extended period.

Various profitability and cost ratios, summarised in the form of a 'heatmap' (Chart 51), suggest, however, that German and Swiss banks have significantly lower profitability buffers than the European average. Banks in Spain, Portugal and some Nordic countries, by contrast, have significantly higher profitability. The situation in Germany and Switzerland has generally been attributed by commentators to excess capacity and distortions from the presence of publicly-owned and guaranteed banks, although the public guarantees for Germany's Landesbanks are due to be phased out from 2005. Since the previous Review, many European banks have extended, as part of a broader restructuring programme, efforts to cut costs, thereby boosting their pre-provision operating income. Results for 2002 Q2 and Q3 show, however, that restructuring costs, along with credit costs, are still affecting headline profits at some larger European banks. Most large European banks have, though, remained profitable.

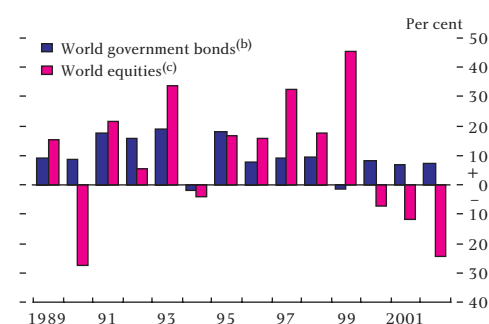
Table 3:
Typical guaranteed interest rates

Country	Previous (per cent)	Now (per cent)
Denmark	3.0	2.0
Finland	4.5	3.5
France	3.5	3.0
Germany	4.0	3.3
Italy	4.0	3.0 ^(a)
Netherlands	4.0	3.0
Portugal	–	4.0
Spain	3.2	3.1
Switzerland	4.0	3.3
UK	–	1.0 ^(a)

Source: European Commission 'Report of the working group on life assurance to the IC solvency subcommittee'.

(a) Upper value of range.

Chart 50:
Asset class total returns^(a)



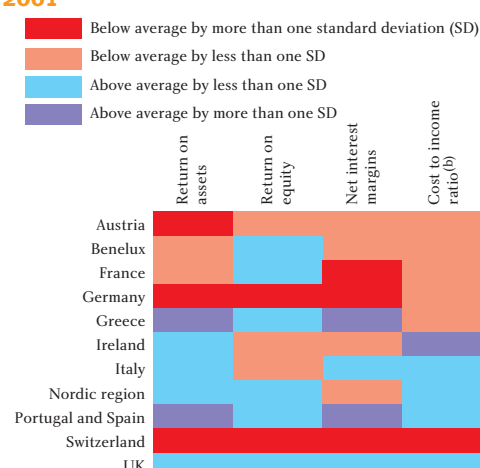
Source: Bloomberg.

(a) Last observation is year-to-date return.

(b) Salomon Smith Barney world government bond index hedged into euros.

(c) MSCI world equities total returns measured in euros.

Chart 51:
European banking sector key ratios for 2001^(a)

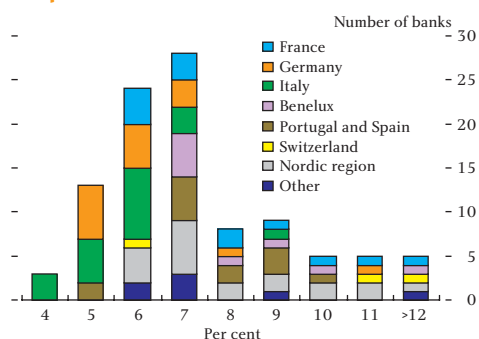


Sources: Bureau van Dijk Bankscope and Bank calculations.

(a) Average for each banking sector, weighted by total assets.

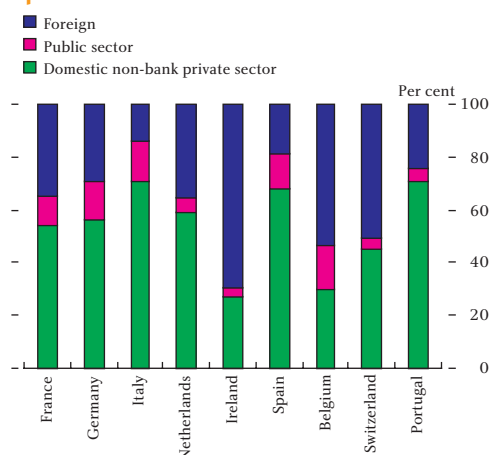
(b) Inverted scale.

Chart 52:
Tier 1 ratios for the hundred largest European banks for 2001



Source: Bureau van Dijk Bankscope.

Chart 53:
Distribution of European banking systems' exposures^{(a)(b)}



Sources: IMF and Bank calculations.

(a) Percentage of total banking sector assets (excluding domestic interbank claims).

(b) Data as of end-Aug. 2002.

After profits, capital provides further protection. At the end of 2001, the 100 largest banks in Europe (excluding the UK) had an average published Tier 1 ratio of 8%, twice the required minimum, although the extent of 'excess capital' varied across countries (Chart 52). Greater use has been made of 'innovative' or hybrid capital instruments, which arguably have less capacity for absorbing losses than pure equity. But most regulators limit such instruments to a small proportion of Tier 1 capital, and most European banks still have pure equity well in excess of the required 4% minimum. However, banks' ability and willingness to inject capital (through retained earnings or issuance of new equity) is obviously currently affected by weakness in profits and in capital markets. Encouragingly, several European banking groups in November announced various measures to strengthen their Tier 1 ratios (either issuing equity or other capital instruments, or by selling risk assets). At the time these firms all had higher-than-average CDS prices, and most had been subject to recent rating downgrades, suggesting that market discipline may have acted as catalysts for banks to take remedial action.

Most European banking sectors remain primarily exposed to their domestic economies (Chart 53). European banks' international claims are primarily on borrowers elsewhere in Europe (including the UK) and the USA. Exposures to EMEs are small relative to total assets. But within foreign claims, Central and Eastern Europe appears significant for Austrian and Italian banks, and Latin America for Spanish and Italian banks. Section I.5 below discusses the potential risks arising in EMEs.

4 Japan

Growth in the second and third quarter was strong. Nevertheless, the near-term outlook for the economy has deteriorated since the June 2002 *Review*, partly as a result of the weaker global outlook. This, together with the fall in the equity market, has aggravated existing fragilities in the banking sector.

Recent economic and financial developments

The near-term economic outlook, as measured by Consensus forecasts for GDP growth in 2003, has deteriorated since the June 2002 *Review* (Chart 54), though by less than in North America or Europe. Recovery is still expected to continue into 2003, but not at a sufficient pace to halt deflation. Real GDP is estimated to have grown by 1.0%, quarter-on-quarter, in 2002 Q2 and by 0.7% in 2002 Q3. Industrial production growth has slowed, as external demand has moderated, while service sector output has been little changed (Chart 55).

Fitch Ratings downgraded Japan's local currency rating by one notch to AA– and kept the negative rating outlook, citing the 'ongoing deterioration in Japan's public finances amid sustained weakness in economic performance'.

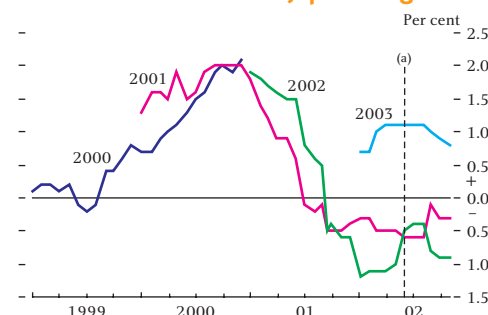
Against the background of a weakening domestic and international economic outlook, Japanese equity prices fell sharply during the summer and early autumn. The Tokyo market has remained close to post-1990 lows, in contrast to overseas markets, which rallied strongly in mid-October.

The non-financial corporate sector

The near-term outlook for corporate profits has deteriorated since the June 2002 *Review*. The consolidated sales of non-financial listed firms in the six months to September were slightly lower than a year before and firms expect full-year sales growth to be well below what they had forecast in May. Forecasts for full-year current profits have been revised down marginally but forecasts for post-tax profits, which continue to be depressed by asset write-downs and restructuring charges, have been cut by 11%.

Despite experiencing a sharp deterioration in profitability in fiscal 2001, the private non-financial corporate (PNFC) sector recorded a large financial surplus for the fourth consecutive year (Chart 56). In aggregate, the PNFC sector repaid 5.2% of its outstanding loans from private financial institutions. The Bank of Japan's (BoJ) Senior Loan Officer Surveys suggest that the decline in corporate borrowing last year, and in the first half of this year, was largely due to further weakening in firms' demand for credit.

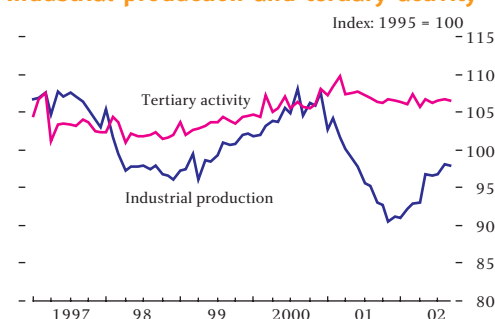
Chart 54:
Consensus forecasts for Japanese growth



Source: Consensus Economics Inc.

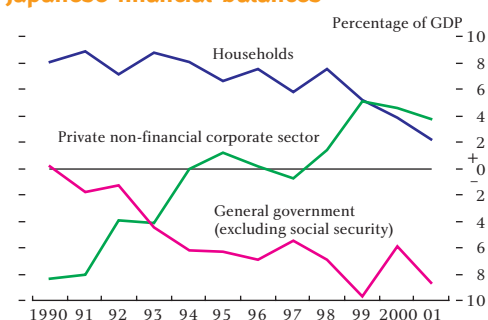
(a) Jun. 2002 *Review*.

Chart 55:
Industrial production and tertiary activity



Source: Thomson Financial Datastream.

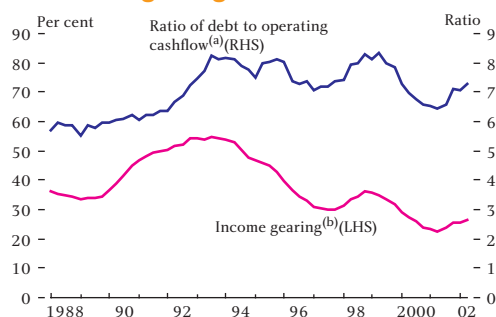
Chart 56:
Japanese financial balances^(a)



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

(a) Financial years.

Chart 57:
Corporate debt-to-operating cash flow ratio and income gearing

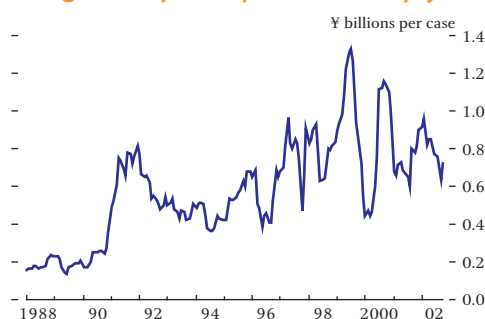


Source: Ministry of Finance.

(a) Gross debt/four-quarter moving average of operating profits plus depreciation.

(b) Four-quarter moving average of interest payable/four-quarter moving average of current profits plus interest payable.

Chart 58:
Average debt per corporate bankruptcy^{(a)(b)}

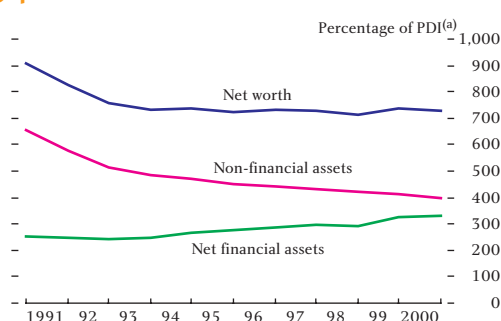


Sources: Bloomberg and Thomson Financial Datastream.

(a) Six-month moving average.

(b) Excluding debt of failed insurers.

Chart 59:
Japanese household wealth



Source: Economic and Social Research Institute of the Japanese Cabinet Office.

(a) PDI: personal disposable income.

Weak profitability has meant that the ratio of corporate debt to operating cash flow has remained high (Chart 57). But corporate income gearing has fallen sharply since 1993, largely because of the decline in nominal interest rates. Against this background, the number of corporate failures per month has been broadly stable, though at a historically high level. The average amount of debt per bankruptcy has declined since the spate of large failures in the spring in the wake of the Japanese Financial Services Agency's (JFSA) special loan inspections (Chart 58).

The household sector

The ratio of households' net worth to income fell sharply in the early 1990s, from just over 900% at end-1990 to just over 700% at end-1993. However, since then the ratio has remained broadly flat, in spite of large falls in equity and land prices (Chart 59), reflecting the high household saving rate. Households' exposure to the real estate market is much greater than to the equity market (Chart 60). At end-2000, land holdings accounted for over a third of household assets, while households' direct holdings of equities accounted for just 4½% of their assets.

Turning to the liabilities side, the household debt-to-income ratio has been broadly flat since the mid-1990s (Chart 61), although it is relatively high by international standards. However, the drop in nominal interest rates has brought about a marked fall in overall household income gearing since 1991.

Although in aggregate, household balance sheets appear strong and household income gearing is low, personal bankruptcy filings have been rising rapidly. In the first ten months of the year, filings rose 36%, year-on-year, having risen by 15% in 2001.

The financial system

There have been substantial developments since the June 2002 Review in official policies towards the banking sector. In mid-September, the Bank of Japan announced a plan to purchase shares directly from banks whose equity holdings exceed their Tier 1 capital and publish a 'comprehensive review of the non-performing loans (NPL) problem'. The newly appointed Financial Services Minister set up a task force to address the banks' NPL problems. This was followed by the publication by the JFSA of a 'Program for Financial Revival' to restore confidence in the Japanese financial system and halve the NPL ratios of the major banks by end-March 2005. At the same time, monetary policy was eased further. The second stage of the curtailment of deposit insurance, for demand deposits, was postponed by a further two years, until April 2005.

Banks' exposure to equity market risk

The BoJ argued that the market risk entailed in banks' shareholdings had become a 'significant destabilising factor' that needed to be addressed urgently. At end-March, most major banks and a few regional banks had equity holdings in excess of Tier 1 capital. Under existing JFSA rules, banks are required to reduce their equity holdings below Tier 1 capital by September 2004. The BoJ intends to purchase shares worth ¥2 trillion by September 2003, around a quarter of the total that banks have to sell, and hold them until at least September 2007. Sales to the BoJ will be outright, unlike sales to the existing Bank Shareholdings Purchase Corporation, and will completely remove the market risk and free up capital.

Non-performing loans

The BoJ's review of the NPL problem outlined a set of principles, including more forward-looking evaluation of NPLs and the promotion of quick disposal of NPLs, which it recommended that banks adopt. The BoJ also commented that the rate at which new NPLs appear was likely to remain high because of an increasing number of corporate failures due to structural changes, such as increased competition from imports.

As described above, the BoJ initiative was followed by a shift in JFSA policy towards the banking sector. For example, the JFSA intends to make the major banks use discounted cash flow methods to evaluate their loans to some borrowers, which would tend to make provisioning more forward-looking. The JFSA will conduct another round of special inspections of loans to large borrowers around the March 2003 book closing.

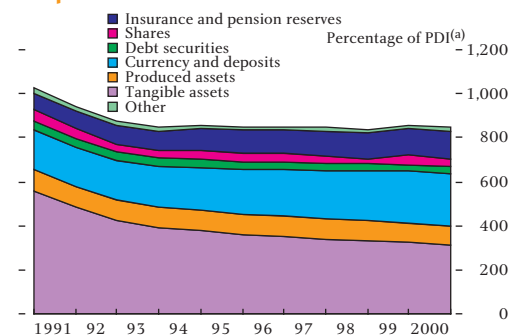
The JFSA programme also outlines measures to facilitate the removal of NPLs from bank balance sheets and the restructuring of over-indebted companies. These include suggestions on how to enhance the role of the Resolution and Collection Corporation and plans to establish a new 'industrial revival corporation', designed to help viable companies restructure by purchasing their bank loans and by providing them with technical and business support. It is not yet clear how these measures will be implemented and how any losses from restructuring would be distributed across the various sectors of the economy.

Deposit insurance

In October the JFSA decided to postpone the transition to partial deposit insurance for demand deposits until April 2005. The JFSA said that the delay was needed to maintain depositor confidence while structural reforms were being implemented and the NPL problem was being resolved. It also reaffirmed its earlier decision that even when full protection of demand deposits is lifted, non-interest bearing payment and settlement deposits (repayable on demand) would continue to be fully protected.

Chart 60:

Composition of household assets

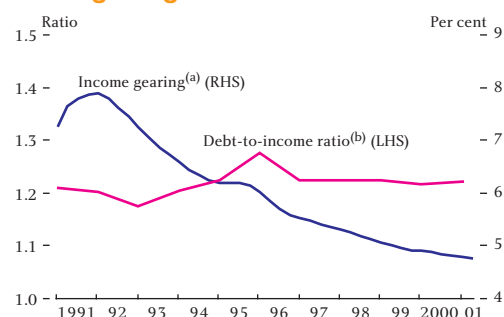


Source: Economic and Social Research Institute of the Japanese Cabinet Office.

(a) PDI: personal disposable income.

Chart 61:

Household debt-to-income ratio and income gearing

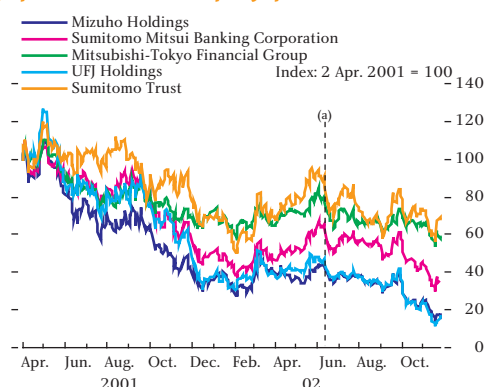


Source: Economic and Social Research Institute of the Japanese Cabinet Office.

(a) Four-quarter moving average of gross interest paid/four-quarter moving average of disposable income.

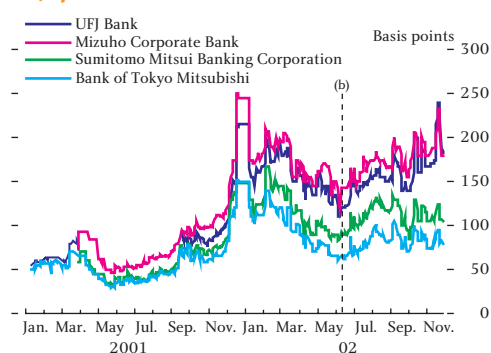
(b) Total liabilities/disposable income.

Chart 62:
Japanese banks' equity prices



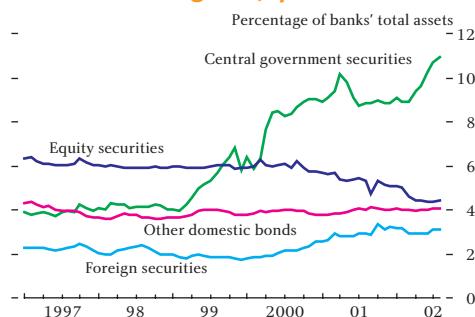
Source: Bloomberg.
(a) Jun. 2002 *Review*.

Chart 63:
Five-year senior credit default swap prices for Japanese banks^(a)



Source: CreditTrade.
(a) Annual premium for credit protection on issuer using standard ISDA documentation, measured as mid-point between last bid and ask quotes.
(b) Jun. 2002 *Review*.

Chart 64:
Securities holdings of Japanese banks



Source: Thomson Financial Datastream.

Banking sector capital

The average published Tier 1 capital ratio of the major banks at end-September was almost unchanged at 5.4%, helped by an 8% reduction in risk-weighted assets since end-March. Deferred tax assets were equivalent to just over half of their average Tier 1 capital. The JFSA intends to review the treatment of deferred tax assets²² in regulatory capital. Earlier press reports had suggested that the JFSA might introduce a 10% cap on the value of deferred tax assets that can be counted towards Tier 1 capital.

Fears that the banks might be left undercapitalised, and hence open to nationalisation, caused a sharp fall in the share prices of the major internationally active banks in early October (Chart 62). In the first half of November, shares in these banks came under renewed pressure following press speculation about the prospect of nationalisation. Against this background, market measures of perceived bank credit risk, such as credit default swap prices, rose markedly (Chart 63). The JFSA reiterated that, in the event of a bank getting into difficulties, the authorities would take whatever measures were necessary to prevent systemic risk arising. This commitment is underpinned by the ¥15 trillion fund that was earmarked to deal with any such eventuality.

Following its one-notch downgrade of Japan's local currency rating to AA-, Fitch announced a review of the ratings it assigns to Japanese banks. Fitch, like Moody's, explicitly factors into its investment-grade ratings for banks' long-term debt, the expectation of government support.

Banking sector profitability

Having recorded a combined consolidated loss of ¥3.4 trillion in fiscal 2001, the major banks expect to record a loss of ¥0.2 trillion in fiscal 2002, slightly less than they forecast in May. The banks expect new loan-loss provisions and loan write-offs to fall to just ¥3.2 trillion in fiscal 2002 but have only partly factored in the consequences of stricter loan assessments.

Pre-provision operating profits in the first half of fiscal 2002 were higher than expected, reflecting continued strong trading profits on both domestic and foreign bonds. Banks have been increasing their exposure to Japanese government securities whilst shrinking their balance sheets. At end-August, government securities accounted for 10.9% of banks' assets, compared with 8.9% at end-March (Chart 64).

The insurance sector

Life insurers are less exposed to domestic equities in Japan than in most other G7 countries – at end-March 2002, domestic

22: Specific provisions for loan losses count as a tax-deductible expense only when the loss is finalised, rather than when the provision is made. When the loss is finalised, it creates a loss-carry forward which must be used within the following five years.

equities accounted for 13.4% of the assets of private life insurers. Even so, the fall in the equity market significantly reduced solvency margins between end-March and end-September. In September, Standard and Poor's cut the financial strength ratings of five of the seven largest Japanese life insurers by one notch, citing concerns over their capital arising from the weakness of the equity market.

Links to the international financial system

Recent evidence on links between Japan and the rest of the world²³ does not suggest much change since the June 2001 Review in the risk of contagion. At end-2001, Japan's net external assets totalled US\$1.4 trillion (35.7% of GDP), with US\$2.9 trillion gross external assets and US\$1.5 trillion gross external liabilities.

Japan's overseas claims

In the six months to end-June, Japanese-owned banks' consolidated foreign claims fell by over 9% to US\$1.1 trillion, with claims on most countries declining. Their claims on the US fell by nearly 14% between end-2001 and June 2002, largely because of a 29% fall in Japanese banks' US affiliates' US\$ local claims (Chart 65). Although technical factors²⁴ account for part of this decline, Japanese banks have been scaling back their overseas branches and subsidiaries, particularly in the USA, perhaps to support capital ratios by realising capital gains and reducing risk-weighted assets.

Japanese banks have increased their holdings of foreign bonds, particularly US Treasuries, markedly since 1999 (Chart 66). They purchased ¥4.7 trillion of foreign bonds in 2002 Q3 alone.

Japanese-owned banks' foreign claims on offshore financial centres (OFCs) fell by 10% in the six months to end-June. Over the same period, foreign claims on the Cayman Islands fell by almost 13% to US\$82.6 billion, reversing most of the rise in claims since end-March 2000. It appears that technical factors accounted for much of the sharp fall in claims on the Cayman Islands between end-December and end-March²⁵ (Chart 67).

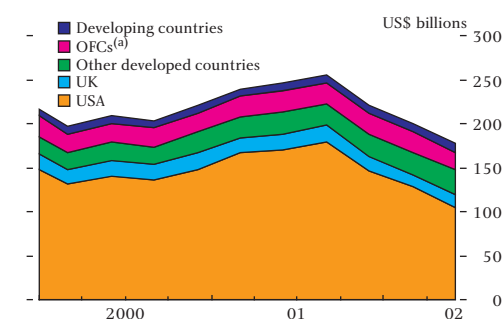
23: In addition to their on-balance-sheet claims on Japan, discussed in section I.6, internationally active banks also have off-balance-sheet positions with Japanese financial institutions through derivatives transactions.

24: According to the BIS consolidated banking statistics press release for 2002 Q2, part of this decline related to the transfer of some assets to a securities subsidiary.

25: According to the BIS consolidated banking statistics press release for 2002 Q1, the restructuring of some Japanese institutional investment funds reduced Japanese claims on several offshore financial centres.

Chart 65:

Japanese-owned banks' local currency local claims



Source: BIS.

(a) Including Hong Kong and Singapore.

Chart 66:

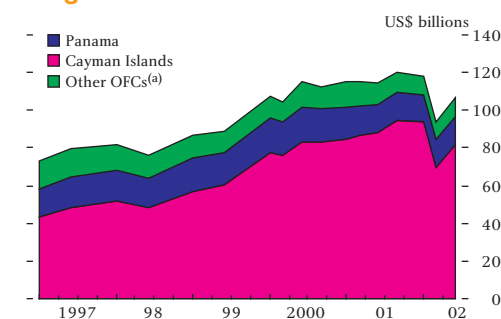
Japanese-owned banks' holdings of foreign securities



Source: Bank of Japan.

Chart 67:

Japanese-owned banks' consolidated foreign claims on offshore financial centres

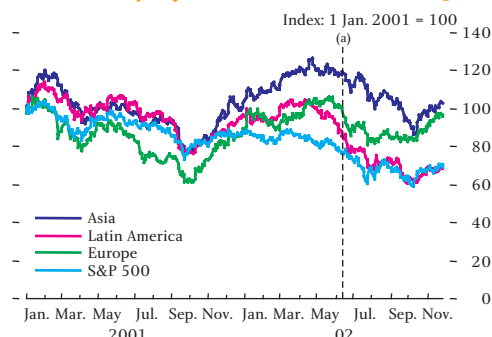


Source: BIS.

(a) Offshore financial centres excluding Hong Kong, Singapore, Jersey, Guernsey and the Isle of Man.

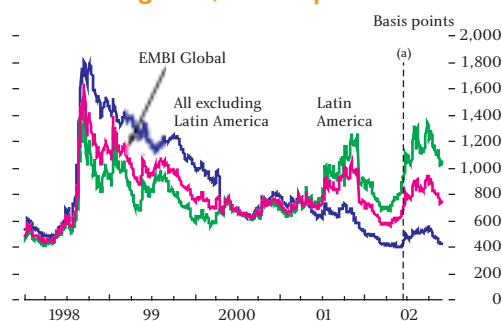
5 Emerging market economies

Chart 68:
US\$ EME equity indices and the S&P 500



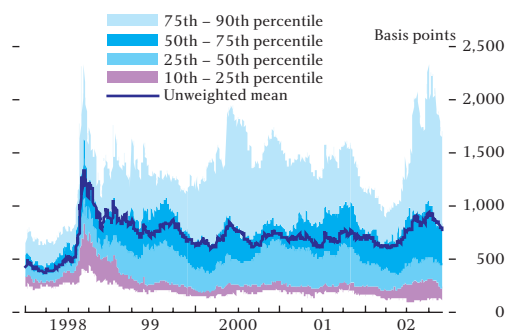
Source: MSCI.
(a) Jun. 2002 *Review*.

Chart 69:
EME sovereign US\$ bond spreads



Source: JP Morgan Chase & Co.
(a) Jun. 2002 *Review*.

Chart 70:
EME sovereign US\$ bond spreads: distribution over time^(a)



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

Investor appetite for emerging market economy (EME) risk appears to have declined since the first quarter of 2002, reflecting heightened concerns about global recovery and a decline in wealth resulting from lower asset prices. Inflows of external finance to some EMEs have decreased; and emerging market asset prices have generally fallen.

Investors continue, nevertheless, to discriminate among EMEs. Borrowers in some investment-grade EMEs, primarily in Asia and Europe, have retained access to finance on broadly unchanged terms. By contrast, availability of external credit to some borrowers with lower credit ratings has declined. Asset prices have fallen particularly sharply in Latin America, especially in Brazil, where markets remain concerned about debt sustainability despite a new IMF programme. Investor concerns about debt sustainability also extend to several other EMEs, including Turkey. Brazil and Turkey have both faced political uncertainties in recent months, but there is some evidence that, as these have lifted, investor sentiment has improved.

Tightening EME capital markets

The June 2002 *Review* noted that EME equity markets had outperformed developed economy markets in 2002 Q1. Since then, EME equity indices have fallen broadly in line with those in developed economies, suggesting common concerns about global recovery and the effects of lower risk appetite (Chart 68). EME equities are 12% lower in dollar terms than at the time of the June 2002 *Review*. Latin American equities have fallen more sharply, by nearly 20%, largely because of a 30% fall in the Brazil sub-index.

In April 2002 the average spread of EME sovereign bond yields over US Treasuries was at its lowest level since just before the Russian debt default in August 1998 (Chart 69)²⁶. Since then, spreads have risen broadly in line with the spreads on domestic sub-investment-grade debt in developed economies (Section I.1). The rise mainly reflects an increase in the Latin America sub-index. In particular, spreads on Brazilian bonds, which account for around 15% of the EMBIG, increased by 941 basis points over this period. By contrast, spreads on EME debt outside Latin America were broadly unchanged. As a result, the dispersion of spreads has widened, indicating that investors continue to discriminate among sovereign credits (Chart 70).

These asset price developments have been mirrored by changes in the level and geographical composition of capital flows to EMEs. Although net bond issuance was relatively strong in

²⁶ EME sovereign bond yields are measured using the JP Morgan Chase & Co Emerging Market Bond Index Global (EMBIG).

2002 H1, it seems likely to have fallen to near zero in the third quarter. Sovereign issuance across Latin America was especially low at that time, although Mexico, and outside the region, Poland, raised significant debt finance. In line with the more recent improvement in investor sentiment, there have been some signs of a pick-up in gross bond issuance in November. Share issuance has been subdued throughout the period, although in July Bank of China raised the equivalent of US\$2.4 billion in Hong Kong, the largest initial public offering this year outside the United States.

In September, the Institute of International Finance revised down its previous 2002 forecast for private capital flows to EMEs because of weaker-than-expected portfolio equity flows and non-bank credit in the year-to-date (Table 4). But it still forecasts a rise in flows to EMEs in Asia/Pacific and Europe, mainly reflecting higher foreign direct investment in China and EU-accession countries, offset by a large decline in flows to Latin America.

Developments in Latin America

A sharp deterioration in sentiment towards Brazil, the largest economy in Latin America, has affected regional prospects. The Brazilian real depreciated by 27% against the US dollar from the time of the June 2002 *Review* up to the elections at end-October (Chart 71). The spread of Brazil's component of the EMBIG over US Treasuries rose by 484 basis points to around 1,796 basis points over the same period; in yield terms, the Republic of Brazil US dollar bond maturing in 2011 was returning around 22%. That was despite a US\$30 billion IMF programme, announced on 7 August. Market contacts suggest that these asset price developments reflected uncertainty about policy in Brazil following the elections, as well as lower investor risk appetite.

Weaker asset prices have highlighted vulnerabilities in the structure of Brazil's public and external debt. The depreciation of the real has raised Brazil's external debt-to-GDP ratio to around 45% in August from 42% at end-2001. Public sector debt rose to 60% of GDP in October from 53% at end-2001, as around 30% of it is linked to the exchange rate and around 50% to short-term interest rates. This sensitivity to asset prices, and a depreciating exchange rate, partly explain the rise in public debt over the past two years, despite a primary fiscal surplus averaging close to 3.75% of GDP over this period, the level currently required in 2003 by the new IMF programme (Chart 72).

Asset prices have recovered somewhat since the October elections, with the new administration signalling commitment to achieving the targets set by the IMF programme. Brazil has sufficient reserves and other assets to meet external and domestic financing needs in coming months; and there are prospective further inflows of IMF funds. Moreover, Moody's

Table 4:
Net financial flows to emerging market economies by region

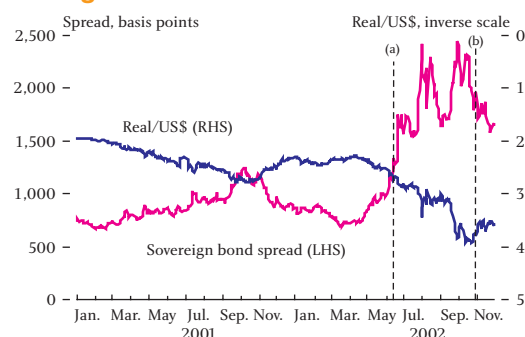
US\$ billions	2000	01	2002 forecast	Change from previous forecast ^(a)
Private flows	187.6	126.0	122.9	-36.1
Latin America	64.9	45.6	29.1	-23.3
Europe	41.4	16.4	23.9	-5.2
Africa/Middle East	5.0	10.6	9.2	-0.4
Asia/Pacific	76.3	53.4	60.7	-7.1
Five Asian crisis economies ^(b)	16.9	9.4	9.2	0.2

Source: IIF 'Capital Flows to Emerging Market Economies' 18 Sep. 2002.

(a) Change in IIF forecasts from Apr. 2002 to Sep. 2002.

(b) South Korea, Indonesia, Malaysia, Thailand, Philippines.

Chart 71:
Brazil: sovereign US\$ bond spread and exchange rate

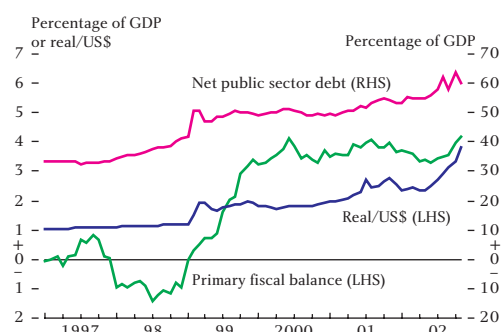


Sources: JP Morgan Chase & Co. and Bloomberg.

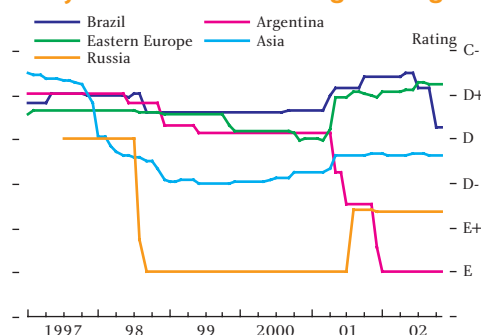
(a) Jun. 2002 *Review*.

(b) First business day following the second round of presidential elections on 27 Oct. 2002.

Chart 72:
Brazil: fiscal indicators and the exchange rate

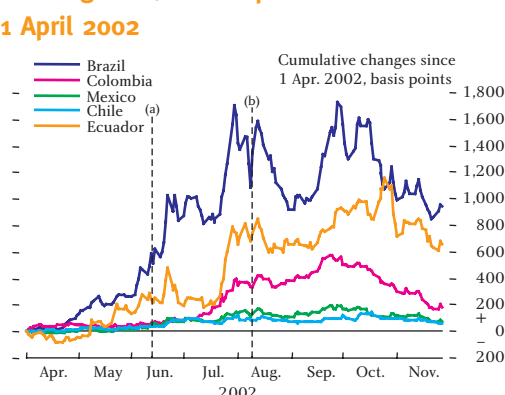


Sources: Banco Central do Brasil and Bloomberg.

Chart 73:**Moody's bank financial strength ratings^(a)**

Sources: Moody's Investors Service, Bureau van Dijk Bankscope, BIS and Bank calculations.

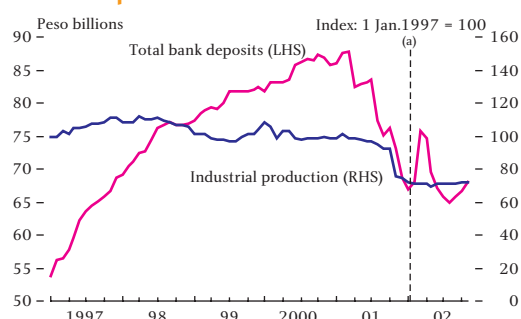
(a) Bank financial strength ratings reflect Moody's opinion of the likelihood that a financial institution will require third party support. They are made on a scale A (least risk) to E (most risk). Regional figures are an average of constituent country figures, weighted according to UK-owned banks' current claims. Country figures are an asset-weighted average of individual institutions' ratings.

Chart 74:**Changes in selected Latin American sovereign US\$ bond spreads since 1 April 2002**

Source: JP Morgan Chase & Co.

(a) Jun. 2002 *Review*.

(b) Announcement of IMF programme for Brazil.

Chart 75:**Argentina: total bank deposits and industrial production**

Source: Bloomberg.

(a) 8 Jan. 2002: the peso was devalued. Subsequently on 3 Feb. 2002, a government decree converted banks' US\$ deposits into pesos at a fixed rate of 1.4 per US\$.

financial strength ratings suggest that the Brazilian banking system remains relatively robust, despite recent downgrades, compared with systems of other EMEs (Chart 73). But with maturing public sector debt of around US\$75 billion in 2003, a marked further improvement in market sentiment and a rapid recovery in growth will be required to ensure public sector debt sustainability.

The June 2002 *Review* discussed how problems in Brazil might affect other economies, particularly those in Latin America. Spreads on sovereign bonds have risen in several other countries in the region, including some with strong trade links to Brazil and large external financing needs. For example, spreads on Colombian and Ecuadorean debt have risen by 123 basis points and 419 basis points respectively since the June 2002 *Review*, although this has also reflected domestic political uncertainties in these economies (Chart 74). Asset prices have also weakened, though to a much lesser extent, in some investment-grade EMEs in the region, such as Chile and Mexico. No doubt in Mexico's case that partly reflects weaker growth prospects in the United States, destination for around 80% of its exports.

The Argentine crisis has also affected other economies in Latin America. The protracted fall in output and turbulence in the Argentine financial sector have provoked severe problems in Uruguay and Paraguay, which both have strong economic and financial links to Argentina and highly dollarised financial sectors. The Argentine economy has been contracting since 1998 and turned down particularly sharply following the default in December 2001: the fall in GDP since 1998 takes output back to 1995 levels. There are now, however, some signs that the economy may have stabilised, with industrial activity and bank deposits no longer falling (Chart 75). But the government has yet to agree a new programme with the IMF and has made only limited progress in discussions with private sector creditors.

Developments in Latin America could affect the global financial system through several channels, including the credit exposures of banks and portfolio holdings of non-bank investors. BIS reporting banks' foreign claims on Brazil were US\$124 billion at end-June 2002, of which around 50% were local currency claims – that compares with bank claims on Argentina of US\$74 billion at end-2001. Claims on Brazil were second only to Mexico among EMEs, although they accounted for only 1% of total foreign claims on all countries. Spanish and US banks were Brazil's largest creditors (Chart 76), as was the case for Argentina; UK-owned banks' claims on Brazil were smaller at US\$12 billion, 0.9% of their external exposures²⁷.

27: 'UK bank exposures: data sources and financial stability analysis' by Andrew Gracie and Andrew Logan in the June 2002 *Review* discusses the Bank of England's use of these data. A box on page 58 of that *Review* discusses local currency EME lending.

Foreign bank claims on the region fell by 6% during 2002 H1, which some contacts have attributed to retrenchment following the Argentine default. Bond market capitalisation of the region, as proxied by bonds included in the EMBIG, still exceeds the total of other EME regions, but has declined by around 20% since the start of 2001.

Financing vulnerabilities in other EMEs

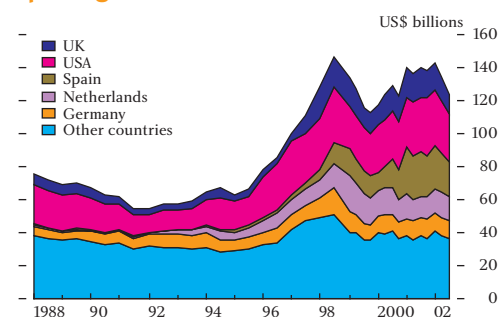
Latin American economies were not unique in facing financing problems. In Turkey, asset prices weakened significantly in May following the illness of former Prime Minister Ecevit. In the run-up to the election, Treasury bill yields rose to around 75%, the EMBIG sub-index spread widened to over 1,000 basis points and the exchange rate depreciated by around 15% (Chart 77). As in Brazil, falls in asset prices in Turkey have immediate effects on public sector debt, which amounts to around 90% of annual gross national product, as about 90% of debt is linked to floating domestic interest rates or to the exchange rate.

Financial market reaction to the election of the AK Party in November has been positive: local Treasury bill yields have fallen to around 51%, external spreads have narrowed to 671 basis points, and the exchange rate has appreciated by 9%. The new government has stated that it will meet the conditions for release of the recently delayed tranche of IMF funds, but that it then wishes to negotiate some changes to the existing IMF programme. Over the programme's course, the economy has strengthened, with growth rising to 8.8% year-on-year in 2002 Q2 and inflation falling to 33% in October. The authorities have generally met IMF conditions. But even with continued commitment to the programme, some market contacts still expect Turkey to have an external financing shortfall in 2003.

Indonesia and the Philippines have large debt stocks, as well as fiscal deficits, and are also exposed to swings in external finance availability. Both are attempting to consolidate their fiscal positions. However, the Philippines' deficit has slipped significantly from the original government target for 2002 (Chart 78). In both countries, terrorist activity has damaged investor sentiment and tourism receipts, potentially affecting growth prospects and the fiscal position.

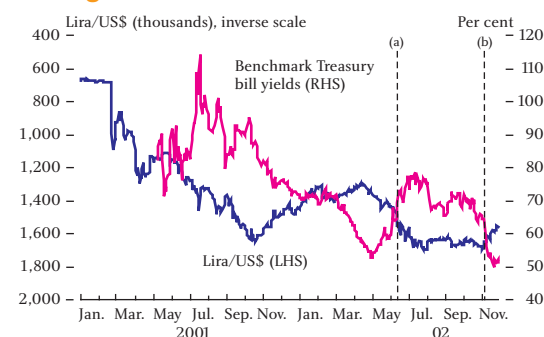
The EU accession countries generally have higher ratios of foreign exchange reserves to short-term external debt than do Latin American EMEs, suggesting that they are relatively less vulnerable to external financing pressures (Chart 79). But over the past three years, current account deficits have ranged on average between 3%–6% of GDP in the Czech Republic, Hungary and Poland (Chart 80). These have been financed largely by inflows of foreign direct investment.

Chart 76:
Consolidated claims on Brazil by BIS reporting banks



Source: BIS.

Chart 77:
Turkey: Treasury bill yield and exchange rate

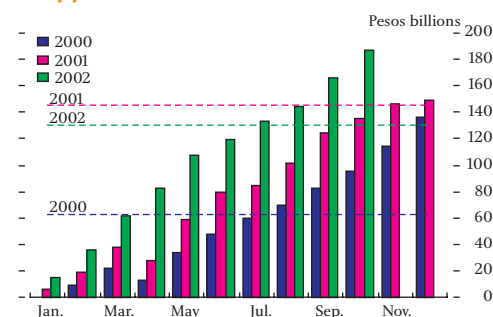


Source: Bloomberg.

(a) Jun. 2002 Review.

(b) First business day following general election on 3 Nov. 2002.

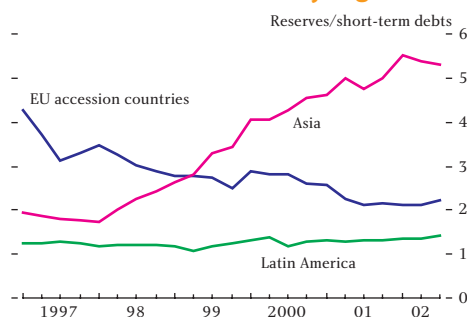
Chart 78:
Philippines: cumulative fiscal deficit^(a)



Sources: Bloomberg and World Bank.

(a) Horizontal lines indicate full-year targets.

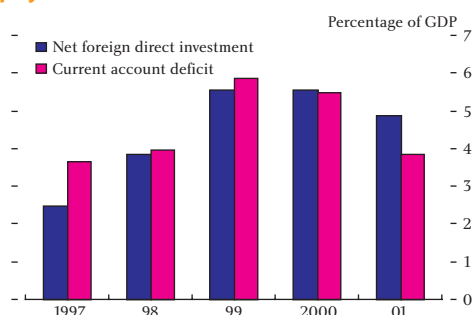
Chart 79:
Reserve coverage of short-term external debts to BIS-area banks: by region^(a)



Sources: BIS and IMF.

(a) Regional figures are a weighted average of major EMEs' ratios. Weights reflect BIS banks' current external claims on each country in the sample. The sample covers EMEs that account for over 70% of each region's liabilities to BIS banks.

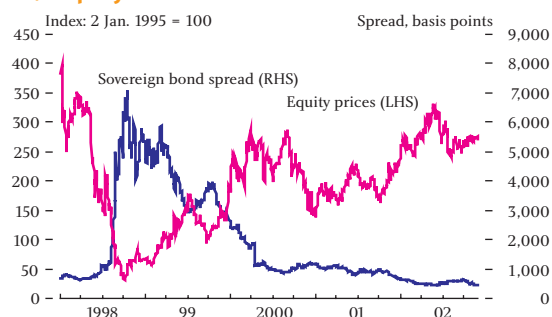
Chart 80:
Major EU accession economies' balance of payments^(a)



Sources: National central banks and IMF.

(a) Poland, Hungary and the Czech Republic, which, together accounted for 68% of accession economies' US\$ GDP in 2001.

Chart 81:
Russia: sovereign US\$ bond spread and US\$ equity index



Sources: JP Morgan Chase & Co. and Bloomberg.

Previous *Reviews* have noted that any setback to accession prospects might affect the ability of these countries to finance their external deficits, and force them to adjust. This risk has declined since the June 2002 *Review*, with the recommendation by the European Commission in October that accession negotiations for ten countries should be ready for conclusion at the December EU summit, the 'yes' vote by Ireland on the Nice Treaty in November, and agreement on Common Agricultural Policy funding from 2006. Moody's recently upgraded the sovereign ratings of eight countries that may join the EU in 2004. But several hurdles remain, including national referenda on membership. Any delay might still lead to a sharp adjustment in local bond prices and exchange rates. This might have its biggest impact on the financial systems of the developed economies through international banks' exposures to local banking systems. These are most significant for German banks, which account for around 30% of all BIS reporting banks' claims on the region.

Russia has reduced its near-term vulnerability to external financing pressures by repaying early some debt originally due in 2003, lowering the external debt servicing spike that year to around US\$17 billion. Meanwhile, foreign exchange reserves have risen to US\$44 billion from US\$12.5 billion at the time of the 1998 crisis. The fiscal position has also improved, aided by strong growth and higher oil prices, and public debt is projected to fall to around 40% of annual GDP at end-2002. Reflecting these developments, asset prices have risen sharply, with spreads falling below levels before the crisis in 1998 (Chart 81). But fiscal prospects remain sensitive to oil market developments, despite a new fiscal reserve fund and contingent budget clauses that cut public spending if oil prices fall. Also, Russian banks are still weak, as indicated by an average Moody's financial strength rating between D- and E+ (Chart 73), although the authorities have announced plans to strengthen the system.

Balance sheet adjustment in Asia

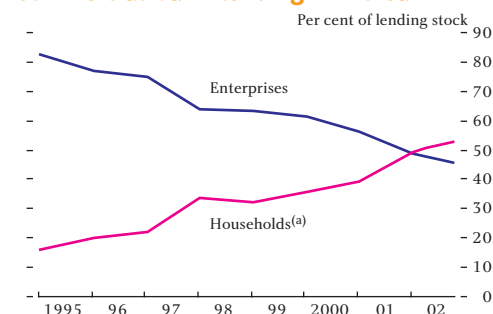
Many EMEs in Asia have significantly lowered their vulnerability to external financing pressures in recent years by accumulating foreign exchange reserves and reducing short-term external debt (Chart 79). But progress on reducing domestic balance sheet risks in some of the former crisis economies has been varied. Many have recapitalised banking sector balance sheets by transferring non-performing loans (NPLs) to government-owned asset management companies. Progress has been particularly marked in Korea where, according to Standard & Poor's, gross NPLs accounted for only 8.6% of total bank loans in mid-2002; by contrast, Standard & Poor's reported NPLs of close to 50% in Indonesia. Overall, bank balance sheets in much of Asia remain weaker than in some other EME regions (Chart 73).

Banks are adjusting the structure of their assets in several Asian EMEs. In some, increased exposures to the household sector have offset reduced lending to large companies. For example, in Korea the stock of household lending as a share of commercial bank lending has almost doubled since 1996 (Chart 82). Shifts in exposures may introduce new risks. For example, in the Hong Kong credit card market, the charge-off ratio on credit card receivables has continued to rise, to an annualised rate of 15% in 2002 Q3. Relatively low average loan-to-value (LTV) ratios in Hong Kong are probably one reason why banks there have faced only limited defaults on residential property exposures, despite a 55% fall in property prices since 1998. Regulators in Korea have lowered limits on LTV ratios for property lending to 60%, and have acted to tighten bank management of other household exposures, including higher provisioning requirements.

One consequence of bank recapitalisations in former crisis economies has been a rise in public sector debt, particularly in those countries where progress on asset disposal has been slow. Apart from Korea, these economies have also seen a deterioration in their budget positions since the 1997–98 crisis, reflecting the impact of automatic stabilisers and active stimuli by national authorities in response to weaker growth in 2001 (Chart 83).

Fiscal deficits have also risen in recent years in some economies not seriously affected by the 1997–98 crisis. In India, the consolidated public sector fiscal deficit was over 11% of GDP in the financial year to April 2002, and debt was equivalent to almost 90% of annual GDP. Official debt levels are much lower in mainland China, at around 25% of annual GDP, but that excludes substantial contingent liabilities in the state-owned bank and industry sectors. These could crystallise as the economy becomes increasingly exposed to international competition and external capital markets following entry to the World Trade Organisation. Hong Kong has no public debt and foreign exchange reserves of US\$111 billion, about 350% of the monetary base. But the fiscal deficit in 2002–03 looks likely to exceed those of recent years (Chart 84). Sustained deficits, and falling fiscal reserves, highlight the importance of consolidation measures announced by the government earlier this year.

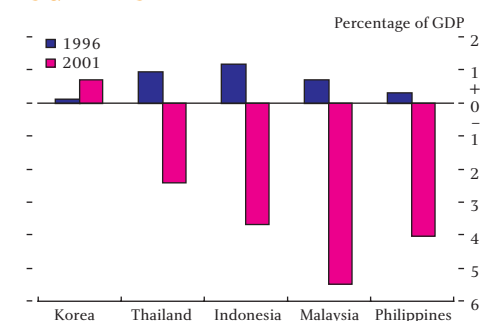
Chart 82:
Commercial bank lending in Korea



Source: Financial Supervisory Service of Korea.

(a) All housing related lending, including that to the enterprise sector.

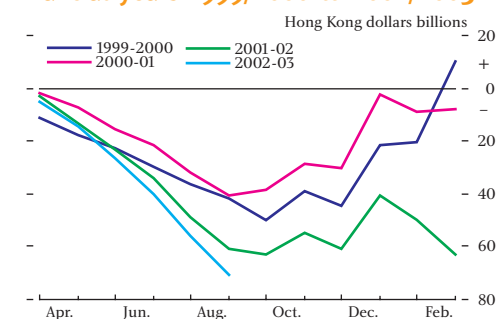
Chart 83:
Government fiscal balances in selected Asian EMEs^(a)



Sources: IMF World Economic Outlook and Asian Development Bank.

(a) Includes countries particularly affected by the 1997 Asian crisis. Definitions of fiscal balances may vary across countries.

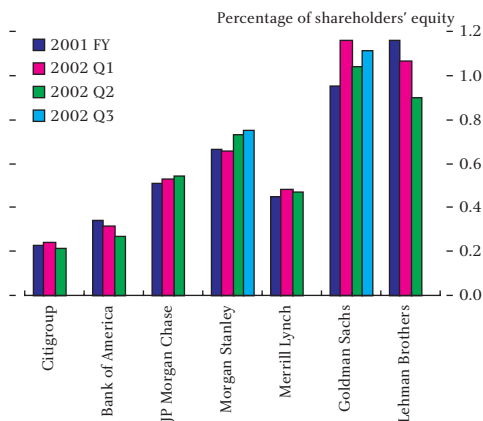
Chart 84:
Hong Kong: cumulative fiscal balance, financial years 1999/2000 to 2002/2003



Source: BIS.

6 The international financial system

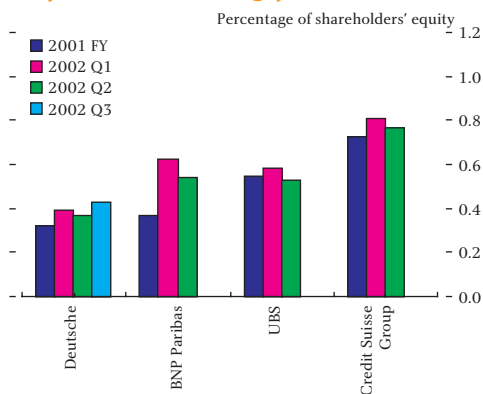
Chart 85:
Average indicative Value-at-Risk (VaR) for US LCFIs' trading portfolios^(a)



Sources: Earnings releases and SEC filings.

(a) For comparability purposes, published VaRs have been adjusted to a ten-day holding period and a 99% confidence interval. This assumes independent and normally distributed returns.

Chart 86:
Average indicative Value-at-Risk (VaR) for European LCFIs' trading portfolios^{(a)(b)(c)}



Sources: Earnings releases.

(a) For comparability purposes, published VaRs have been adjusted to a ten-day holding period and a 99% confidence interval. This assumes independent and normally distributed returns.

(b) European LCFIs where quarterly data are available.

(c) For BNP Paribas 2002 H1 used as 2002 Q2.

In an environment of high volatility in some financial markets (Section I.1), deteriorating credit risk (Sections I.1–I.4), and stresses in some emerging market economies (Section I.5), the international financial system has remained resilient. Nevertheless, for the first time in recent years, market indicators briefly suggested perceptions of vulnerability, with credit spreads in particular widening for some large banks and securities dealers.

Financial market conditions

Market volatility, liquidity and risk

As well as being a consequence of heightened uncertainty and perceptions of risk, the increased day-to-day and intraday volatility described in Section I.1 can itself be a source of risk – directly via firms' market exposures, and indirectly via lower liquidity if firms collectively attempt to retreat from risk. On the first of these, although some large firms have announced poorer trading results, there have been only isolated instances of significant strain – for example, at the Beacon Hill hedge fund group in the wake of very sharp movements in US dollar bond yields in mid-October, exacerbated by convexity hedging in the mortgage-backed securities market (a risk discussed in the June *Review*²⁸).

A rise in volatility means a rise in the market risk of any given position as measured by its value-at-risk (VaR). If, as a result, firms generally were to cut back position-taking, market liquidity might be impaired, perhaps further increasing risk. Liquidity and risk appetite are, however, notoriously difficult to measure and assess. Published data suggest that firms have not permitted market risk taking to rise significantly, although they have not responded in a uniform way (Charts 85 and 86). Anecdotally, there would seem, on the whole, to have been some moving away from risk for a period in selected markets (notably, equities and credit).

Hedge funds

Over recent years a significant source of proprietary risk-taking has been the hedge fund industry. Risk and risk appetite in the sector are often assessed on the basis of leverage. Generally risk appetite seems to remain at a much lower level than in the run-up to the LTCM failure in 1998. Funds are, though, said to be seeking leverage on better terms, and there are developments in the supply of credit to the industry that, in some degree, may make this feasible. These include so-called 'VaR-based' margining, where lenders may not require full additional margin on financing an incremental position, but rather will recognise historical co-variances in returns across positions and so allow some degree of margin offset; and synthetic leverage, for example through total return swaps, which allow hedge funds to receive the returns on a financial instrument without needing to finance its purchase. In

28: See pages 70–72 and Box 7 of the June *Review*.

part, these developments may reflect increased competition in the prime brokerage market, with greater involvement by European banks (including British, French, German, and Swiss).

Leverage is, however, an incomplete measure of risk. That has been relevant in the recent environment because, for an unchanged initial margin requirement (and so unchanged leverage as conventionally measured), higher volatility entails greater risk for a fund, and so for its creditors. It is not clear how far initial margin requirements have been raised to reflect higher volatility in some markets.

Asset price changes have made some strategies more difficult to manage, most obviously long-equity funds, but also convertible bond arbitrage, where the embedded equity options are generally now deeply out-of-the-money and so will not be exercised, leaving funds exposed to credit risk if they had not already hedged it. Some funds may have purchased credit protection for a shorter maturity than that of the bonds, in most cases leaving them with mark-to-market losses if they choose to replace hedges at today's higher CDS prices. Perhaps reflecting strains at some hedge funds, fewer companies have been issuing convertibles to shore up their liquidity (Chart 87).

Availability of financing

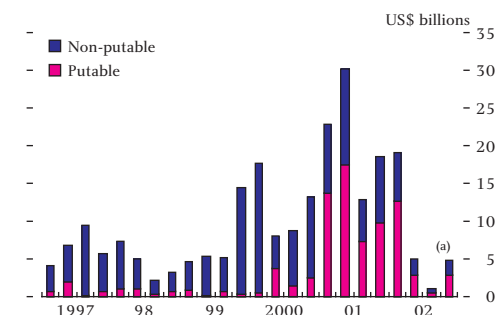
For those companies that did turn to convertibles in recent years, their debt-servicing burden has not in the event been alleviated by conversion into equity; and many now face a refinancing need as maturities approach or embedded put options are exercised. More generally, the prospective refinancing requirement next year is large (Charts 88 and 89). This burden seems likely to fall on credit markets if current equity market conditions persist. In particular, the IPO (initial public offering) market has remained subdued, although there have been windows for secondary offerings, especially if heavily discounted (Chart 90). This has, for example, enabled a number of European insurance companies to replenish their capital through rights issues, as discussed in Section I.3.

One sporadically bright spot has been the LBO (leveraged buy-out) market, which has been used by both US and European conglomerates to shed subsidiaries with tangible assets, strengthening their balance sheets and so probably reducing banking sector risks (Chart 91). There is said to be a significant pipeline in the USA and Europe, although activity has been running at a lower level in the fourth quarter than in the third.

The equity supporting these deals has typically come from large private equity firms, whose investors include pension funds. With debt-to-equity leverage said generally to be around four-to-one in recent deals and available equity from the sponsors to be in the region of US\$80 billion, some commentators have suggested that

Chart 87:

US domestic convertible bond issuance

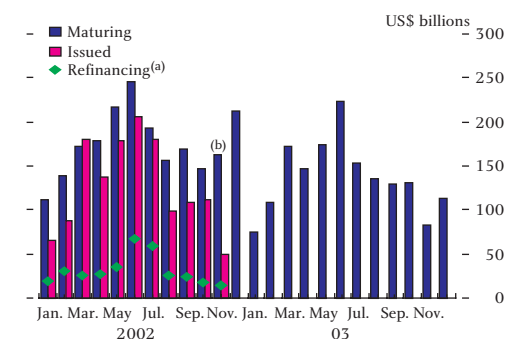


Source: Thomson Financial.

(a) Issuance shown for 2002 Q4 to date.

Chart 88:

Loans maturing, issued and classed as refinanced in 2002-2003



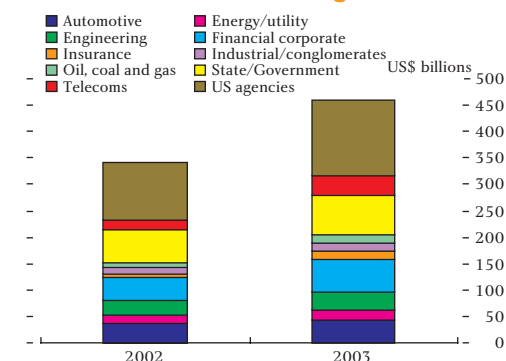
Sources: Dealogic and Bank calculations.

(a) Loan purpose identified as refinancing.

(b) Issuance shown to 22 Nov. 2002.

Chart 89:

International bonds maturing^{(a)(b)}

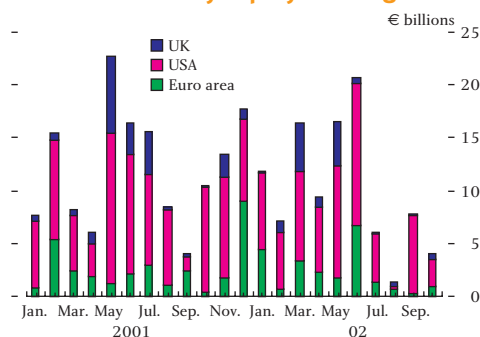


Sources: Dealogic and Bank calculations.

(a) Industries, excluding banking and financial, with ten largest volume of international bonds maturing in 2003.

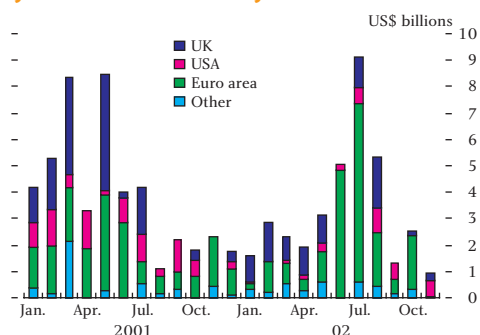
(b) Bonds issued up to 22 Nov. 2002.

Chart 90:
Value of secondary equity offerings



Sources: Bloomberg, Thomson Financial Datastream and Bank calculations.

Chart 91:
Syndicated lending for leveraged buy-outs by borrower nationality^{(a)(b)}

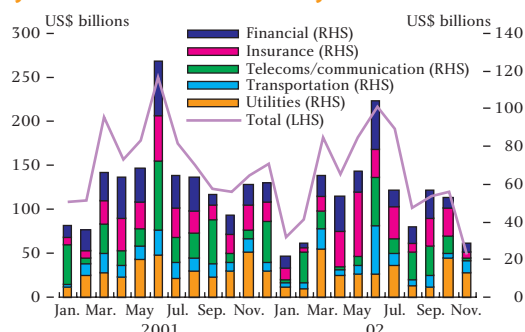


Source: Dealogic.

(a) All loans with loan purpose code identified as 'leveraged buy-out'.

(b) Issuance shown to 22 Nov. 2002.

Chart 92:
Syndicated loan issuance by sector^{(a)(b)}



Source: Dealogic.

(a) Investment-grade and sub-investment-grade.

(b) Issuance shown to 22 Nov. 2002.

up to US\$400 billion might be available to aid balance sheet restructuring in this way.

Besides the equity portion, these structures typically include a senior bank loan tranche and a 'mezzanine' tranche of subordinated high-yield bond finance. Contacts indicate that the most difficult element to arrange in recent months has generally been the mezzanine bond, and any associated bridge loan.

Credit conditions in capital markets

This tightening in mezzanine finance would be consistent with a reduced appetite for lower-grade credit risk more generally. This in turn potentially has implications for stability if it were to impede balance sheet adjustment in the corporate sector. Wholesale credit markets tightened significantly but selectively into the late autumn (Chart 92), with availability bifurcating. Demand has been high for issues by strong companies. But companies operating in troubled sectors – energy, telecommunications, and autos – or with high leverage have typically had to pay a premium for, or have been unable to access, bond finance. In consequence, some borrowers, notably auto companies, have turned increasingly to the asset-backed security (ABS) and asset-backed commercial paper (ABCP) markets, which they have been able to access with the help of over-collateralisation or other indirect credit enhancements. In both the USA and Europe, the share of borrowing that is securitised has risen (Chart 93).

The tightening was most marked in the high-yield (sub-investment-grade) bond market, which effectively closed in August. Although the US dollar market has since re-opened in a modest way, activity in the euro high-yield market has remained minimal, possibly reflecting the extent to which issuance was concentrated in the telecom and cable sectors during the late 1990s when the market was developing. The sub-investment-grade international syndicated loan market has, on the whole, continued to function, and the volume of new leveraged loans (broadly equivalent to sub-investment-grade) has exceeded that of high yield bonds. Spreads on lower investment-grade loans have generally risen, but spreads on similarly rated bonds have risen by much more, both in Europe (Chart 94) and the USA.

This spread difference probably reflects structural differences between loans and bonds. Loans typically carry more covenants, and so give lenders more influence in the event of a deterioration in a borrower's finances. In addition, bonds issued by a holding company are effectively subordinated to loans to an operating subsidiary. According to Moody's²⁹, for investment grade debt, the average recovery rate in 1982–2001 on senior, secured bank loans was 71%, compared with 53% for senior, secured bonds and 35% for senior, unsecured bonds. For

29: Moody's, Default Recovery Rates of Corporate Bond Issuers, February 2002.

speculative-grade bonds, the average recovery rate on senior unsecured bonds fell from 44% in 1982–2000 to 36% in 2001; for subordinated bonds, the corresponding fall was from 32% to 16%. Issuance patterns seem consistent with these figures (Charts 95 and 96). Since May 2002, the proportion of lending going to borrowers rated BBB or below has scarcely changed for loans, but has fallen off dramatically for bonds.

Terms and conditions of bank lending

Tighter borrowing conditions have in part reflected perceptions of higher credit risk, as indicated by ratings downgrades, enforced balance sheet restructurings, defaults, and low recovery rates which have reflected, *inter alia*, the high incidence of default amongst alternative telecom companies lacking tangible assets. One aspect of the tightening has been more restrictive terms and conditions in parts of the bank lending market.

The withdrawal by TXU, a Texas utility, of support for its European arm has reminded bankers of the risks associated with lending to subsidiaries on the basis of parental strength. Support is not always forthcoming if a whole group, and so the parent company itself, comes under pressure. Bankers have suggested that they might respond to this lesson by tightening terms on credit to subsidiaries in the absence of a parental guarantee.

More generally, as the credit problems of the past few years have persisted and perhaps deepened, bank lenders seem to have been tightening covenants for lower investment-grade and leveraged loans. According to the Loan Pricing Corporation, lenders have, for example, lowered ceilings on leverage: average non-telecom debt/EBITDA³⁰ ratios in covenants on leveraged loans have declined since 1997 from nearly five to four.

Changes in loan spreads and fees have been mixed, in some instances rising slightly on lower grade credits in both the USA and Europe, eg by some 15 basis points since June for BBB credits on US dollar one-year lending. Nevertheless, the changes are small, and spreads and fees remain low on undrawn commitments (Chart 97). Spreads on drawn loans also remain much lower than credit default swap prices (Chart 98), perhaps suggesting that loan pricing does not adequately cover risk, although structural differences between the two products make judgments in this area difficult³¹.

Factors affecting the supply of credit

Changing perceptions of risk have not been the only factor influencing credit conditions. As discussed in earlier *Reviews*³²,

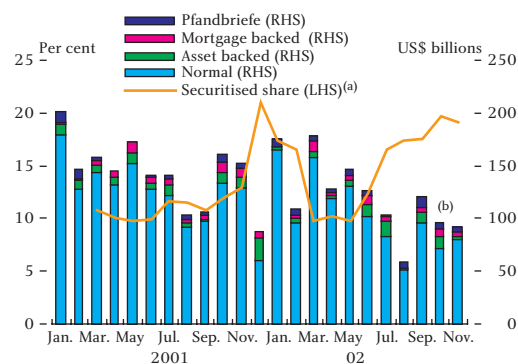
30: Loan Pricing Corporation, Gold Sheets online, 16 September 2002. 'EBITDA' denotes earnings before interest, tax, depreciation, and amortisation, a measure of cash flow.

31: Loan spreads may rationally be somewhat below CDS premia (and usually are) because, for example, they contain covenants, and do not involve a 'cheapest to deliver' option.

32: See pages 67–68 of the June 2002 *Review*.

Chart 93:

International bond issuance



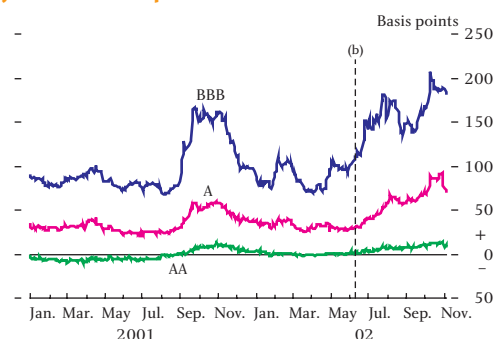
Source: Dealogic.

(a) Three-month moving average.

(b) Issuance shown to 22 Nov. 2002.

Chart 94:

Euro-denominated bond spreads less jumbo loan spreads^(a)



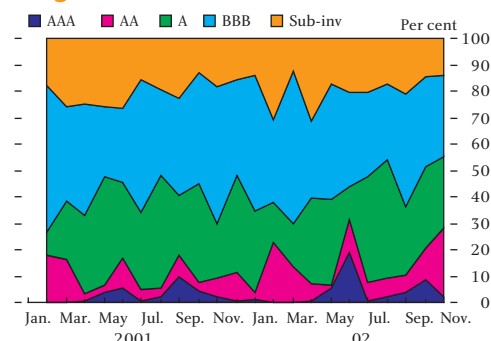
Sources: Merrill Lynch and Loan Pricing Corporation.

(a) Asset swap spread; ie option-adjusted spread over London Inter-Bank Offered Rate of a matched floating rate bond.

(b) Jun. 2002 *Review*.

Chart 95:

Syndicated loan issuance by S&P credit rating^{(a)(b)}

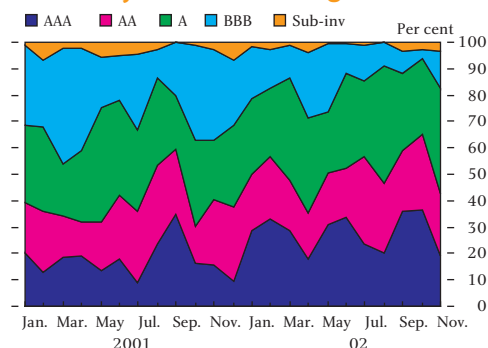


Source: Dealogic.

(a) International and domestically issued syndicated loans with an assigned Standard & Poor's credit rating.

(b) Issuance shown to 22 Nov. 2002.

Chart 96:
Non-governmental international bond
issuance by S&P credit rating^{(a)(b)}

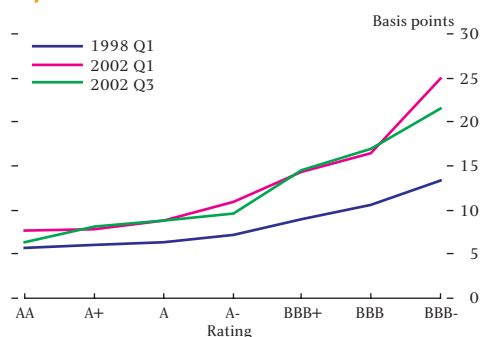


Source: Dealogic.

(a) Internationally issued bonds with an assigned Standard & Poor's credit rating.

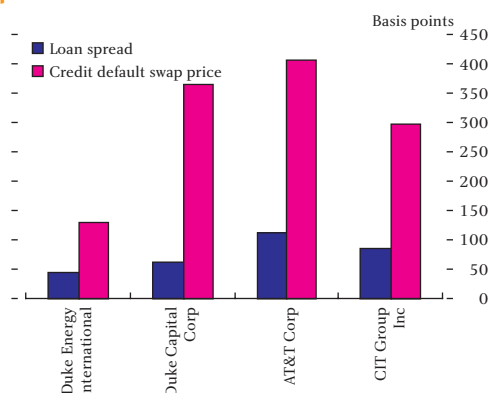
(b) Issuance shown to 22 Nov. 2002.

Chart 97:
Price of undrawn commitments for US
corporates



Source: Loan Pricing Corporation (LPC).

Chart 98:
Loan spreads and credit default swap
prices^{(a)(b)}



Sources: CreditTrade, Dealogic and JP Morgan Securities Ltd.

(a) Loan spread calculated as basis points above London Inter-Bank Offered Rate.

(b) Annual premium for credit protection on issuer using standard ISDA documentation, measured as mid-point between last bid and ask quotes on day of loan signature.

some large commercial banks have progressively become more selective about extending credit, in some cases participating only where there is a prospect of higher-margin business, perhaps judged against a target return on capital for the relationship. More recently, as discussed below, some banks have also been putting greater emphasis on avoiding or reducing large concentrated credit exposures. These attempts – including secondary loan sales and purchases of credit protection – may have contributed to the widening of credit spreads and tightening of credit conditions for some large companies carrying significant amounts of debt. Other things being equal, these developments would also point to the need for larger syndicates for any given size of loan. In fact, however, a number of medium-sized internationally active banks appear to have been stepping back a little from wholesale loan markets, possibly on account of cyclical or structural pressures (see Section I.3).

The pattern of the supply of credit from non-bank financial institutions has also evolved. US prime loan mutual funds have for some years been important in the US leveraged loan market (for the drawn tranches) and so are one possible indicator of institutional risk appetite. These funds have experienced net outflows recently (Chart 99), and their managers appear to have become somewhat wary of credit risk.

CDOs (collateralised debt obligations)³³ are probably a more important source of capital to support credit risk. In the cash CDO market, there has recently been much reduced demand for deals backed by high-yield bonds, with correspondingly more deals for leveraged loans. Synthetic CDO volumes continue to grow, particularly in Europe, perhaps containing the rise in single-name CDS prices as managers sell protection in order to put together underlying portfolios. Arbitrage between credit markets should, in principle, mean that this results in credit conditions for underlying borrowers being easier than would otherwise have been the case. Having been significant buyers of loans in both syndication and secondary markets in the first half of 2002, collateralised loan obligation (CLO) volumes have been well down in the second half, although there is still a CLO pipeline. As in the LBO market discussed above, senior tranches are said currently to be easier to sell than mezzanine tranches, as credit deterioration has reduced the value of the equity tranches and adversely affected the mezzanine tranches of some deals structured in the late-1990s.

There have also been some recent changes in the appetite for credit risk in the insurance industry, which for some years has been actively and widely involved in the credit risk transfer market³⁴. Life insurers – perhaps especially in continental

33: Rule, David, 'The credit derivatives market', *Financial Stability Review*, June 2001.

34: Rule, David, 'Risk transfer between banks, insurance companies and capital markets: an overview', *Financial Stability Review*, December 2001, page 137.

Europe – have typically bought funded instruments (such as credit-linked notes), while monolines³⁵, reinsurers and some property and casualty (P&C) companies have also bought unfunded instruments. According to the latest British Bankers' Association survey on the global credit derivatives market (including CDOs), market participants estimated that insurers (including monolines) accounted for 33% of protection sold at end-2001 compared with 23% at end-1999 (Chart 100)³⁶.

Recently, however, parts of the industry have stepped back, in varying degrees, from the credit arena. Demand for CDO equity tranches amongst continental European life insurers is said to have fallen; some monolines have announced reduced involvement, perhaps temporarily, in the credit risk transfer markets, contributing to a slight widening of premiums on 'super-senior' CDO tranches; and some P&C and reinsurers are less active too. It is difficult at this stage to assess the scale of this reduction in the supply of capital available to the credit risk market, as the largest P&C companies and many monolines and global reinsurers remain active.

Internationally active financial institutions

Financial market conditions have led to perceptions, notably in the wholesale credit markets, that risks have increased, and some internationally active financial institutions have encountered greater financial pressures in recent months. This reflects slowing economic activity, increased corporate credit losses, falling equity markets, stresses in emerging market economies, a slowdown in investment banking activity, and increased litigation risks (eg arising from involvement with Enron and Worldcom), with associated reputational costs and uncertainty about the impact on business models.

Large complex financial institutions (LCFIs)³⁷

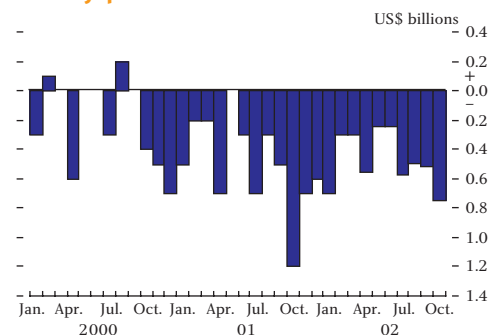
Globally active banks and securities dealers have been amongst the institutions subject to these pressures. This has, at times, been reflected in higher CDS prices (Charts 101 and 102), sharp falls in share prices, increases in share price implied volatilities, credit rating downgrades and ratings being placed on negative watch (Table 5). Since 1998, the international financial system has weathered a series of shocks – the Asian crisis, LTCM, Argentina and Enron among them – but recently, to a greater extent than before, there have been periods when market concerns have focused on individual institutions.

35: Monoline credit insurers specialise in providing credit enhancement for capital market transactions.

36: These figures should be regarded as only rough indications, since they are derived from survey data.

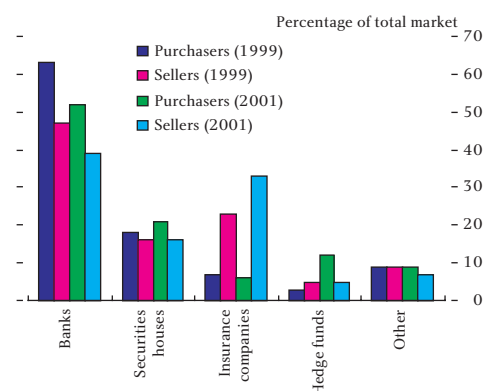
37: The December 2001 *Review* (page 81) described the criteria used to determine an LCFI peer group. The group is as follows: ABN Amro, Bank of America, Barclays, BNP Paribas, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan Chase, Lehman Brothers, Merrill Lynch, Morgan Stanley,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

Chart 99:
Monthly prime loan mutual fund flows



Sources: Lipper and Loan Pricing Corporation (LPC).

Chart 100:
Participation in the credit derivatives market^{(a)(b)}

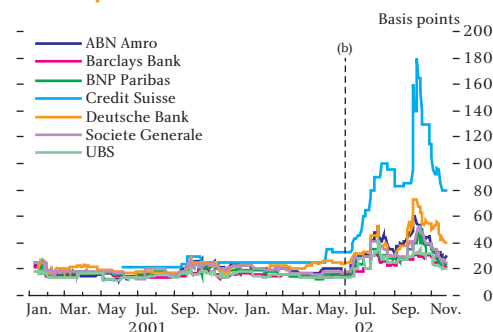


Source: BBA.

(a) As assessed by respondents to the BBA survey; end-1999 from the 1999/2000 survey; end-2001 from the 2001/2002 survey.

(b) Insurance companies include monolines and reinsurers.

Chart 101:
Five-year senior credit default swap prices for European banks^(a)

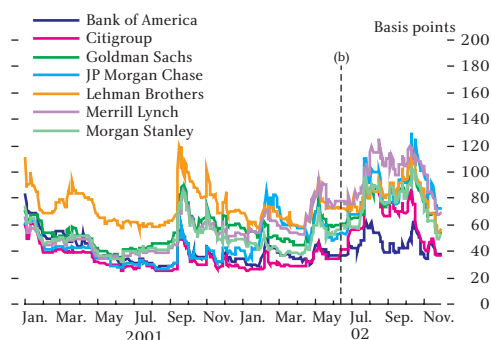


Sources: CreditTrade and JP Morgan Securities Ltd.

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

(b) Jun. 2002 *Review*.

Chart 102:
Five-year senior credit default swap prices
for US banks and dealers^(a)

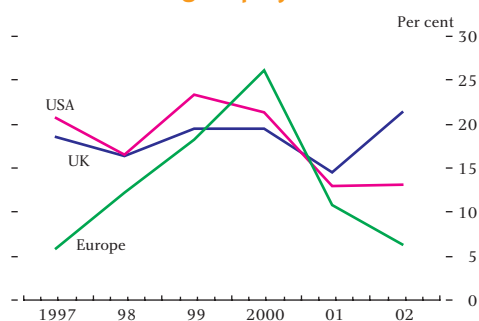


Source: CreditTrade.

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

(b) Jun. 2002 Review.

Chart 103:
Return on average equity of LCFIs^{(a)(b)}

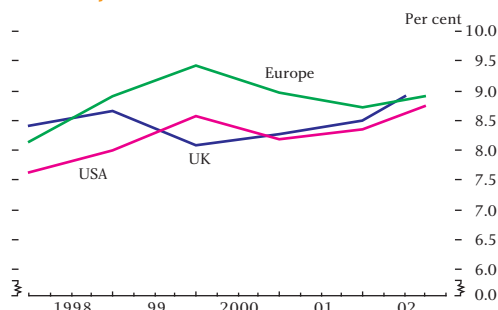


Sources: Bloomberg, bank interim reports and Bank calculations.

(a) Data as at 2002 Q3, apart from UK which is as of 2002 H1.

(b) Weighted by total assets.

Chart 104:
Tier 1 capital ratio for LCFIs^{(a)(b)(c)}



Sources: Bloomberg, Board of Governors of the Federal Reserve System, bank interim reports and Bank calculations.

(a) Data as at 2002 Q3, apart from UK which is as of 2002 H1.

(b) Weighted by total assets.

(c) LCFI commercial banks only.

Nevertheless, compared with the erosion of banks' capital in the recession of the early 1990s, the recent pressures have been modest – as have been the ratings downgrades. Most LCFIs have remained profitable (Chart 103), with returns on equity remaining strong; and crucially, published capital ratios also remain high (Chart 104). For some firms, however, profitability is low.

Insurance and reinsurance

The strength of the internationally active insurance industry is also relevant to financial stability, as the banking system is exposed to it in a variety of ways. Indirect links include banks' lending to sectors dependent on the availability of insurance, such as the construction industry. More direct links include credit protection provided to banks via credit derivatives (or surety bonds), where the bank has a counterparty exposure; interest-rate swap and other derivative counterparty credit exposures; and liquidity lines and letters of credit. Ownership structures can also be important, with links via participation in bancassurance groups or large cross-shareholdings – both more common in Europe than in the USA. (For exposures of UK banks to insurers and pension funds, see Section III.)

Increased financial pressures have recently been apparent in the insurance industry. The various causes include losses in corporate bond portfolios and on other credit exposures, equity portfolio losses, and, in the P&C sector, exposures to recent natural disasters and terrorism. The challenges facing the European life industry are discussed in Sections I.3 and III. For the non-life and reinsurance sector, Swiss Re³⁸ have estimated that, since 2000, capital has fallen by around US\$180 billion (or 25% of capital funds in 2000). This reduction has put upward pressure on premiums and so has perhaps made traditional lines of business more attractive than credit markets, contributing to the change in conditions described above.

In 2002 H2, rating agencies downgraded a number of reinsurers, citing the reduction of capital and increased leverage. Share prices also generally fell, especially in Europe (Chart 105). And credit default swap prices rose. More recently, action to strengthen capital – via rights issues or parental support – has been taken by a number of groups, and CDS prices have generally fallen back (Chart 106), while remaining higher than at the time of the June Review.

System resilience and risk management

Developments in industry risk management and the range of financial instruments may have helped to make the system more resilient to any idiosyncratic problems at individual institutions.

38: Swiss Re. sigma No.4/2002, page 9.

Table 5:

Rating actions on large internationally active banks and securities houses since June 2002 *Review*^{(a)(b)(c)}

	From:	To:	Notches:	Date:
ING Group	Aa2/AA-	Aa2/A+	0/-1	21 Nov.
ABN Amro	Aa2/AA	Aa3/AA-	-1/-1	12 Sep./23 Sep.
Toronto Dominion	Aa3/AA-	Aa3/AA-(neg)	0/0	4 Nov.
Merrill Lynch	Aa3/AA-	Aa3/A+	0/-1	17 Oct.
Morgan Stanley	Aa3/AA-	Aa3/A+	0/-1	17 Oct.
CIBC	Aa3/AA-	Aa3/A+	0/-1	27 Sep.
Goldman Sachs	A1/A+	Aa3/A+	+1/0	9 Aug.
Dresdner Bank	Aa2/AA-	Aa3/A+	-1/-1	9 Oct./9 Oct.
Credit Suisse	Aa3/A+	Aa3/A	0/-1	26 Nov.
BSCH	Aa3/A+	Aa3(neg)/A	0/-1	1 Aug./24 Jul.
JP Morgan Chase	Aa3/AA-	A1/A+	-1/-1	9 Oct./17 Sep.
Commerzbank	A1/A	A1/A-	0/-1	8 Oct.
IntesaBci	A1/A	A1/A-	0/-1	12 Nov.
Hypo Vereinsbank	Aa3/A	A1(neg)/A(neg)	-1/0	23 Oct./24 Oct.

Source: Bloomberg.

(a) Ratings shown as Moody's (senior unsecured debt)/Standard & Poor's (Long-term local issuer).

(b) Sorted by final Moody's rating. Rating at holding company level where available.

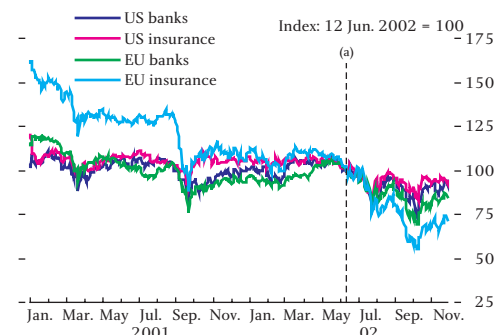
(c) For Moody's ratings, (neg) represents watchlist for possible downgrade. For Standard & Poor's ratings, (neg) represents credit watch negative.

Collateral has been employed more extensively over the past few years by LCFIs and other international banks, to cover counterparty credit exposures arising from OTC derivative market activities. Such collateralisation arrangements are typically governed by Credit Support Annexes (CSAs) to ISDA Master Agreements. Bankers report that, increasingly, such arrangements are being extended to foreign exchange (FX) exposures (Chart 107). Their use in relationships with wholesale market counterparties other than banks and securities dealers, such as insurance companies, is perhaps less extensive. CSAs typically call for collateralisation of marked-to-market exposures above a set threshold, which might be, say, US\$10–US\$25 million between two large banks dealing in ten-year interest rate swaps. Up to the threshold, exposures are uncollateralised. If a counterparty were downgraded, the threshold might be reduced.

Bankers are aware of a range of other issues that could potentially be triggered by ratings downgrades. For example, with the growth of structured finance and other asset-backed vehicles, banks and dealers enter into transactions, eg interest-rate swaps and credit derivative transactions, with special purpose vehicles (SPVs). In these cases, a CSA may not exist *ex ante*, but if the bank were downgraded, one may need to be negotiated, with collateral calls following. Similarly, an SPV's asset-backed commercial paper rating may depend on the rating of a bank providing a liquidity line or other credit enhancement. A downgrade of the bank may mean that an alternative provider of credit enhancement has to be found or, alternatively, that the bank has to take back onto its balance sheet the vehicle's underlying assets.

The size of these potential collateral calls makes it important, therefore, for banks active in the derivative or structured finance markets to have access to collateral in case of need. That could be provided by access to unsecured funding (for example, from a strong deposit base) or a highly liquid asset portfolio.

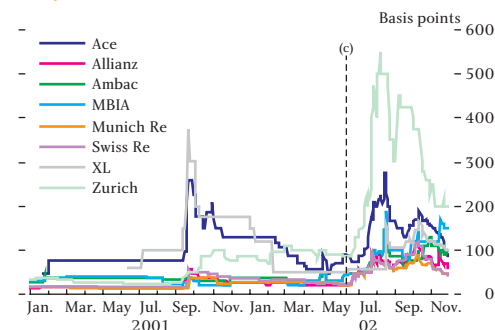
Chart 105:
Bank and insurance share price indices by country



Source: Thomson Financial Datastream.

(a) Jun. 2002 *Review*.

Chart 106:
Credit default swap quotes for insurance companies^{(a)(b)}



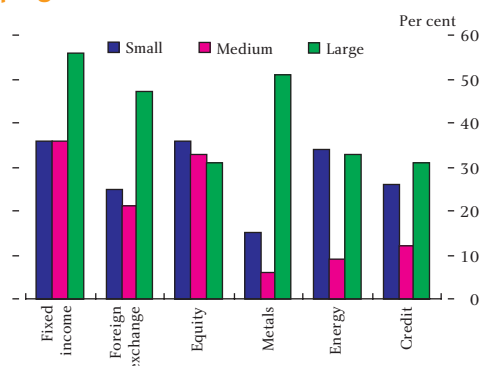
Source: JP Morgan Securities Ltd.

(a) Quotes for five-year senior protection.

(b) Excludes Scor, for which CDS quote was 875 basis points at end October 2002.

(c) Jun. 2002 *Review*.

Chart 107:
Collateralisation of derivative exposures by programme size^{(a)(b)}

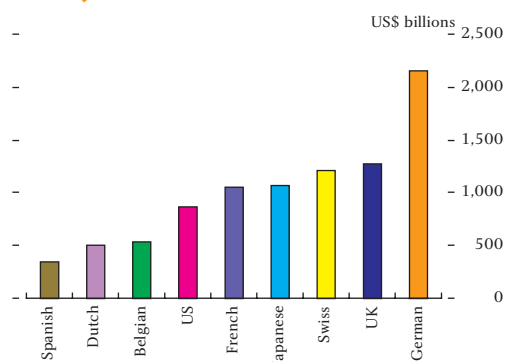


Source: International Swaps and Derivatives Association.

(a) Percentage of exposures to different product groups that are covered by collateral.

(b) Small, medium and large programmes are defined as those with 0-50, 51-500 and 500+ collateralisation agreements.

Chart 108:
Total consolidated foreign claims on all countries by ownership of reporting bank at end-June 2002



Source: BIS.

Table 6:
Consolidated external claims of UK-owned banks at end-June 2002^(a)

US\$ billions vis-à-vis	USA	Europe	Japan	EMEs ^(b)
Total foreign claims	393	352	51	361
Adjustment for guarantees	11	96	4	-32
Undisbursed commitments	30	39	2	71
Claims under derivatives contracts	66	74	12	12
Gross position as percentage of Tier 1 capital	314	353	43	258

Sources: Bank of England and FSA regulatory returns.

(a) The next release of this data – for 2002 Q3 – is 20 Dec. 2002 (www.bankofengland.co.uk/mfsd/).

(b) And offshore centres.

Noteworthy among developments in infrastructure, CLS Bank International, launched in September, is reducing the credit exposures previously entailed by foreign exchange settlements: see the article *Strengthening financial infrastructure* in this Review.

Portfolio credit management is a second area of improved risk monitoring and control. Some LCFIs are reported to have made progress in developing systems that can more easily identify and track comprehensive global consolidated credit exposures to a particular name. More generally, according to market contacts, a number of the biggest commercial banks now routinely use credit derivatives, alongside older techniques such as loan sales and securitisation, to manage ‘lumpy’ portfolio exposures. Market experience suggests, however, that hedging large exposures is sometimes not feasible once a borrower has fallen to sub-investment-grade. Looking forward, complications might also arise from the accounting treatment of hedges under FASB 133 and IAS 39. Because a CDS is marked to market whereas a loan or undrawn commitment is not, buyers of credit protection risk a ‘double hit’ if, as the world economy recovers, the values of long CDS positions have to be marked down while, due to lags, provisions against the underlying loan exposures are still increasing³⁹.

Innovation in financial instruments is a third area affecting the risk environment. On the positive side, innovation has broadened the range of financing options available to market users. Over the past year or so, as credit markets tightened, stretched borrowers were able to turn to, *inter alia*, asset-backed markets, to sales of businesses to private equity firms, and to deeply discounted rights issues. This followed, in 2001, refinancing of short-term debt through bond markets, and issuance of convertibles. Meanwhile, further development of credit risk transfer markets has helped to distribute the resulting credit risk through the system, including to non-banks.

By the same token, innovation expands the range of risk-taking opportunities, and can lead to ‘crowded trades’. In a number of markets, the ‘demand for yield’ is strong, and derivatives can be used to enhance the yield of investment products. One example is the provision by international banks of guarantees of the principal invested in funds of hedge funds,⁴⁰ which have continued to grow since the June Review. These funds do not yet appear to have experienced stress. Nevertheless, there are concerns in the industry that if the prices of the assets underlying such products were to fall sharply, adverse market dynamics could develop and aggravate the initial asset price changes. Another example is the so-called ‘power reverse dual

39: See page 69 of the June 2002 Review. For IAS 39, see the article ‘Strengthening financial infrastructure’ in this Review.

40: See the discussion on page 73 of the June 2002 Review.

currency' bonds, said to have been popular with Japanese investors, which pay a high initial coupon, link future interest and perhaps principal payments to the path of the yen/US dollar exchange rate, and give the issuer a series of call options. There are some concerns that hedging liquidity may prove illusory in the event of abrupt market movements, because market participants are positioned the same way (a 'crowded trade').

Links to the UK financial system

As well as via the interbank market links discussed in Section III, the UK and international financial systems are connected through UK-owned banks' overseas lending, foreign banks' London-based cross-border operations, and foreign banks' lending in the UK (Box 2 considers the foreign exposures of internally active banks more generally).

In the first half of 2002, UK-owned banks replaced the Japanese as the second largest group of international creditors (Chart 108). Table 6 shows a breakdown of their on-balance-sheet and off-balance-sheet positions *vis-à-vis* the regions discussed in the earlier sections of this *Review*. Section III.2 considers in more detail the composition of the large UK banks' foreign claims, and how this bears on potential risks associated with these exposures.

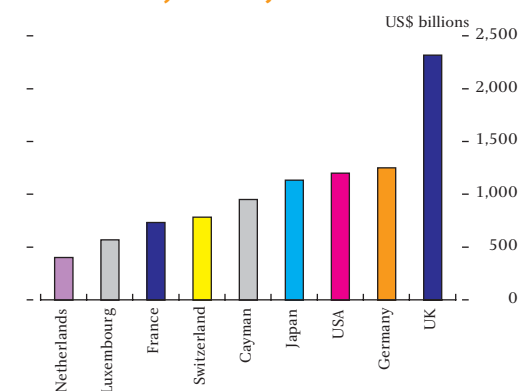
Many foreign-owned banks also do a large part of their cross-border lending from London. On a residency – rather than ownership – basis, the external claims of banks in the UK far exceed those of any other banking centre (Chart 109).

UK-resident foreign banks' external claims totalled US\$1.7 trillion at end-September 2002, while liabilities to other UK-resident banks, together with CDs issued in the UK, stood at US\$518 billion. Collectively, foreign banks had net London interbank liabilities and CDs outstanding of US\$165 billion, while the LCFIs described above had net London liabilities of US\$21 billion⁴¹. On a consolidated basis, the net sterling liabilities of foreign banks' UK offices, to all sectors, increased to around US\$105 billion at end-June 2002, from US\$77 billion at end-2001.

Lending to UK residents by foreign banks forms another link between the international and UK financial systems. If they were to cut back their lending, the slack would have to be taken up by UK banks if overall supply conditions were to be maintained. At end-September 2002, foreign banks accounted for 43% of the UK-resident banking system's lending to non-bank financial companies, and for 36% of UK bank lending to the private non-financial companies (PNFCs). German banks had just under a 10% share of lending to UK PNFCs (Chart 110).

Chart 109:

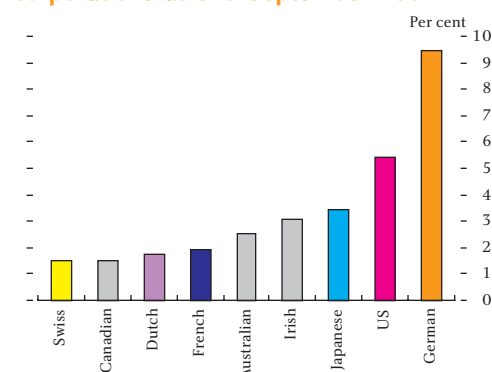
External assets of banks (by residency of creditor bank) at end-June 2002



Source: BIS.

Chart 110:

UK-resident foreign banks' share of lending to UK private non-financial corporations at end-September 2002^(a)

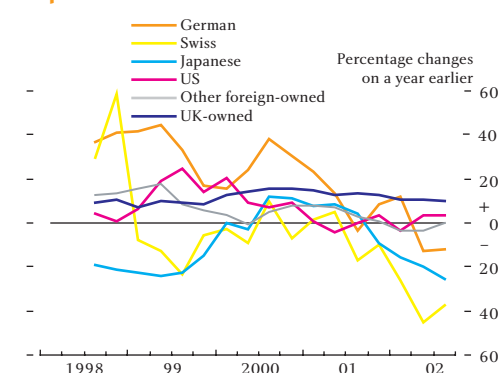


Source: Bank of England.

(a) Lending to UK-based activities of private non-financial corporations regardless of the ultimate ownership of the PNFC.

Chart 111:

Four-quarter growth in UK-resident foreign banks' lending to private non-financial corporations

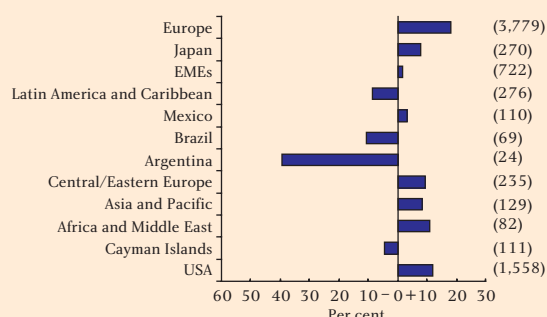


Source: Bank of England.

41: Some parts of LCFIs' UK operations are not conducted in firms classified as banks, and those positions are not captured in these statistics.

Box 2: Internationally active banks

Chart A:
Continental European banks' foreign exposures, change over 2002 H1^{(a)(b)}

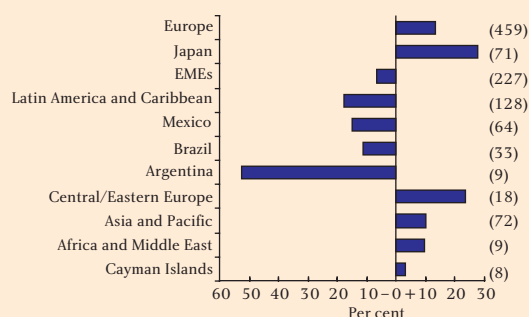


Source: BIS.

(a) BIS geographical definitions.

(b) Figures in brackets show total exposure in US\$ billions, end-June 2002, of continental European and Irish banks.

Chart B:
US large banks' foreign exposures, change over 2002 H1^{(a)(b)(c)}



Source: Federal Financial Institutions Examination Council.

(a) BIS geographical definitions.

(b) Figures in brackets show total exposure in US\$ billions, end-June 2002.

(c) Claims of US banks are adjusted for guarantees (risk transfer) and revaluation gains on derivative products.

A full assessment of the ways in which financial problems might be transmitted internationally would require more data than are currently published by the authorities. For example, few countries yet report *off-balance-sheet* claims such as revaluation gains under derivative contracts – though the BIS is co-ordinating efforts to enhance statistical reporting of off-balance-sheet elements of international credit and counterparty risks. A partial picture of international financial system links can, nevertheless, be assembled by drawing on the BIS banking statistics, which capture *on-balance-sheet* cross-border claims and credit extended by banks' local offices in foreign countries.

The foreign exposures of BIS-reporting banks are mainly to developed countries. After adjusting, where possible, to include guarantees, 51% of the total claims of BIS-reporting banks are on developed European economies, around 23% on the USA, 6% on offshore banking centres and 10% on emerging market economies. The US dollar value of their total foreign claims increased by around 8% over the first six months of 2002, with an increase in the second quarter reversing a slight contraction in Q1. But, after adjustment for exchange rate changes, the second quarter increase in foreign claims was only around 1.5%.

Discrimination between borrowers has been apparent, with significant increases in claims on Central and Eastern Europe, some Asian and Pacific countries, as well as in developed markets, while claims on Latin America declined (Charts A and B). The 27% increase in US banks' claims on Japan reflected a rise in the 'money centre' banks'¹ holdings of Japanese government securities and assets held on trading account. Their cross-border claims on Japan, plus those of their Japan-based local offices, were 9% of their total foreign claims at end-June 2002 and around 44% of Tier 1 capital. European banks' claims on Japan increased by 8% over the same period, and accounted for around 4% of total foreign claims.

1: Bank of America, Bank One, Taunus Corp, JP Morgan Chase and Citigroup.

Foreign bank lending to non-bank financial companies has changed little, in sterling terms, since end-2001. But outstanding credit from foreign banks' UK offices to PNFCs fell by around £12 billion (US\$18 billion), or 10%, between end-2001 and end-September 2002 (Chart 111). This may reflect pressures on some overseas banking systems, as well as subdued demand for credit amongst PNFCs. The effect on the financing of UK firms is explored further in Section II.

II The UK environment

1 The macroeconomic background

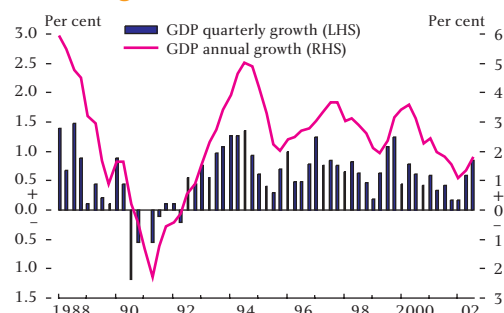
Activity in the UK has recovered somewhat according to data released since the June 2002 *Review*. GDP is estimated to have grown by 0.6% in 2002 Q2 and 0.8% in Q3, following little growth around the turn of the year (Chart 112). But expectations have become somewhat more pessimistic, according to survey evidence and Consensus forecasts, probably reflecting the weaker-than-expected world economic recovery and the further equity price falls since June. The November modal projection of the Bank's Monetary Policy Committee was for annual GDP growth to continue to recover from the current rate of 1.8% to a little above the long-term trend rate by early 2003, assisted by robust household demand and public spending. Thereafter growth was projected to slow towards trend. This profile was broadly similar to that shown in the August 2002 *Inflation Report*.

Notwithstanding the favourable aggregate environment, persistent imbalances in the economy pose risks to stability. Consumer spending rose by nearly 4% in the year to 2002 Q3, while business investment fell by over 12% during the same period. The Q3 output data suggest a further rise in services sector growth, together with only a modest rebound in manufacturing activity (since partially reversed). The UK's current account deficit widened a little further in Q2, bringing the cumulative deficit in 2002 H1 to nearly £8 billion (1.5% of GDP).

Despite the persistent current account deficit, the UK's net external liabilities are estimated to have fallen from a peak of over £140 billion at end-March 1999 (16.2% of GDP) to zero at end-June 2002. This mainly reflected increases in net direct investment assets in the early part of this period. More recently, falling equity prices have reduced net portfolio equity liabilities, given that the stock of such liabilities exceeds the stock of corresponding assets⁴².

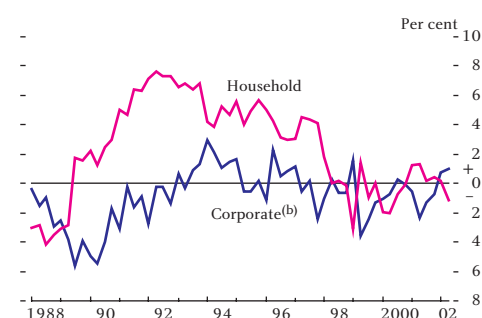
There were offsetting movements in 2002 H1 in the net financial positions of the non-bank private sectors: from deficit to surplus for the corporate sector and from surplus to deficit for the household sector (Chart 113). Indebtedness in relation to income continued to rise in both sectors, but more slowly in the corporate sector and more rapidly in the household sector.

Chart 112:
Real GDP growth



Source: ONS.

Chart 113:
Financial balances of the corporate and household sectors^(a)



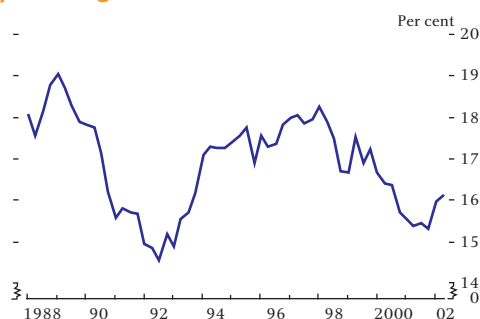
Source: ONS.

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

(b) Corporate sector includes private non-financial corporations only.

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

Chart 114:
Gross trading profits of PNFCs as a percentage of GDP^{(a)(b)(c)}



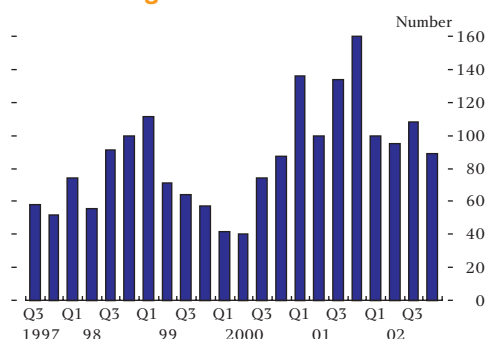
Sources: ONS and Bank of England.

(a) GDP at current prices. Data are seasonally adjusted.

(b) Excluding alignment adjustment.

(c) PNFCs excluding oil companies.

Chart 115:
Profit warnings^{(a)(b)}

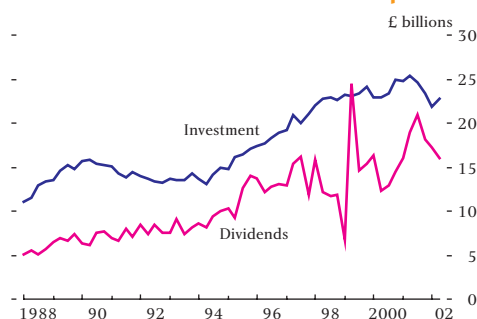


Sources: LexisNexis Professional (since Sep. 2002), Reuters and Bank of England.

(a) Fledgling and Alternative Investment Market companies are included.

(b) 2002 Q4 warnings grossed up using data to 27 Nov. 2002.

Chart 116:
PNFCs' investment and dividends paid^(a)



Sources: ONS and Bank of England.

(a) Data are seasonally adjusted and at current prices.

2 The corporate sector

Data released since the June 2002 *Review* suggest a modest recovery in corporate profitability, but cutbacks in dividend payments and capital spending have continued, associated with companies' efforts to repair balance sheets. Capital gearing has fallen back in relation to the replacement cost of capital, but equity market weakness has pushed gearing up in relation to market valuations. Income gearing and liquidity have both improved, helping to keep corporate liquidations at modest levels.

Profitability

Following declines between mid-1999 and late-2001, non-oil private non-financial companies' (PNFCs) gross trading profits recovered somewhat in 2002 H1, rising by over 9% in the year to Q2 according to national accounts data. This has attenuated a little the four-year decline in the profitability of the corporate sector in relation to GDP (Chart 114). Company accounts data, however, showed some deterioration in operating profit margins among the relatively small proportion of quoted companies that have reported results both for the year to end-March or end-June 2002 and the corresponding previous year. There has been a greater deterioration for the larger companies in this group.

Profit warnings have been running at lower levels so far this year than last, but remain higher than in the 1999–2000 period (Chart 115). Research at the Bank suggests that such warnings contain forward-looking information about corporate profitability and more generally the corporate sector's financial position⁴³. But the confidence attached to profit forecasts and analysts' earnings expectations may have been undermined somewhat by the accounting problems in the USA revealed by the Enron, WorldCom and other corporate failures, notwithstanding the corrective actions taken since the problems came to light.

The financial balance and corporate sector adjustment

The modest recovery in profits helped the corporate sector to return to financial surplus in 2002 H1 – of close to 1% of GDP, following a deficit of 1.2% in 2001 (Chart 113). But the turnaround also reflected the actions taken by companies to adjust to the earlier deterioration in balance sheets. The June 2002 *Review* noted tentative signs of such adjustment late last year, but subsequent evidence suggests that it intensified this year⁴⁴. Dividend payments have now fallen for three

43: See Kearns, A, and Whitley, J (2002), 'The balance sheet information content of UK company profit warnings', *Quarterly Bulletin*, Autumn, pages 292-298.

44: Research suggests that the corrective actions taken by the corporate sector to improve balance sheets are very much what might be expected following a build-up of indebtedness and a cyclical downturn. See Benito, A and Young, G (2002) 'Financial pressure and balance sheet adjustment by UK firms', Bank of England Working Paper no. 168.

successive quarters, by nearly 24% in total since 2001 Q3 (Chart 116). Gross domestic fixed capital formation declined by nearly 10% in the year to 2002 Q2, also reflecting concerns over prospects for demand. And companies scaled back expenditure on M&A activity last year and early this year. Adjustment has been accompanied by signs of reduced demand for labour, although so far this has been manifested mainly in reductions in hours worked rather than lower employment.

External financing

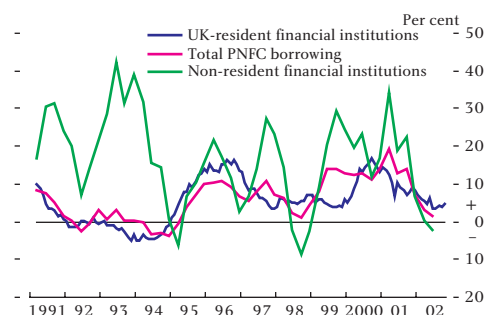
The developments reported above have contributed to a stabilisation of companies' external financing needs. Increased recourse to bank and bond finance between 1999 and 2001 reduced the share of equity and increased the share of debt finance over that period. But equity still has much more weight in the overall average cost of capital⁴⁵, and the recent equity price declines have pushed up the weighted average cost of capital further, not only relative to risk-free rates, but also in absolute terms. This too will have restrained companies' demand for external finance.

Sterling borrowing from UK-resident banks has continued to slow, growing by around 4.5% in the year to October, down from around 8% a year earlier (Chart 117). This mainly reflects reduced demand, but another factor may be a tightening by banks of terms and conditions associated with loans to UK companies whose credit quality is thought to have deteriorated. Foreign-owned banks account for most of the slowdown in total lending to UK companies (Chart 118); some of them may have become more cautious about granting loans, or have reassessed the pricing of those loans, because of increased provisions and pressure on profits in their home markets. This may also explain anecdotal evidence of reduced foreign bank participation in the syndicated loan market, where refinancing activity has fallen slightly this year (Chart 119). Acquisition-related syndicated loans appear to have recovered somewhat in 2002, but the data are dominated by Network Rail's acquisition of Railtrack.

International public bond issuance by UK companies, too, has fallen back since July (Chart 120), especially at lower ratings. Again, this probably reflects changes in both the demand for and supply of finance, associated in both cases with a retreat from risk. A lower risk appetite on the part of investors is consistent with rising UK corporate bond spreads at lower ratings (Chart 121), where credit risk accounts for a larger proportion of the observed spread (as described in Section I) and where such risk appears to have increased more than for higher-rated companies. Since June, for example, bond spreads (over swap rates) have risen by some 110 basis points for double- and

45: As at end-June 2002, equity accounted for some 58% of the stock of PNFCs' external finance, with borrowing from banks and other financial institutions accounting for a further 27%, and bond finance 10%, of the stock (the other 5% was trade credit).

Chart 117:
Growth of bank borrowing by UK PNFCs^{(a)(b)(c)}



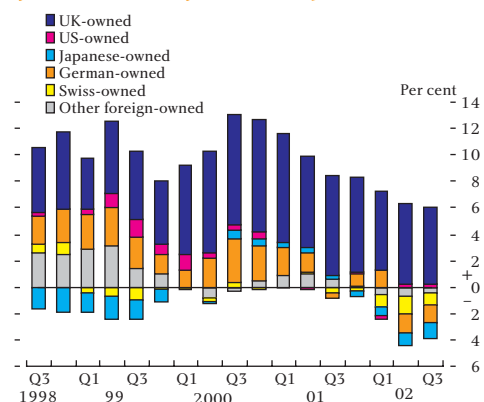
Sources: ONS and Bank of England.

(a) Twelve-month growth rates.

(b) UK resident data are monthly and include lending in sterling only.

(c) Total PNFC and non-resident data are quarterly, and include lending in both sterling and foreign currency.

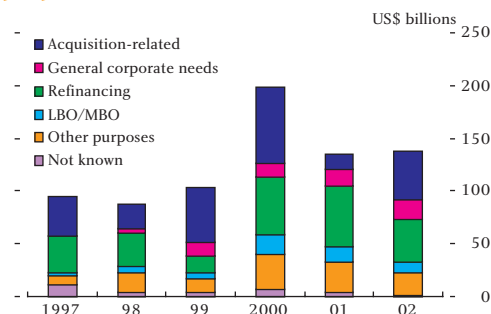
Chart 118:
Contributions to growth in bank borrowing by UK PNFCs, by ownership of bank^(a)



Source: Bank of England.

(a) Peer-group comparison of contributions to annual growth in bank lending to PNFCs by UK-resident banks and building societies. Data exclude securitisations.

Chart 119:
Syndicated finance raised by UK PNFCs, by purpose of loan^{(a)(b)(c)}



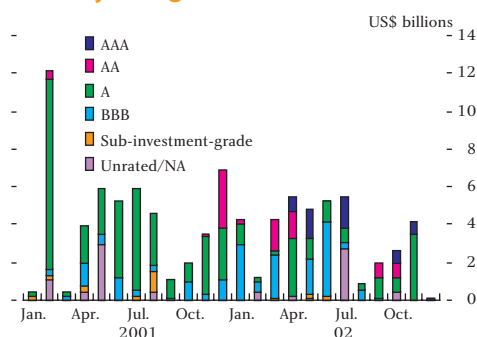
Sources: Dealogic and Bank of England.

(a) Syndicated loan facilities granted to UK PNFCs, sorted by signing date.

(b) Purpose of loan is the principal purpose (ie the first code assigned to each loan in Dealogic Loanware).

(c) 2002 data cover the period from 1 Jan. 2002 to 22 Nov. 2002, annualised.

Chart 120:
International public bond issuance by UK PNFCs by rating^{(a)(b)(c)}



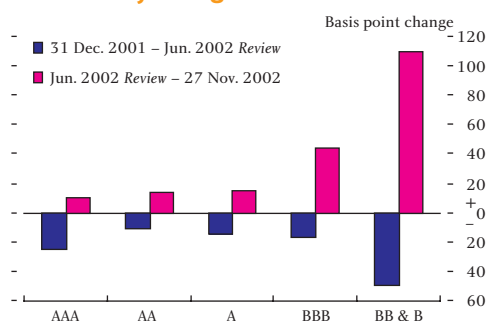
Sources: Dealogic and Bank of England.

(a) Bond issues sorted by payment date.

(b) The Standard & Poor's rating is used, where available. Otherwise, Moody's Investors Service or Fitch IBCA ratings are used.

(c) Data cover bond issues announced up to 22 Nov. 2002.

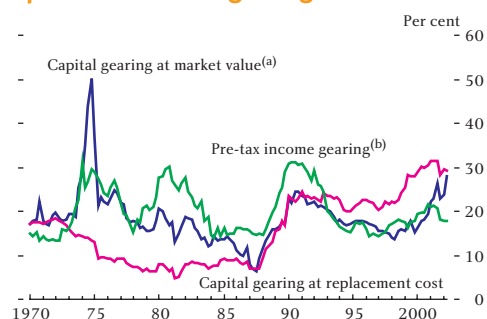
Chart 121:
Credit spread changes on bonds issued by UK PNFCs by rating^(a)



Sources: Merrill Lynch and Bank of England.

(a) Change in the unweighted average of asset swap spreads between the dates shown. The calculation is based on all bond issues, in all currencies, by those UK-domiciled PNFCs included in the Merrill Lynch Global High Grade and Global High Yield Corporate Indices. Asset swap spread is defined as the option-adjusted spread over London Inter-Bank Offered Rate of a matched floating rate bond.

Chart 122:
Capital and income gearing of PNFCs



Sources: ONS and Bank of England.

(a) PNFCs' net debt divided by the market valuation of PNFCs.

(b) PNFCs' interest paid divided by profits before tax and interest. Data are seasonally adjusted.

single-B rated UK issuers in aggregate, by around 45 basis points for triple-B issuers, and by only 10–15 basis points for A and higher-rated companies (where issuance has recovered recently).

Greater differentiation of credit risk leaves lower-rated companies with fewer financing alternatives, in the light also of falling equity prices and increased equity market volatility. Total equity issuance this year has, however, been higher than last year in value, partly reflecting recourse by both PNFCs and financial companies to rights issues, although many have had to be both deeply discounted and underwritten to ensure take-up. Some recent rights issues appear to have been motivated by debt reduction rather than by acquisition of other companies, which was the principal objective of equity issuance in 1999 and 2000.

Gearing and debt service costs

Lower borrowing will help to reduce corporate sector capital gearing ratios, which have risen to historically high levels in recent years (Chart 122). Indeed, indebtedness relative to the capital stock measured at replacement cost has eased back somewhat over the past year. But, notwithstanding the slowdown in corporate debt accumulation, equity market weakness has pushed capital gearing up further in relation to the market value of the capital stock – it rose by 4 percentage points in 2002 Q2, reaching levels above those in the early 1990s. Further falls in equity prices since June are likely to have raised this measure of gearing again in Q3.

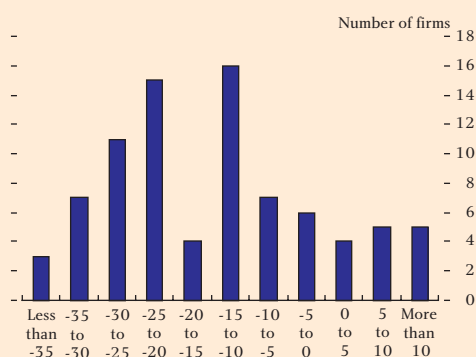
High gearing together with continuing equity market weakness may necessitate further adjustment by companies with large defined-benefit pension schemes. In a sample of 83 FTSE-100 UK companies that have produced data on net pension liabilities under FRS 17 assumptions, all but 15 were estimated to have had pension fund deficits (on an FRS 17 basis) at 27 November 2002. In 46 cases, these deficits were relatively modest – less than 5% of market capitalisation – but in six cases the deficit exceeded 20% of market capitalisation. The 22 companies with deficits in excess of 5% of market capitalisation had lower profitability and interest cover on average than the 46 companies with deficits below 5% of market capitalisation. But there was little difference in the average capital gearing of the two groups. The likely effects on the corporate sector's financial position are considered in more detail in Box 3.

The somewhat more difficult financial environment has not as yet caused major debt servicing difficulties for companies. Indeed, income gearing has eased a little further since the June 2002 Review and is at its lowest for nearly three years (Chart 122). This reflects both a fall of over 11% in debt interest payments over the past year, in turn attributable to lower bond yields together with the slower growth of debt, and also the

Box 3: Funding company-sponsored pension schemes

Deficits on company-sponsored defined-benefit pension schemes provide a snapshot of the additional contributions that companies need to make to meet their future liabilities. Chart A shows the distribution of deficits as a proportion of fund liabilities for 83 FTSE-100 companies which have disclosed deficits on an FRS 17 basis, updated for share price movements to 27 November 2002¹. Because both the future return from the assets of any pension fund, and the future cost of meeting the liabilities, are uncertain, no single valuation can encapsulate what contributions the sponsoring company might need to make over time. Instead, an estimate of the possible range of contributions and their likelihood of occurring is helpful.

Chart A:
The distribution of surpluses/deficits as percentage of total liabilities^(a)



Sources: Individual annual reports and Bank calculations.

(a) Surplus/deficit as percentage of total liabilities.

This can be estimated by simulating the net contributions made by an hypothetical company that acts to keep its fund broadly in balance, topping-up the fund when a deficit appears and making withdrawals when it moves into surplus.

It is assumed here that the expected real return on the pension portfolio is 6.1% pa with a standard deviation of 17.5 percentage points, in line with historical experience for a typical pension portfolio with 75% of its assets invested in equities. The real interest rate used to discount pension liabilities is

3.35% pa, broadly consistent with current real corporate bond yields.

By investing the fund in assets with an expected yield higher than is necessary to meet its liabilities, the sponsoring company would hope over time to be able to withdraw more profits from the fund than it needs to make top-up contributions. For a company whose pension fund is initially in balance, the median present value of withdrawals net of top-up contributions is estimated to be substantial at around half the initial value of the fund. For companies that start with a pension fund deficit, any prospective benefits are reduced according to the size of the initial deficit. Thus, for a company with a deficit worth a quarter of its pension liabilities, the median present value of net withdrawals would be worth a quarter rather than a half of the initial liabilities. Nevertheless, there is a better than evens chance that it will be able to make net withdrawals from the fund over time.

While this analysis provides some reassurance even for sponsoring companies with large pension fund deficits, it would be wrong to underestimate the risks. Given the parameter values assumed here, there is around a one-in-five chance that companies would lose money in this way and a one-in-ten chance that their losses would amount to more than a quarter of the initial value of the fund. Moreover, the distribution of future returns on asset portfolios could be worse than has been assumed. This would shift the risk towards a greater possibility of loss. And even in the central case, deficits would occur in individual years. These are likely to be most problematic where company pension funds are large in relation to the firm's main business, since the necessary size of any top-up contribution could be a substantial share of resources. Six FTSE-100 companies had deficits in excess of 20% of their market capitalisation at end-November. When other debts are taken into account, the financial position of such companies would appear more vulnerable and the burden of increased pension fund contributions would be particularly acute.

¹ FRS 17 is the new method for accounting for pensions. It has not been fully implemented, although companies are required to make additional disclosures on this basis in the notes to their accounts.

modest recovery in profitability. Even if income gearing were to rise somewhat, most companies currently possess substantial liquid assets with which to service the debt. Corporate liquidity, as measured by the ratio of cash plus deposits to income or liabilities, has been rising since 1999 and is currently historically high on some indicators.

Corporate defaults and failures

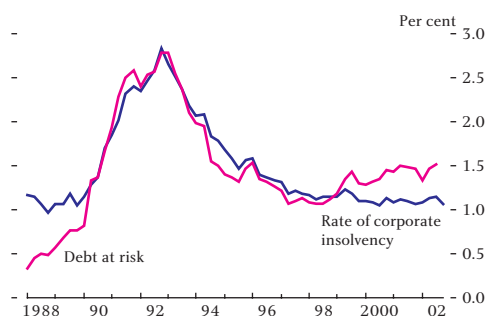
These modest levels of income gearing help to explain the continued low rate of corporate liquidations in the UK, although rising overall indebtedness has pushed up aggregate 'debt at risk'⁴⁶ (Chart 123). Corporate liquidations fell in 2002 Q3, reflecting a 6% fall in insolvencies reported to the DTI, although they remained 5.2% higher than a year earlier. The Dun and Bradstreet statistics (which, unlike the DTI numbers, include unincorporated businesses) showed a small rise in liquidations in Q3, to a level 5.5% above that of a year earlier. The modest rise in liquidations over the past year is broadly as predicted by models of implied corporate default probability, especially those based on market indicators such as equity price levels and volatilities. Corporate recovery bankers report a rise in corporate workout activity this year, involving mainly large rather than small companies. This is consistent with statistics showing a greater rise in defaults (on quoted debt) by value than by number.

Turning to the immediate outlook, the earlier reduction in GDP growth in 2001 Q4 and 2002 Q1 will tend to have a lagged effect, other things being equal, in raising insolvencies in late 2002 and in 2003. But the rise in profitability and reduction in capital gearing at replacement cost in 2002 H1, together with – crucially – the resilience of the income gearing position, suggest that any rise in corporate liquidations over the next year may well be modest. There is little sign as yet of any major rise in receiverships, administrations and company voluntary arrangements, which are often a good predictor of subsequent liquidations. The latest Euler Trade Indemnity survey indicates that policyholder claims against bad debts rose somewhat in Q3, although the level remains 6% below that of a year ago.

Sectoral developments

For any given aggregate exposure to the corporate sector, the risks to UK banks would be greater the more the exposure is concentrated in more vulnerable sub-sectors. Nearly half of the outstanding stock of loans granted by large UK-owned banks to non-financial companies goes to the manufacturing and real estate sectors taken together (Chart 124). Exposures to telecoms and electricity companies are low but the probability of default has risen.

Chart 123:
Corporate liquidation rate and 'debt at risk'^{(a)(b)}

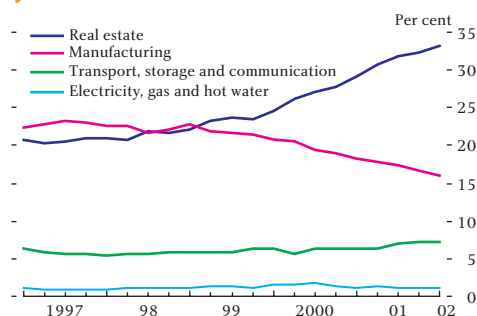


Sources: DTI and Bank of England.

(a) Data annualised and seasonally adjusted.

(b) Rate of corporate insolvencies multiplied by net debt of PNFCs, expressed as a percentage of GDP at current prices.

Chart 124:
Share of non-financial corporates' total borrowing from large UK-owned banks, by sector^{(a)(b)}



Source: Bank of England

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

(b) Data comprise the ten largest such banks, by total consolidated assets, as at Jun. 2002. Data include borrowing from groups' subsidiaries prior to merger or acquisition.

46: 'Debt at risk' is defined as the product of debt outstanding and the liquidations rate as a proportion of nominal GDP. See Benito, A, Whitley, J, and Young, G, 'Analysing corporate and household sector balance sheets', in the December 2001 *Review*.

Manufacturing

Profitability in manufacturing remains weak, with the net rate of return on capital, at 4% in 2002 Q2, well below the PNFC average (11.5% in 2002 Q2). This reflects longer-run structural factors, the strength of sterling and, more recently, the slow growth in world economic activity. But profitability has improved a little this year compared with last. The sector has also continued to repay bank debt, so its debt-to-assets ratio has fallen from 36% to 31% over the past year⁴⁷. These modest improvements may help to explain the decline in credit downgrades in manufacturing (relative to the service sector) over the past year. But market perceptions of credit quality have continued to deteriorate; for example, bond spreads for manufacturers of capital goods have risen sharply since June (Chart 125).

Telecommunications

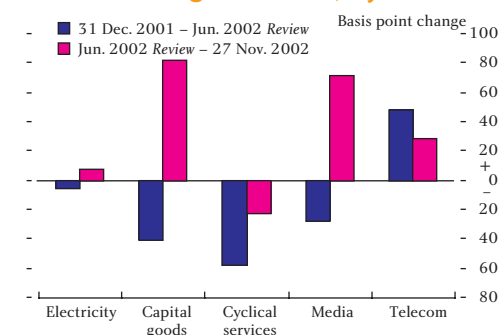
Previous *Reviews* have discussed the weakness in financial performance and credit quality in the UK telecoms sector. The mean profit margin was –10% in 2001 (–16% if weighted by debt) and several of the more indebted companies have again recorded losses thus far in 2002. A third of credit downgrades during 2002 and seven of the eight defaults on private quoted-company debt by UK companies have occurred in telecoms. No UK telecoms company is currently rated higher than single-A and access to finance remains difficult for low-rated borrowers. However, bond spreads of investment-grade issuers have only risen a little further since June (Chart 125) and have fallen most recently, which may reflect progress made by some of these companies in reducing their high levels of debt; syndicated loans and bond issuance have declined substantially this year (Chart 126).

Electricity

Financial problems have become more acute in the electricity sector. The New Electricity Trading Arrangements (NETA) have revealed the extent of overcapacity in electricity generation, and wholesale electricity prices have fallen by some 40% since they were first proposed in 1998⁴⁸. For some generating companies, particularly ‘baseload’ generators (those that cannot readily adjust output), prices are now below the average costs of production. This has caused difficulties across the electricity market, including most notably for British Energy, the UK’s largest electricity generator. And retailers of electricity, which might expect to benefit from wholesale prices falling by more than retail prices, may not have done so if they entered into fixed-price contracts to purchase electricity. However, although individual companies have experienced difficulties, and there have been some rating downgrades, credit spreads on outstanding bond issues by UK investment-grade companies are little changed in the course of the year. And, given that major

Chart 125:

Credit spread changes on bonds issued by UK investment-grade PNFCs, by sector^(a)

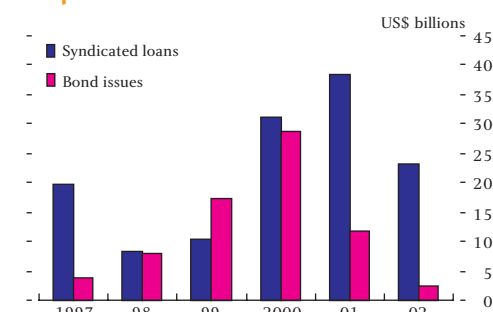


Sources: Merrill Lynch and Bank of England.

(a) Change in the unweighted average of asset swap spreads between the dates shown. The calculation is based upon all issues in all currencies, by those UK domiciled PNFCs included in the Merrill Lynch Global High Grade Corporate Index. Asset swap spread is defined as the option-adjusted spread over London Inter-Bank Offered Rate of a matched floating rate bond.

Chart 126:

Gross syndicated loan and bond finance raised by UK telecommunications companies^{(a)(b)(c)}



Sources: Dealogic and Bank of England.

(a) Syndicated loan facilities granted, sorted by signing date.

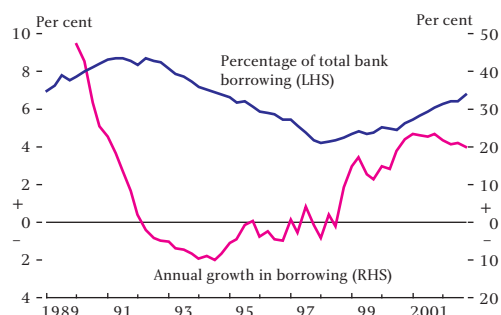
(b) International public bond issues, sorted by payment date.

(c) 2002 data cover the period from 1 Jan. 2002 to 22 Nov. 2002, annualised.

47: Based on a 10% sample for 2002.

48: NETA came into operation in March 2001.

Chart 127:
Bank borrowing by the real estate sector^{(a)(b)}

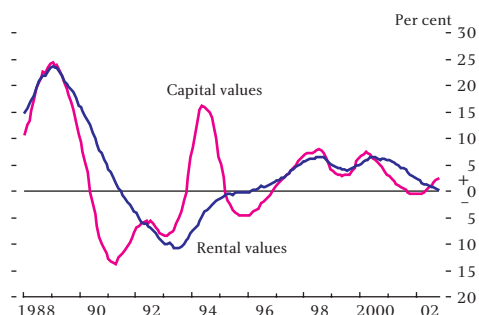


Source: Bank of England.

(a) Expressed as a percentage of total borrowing from UK-resident banks.

(b) Annual growth of borrowing by real estate sector from UK-resident banks.

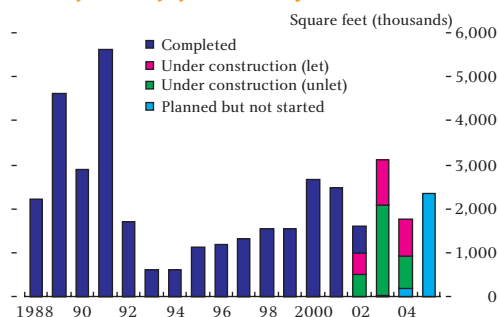
Chart 128:
Annual growth in capital and rental values^(a)



Source: Investment Property Databank.

(a) Using the all-property index.

Chart 129:
Development pipeline: City offices



Source: Insignia Richard Ellis.

UK banks' exposures to the sector have remained relatively stable at around 1% of their total loans to non-financial companies (Chart 124), necessary reductions in electricity capacity are unlikely to impose substantial pressure on those banks.

Commercial property

Previous *Reviews* have noted the now prolonged rapid growth of bank borrowing by the real estate sector, which has averaged more than 20% at an annual rate since 2000⁴⁹. Such borrowing reached nearly 7% of total bank borrowing in 2002 Q3, still below the peak of almost 9% in the early 1990s, but well above the trough of 4% some five years ago (Chart 127).

Persistent rapid borrowing growth sits oddly, on the face of it, with the weakness in the commercial lettings market, where annual rental value growth slowed from a local peak of 6.3% in mid-2000 to only 0.3% in October 2002 (Chart 128). Much of the recent growth in borrowing appears to have financed investment in existing property, rather than new development, possibly reflecting the recent outperformance of property as an investment class at a time of depressed equity markets and continued low interest rates. Some market commentators and feedback from the Bank's Property Forum⁵⁰ suggest, however, that this divergence between strong investment and a weak lettings market is unsustainable.

The relative attractiveness of property as an investment might diminish if the equity market recovered. That could reinforce the downward pressure on capital values from current and prospective conditions in the lettings market. There is clearly a risk of significant falls in rental values in certain sub-sectors, notably the City office market given the pressure on financial companies. City office vacancy rates have increased rapidly since 2001, although they remain well below the peaks seen in 1992. With substantial new City developments under construction or planned and due to come on-stream in 2003/04 (Chart 129), vacancies will increase further if the take-up of space does not rise. Availability of second-hand space in the City is at its highest since 1993. But elsewhere, and especially in the retail sector, rental growth looks more robust. Moreover, the current low level of interest rates, if sustained, is likely to mitigate the effects of any given fall in rental values on borrower default. Apart from the specific risks associated with the City office market, therefore, the main risks for the commercial property sector are those linked to the overall macroeconomic outlook.

49: See also the speech delivered by David Clementi at the Chartered Surveyors Livery Company, Goldsmiths' Hall, London, 29 April 2002 (www.bankofengland.co.uk/speeches/speech170.pdf).

50: For background on the Property Forum, see the Box on page 72 of the November 1999 *Review*.

3 The household sector

Buoyant growth in incomes last year was followed by slower growth in 2002 H1, partly reflecting the corporate sector adjustments considered above. With consumption remaining resilient, savings have fallen and households have moved back into financial deficit. The counterpart to the elimination of the substantial financial surplus of earlier years (Chart 113) has been rapid growth in borrowing.

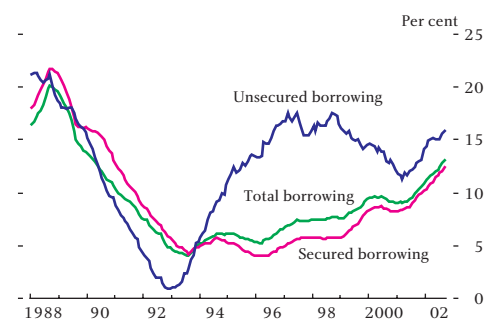
The build-up of debt

The growth rate of household borrowing has continued to rise this year, reaching just over 13% in the year to 2002 Q3, the highest since 1990 (Chart 130). This primarily reflects the strength of mortgage borrowing, which accounts for over 80% of total household debt and which grew by a further 12.4% in the year to Q3. The robustness of mortgage borrowing reflects such inter-related factors as low interest rates, intense competition among lenders, buoyant housing market activity and above all house prices currently rising at annual rates of around 25%–30%⁵¹. Borrowing has been boosted by a further increase in mortgage equity withdrawal, which has risen substantially since 1995. By 2002 Q2, it amounted to about half of new borrowing and was equivalent to 6% of post-tax incomes, not far short of the 8% peak recorded in the housing market boom of the late 1980s (Chart 131). It has been facilitated by competition and product innovation in the mortgage market, as manifested in the growth of remortgaging and the introduction of ‘flexible mortgages’.

Some households may have used mortgage equity withdrawal as a lower-cost substitute for new unsecured debt in financing consumption, although others may have used it to repay existing debts or to purchase financial assets. Nevertheless, unsecured borrowing overall has also continued to grow rapidly, especially the credit card component, which rose by 19% over the past year (Chart 132). The share of credit cards in total household sector unsecured debt outstanding is now around 30%, compared with 20% in the mid-1990s. Credit card ownership has widened over this period and increases in the proportion of credit card balances on which interest is paid, and in the average duration of credit card debt, suggest that the use of credit cards as a means of short-term borrowing is becoming more widespread⁵². The factors lying behind the growth of unsecured borrowing are considered in more detail in Box 4.

Continued rapid borrowing growth has pushed up the household sector's debt-income ratio to 120% in 2002 Q2, over 10 percentage points above the peak of the early 1990s

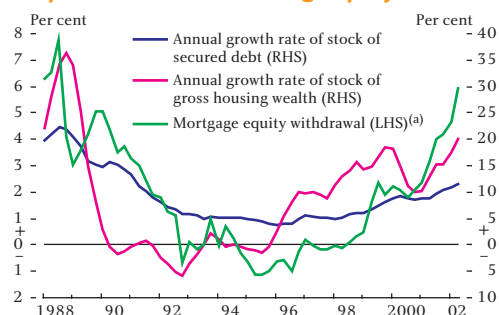
Chart 130:
Annual growth rate of borrowing by individuals^(a)



Source: Bank of England.

(a) Data are seasonally adjusted.

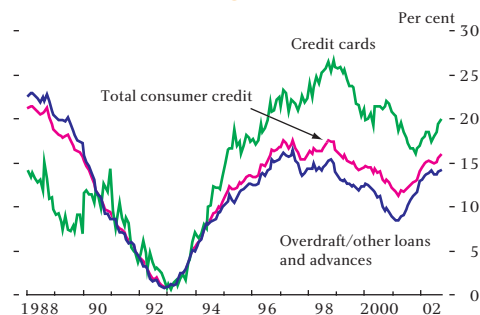
Chart 131:
Mortgage equity withdrawal and components of net housing equity



Sources: ONS and Bank of England.

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

Chart 132:
Annual growth rate of components of unsecured borrowing^(a)



Source: Bank of England.

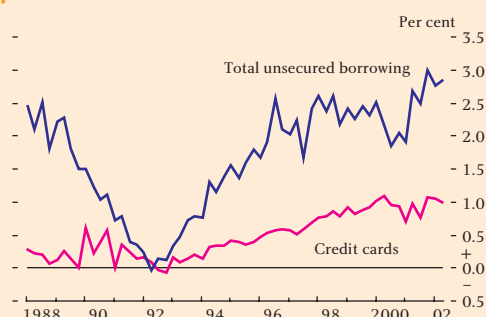
(a) Data are seasonally adjusted.

51: Depending on whether the Nationwide or Halifax measure is used.

52: Page 80 of the June 2001 *Review* and page 10 of the November 2002 *Inflation Report*.

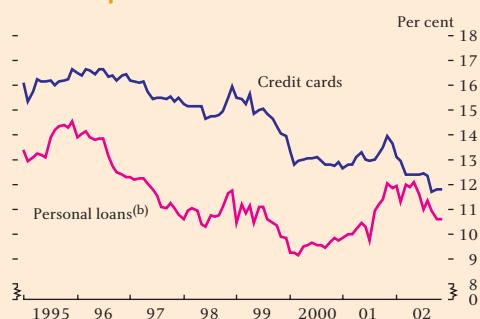
Box 4: The growth of household unsecured debt

Chart A:
Unsecured borrowing as a percentage of post-tax income



Source: ONS.

Chart B:
Interest spreads on unsecured credit^(a)

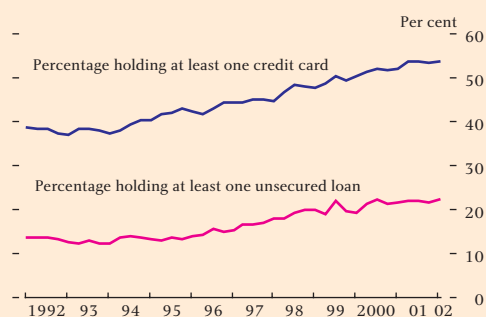


Source: Bank of England.

(a) Weighted average of quoted interest rates on new business less Repo rate.

(b) Rate based on loan of £3,500.

Chart C:
Percentage of people holding unsecured debt



Source: NOP Financial Research Survey.

As a result of its rapid growth in recent years, unsecured debt now accounts for 19% of total household debt outstanding, compared with about 14% ten years ago. In 2001 Q3, unsecured net advances were equivalent to 2.8% of household post-tax income, a rate comparable to that recorded at the peak of the late 1980s consumer boom (Chart A). This has coincided with sharply higher mortgage equity withdrawal in recent years, so in *aggregate* there is little indication that lower cost secured borrowing has displaced higher-cost unsecured borrowing¹.

Unsecured debt is intrinsically riskier for lenders than secured, so the factors underlying its rapid growth over recent years are of particular interest. Strong demand for credit reflects a robust employment market, sustained growth in real incomes and historically low interest rates. But lending growth has also been in part supply-driven. In particular, the effect on borrowing costs of lower official interest rates in recent years has been accentuated by increased competition, reflected in a narrowing in interest spreads on new business, especially credit cards (Chart B). Rates charged on good quality loans are likely to have fallen particularly sharply given increased use of risk-based pricing. The latter may also have facilitated lenders' attempts to widen their customer base, increasing access to credit for groups for whom it had previously been too costly or unavailable.

Survey evidence suggests the penetration of personal loans and credit cards has increased significantly in recent years (Chart C), particularly among lower income groups². There have been significant changes in the socio-economic mix of credit card holders, with the share in groups A, B and C1 falling from 69% to 58% between 1996 and 2001, whilst the percentage in D and E groups rose from 13% to 24%³. The June 2002 *Review* showed that between 1995 and 2000 unsecured debt-income ratios increased most rapidly for young and low-income groups⁴ (from relatively high levels compared with other groups). To the extent that younger or lower income households are more susceptible than others to income shocks, these changes in the distribution of unsecured debt could suggest that aggregate data might underestimate changes in the vulnerability of the household sector as a whole. Even if this were the case, however, the implications for lenders would depend on how far any increase in risk arising from a change in the distribution of their loan portfolios has been anticipated in pricing policy.

1: In spite of developments in the mortgage market, such as the growth of remortgaging, which have tended to facilitate equity release.

2: Relatively young households may of course have less access to equity withdrawal as an alternative, particularly given the increase in the average age of first-time buyers in recent years.

3: APACS Consumer Payments Survey, August 2002.

4: June 2002 *Review*, page 83.

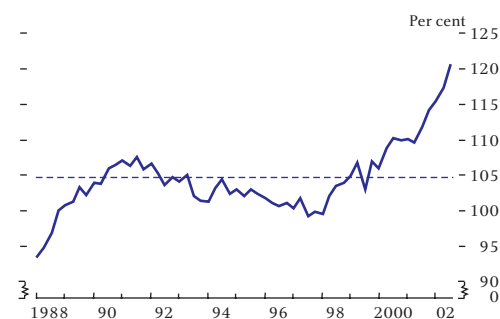
(Chart 133). There are tentative signs from some – but not all – housing market indicators that the rate of growth of loan demand related to house purchase may have moderated in Q3. However, remortgaging activity has remained persistently high and was associated with further strong growth in mortgage equity withdrawal in Q3, according to data from the Council of Mortgage Lenders and the British Bankers Association. Moreover, survey evidence suggesting that households' confidence in their own financial position – if not in the wider economy – remains robust does not point to a marked weakening in their prospective appetite for debt. On the supply side, competition among lenders for new business remains strong and banking contacts are not themselves expecting slower loan demand growth in the short term. As noted in Section III and as also confirmed by those contacts, there is little indication of any generalised tightening in lenders' terms and conditions.

Balance sheet indicators and vulnerabilities

Despite rapidly growing debt and lower equity prices, the deterioration in the household sector's balance sheet position, as measured by capital gearing, has been limited (Chart 134). This largely reflects the buoyancy of housing wealth, which accounts for about half of households' gross assets. Household debt in relation to *financial* wealth (ie excluding housing) has risen more rapidly and by 2002 Q2 was approaching the highs of the early 1990s (Chart 134). It is likely to have risen further since then given falls in equity markets in Q3. Liabilities relative to *liquid* financial assets, which are particularly relevant to the ability of households to absorb unexpected increases in payments or falls in income, have also risen sharply (Chart 135).

These developments have raised further the vulnerability of the household sector to substantial rises in interest rates or falls in income, while the balance sheet position is more susceptible to a further fall in equity prices or a major correction in the housing market. That said, interest rates are expected by financial markets to rise only modestly over the next year, and a large fall in household incomes is not the most likely outcome, as discussed in the November 2002 *Inflation Report*. Equity prices have recovered a little recently, although any renewed substantial falls might induce households to seek to rebuild balance sheets via an increase in saving⁵³. There is little sign of any such effect as yet, mainly because rapid increases in house prices have supported consumer demand and offset the impact of lower equity prices. But, as also emphasised in the November *Inflation Report*, recent rates of house price inflation are unsustainable. A slowdown in house price inflation could reinforce prospective balance sheet adjustment by households. If it were accompanied by unexpected falls in household incomes, the consequences would be likely to

Chart 133:
Household sector debt as a percentage of income^{(a)(b)}

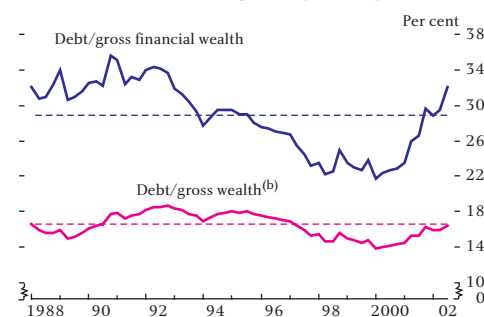


Sources: ONS and Bank of England.

(a) Debt is total liabilities. Income is household post-tax income.

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

Chart 134:
Household sector capital gearing^(a)

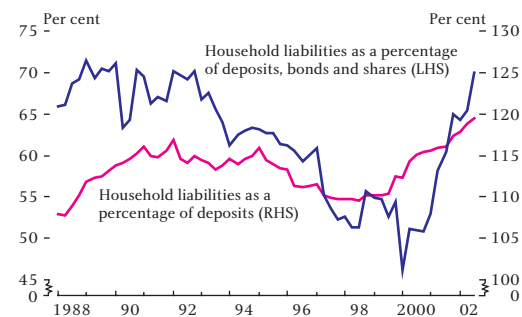


Sources: ONS and Bank of England.

(a) Dashed lines indicate average of series from 1988.

(b) Gross financial plus housing wealth.

Chart 135:
Household liabilities relative to liquid financial assets^(a)

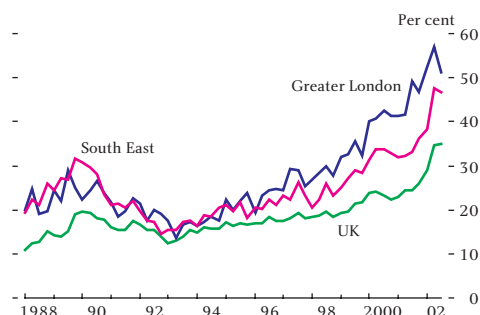


Sources: ONS and Bank of England.

(a) Data are not seasonally adjusted.

53: There are signs of adjustment on the assets side of the balance sheet, involving shifts from equity holdings to more liquid assets, such as bank deposits.

Chart 136:
Percentage of first-time buyers with
advance-to-income ratios of greater than
three



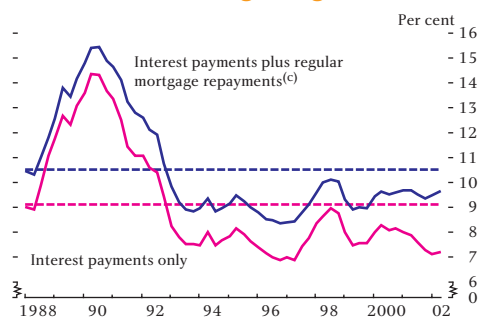
Sources: Council of Mortgage Lenders and Bank of England.

be most severe for those households whose income gearing is highest and whose loan-to-income ratios have become most stretched recently. In that context, there has been a significant rise in recent quarters in the proportion of first-time buyers with high loan-to-income ratios (Chart 136). These ratios vary on a regional basis: the Greater London area, with the highest such multiples, may be particularly vulnerable, especially given pressures on the financial services industry.

Evidence from disaggregated data

The risks associated with rising aggregate indebtedness would be increased if the rises had been concentrated among the most vulnerable households. The latest British Household Panel Survey (BHPS)⁵⁴ shows that the lowest-income and youngest households have increased their debt-income ratios by more than other groups – and from higher levels – between 1995 and 2000. But they still accounted for only 5% of total debt in the BHPS sample for 2000. More recent data from the Financial Research Survey (FRS)⁵⁵ show that lower-income groups have higher ratios of unsecured loans to income than most higher-income groups. The low-income households are less likely to have substantial housing wealth and may be more vulnerable to financial shocks, such as spells of unemployment.

Chart 137:
Measures of income gearing^{(a)(b)}



Sources: ONS and Bank of England.

(a) Payments as a percentage of household post-tax income.

(b) Dashed lines indicate average of series from 1988.

(c) See page 82 of the Jun. 2002 *Review* for how this series is constructed.

Debt servicing costs and arrears

Notwithstanding the rapid accumulation of debt in recent years and the risks associated with it, there is still very little sign of households facing difficulties in servicing debt. In particular, mortgage arrears continue to run at historically low levels and there has not been any marked recent deterioration in the trend in credit card arrears. This is not surprising, given that household income gearing, which is likely to be most directly associated with the risk of default, remains well below the average levels of the past fifteen years (Chart 137). This is also true of alternative measures of income gearing that include regular repayments of mortgage principal, although, unlike the interest-only measure, these have not fallen further since 2001⁵⁶. Modest income gearing in turn reflects continued growth in household incomes and employment and historically low interest rates on both mortgage and unsecured debt. Households may in consequence believe that ‘sustainable’ debt levels have risen. But this perception could change rapidly if interest rates were to rise substantially, incomes fall or unemployment rise. Furthermore, the perception may not fully take into account the persistence of the real burden of debt in a low-inflation environment.

54: The BHPS is an annual survey of households in Britain. It is based on a nationally representative sample of adult members in around 5,500 households originally surveyed in 1991 and re-surveyed each year thereafter.

55: The Financial Research Survey, carried out by National Opinion Polls, is a monthly monitor of the personal finance markets in Great Britain. See page 94, footnote 68 of the December 2001 *Review*.

56: For a fuller discussion of alternative measures of income gearing, see page 82 of the June 2002 *Review*.

III The UK financial system

Sections I and II have identified some further deterioration since the June Review in the macroeconomic outlook abroad and – to a lesser extent – in the UK. This Section reviews the implications for UK-owned banks and life insurers. Together with pension funds, these institutions form the major part of the UK financial system. In 2002 Q2, they had financial liabilities of £4.9 trillion (Chart 138).

UK-owned banks, in the main, appear to be both profitable and well capitalised and hence in a strong position to absorb losses. Life insurance companies were more directly affected by the falls in equity prices during 2001 and much of 2002.

1 The UK life insurance sector

The impact of falling equity prices

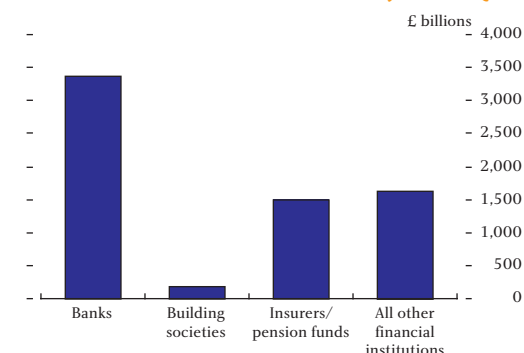
The sharp decline in equity markets since the June Review, described in Section I.1, has further underlined the UK life insurance industry's exposure to equity prices. A significant proportion of UK life insurers' assets are held in equities: on average 42% at end-2001, although this share has been declining in recent years as equity prices have fallen (Chart 139). Corporate bond holdings have increased from 13% in 1999 to 20% in 2001 – an alternative exposure to corporate performance. Holdings of government bonds have stayed relatively stable.

A decline in equity markets will reduce life insurers' solvency margins if liabilities – ie the payments due to policyholders – do not fall or cannot be reduced in line with the fall in their asset values. One measure of their financial strength, the free asset ratio, shows the extent to which life insurers hold assets over and above their liabilities (measured under statutory guidelines) and the required minimum margin of solvency⁵⁷. It has been falling for the past two years, mainly because of large falls in equity prices over the same period (Chart 140).

Concerns about insurers' financial strength have been reflected in their share prices. The index of large UK life insurers has under-performed the FTSE 100 slightly since the beginning of 2002 (Chart 141). But life insurers have been taking a range of remedial steps. Several have raised additional capital, through the bond or equity markets; and some life insurance subsidiaries of larger groups have received capital injections from their parent company (Table 7). Some have also adjusted their asset

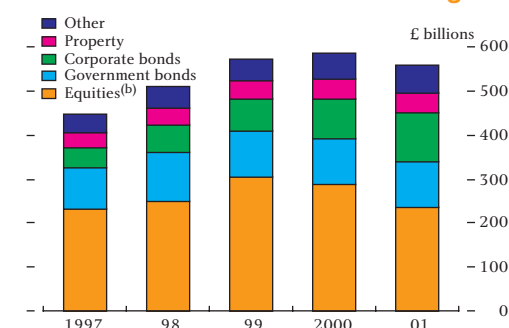
⁵⁷: Free asset ratios are commonly used to compare the relative strength of individual firms, but the ratio will be affected by a number of factors specific to each firm, including the approach used for valuing liabilities and the mix of assets held.

Chart 138:
Unconsolidated financial liabilities of
UK-resident financial institutions, 2002 Q2



Source: ONS.

Chart 139:
UK-resident life insurers' asset holdings^(a)

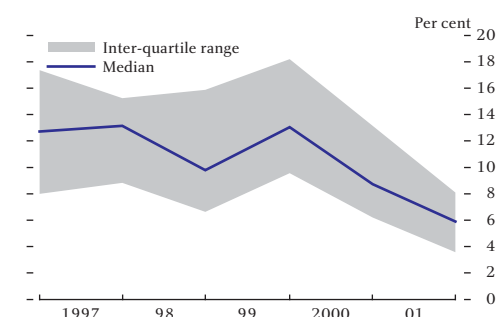


Sources: Standard & Poor's and Bank calculations.

(a) Assets held to match non-linked business (ie both with-profits products and protection-type products).

(b) Equities includes both direct holdings and holdings in collective investment schemes.

Chart 140:
Free asset ratio for large UK-resident life insurers^{(a)(b)}

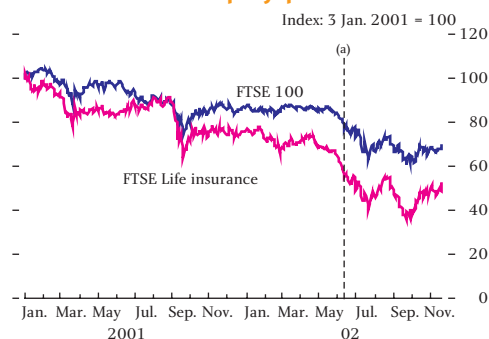


Sources: Standard & Poor's and Bank calculations.

(a) With-profit funds only.

(b) The ratio of total net assets admitted for regulatory purposes (after deductions of reserves for liabilities and the required margin of solvency) to total gross admissible assets.

Chart 141:
UK life insurance equity prices



Source: Bloomberg.
(a) Jun. 2002 Review.

Table 7:
Examples of UK life insurance sector capital raising, 2002

Company/subsidiary (Group)	Amount (£ millions)	Per cent of free assets ^(a) (at end-2001)
Clerical Medical (HBOS) ^(b)	300	15
Legal & General ^(c)	786	29
Pearl UK (AMP) ^(b)	331	44
Scottish Mutual (Abbey National) ^(b)	575	114
Standard Life ^(d)	1,000	30

Sources: Company reports and Standard & Poor's.

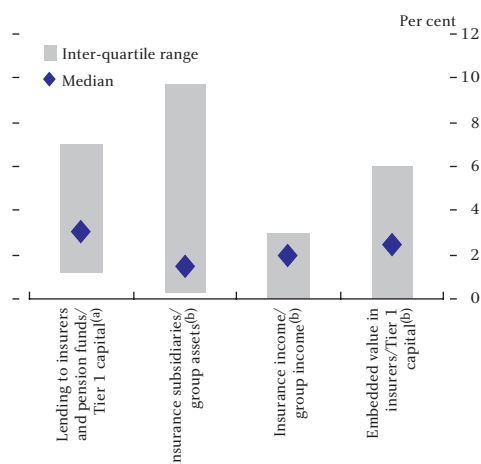
(a) Assets after deductions of reserves for liabilities and the required minimum margin of solvency.

(b) Capital injection from parent group.

(c) Rights issue.

(d) Bond issue.

Chart 142:
Largest ten UK-owned banks' linkages with insurers



Sources: Published accounts, FSA regulatory returns and Bank of England.

(a) Jun. 2002.

(b) End 2001.

portfolios, reducing their equity exposure by outright sales or by purchasing protection in derivatives markets against further price declines.

Life insurers have also taken steps to reduce their liabilities, reducing the size of bonus payments to policyholders (both annual and final) for 2002. Most have also imposed, or increased, reductions in the value of policies when they are cashed in before maturity (known as 'market value adjusters'). The FSA carried out a review of about 20 of the largest UK life insurers, asking them to assess their liabilities under 'realistic' assumptions, rather than the assumptions required for statutory solvency tests. This forms part of longer-term work to reform the regulation of insurance companies, making the size of their solvency margins more transparent (as discussed in the article *Strengthening financial infrastructure* in this Review). The FSA review concluded that life insurers could withstand further large falls in equity values (from a FTSE 100 level of 4,000)⁵⁸.

The impact beyond the life insurance sector

Pressures within the UK life insurance sector appear to have been largely self-contained. The direct potential credit exposure of the largest UK-owned banks from loans to the insurance sector is limited – lending to insurance companies and pension funds accounts for only 5% of the largest ten banks' combined Tier 1 capital, while undrawn facilities account for a further 4%.

But ownership interests are potentially more significant. Seven of the ten largest UK-owned banks own life insurance subsidiaries, though their scale varies markedly (Chart 142). There are several possible channels through which weaknesses in these subsidiaries might affect their parents. First, via reductions in banks' operating incomes. Second, via the cost of insurance re-capitalisation – some banks have disclosed capital injections to their life insurance subsidiaries during 2002 (Table 7). Finally, via the effect on banks' Tier 1 capital of any changes in the 'embedded value' of a life insurance subsidiary⁵⁹ – though, as discussed below, the large UK-owned banks have high published capital ratios.

58: Announced in 'FSA launches radical new approach to insurance regulation', FSA Press Release, October 2002. In June, the FSA also amended part of the resilience test of life insurers' assets applying to equities.

59: 'Embedded value' is the value of business in force, plus the value of any net assets.

2 The UK-owned banking system

The ten largest UK-owned banks account for 97% of all UK-owned banks' assets, and thus dominate aggregate measures of banks' balance sheets. The analysis below therefore focuses on aggregates of these ten large banks while the robustness of the smaller UK-owned banking sector is discussed in Box 5⁶⁰.

Taken together, the large UK-owned banks' credit default swap prices – which are one indicator of market perceptions of robustness – have increased since the previous Review. Their price level remains, however, below those of both foreign banks and other UK companies (Chart 143). The large UK-owned banks' equity prices have fallen since the previous Review, but by less than those of many other UK companies and foreign banks.

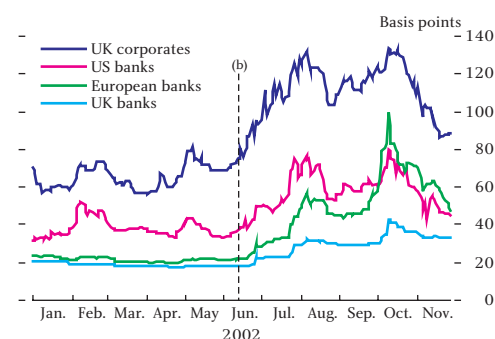
Profitability and capitalisation

While there was some variation across individual institutions, the large banks' profits fell slightly, on average, during the first half of 2002. So far, however, the large UK-owned banking sector has in general remained highly profitable relative to the early 1990s (Chart 144). Latest interim results show that return on equity averaged 18.8% compared with 16.4% for the 50 largest US-owned banks.

Net interest income is typically UK banks' main source of revenue, and rose in most cases during 2002 H1 as increased lending volumes more than offset some further decline in net interest margins. But, in general, with increased provisioning, overall return on equity did not increase. As discussed below, most UK-owned banks' trading activities are relatively small so that the most obvious sources of risk to banks' profits arise from any increase in arrears on loan portfolios, further reduction in interest margins on new business, or fall in the demand for credit, rather than through a realisation of market risks.

Overall, throughout the past decade, retained earnings have helped to strengthen banks' capital. In addition, a number of banks have issued further capital. Tier 1 capital ratios increased slightly during the first half of 2002 – to 8.8% on average (Chart 145), compared with 9.1% for the 50 largest US-owned banks.

Chart 143:
Credit default swap prices for large UK-owned banks and other firms^(a)

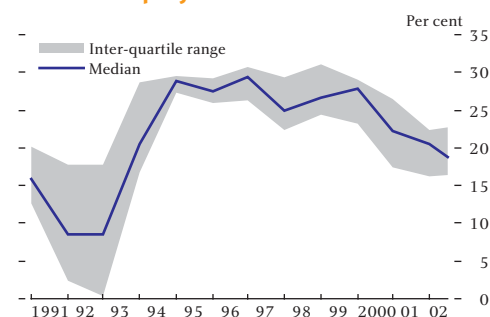


Sources: JP Morgan Securities Ltd, CreditTrade and published accounts.

(a) Data are available for seven large UK-owned banks, 18 other FTSE-100 companies, 15 continental European and seven US banks. Individual company data are weighted by 2001 assets.

(b) Jun. 2002 Review.

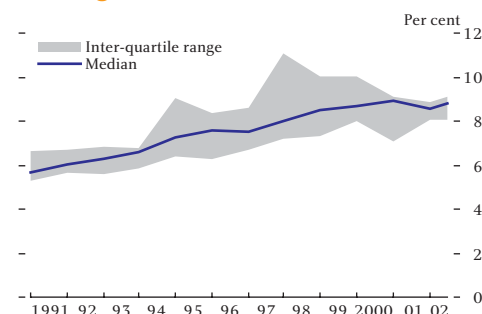
Chart 144:
Large UK-owned banks' twelve-month return on equity^(a)



Source: Published accounts.

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

Chart 145:
Large UK-owned banks' Tier 1 capital/risk-weighted assets^(a)

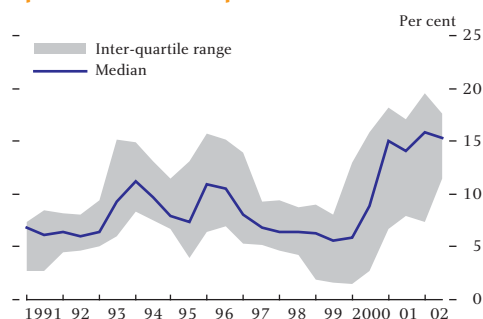


Source: Published accounts.

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

60: The ten largest banking groups are: Abbey National, Alliance & Leicester, Barclays, Bradford & Bingley, HSBC Holdings, HBOS, Lloyds TSB, Northern Rock, RBS Group and Standard Chartered. Throughout this section, these banks are described as the large UK-owned banking sector. Unless otherwise stated, charts include data for these banking groups' subsidiaries prior to merger or acquisition, while figures for de-mutualised building societies are included from the date that data became available.

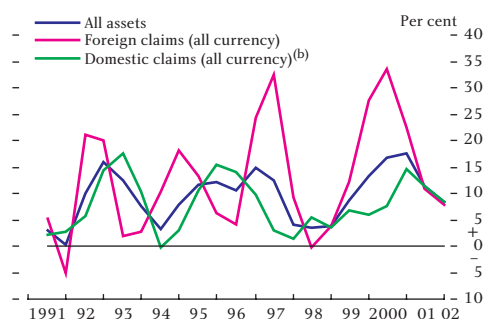
Chart 146:
Proportion of UK-owned banks' Tier 1 capital that is 'non-prime'^(a)



Source: FSA regulatory returns.

(a) Non-prime Tier 1 capital excludes ordinary shares, associated reserves and retained earnings.

Chart 147:
Twelve-month growth of large UK-owned banks' consolidated assets^(a)

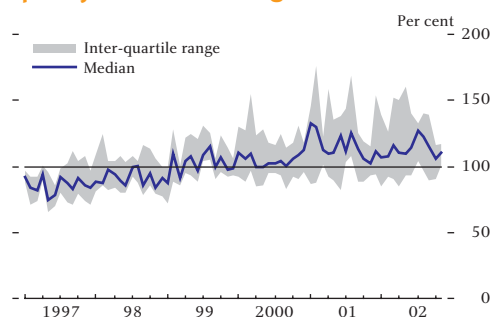


Sources: FSA regulatory returns and Bank of England.

(a) Growth rates adjusted for changes in reporting population.

(b) Domestic claims are calculated as the residual between total assets and foreign claims.

Chart 148:
Large UK-owned banks' sterling stock liquidity ratios excluding CDs^(a)



Source: FSA regulatory returns.

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

Tier 1 capital includes a range of different elements, in addition to common equity and reserves. For example, as highlighted above, changes in the embedded value of banks' investments in insurance companies are included in consolidated Tier 1 capital. Two of the large UK-owned banks have embedded value in insurers above 10% of their Tier 1 capital. In recent years, the large UK-owned banks have made more use of non-equity instruments. At the same time, the range of 'innovative' instruments used has increased. Like equity, these instruments are subordinated to non-capital liabilities, but carry debt-servicing obligations that may be less easy to defer. Recognising these differences, the FSA has recently proposed a refined distinction between the various elements of Tier 1 capital⁶¹, as discussed in the article *Strengthening financial infrastructure* in this Review. Data compiled under this definition show clearly that 'non-prime' instruments have grown relative to 'prime' capital in recent years (Chart 146). Nevertheless, even if all non-prime capital were excluded, the large UK-owned banks would all have published capital ratios well in excess of 6% of risk-weighted assets.

Asset growth, funding and liquidity

Overall growth of the large UK-owned banking sector's consolidated balance sheet slowed during the first half of 2002 (Chart 147). Growth of retail deposits has remained robust, but other deposits have fallen over the past twelve months. With asset growth outstripping deposits, the large UK-owned banks have made increased use of other (wholesale) sources of funding. In addition, they have continued to make use of securitisations, transferring £8.3 billion of the £52.2 billion of new household lending off their balance sheets in this way during the first nine months of 2002.

Increased wholesale funding has had little impact on the large UK-owned banks' liquidity, as measured by the sterling stock liquidity ratio (SLR). The SLR establishes a minimum level of holdings of liquid assets 'eligible' in the Bank of England's open market operations in relation to both the stock of sterling retail deposits and projected net wholesale outflows. Excluding CDs, there has been no material change in the SLR over the past six months, relative to its past variation (Chart 148). The SLR covers only banks' holdings of 'eligible' liquid assets, whereas all liquid assets could be sold if necessary. However, although there is currently no equivalent measure of liquidity for the whole balance sheet⁶², the ratio of all liquid to total assets has remained broadly constant in recent years.

61: Discussed in 'Tier 1 Capital for Banks: Update to IPRU (Banks)', FSA Consultation Paper 155, October 2002.

62: As described in the June Review, in consultation with the industry and the Bank, the FSA is undertaking a comprehensive review of policy for banks' liquidity risk.

Box 5: Small banks

The main text focuses on the large UK-owned banking sector, covering ten banks, the assets of which exceed £20 billion in each case. There are more than 40 other 'small' UK-owned banks, ranging in size from total assets of less than £10 million to over £5 billion. There have been no failures of top-ten UK-owned banks in recent years, but a number of smaller financial institutions failed at about the same time during the early 1990s¹. While individually these banks represented only a small part of the UK financial system, the scope for coincident failures motivates surveillance of the small banking sector using a range of financial stability indicators.

There are a number of differences in patterns of exposure to *credit risks* between the large and small banks. First, the larger banks have greater overseas exposures (Chart A). Second, within their domestic lending, the smaller banks typically have relatively small retail mortgage portfolios². Third, claims on other banks often form a larger part of the small banks' portfolios.

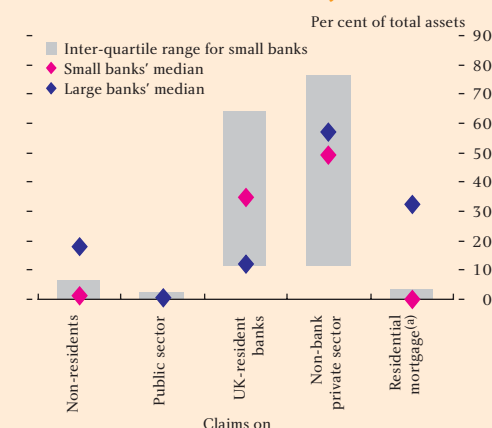
Growth of small banks' balance sheets has typically increased slightly over the past twelve months, in real terms (Chart B). A number of empirical studies have established a correlation between rapid balance sheet growth and future bank failure for small banks. It is therefore comforting that the higher percentiles of real growth rates are no higher now than over much of the previous decade, following a spike in some banks' growth rates during 2000.

Like the large UK-owned banking sector, most small UK-owned banks are both *profitable* and have high published regulatory *capital ratios*. Over the year to 2002 H1, the majority of small banks earned greater returns on assets than the average for large banks (Table A). In the recent past, however, small banks' earnings have typically been more volatile than those of larger banks so that recent profits may give a less clear indication of future profitability. The overall profitability data also mask variation of experience across banks, with seven small banks making losses. Reassuringly, however, the loss-making banks' capital ratios were broadly in line with those of the other small banks. None of the small banks had a risk-asset ratio below 10% in 2002 H1 (Table A) and, while high regulatory capital ratios may, in part, reflect regulatory preferences, most small banks have capital ratios well in excess of individual regulatory minima.

1: See Logan A, 'The early 1990s small banks crisis: leading indicators', *Financial Stability Review*, December 2000.

2: Data here do not cover building societies, which are also regulated by the FSA and whose mortgage portfolios are much more material.

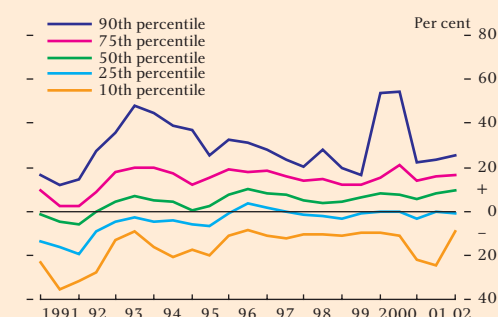
Chart A:
Composition of small UK-owned banks' UK-resident balance sheets, 2002 H1



Sources: Bank of England and FSA regulatory returns.

(a) Residential mortgages are reported on a consolidated (group) basis.

Chart B:
Real twelve-month growth rates of small UK-owned banks' assets^(a)



Sources: FSA regulatory returns and ONS, Bank calculations.

(a) Growth rates have not been adjusted for mergers or acquisitions. Nominal growth rates deflated by prevailing twelve-month RPIX inflation.

Table A:
Profitability and capitalisation of small UK-owned banks, 2002 H1^(a)

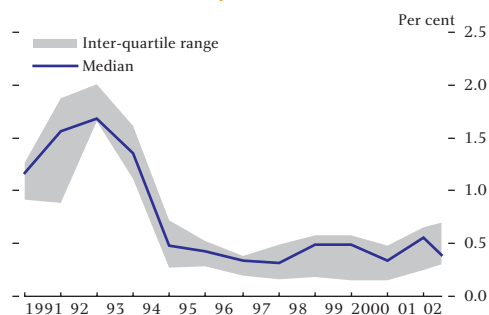
Risk-asset ratio (per cent)	Return on assets (per cent) ^(b)			
	<0	0 to 2	2 to 5	>5
<10	0	0	0	0
10 to 20	2	12	3	1
>20	5	11	6	4

Source: FSA regulatory returns.

(a) Figures refer to the number of banks in each bucket. Return on assets data are not available for all small banks.

(b) Large UK-owned banks' median: return on assets: 1.0%, Tier 1 capital ratio: 12.4%.

Chart 149:
Large UK-owned banks' provisions for bad and doubtful debts/customer loans^(a)



Source: Published accounts.

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

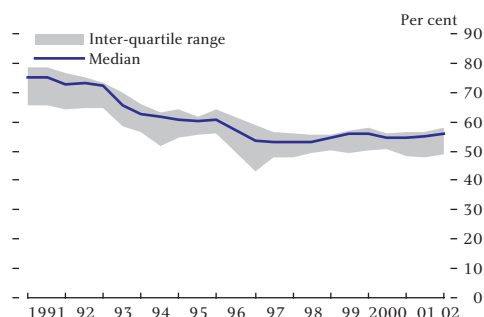
Chart 150:
Classification of large UK-owned banks' assets^(a)



Sources: FSA regulatory returns and Bank of England.

(a) Figures for the ten largest banks at the date shown.

Chart 151:
Large UK-owned banks' risk-weighted assets/total assets^(a)



Source: FSA regulatory returns.

(a) Data for Jun. 1996 missing, due to form change.

Credit risk

On backward-looking measures, the quality of the large UK-owned banking sector's overall assets has not deteriorated materially since the previous *Review*. Provisions have not grown as fast as banks' loan portfolios so that provisioning ratios fell during 2002 H1 (Chart 149). Bank contacts suggest both that the asset quality of foreign loan portfolios has deteriorated relative to domestic portfolios, and that within their domestic portfolios the quality of loans to households has been unchanged or even improved. The stability of provisioning is not surprising given the mildness of the recent economic downturn. Provisions have been close to the predictions of the simple model described in the June *Review*⁶³, which related provisions to current and past economic factors and to the structure of commercial banks' portfolios.

Sections I and II highlighted a number of developments that may affect borrowers' future ability and willingness to maintain payments. Their potential impact on banks' balance sheets depends on both banks' exposures and the value of any collateral or guarantees that the banks hold. Chart 150 shows a breakdown of the large UK-owned banking sector's assets, which suggests that the current pattern of exposures is different from that prevailing during the early 1990s. Relative to capital, retail mortgages and foreign exposures are both larger than was the case for the ten largest UK-owned banks in 1990, while unsecured retail portfolios and lending to non-financial companies are smaller. These differences reflect changes both in the composition of the large UK-owned banking sector – for example, as building societies became banks – and in banks' portfolios.

Changes in portfolio composition have been reflected in a widespread decline in the ratio of 'risk-weighted' to total assets – as used by regulators to calculate capital requirements (Chart 151). In other words, on the existing broad, 'Basel I', classification, on-balance-sheet exposures appear less risky now than ten years ago. This classification does not, however, match the more finely graded measures generally used by banks to assess their own capital needs, and hence may not fully capture patterns in the credit risk borne by banks. Patricia Jackson's article in this *Review* describes the ongoing discussions of a revised Capital Accord ('Basel II').

Domestic credit exposures

Lending to households accounts for the bulk of the large UK-owned banking sector's domestic claims on non-banks. Household loan portfolios continue to grow more rapidly than lending to most corporate sectors – though the rapid growth of lending for commercial real estate is a notable exception. Growth of unsecured consumer credit remains particularly high.

63: Hoggarth, G and Pain, D 'Bank provisioning: the UK experience', *Financial Stability Review*, June 2002.

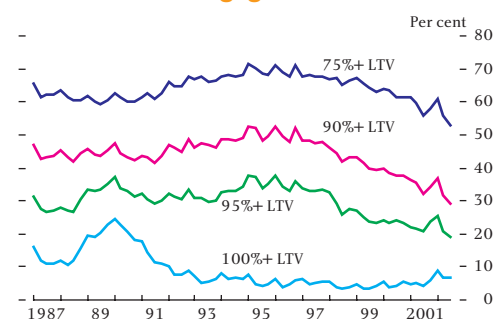
The ability of households to service their growing debts is discussed in Section II. From the banks' perspective, there continues to be little evidence of strain in *mortgage portfolios* and mortgage arrears remain close to historical lows. This position could, of course, change if economic conditions were to deteriorate substantially. The early 1990s experience of the large UK-owned banks, however, provides some comfort. At that time, those large banks with the greatest share of their assets in mortgages experienced the least deterioration in credit quality. This reflected the value of their mortgage collateral, notwithstanding the 20% fall in house prices between 1989 and 1992. In addition, the incidence of high loan-to-value (LTV) ratios for new mortgages has been lower recently than during the early 1990s (Chart 152). LTV ratios on the stock of outstanding mortgages will have declined as house prices have risen – though mortgage equity withdrawal, as discussed in November's *Inflation Report*, will have partially offset this effect.

There have, however, been some changes in the nature of mortgage lending that may have led to increased risks. First, as discussed in the *June Review*, mortgage indemnity insurance reduced banks' losses during the early 1990s. Second, competitive pressures, as reflected in the particularly strong growth in re-mortgaging activity mentioned by bank contacts, may lead to a reduction in lending margins – though, as described above, the lenders' overall profitability remains high. Third, buy-to-let activity has continued to grow strongly, but contacts do not generally see this growth as a serious threat to asset quality – both because the stock of buy-to-let remains relatively small and because such loans are typically made at lower LTV ratios.

The large UK-owned banking sector's *credit card* exposures are considerably smaller than their mortgage portfolios (£26 billion compared with £416 billion) but have grown rapidly in recent years. Market contacts suggest that this reflects, in part, strategic decisions to increase credit card penetration – both to existing and new customers, including lower-income borrowers. This change in strategy could increase the sensitivity of credit quality to cyclical factors – for example, because unsecured loan-to-income ratios are higher for lower-income borrowers, as discussed in Section II.

Available data provide a mixed picture of changes in the credit quality of credit card portfolios. Data from the Association for Payment Clearing Services show a rise in late payments (Chart 153), but bank contacts suggest that these have yet to be reflected in bad debts or write-offs. It is, however, possible that rapid growth in credit card portfolios will lead to higher arrears in future as contacts suggest that payment performance sometimes deteriorates after the first few years of a credit card relationship.

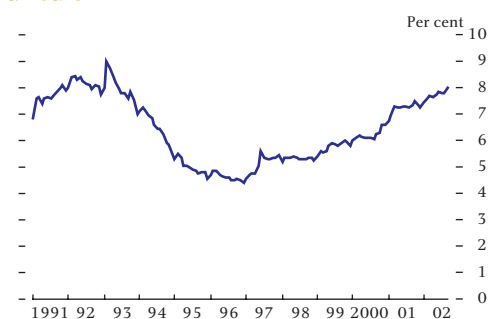
Chart 152:
Incidence of higher loan-to-value ratios on new retail mortgages^(a)



Source: Council of Mortgage Lenders.

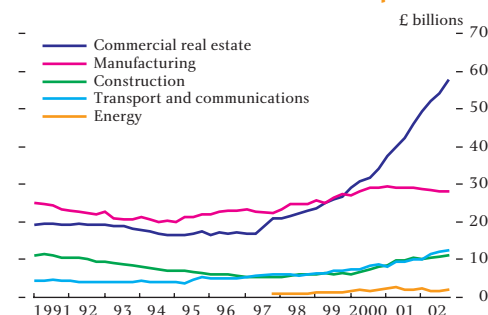
(a) By number of loans.

Chart 153:
Proportion of outstanding credit card balances that are three months or more in arrears



Source: APACS.

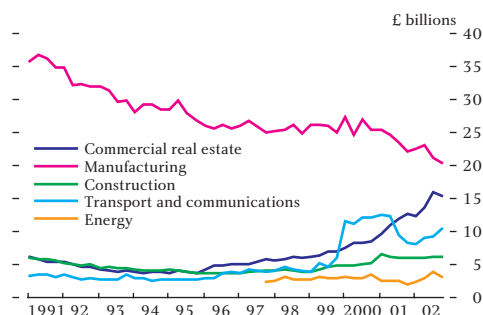
Chart 154:
Large UK-owned banks' UK-resident claims on various UK non-financial companies^(a)



Source: Bank of England.

(a) Break in data for 1997. Consistent data for energy are unavailable prior to Sep. 1997 due to classification changes.

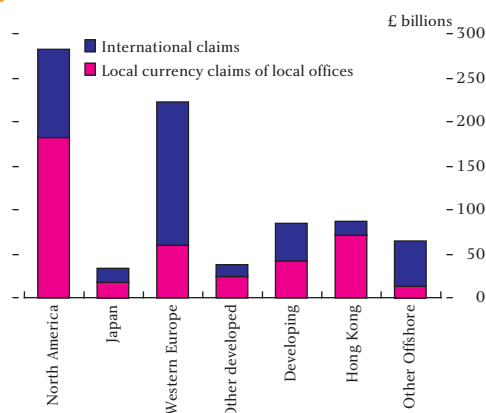
Chart 155:
Undrawn facilities to various UK non-financial companies granted by large UK-owned banks' UK offices^(a)



Source: Bank of England.

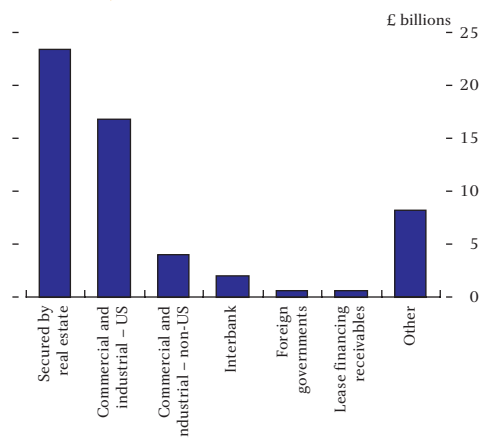
(a) Break in data during 1997. Consistent data for energy are unavailable prior to Sep. 1997 due to classification changes.

Chart 156:
Large UK-owned banks' foreign claims, June 2002



Source: Bank of England.

Chart 157:
Loans and leases of UK-owned banks in the USA, June 2002



Sources: Board of Governors of the Federal Reserve System and IMF.

Capital gearing in the UK *corporate* sector is also high relative to averages over the past decades, raising the debt at risk from individual corporate failures. There has, however, been widespread effort by firms to repair balance sheets. And, while bank contacts report some increase in defaults by large corporate borrowers, there has been less evidence of strain in small business portfolios. Section II identified two vulnerable sectors – electricity and telecommunications. Available data suggest that the large UK-owned banks' exposures to UK energy, transport and communications companies are low (Chart 154). Lending to companies is, however, likely to be more 'lumpy' than retail lending so that exposures to particular sectors, although small relative to the portfolio as a whole, may nevertheless pose risks. Moreover, the large UK-owned banks have unused commitments of £13.6 billion to these sectors (Chart 155).

The large UK-owned banks' lending for *commercial real estate* increased by 28% over the twelve months to June, and it accounts for almost as large a part of their total domestic exposures as it did in 1991. Growth remains concentrated, with a few banks still accounting for most lending. Although vacancy rates have increased for some commercial property sectors, as noted in Section II, bank contacts suggest that speculative lending – where a tenant has not been confirmed – is concentrated in residential developments. Contacts report, however, that LTV ratios on commercial real estate have typically risen over the past few years, though some recent data reveal a small fall.

Overseas credit exposures

Section I highlighted a number of possible macroeconomic and financial risks outside the UK. The large UK-owned banking sector's foreign claims remain concentrated in developed countries (Chart 156). During the first half of 2002, claims on Latin America fell – most markedly in the case of Brazil – while claims on other EMEs, offshore centres and developed countries rose.

The large UK-owned banking sector's single largest country exposure is to the *United States*. Around two thirds of these exposures are dollar-denominated claims of operations in the US. Federal Reserve data covering most of these operations show that loans and leases – which account for 45% of local US assets – are primarily secured on real estate or to US-owned corporates (Chart 157). A further 16% are mortgage-backed securities. This contrasts with the large UK-owned banks' claims on *Western Europe*. Most claims on Western Europe are cross-border and, of these, the majority are on banks or the public sector, rather than non-financial companies. The prevalence of lending to the US non-bank private sector means that asset quality is likely to be more sensitive to macroeconomic fluctuations,

though any losses may well be lower to the degree that this lending is secured.

The UK-owned banks' second largest country exposure is to *Hong Kong*, where several large UK-owned banks have substantial branch and subsidiary activities. According to published accounts, around two thirds of the loans extended in Hong Kong by these operations are property-related (Chart 158). As discussed in Section I.5, mortgage defaults have not yet increased, despite ongoing weakness of Hong Kong property prices. Credit card arrears have increased significantly, but unsecured retail lending accounts for a smaller part of UK-owned banks' Hong Kong exposures.

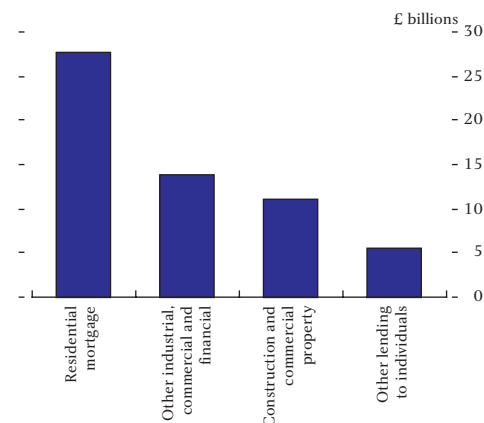
Market and interest rate risk

As noted in the *June Review*, most large UK-owned banks' trading book capital requirements are low relative to their capital requirements for credit risk. This is, on the whole, not surprising as only a small part of the large UK-owned banking sector's balance sheet is held in the 'trading' as opposed to the 'banking' book (Chart 159). For example, the large UK-owned banking sector's direct equity holdings are less than 2% of its total consolidated assets.

Banks' Value-at-Risk (VaR) disclosures also suggest that trading book exposures to market risk were small at the end of 2001. It should be noted, however, that VaR estimates are not published on a consistent basis, are based on historical volatilities and correlations, and are therefore not a complete metric of market risk. The recent increase in some market price volatilities, described in Section I.1, will however, have led to increased VaR for any given portfolio. As part of their VaR disclosures, some banks distinguish between VaR due to movements in exchange rates, equity and other asset prices. Their disclosures suggest that yield curve movements account for the larger part of UK-owned banks' VaR (Chart 160).

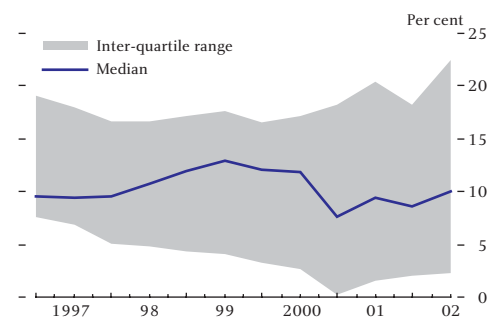
In addition to any trading book impact, changes in interest rates may lead to losses from banking book activities where there are unhedged interest rate mismatches. So, for example, a bank lending at fixed interest rates and funding at floating rates will incur losses if short-term interest rates rise. Gauging exposure to interest rate risk requires a view of the mismatch between assets and liabilities on which interest rates paid or received are subject to re-pricing, net of any hedging activity. UK-reporting banks are required to provide such information, where practicable, as part of their accounts. Not surprisingly, given the maturity transformation function of banks, more liabilities than assets are open to re-pricing over short horizons (Chart 161). Banks could therefore face small losses were interest rates to rise, and would gain were they to fall. Options prices suggest, however, that interest rates are expected to remain within a tighter range than

Chart 158:
Loans extended in Hong Kong by UK-owned banks' Hong Kong operations, June 2002



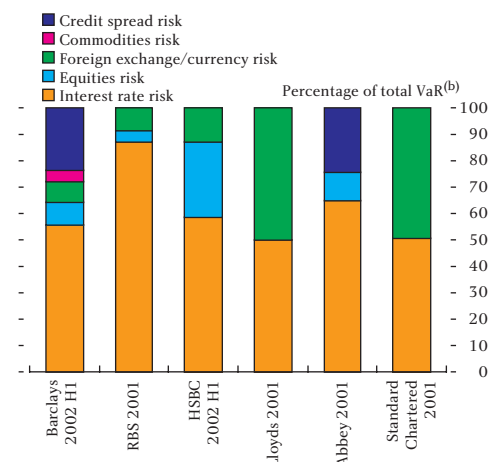
Sources: Published accounts and ONS.

Chart 159:
Large UK-owned banks' trading book/total assets



Source: FSA regulatory returns.

Chart 160:
Latest value-at-risk disclosures: by risk classes^(a)

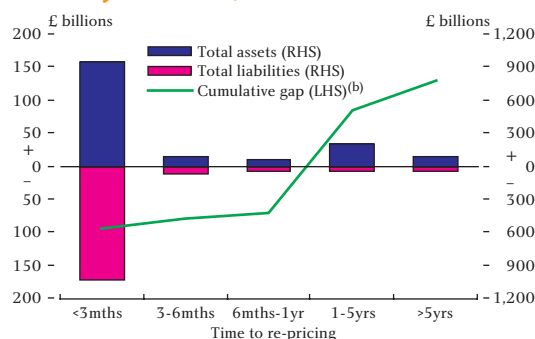


Source: Published accounts.

(a) Figures are for trading average VaR.

(b) Excludes 'diversification' effects.

Chart 161:
Large UK-owned banks' aggregate interest sensitivity mismatch, end-2001^(a)

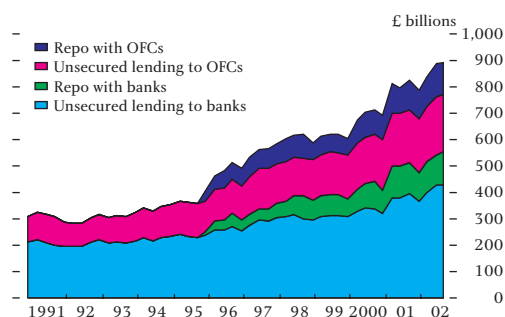


Source: Published accounts.

(a) Figures derived using banks' disclosures under FRS13.

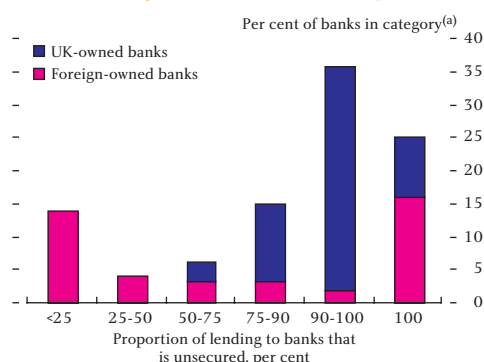
(b) Cumulative excess of assets over liabilities open to re-pricing, net of off-balance sheet items.

Chart 162:
All UK-resident banks' lending to banks and other financial institutions in the UK



Source: Bank of England.

Chart 163:
Patterns in UK-resident banks' UK lending to banks, September 2002 histogram



Source: Bank of England.

(a) Weighted by each bank's stock of loans to banks.

was the case during the early 1990s. If so, changes in interest rates will have little impact on banks' earnings, though larger movements, if they were to happen, could have more significant effects. Moreover, the accounting data may overstate the banks' exposures. First, notes to banks' accounts suggest that not all banks have fully recorded hedging activities. Second, banks have discretion in re-pricing many assets and liabilities – for example, whether to pass changes in official interest rates on to depositors – so that the potential to re-price need not always be exercised.

Links between financial institutions

The earlier part of this section described the robustness of the various UK-owned banks to risks and their exposure to a deteriorating operating environment. This part reviews the links amongst financial institutions which are essential for effective financial intermediation. Some arise through direct lending to other banks and financial institutions. Others arise from counterparty exposures through off-balance-sheet and payments activities.

Direct lending to other banks and financial institutions

As outlined in the June Review, much interbank lending is at short maturities. Lending to financial institutions has been little changed since the June Review (Chart 162). 35% of lending to non-bank financial institutions is secured via repo, so that exposures to loss are not likely to be significant. While a sizeable amount (£122 billion) of interbank lending is also secured, over three quarters remains unsecured. Unsecured lending typically accounts for a larger part of UK-owned banks' London interbank lending than is the case for most foreign banks (Chart 163). While some of the UK-resident interbank lending may represent intra-group transactions, there are also likely to be significant unsecured exposures between banks. This network of inter-linkages could create some potential scope for contagion, as discussed in Simon Wells' article in this Review. Over the past ten years, UK resident banks' write-offs on loans to other banks have never exceeded 0.03% of total loans to banks in any one year.

Overseas banks are important participants in the London interbank markets, making up 18 of the top 30 individual interbank lenders and 17 of the top 30 borrowers. Foreign banks' borrowing in the UK forms an important link between foreign and UK financial institutions that is not necessarily picked up by data on cross-border lending. The major Large Complex Financial Institutions (LCFIs), discussed in Section I.6, account for around half of all foreign banks' borrowings (Chart 164). German banks have larger-scale borrowings than do the US or Japanese banks.

Off-balance-sheet counterparty exposures

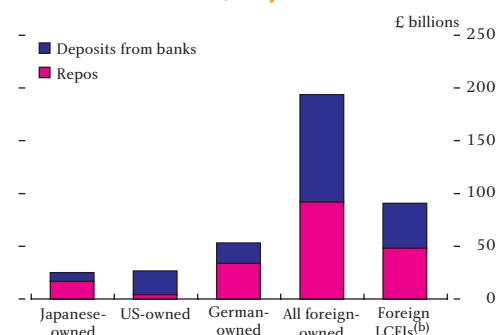
Derivative and other off-balance-sheet contracts can give rise to significant counterparty exposures. For example, the large UK-owned banking sector's off-balance-sheet derivative exposures had a mark-to-market value of £156 billion, or around 160% of Tier 1 capital, in June 2002. However, as discussed in the June 2002 *Review*, while the scale of derivatives markets continues to grow rapidly, increased use of various forms of credit risk mitigation may have limited increases in counterparty exposures. Most prevalent are netting and the use of margining arrangements. Additionally, the availability of central counterparty clearing mechanisms has increased recently as LCH has extended its range to include gilts, as discussed in the article *Strengthening financial infrastructure* in this *Review*. The potential importance of these risk mitigants is reflected in the stability of regulatory capital requirements for counterparty risk, at a time when derivative exposures have been increasing (Chart 165).

Payment activity

Another source of credit exposure – often intra-day – amongst banks and between banks and their customers arises from involvement in payment and settlement activity. The values transferred through the UK's main domestic payment and settlement systems have changed little over the past six months and remain large (Chart 166). For example, daily flows through CHAPS Sterling, are equivalent to 216% of the large UK-owned banks' Tier 1 capital. In most cases, however, system design is such that exposures between system participants are much smaller than the flows themselves. In particular, the two largest systems – CHAPS Sterling and CREST – are both real-time gross settlement systems. These systems therefore remove counterparty risk between participating members. They do not, however, eliminate all risks. Participating banks still need to manage their liquidity to ensure smooth functioning of the systems, and to monitor their intra-day and end-of-day exposures to customers and to banks which are not members of these systems.

Settlement exposures have, in the past, been particularly significant in foreign exchange markets as banks have often had to make payments on one leg of currency transactions before receiving payment on the other leg themselves. The introduction of Continuous Linked Settlement (CLS), which went live during September, has begun to reduce such counterparty exposures by settling foreign exchange transactions on a payment-versus-payment basis. The new system is described in more detail in the article *Strengthening financial infrastructure*.

Chart 164:
UK interbank liabilities of foreign banks'
UK-resident offices, September 2002^(a)

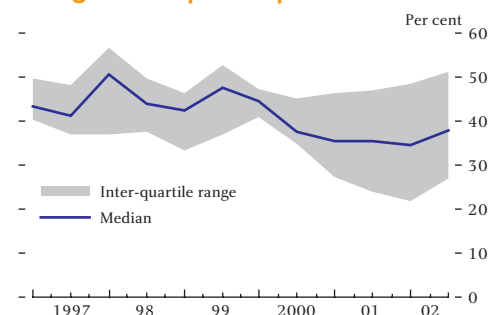


Source: Bank of England.

(a) Excludes tradable instruments issued by banks, ownership of which is not identifiable.

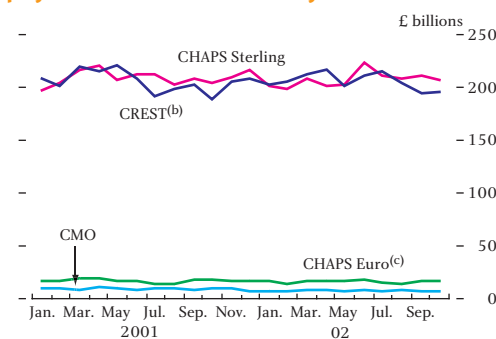
(b) Foreign Large Complex Financial Institutions, as defined in Section I.6.

Chart 165:
Large UK-owned banks' capital
requirements for counterparty risk/all
trading book capital requirements



Source: FSA regulatory returns.

Chart 166:
Daily average^(a) values through various
payment and settlement systems



Sources: APACS and CREST.

(a) Daily average is taken over a period of one month.

(b) Sterling settlement values including DBVs, excluding 'free of payment' deliveries.

(c) Domestic payments only.

Strengthening financial infrastructure

THE STABILITY OF THE FINANCIAL SYSTEM can be enhanced by developments in market infrastructure, market practices, and law and financial regulation, which either make crises less likely to occur, or make it easier to resolve them when they do occur. This article reviews such developments.

Most of these developments relate to crisis prevention, although a few, notably the work of international groups on crisis resolution arrangements for countries with debt difficulties (Box 1) and work on business continuity planning, relate to crisis management. Measures to prevent crises may be taken by market participants and infrastructure providers, or by legislators, central banks, regulators and other public authorities. They include the development of safer payment and settlement arrangements, more effective accounting and disclosure requirements, improvements to the legal regime, and the development of sound principles for prudential regulation. Some other noteworthy developments are listed in Box 3.

This article also reports, in the Annex, on one of the Bank's specific contributions to financial stability through its oversight of payment systems.

Market infrastructure

Continuous Linked Settlement (CLS) goes live

CLS enables foreign exchange transactions to be settled on a payment-versus-payment basis, thus greatly reducing principal risk. CLS Bank International (CLSB), the institution that provides the CLS service, started live operations on 9 September 2002. It is a very important risk-reducing development in market infrastructure.

In 1996, a report by the G10 central banks (the 'Allsopp report'¹) found many deficiencies in banks'

management of foreign exchange settlement risk² and evidence of very large, and sometimes unrecognised, exposures between counterparties. These raised significant concerns for individual banks and for the international financial system as a whole. The Allsopp report set out a strategy for reducing foreign exchange settlement risk, a key component of which was that private-sector industry groups should take action to provide risk-reducing multi-currency settlement services. The private sector's main response has been to develop the CLS system.

CLS is a system owned by the world's major banks, within which the transactions of members and their customers in eligible currencies are settled on a payment-versus-payment basis³. This eliminates principal risk (the risk of loss if you pay the currency you have sold but do not receive the currency you have bought), which is the major component of foreign exchange settlement risk⁴.

CLSB is incorporated as a US bank and regulated by the Federal Reserve ('the Fed'). However, because CLSB settles several currencies and affects the domestic payment systems of those currencies, the Fed consults formally in its oversight of CLSB 17 other central banks, including the Bank of England. These central banks were also closely involved with the Fed in approving the design of the CLS system prior to its introduction.

Chart 1 shows how the daily volumes and values settled by CLSB have grown strongly since its launch. By the end of November, CLS was settling values above US\$600 billion on peak days. At end-November 2002, 42 banks were settling transactions in seven major currencies – the US dollar, euro, yen, sterling, Swiss franc, Canadian dollar and Australian dollar; and CLS

1: Bank for International Settlements (1996) 'Settlement Risk in Foreign Exchange Transactions', Basel.

2: Foreign exchange settlement risk is also commonly known as 'Herstatt risk', after the insolvency of Bankhaus Herstatt in 1974.

3: For a fuller description of how CLS works, see Hills, R and Rule, D (1999) 'Counterparty Credit Risk in Wholesale Payment and Settlement Systems', *Bank of England Financial Stability Review*, November.

4: Foreign exchange settlement risk has other dimensions, including liquidity risk, replacement cost risk and operational risk, but these are usually much smaller than principal risk.

Box 1: IMF/G7/G10 work on crisis resolution arrangements

This box looks at measures that aim to ensure that the IMF lends only to countries with reasonable prospects of achieving sustainable debt positions, or, where a country's position is unsustainable, to facilitate an orderly restructuring.

Clearer policy on access to IMF resources

Greater clarity and predictability about the procedures the IMF will follow in a crisis would help to provide private sector lenders with a clearer framework against which to make their own lending decisions. In September 2002, the IMF Board agreed that, in future, the following criteria will need to be satisfied when a country wishes to borrow in excess of the IMF's normal lending limits:

- the country is experiencing exceptional balance of payments pressures on the capital account resulting in a need for Fund financing that cannot be met within the normal limits;
- a rigorous and systematic analysis indicates that, taking account of the IMF lending, there is a high probability that debt will remain sustainable;
- the country has good prospects of regaining access to private capital markets within the time Fund resources would be outstanding, so that the Fund's financing would provide a bridge;
- the country's policy programme provides a reasonably strong prospect of success, in respect of both adjustment plans and the institutional and political capacity to deliver that adjustment.

Directors also supported strengthening the procedures to be set when deciding whether to lend in excess of the normal limit, including: raising the burden of proof required in programme documents; assessing the risks to the Fund arising from the exposure and the impact on its usable resources; formalising requirements for early consultation with the Board; and requiring an *ex post* evaluation within a year of the end of the arrangement.

IMF lending into arrears

The IMF has a policy that, when a sovereign is in default, it will lend only if two conditions are met.

First, the provision of finance in support of the country's adjustment programme should be considered essential to help limit the scale of economic dislocation and preserve the economic value of investors' claims. Second, the sovereign should engage in an early and constructive dialogue with its creditors to secure a timely and orderly agreement that will help the country to regain external viability. In September 2002, the IMF Board agreed that greater clarity about what constituted a 'good faith' dialogue was needed. It agreed that:

- when a country has concluded that it cannot realistically avoid a restructuring of its debt, it should engage in an early dialogue with its creditors, which should continue until the restructuring is complete;
- the country should share relevant information with all creditors on a timely basis, including the provision of a comprehensive picture of the proposed treatment of all claims on the sovereign, including those of official bilateral creditors, and an elaboration of the basis on which the debt restructuring would restore medium-term sustainability;
- creditors should have an early opportunity to give input on the design of restructuring strategies.

It is too soon to tell whether this attempt to balance clarity and flexibility in the IMF's lending into arrears policy will have an impact on the timeliness with which sovereigns needing to restructure their debt open a dialogue with their creditors.

Wider use of collective action clauses (CACs)

One practical means of promoting a more orderly and efficient sovereign debt workout process is by including in sovereign bond contracts provisions which specify how restructurings will be handled. A number of private sector organisations have expressed a willingness to consider including CACs in bonds issued in jurisdictions, particularly New York, where up until now they have not been used. Within the official sector, a G10 Working Group on Contractual Clauses consulted specialist lawyers who work for both issuers of and investors in sovereign debt and has suggested some principles for the design of CACs. It is hoped that these will assist the private sector in

drafting a set of model CACs. Differences, however, remain on the detail, notably on the majority required to amend the payment terms of bonds. Moreover some emerging market countries are nervous that bonds with CACs will prove to be more expensive.

Sovereign debt restructuring mechanism (SDRM)

The September 2002 meeting of the International Monetary and Financial Committee called on the IMF to develop a concrete proposal for an SDRM for consideration at the Committee's meeting in

April 2003. This work would proceed in parallel with work on CACs, in a 'twin-track' approach. An SDRM would enable a country to restructure its outstanding debt within a clear, pre-determined framework underpinned by international statute. For an SDRM to apply across all jurisdictions, however, will require either an amendment of the IMF's Articles of Agreement or an international treaty. For that reason, it is a longer-term objective. There has been an active debate between the official and private sectors on the need for, and desirability of, an SDRM.

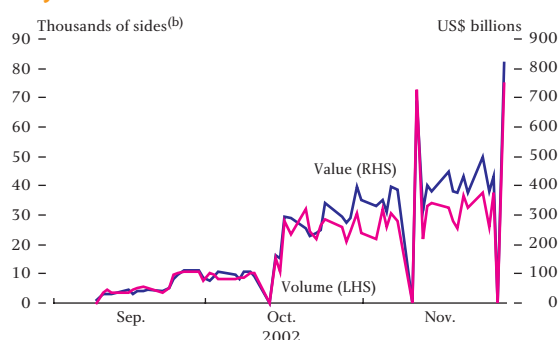
accounted for around 16% of the total settled values in the foreign exchange market, which are around US\$2.4 trillion per day according to the most recent survey carried out by the Bank for International Settlements (BIS) in April 2001. Settled volumes and values in CLS are expected to increase further in coming months, albeit more slowly, as more banks participate and as the transactions of settlement members' customers begin to be settled in the system. A further boost to CLS's turnover should come as more currencies are accepted for settlement. Currently, six additional currencies – the Norwegian krone, Danish krone, Swedish krona, Singapore dollar, Hong Kong dollar and New Zealand dollar – are targeted for inclusion within the next year; and more are expected to be added thereafter.

This helps to ensure the finality of CLS payments. The legal basis of finality of settlement in CLS is underpinned by its designation by the Bank of England under the UK Regulations that implement the EU Settlement Finality Directive (SFD). More detail on the SFD is provided in the Annex on the Bank of England's oversight of payment systems.

CLS is designed to use its members' liquidity efficiently. Although trades are settled gross (ie trade by trade), each member makes only a net payment in each currency where it has a net short position for the day across all deals in that currency which it settles in CLS. Pay-outs received by a member for those currencies in which it has a long position overall are also for the net amount. CLS is thus expected to reduce significantly the values settling through some of the main RTGS systems, including CHAPS Sterling and CHAPS Euro in the UK.

Chart 1:

Daily settlement volumes and values in CLS^(a)



Source: CLS Bank International.

(a) 14 Oct., 11 Nov. and 28 Nov. were US holidays, which accounts for the very low level of trades settled on those days.

(b) Each trade consists of two sides, and is recorded as such by CLSB. For example, the sale of US\$15 million for £10 million would, in US dollar terms, equate to two sides with a combined settlement value of around US\$30 million.

CLSB pays out and receives funds to and from its members using the local real-time gross settlement (RTGS) payment systems of the currencies it settles.

The pay-ins are subject to deadlines, with minimum amounts to be paid in up to five instalments during the five-hour window – 07.00 to 12.00 Central European Time (CET) – during which CLS settlement takes place. Members are thus presented with a new dimension to their daily liquidity management – intraday time criticality.

In the first few weeks of CLS's operations, liquidity pressures on members were successfully managed. Settlement members did not appear to experience any particular difficulties in funding their CLS pay-ins. Very few significant delays were experienced, and CLS completed settlement of underlying trades by, or very shortly after, the targeted time of 9.00 CET on nearly every day.

The tight daily timetable means that operational problems, either in CLS or its settlement members,

could be a significant source of pay-in failures. CLS requires its members to meet strict operational and technical standards to reduce that risk. And CLS itself has invested considerable effort in its own operational risk management and, in particular, its business continuity plans. This is, nevertheless, an area for close regulatory review.

The advent of CLS is expected to increase, perhaps quite substantially, the concentration of payment flows through a small number of correspondent banks. In part, this may reflect increased use of a smaller number of nostro agents for CLS payments than for traditional foreign exchange payments. It is also expected, however, that not all foreign exchange market participants will wish to incur the cost of membership. Those with relatively low volumes or values at risk may instead choose to access the system indirectly, using the services of a settlement member. Any such increase in tiering within the foreign exchange market carries operational, liquidity and, potentially, credit risks. Indirect users will be reliant on their settlement members' soundness and liquidity management, and may need to hold substantial balances with their settlement members. Conversely, settlement members may incur sizeable exposures to their customers, for example, when they extend credit to them. The extent and implications of such concentration of risk are difficult to determine *ex ante* (and there may be offsetting efficiencies and cost savings, for example reflecting the achievement of economies of scale), but the authorities will monitor it closely.

CLS will make an important contribution towards reducing principal risk and it is likely to become the settlement norm for major players and currencies in the foreign exchange market. It carries some associated risks, particularly a concentration of operational and liquidity risk, which will remain a topic of considerable central bank attention. It nevertheless represents the achievement of a long-standing objective of central banks to reduce risk in the foreign exchange market.

Consultation on dematerialisation of money market instruments

Further steps are under way to reduce settlement risks for UK money market instruments (MMIs).

On 13 September 2002, HM Treasury published a consultation document⁵ seeking views on proposed changes to the Uncertificated Securities Regulations 2001 that would be necessary for the issuance and transfer of title of dematerialised equivalents of MMIs. The progressive replacement of MMIs by dematerialised equivalents of MMIs ('eligible debt securities') is scheduled for 2003 H2, with a view to the Central Moneymarkets Office (CMO) closing at end-2003. In 2002, the monthly average for daily turnover in CMO has been between £6.5 billion and £8.2 billion. The proposed legislative changes are necessary to improve the safety and efficiency of money market settlement arrangements through their integration with gilt and equity settlement arrangements. The planned implementation of these changes will be unaffected by the merger between Euroclear and CRESTCo (below). They will enable MMIs to be settled in the same way as other instruments in the CREST system and, in particular, will enable them to be subject to the same Delivery versus Payment (DvP) settlement arrangements.

The dematerialisation of MMIs was the third key strategic recommendation of the Bank of England's Securities Settlement Priorities Review, published in September 1998⁶. The first two recommendations – the merging of the Central Gilts Office (CGO) and CREST, and the introduction of full DvP in central bank money – have already been implemented.

Euroclear-CREST merger

On 4 July 2002, Euroclear, the international central securities depository system, and CRESTCo, which operates the settlement systems for UK equities, gilts and money market instruments, announced plans for an agreed merger. The merger was completed on 23 September, following approval from both sets of shareholders and the UK government's decision not to refer the merger to the competition authorities. Under the terms of the merger, CRESTCo shareholders received a 19% shareholding in Euroclear plc.

The merged entity (which besides CREST and the original international Euroclear operation, also encompasses the national securities settlement systems of Belgium, France, Ireland and the Netherlands) aims to deliver efficient low-cost cross-border settlement to its users, through a

5: HM Treasury (2002) 'Modernising the Settlement of Money Market Instruments', September.

6: www.bankofengland.co.uk/markets/payments/sspr9809.pdf.

combination of rationalised central infrastructure, standardised procedures and high transaction volumes. Its business model will involve a high degree of user choice: for example, over the jurisdiction in which a user's securities are held and whether settlement takes place in central bank or commercial bank money processes. The service will be based on a single settlement platform and subject to strong user governance and consultation.

A key financial stability issue for the central banks concerned is ensuring the continued availability of a robust and effective mechanism for DvP. The business model envisages that central bank money settlement will be available even when the two counterparties concerned (or their commercial banks) have settlement accounts with different central banks; discussions are under way on how such a facility should be designed. Central banks and regulators are also considering the regulatory and oversight framework needed to support the new group.

LCH developments

The June 2002 *Review* reported the imminent introduction of the second phase of the London Stock Exchange's central counterparty (CCP) netting facility, provided by London Clearing House (LCH). This was implemented successfully on 1 July 2002. Netting enables substantial reductions in settlement risk – in October 2002, LCH reported that the number of cleared trades on the London Stock Exchange that still required settlement had fallen by around 97%.

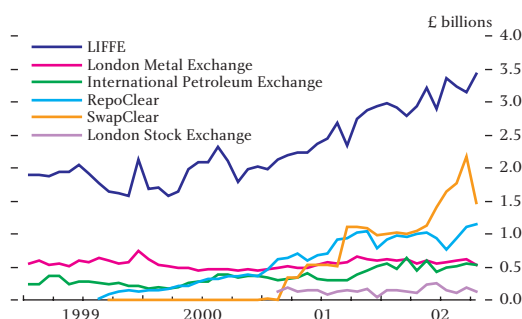
On 5 August 2002, LCH's RepoClear service, under which it acts as CCP for outright and repo bond trades undertaken by its members, was expanded to include gilts. The service accepts transactions from both voice brokers and electronic trading platforms. Volumes have increased markedly since the launch. In November 2002, LCH processed an average of around £4 billion gilts trades per day (single sided count). Some contacts have reported that the multilateral netting of trades through LCH has eased the balance sheet constraints that have previously restricted their ability to trade over quarter ends. And market participants have reported an increase in the liquidity of the general collateral repo market.

Chart 2 shows how the initial margin that members have to deposit with LCH, to reflect the risks that LCH

assumes in its CCP role, has grown in line with LCH's ongoing expansion. LCH's default resources, which protect it in the event that losses stemming from the default of one of its members are greater than the margin provided by that member, have grown commensurately. At end-November 2002, LCH's default fund totalled almost £340 million, compared with £150 million at the beginning of 1999, when it provided clearing services only to LIFFE, the London Metal Exchange, the International Petroleum Exchange and Tradepoint (a stock exchange). LCH also increased its default insurance facility from £100 million to £200 million in August 2002.

Chart 2:

Initial margin required by LCH for each cleared market at end-month



Source: London Clearing House.

Business continuity planning

As highlighted in previous *Reviews*, the events of 11 September 2001 have reinforced efforts to increase firms' and systems' resilience in the face of physical disruption and to ensure that the authorities are prepared to respond to any disruption in market infrastructure that could threaten financial stability.

On 29 August 2002, the US authorities⁷ issued for comment a joint white paper on 'Sound Practices to Strengthen the Resilience of the US Financial System'. The paper outlines proposed sound practices of business continuity management for the core clearing and settlement organisations and financial institutions that play significant roles in critical markets. They propose minimum recovery times and that core clearing and settlement organisations should be able to operate indefinitely, at full capacity, from their back-up sites. The relevant institutions should begin implementing the finalised sound practices within the next year.

7: Board of Governors of the Federal Reserve, the Office of the Comptroller of the Currency and the Securities and Exchange Commission (SEC).

In the UK, HM Treasury, the Bank of England and the Financial Services Authority (FSA) have been continuing their work with other public and private bodies to strengthen business continuity planning in the financial sector⁸.

On 30 July 2002, the FSA issued a consultation paper on 'Operational Risk Systems and Controls' (due to be implemented in 2004)⁹, which includes draft guidance on business continuity management. It has carried out a review of the major firms to assess their state of readiness and identify good practice. This exercise concluded that while plans were generally in place there were a number of issues still to be addressed, particularly regarding the use of remote back-up sites – how far they should be from the primary site, whether they should be permanently staffed, and questions of whether shared facilities would be available in practice in an emergency. The FSA also noted the importance of senior management taking responsibility for business continuity planning.

The Bank has been assessing whether there are appropriate market groups that could take on a co-ordinating role in managing a crisis. The Money Market Liaison Group has assumed this role for the sterling money markets and has adopted a recommendation on interest rates paid/received on unintended overdrafts/balances following a system-wide event or infrastructure failure. The Foreign Exchange Joint Standing Committee and the Markets and Exchanges Regulatory Liaison and Information Network have each set up sub-groups which, *inter alia*, address contingency planning issues.

International market practices

There have been a number of recent large corporate failures in the US, including Enron, which filed for protection under Chapter 11 on 2 December 2001, and WorldCom, which did so on 21 July 2002. Common features have been failures in corporate governance and in auditing and accounting procedures. Box 2 discusses restatement of financial accounts in the United States and the impact of these, and other accounting concerns, on investor confidence. There have been many recent policy responses to these issues, not only in the United States but also in the EU and UK.

US Sarbanes-Oxley Act

US legislators have responded swiftly. President Bush signed into law the Sarbanes-Oxley Act on Corporate Responsibility ('The Act') on 30 July 2002. The Act is intended to promote greater confidence in the integrity of financial statements and in the reliability of earnings measures, to make corporate officers more accountable and to strengthen corporate governance more broadly. Most reforms mandated by the Act have a timetable for action within 180 days (ie by end-January 2003), although some amended rules (eg on disclosure and reporting deadlines) have already come into force.

The Act:

- establishes a Public Company Accounting Oversight Board for the accounting industry;
- restricts non-audit services provided to audit clients;
- introduces new reporting and disclosure requirements;
- requires rotation of lead and review audit partners every five years;
- sharply raises maximum fines and jail sentences for corporate law and fraud offences;
- creates a fund for defrauded investors, with money from fraud penalties;
- prohibits corporate loans to directors or executive officers;
- requires the SEC to conduct a study of rating agencies;
- requires companies to present *pro forma* financial information in a manner that: (1) does not contain an untrue statement of a material fact, or omit to state a material fact necessary to make the information not misleading; and (2) reconciles it with the financial condition and results under US Generally Accepted Accounting Principles.

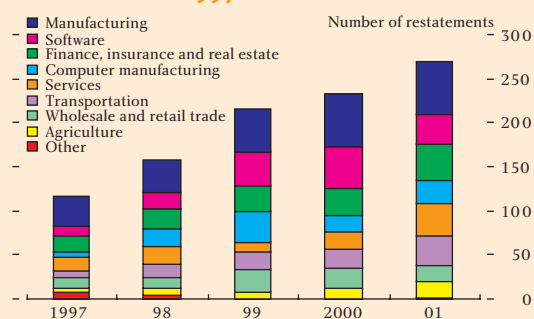
8: The main initiatives are summarised on the tripartite website, www.financialsectorcontinuity.gov.uk.

9: www.fsa.gov.uk/pubs/cp/cp142.pdf.

Box 2: Restatements of financial accounts in the United States

After the bankruptcies of Enron and WorldCom, greater attention has been paid to companies that have restated their financial accounts. Recent studies by Huron Consulting Group¹ and the US General Accounting Office (GAO)² have investigated the frequency of restatements. Although their methods differed, both found that financial restatements have continued to increase (Chart A). According to the GAO survey, the number of restatements as a percentage of total listed companies has also risen, from 0.9% in 1997 to a projected 3.0% in 2002. This could indicate that companies are being more diligent in reviewing their published financial statements, in order to avoid the consequences of errors.

Chart A:
Number of financial restatements filed by industry sector between 1997 and 2001



Source: Huron Consulting Group.

The Huron data are broken down by industry and show that manufacturing has accounted for the largest number of financial restatements each year: 22% in 2001. This was close to the proportion of public companies in manufacturing. The services industry accounted for 13% of all restatements, but only 10% of public companies, and showed the largest proportional increase (80%) in 2001. Huron's results (Table A), consistent with the GAO's, show that revenue recognition errors – including booking forward sales in the current audit period – have been the main factors behind restatements. Apart from revenue recognition and research and development costs, restatements related primarily to the balance sheet.

The GAO estimates that the average abnormal return for those companies that restated their accounts over

Table A:
Accounting issues associated with restatements^(a)

	1997	2001	Total	Percentage of total
Revenue recognition	30	48	220	20.2
Reserves/accruals/contingencies	16	37	137	12.6
Acquisition accounting ^(b)	8	25	108	9.9
Equity	8	52	107	9.8
Capitalisation/expense of assets	12	26	83	7.6
IPR&D	-	1	50	4.6
Impairment of assets	3	16	37	3.4
Gain/loss	3	13	34	3.1
Investments/derivatives	1	21	33	3.0
Other	39	66	280	25.8
Total	120	305	1,089	100

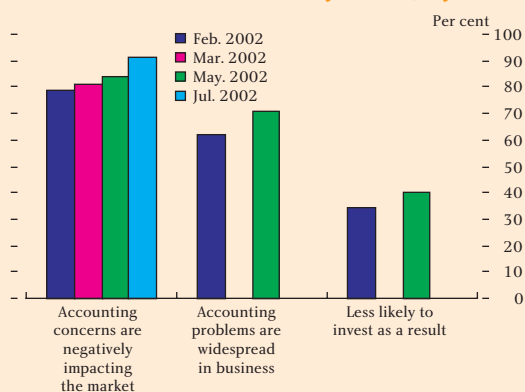
Source: Huron Consulting Group.

(a) Certain restatements relate to more than one accounting issue.

(b) Excludes IPR&D (In-process research and development).

the period 1997–2002, based upon a three-day window around the restatement date, was –10%. The GAO also estimated that the total loss in market capitalisation resulting directly from financial restatements was US\$95.6 billion over the whole period (allowing for general movements in the market). A monthly study of investor confidence compiled by UBS suggests that the increase in financial restatements and accounting concerns has been one factor in lowering investor confidence (Chart B).

Chart B:
Effects of accounting concerns on investor confidence in the stock market, February 2002–July 2002^(a)



Source: UBS index of investor optimism.

(a) Last two questions only asked in February and May surveys.

1: Huron Consulting Group (2002), 'A study of restatement matters, for the five years ended December 31 2001'.

2: US General Accounting Office, 4 October 2002, 'Financial statement restatements: trends, market impacts, regulatory responses and remaining challenges'.

The Act generally makes no distinction between US and foreign private issuers listed in the United States (there is a provision for possible exemption of foreign public accounting firms). EU firms are concerned that some requirements of the Act may be inconsistent with home country rules, such as the requirement to have audit committees composed only of independent directors (which would represent a significant change from current UK practice). It has also been noted that domestic US deposit-taking institutions are exempt from the Act's provision prohibiting loans to directors and executives, but foreign banks are currently not exempt. SEC Chairman, Harvey Pitt, said that the SEC was prepared to consider how to accommodate home country requirements and regulatory approaches. Mr Pitt also sought reciprocity regarding the EU's Financial Conglomerates Directive, where the USA is concerned that the EU could impose additional regulatory requirements on US financial institutions if supervision of them is not judged to be 'equivalent' to that of EU firms.

Related US developments include additional NASDAQ and New York Stock Exchange (NYSE) proposals, planned changes to US accounting standards, and proposed changes to the rules governing initial public offerings (IPOs).

NASDAQ/NYSE

NASDAQ and the NYSE have each made proposals for corporate governance reforms to their respective listing rules, many of which reflect those in the Sarbanes-Oxley Act.

Additional NASDAQ proposals include requiring shareholder approval for stock option plans, requiring all companies to have a publicly available code of conduct and clarifying that a material misrepresentation or omission by an issuer to NASDAQ could form the basis for delisting. This last proposal has already been approved by the SEC.

The NYSE proposals would require listed companies to have a majority of independent directors, who must meet regularly without management present. The audit committee, which would have sole responsibility for the appointment of the independent auditors, and

the remuneration committee must be composed entirely of independent directors. Companies would also be required to have a corporate governance committee composed entirely of independent directors.

Financial Accounting Standards Board – changes to US accounting standards

In an effort to improve the quality and transparency of financial accounting and reporting in the United States, the US Financial Accounting Standards Board (FASB) put forward proposals for a principles-based approach to standard setting on 21 October 2002, for comments by 3 January 2003¹⁰. This was followed on 29 October by a memorandum of understanding between the FASB and the International Accounting Standards Board (IASB), a significant step towards formalising their commitment to the convergence of US and international financial reporting standards. The two accounting standards bodies expect to issue an exposure draft to address the key differences by end-2003, and to remove other differences through co-ordination of their future work programmes. Eliminating the major differences will improve comparability of financial statements across national jurisdictions. The IASB's International Accounting Standards must be applied to the consolidated accounts of EU listed companies from 2005 (below). Sir David Tweedie's article in this *Review* describes these developments in more detail.

In addition to a project on revenue recognition¹¹, added to its agenda on 20 May 2002, the FASB is also considering other possible amendments to various accounting standards. On 28 June 2002, it issued an Exposure Draft on consolidation of special-purpose entities (SPEs)¹². SPEs are widely used by corporations in the United States, in particular by banks, finance companies, and the finance arms of industrial companies (eg Ford and General Motors), to securitise assets. At the time of release of the Exposure Draft, there was a marked slowdown in the completion of such off-balance-sheet financing, but activity picked up again within a few months. The FASB believes that, if a business enterprise has a controlling financial interest in an SPE, the assets, liabilities and results of the activities of the SPE should be included in the consolidated financial

10: www.fasb.org/proposals/principles-based_approach.pdf.

11: www.fasb.org/news/nro52002.shtml.

12: www.fasb.org/draft/ed_prop_interp_spe.pdf.

statements of the business enterprise (the primary beneficiary of the SPE). Some concerns have been expressed that these proposals could discourage legitimate uses of SPEs, such as in securitisations.

On 4 October 2002, the FASB issued a proposed amendment to FASB statement 123 'Accounting for Stock-Based Compensation' that would require new disclosures to clarify the effect of stock-based employee compensation on reported results, and make these disclosures more prominent¹³. Standard & Poor's reported that at 4 December 2002, more than 130 US companies had announced already their intention to adopt the approach of expensing the fair value of options granted, rather than the intrinsic value (zero for 'at-the-money' or 'out-of-the-money' options¹⁴). On 7 November 2002, the IASB published for public comment its own proposals on how entities should account for share-based payment transactions, including grants of share options to employees. The UK Accounting Standards Board released on the same day the IASB proposals for UK consultation. The IASB proposes that an expense should be recognised at the time when share options are granted by the company. Sir David Tweedie's piece in this *Review* discusses this issue further.

Investment banks' conflicts of interest

A joint regulatory initiative between the SEC, the New York Attorney General, NYSE and the National Association of Securities Dealers (NASD) has resulted in stronger rules governing research analysts and IPO allocations, intended to reduce potential conflicts of interest.

On 8 May 2002¹⁵, the SEC approved proposals governing the activities of research analysts which restricted (i) compensation that research analysts can receive from investment-banking activities; (ii) their (personal account) purchasing of subject companies' securities around the time they issue research reports on a company; and (iii) analyst trading of IPO stocks.

On 28 July 2002, NASD's Board of Governors approved new rules, which are awaiting SEC approval, governing IPOs¹⁶. The proposals would ban 'spinning' (allocating IPO shares to an executive of a company on the condition that the brokerage firm receives that company's investment banking business); 'laddering' (agreement to buy in the after-market as a condition for an initial allocation), and 'quid pro quo' agreements (allocation of IPO shares by an underwriter to current or potential clients in exchange for excessive compensation for past or future services provided by the underwriter).

On 3 October 2002, the NYSE and NASD jointly announced a further initiative to strengthen rules concerning research analysts and IPOs¹⁷. The proposed new rules cover the way member organisations, their research analysts and investment-banking departments manage and disclose conflicts of interest. They also announced a new committee, formed at the SEC's behest, to review the IPO process and recommend ways to address recent problems.

The independence of auditors

On 18 October, the International Organisation of Securities Commissions (IOSCO) issued statements of principle covering 'Auditor Oversight' and 'Auditor Independence and the Role of Corporate Governance in Monitoring an Auditor's Independence'. The principles on oversight of auditors include a requirement that the relevant oversight body should be independent of the audit profession or itself be overseen by an independent body, and have adequate funding that is not under the control of the auditing body. The principles on auditor independence, which are intended to guide securities regulators in dealing with these subjects, say that auditor independence should be supported by a combination of prohibitions, restrictions and disclosures, although they do not specify what these should be. On corporate governance, IOSCO says that a company's audit committee should appoint the auditor and

13: www.fasb.org/draft/ed_amend_st123.pdf.

14: The fair value of an option is its current market value, or a best estimate based on an appropriate option pricing model, whereas the intrinsic value is the market price of the underlying instrument less the exercise price, or zero if the underlying price is at or below the exercise price, that is, when the option is 'at-the-money' or 'out-of-the-money'. The fair value of an unexpired option will always exceed its intrinsic value.

15: www.sec.gov/news/press/2002-63.htm.

16: www.nasdr.com/news/pr2002/release_02_037.html.

17: www.nasdr.com/news/pr2002/release_02_050.html.

should be the body through which the company and auditor interact.

Financial reporting and corporate governance in the EU and UK

A number of proposals have been implemented, or are under consideration, in the EU and the UK, which collectively would strengthen existing requirements in the sphere of financial reporting, auditing and corporate governance. They would provide greater statutory backing for the oversight of the financial affairs of listed companies, clarify further the responsibilities of the various parties involved in this oversight process and increase the sanctions for non-compliance. For the most part, these represent the culmination of projects which have been under way for some time, but the concerns engendered by Enron have given them an added impetus. Some features of existing UK arrangements, such as principles-based accounting standards, which emphasise the importance of a 'true and fair view' may provide protection against some of the problems highlighted by the Enron and WorldCom episodes.

The 'Winter report' on EU company law

The High Level Group of Company Law Experts, which was established by the European Commission in September 2001 and is chaired by Jaap Winter, published its report (the 'Winter report') on 4 November 2002. It makes a number of recommendations on corporate governance issues in the EU and its conclusions are likely to form the basis for a company law action plan, which the European Commission has been asked to draw up by EU ministers. A number of the recommendations are broadly similar to the requirements of the UK Combined Code, which is the main body of guidance on corporate governance issues. The Winter report recommends that companies should make disclosures of their adherence to corporate governance policies; that decisions on directors' pay and other areas of possible conflict of interest should be made by a board with a majority of independent directors; and that there should be an audit committee composed of a majority of independent directors responsible, among other things, for the selection of the external

auditor. The Winter report accepts that there cannot be a single corporate governance approach covering all Member States because of the differences in company law that exist at national level.

EU recommendation on auditor independence

An EU Commission Recommendation on auditor independence¹⁸ issued in May 2002 this year has now been adopted as a statement of best practice by the major UK auditing bodies. It covers much of the same ground as the Sarbanes-Oxley Act (above). Although lacking the legal sanctions of the US measures, the Recommendation contains detailed prescriptions – for example, on auditor-client relationships and on the provision of non-audit services.

HM Treasury/DTI Co-ordination Group on Audit and Accounting Issues

A group set up by HM Treasury and the Department of Trade and Industry (DTI) to co-ordinate the work of individual regulators in the sphere of audit and accounting produced an interim report in July 2002¹⁹. It has examined, among other things, issues relating to auditor independence²⁰, financial reporting, corporate governance and company law reform. The group has recommended strengthening the powers and responsibilities of audit committees. It has asked the Financial Reporting Council to develop guidance on the responsibilities of audit committees for inclusion in the Combined Code. Under the UK Listing Rules, companies are obliged to disclose and explain any non-compliance with the Combined Code. The group also suggested that the Government examine the case for underpinning the role of audit committees, which are at present not mandatory, in company law.

A planned DTI review of the arrangements in place since 2000 for the regulatory oversight of the accountancy profession has been brought forward. It will look, in particular, at whether the existing balance between professional self-regulation and independent regulation is appropriate and whether there should be a statutory basis for regulation of accounting. The HMT/DTI Co-ordination Group has also proposed that the Financial Reporting Review

18: europa.eu.int/comm/internal_market/en/company/audit/official.

19: Co-ordination Group on Audit and Accounting Issues (2002), 'Interim Report to the Secretary of State for Trade and Industry and the Chancellor of the Exchequer', July. www.dti.gov.uk/cld/cga_final.pdf.

20: Member States are able to set more stringent requirements than the EU Recommendation on auditor independence, and some of the possibilities the group is considering in the UK go beyond the requirements of the Recommendation.

Panel, the UK body with responsibility for enforcement of accounting standards, become more pro-active²¹.

EU regulation on international accounting standards

The most important prospective development in financial reporting in the UK is the July 2002 EU Regulation on international accounting standards, which requires companies whose shares are traded on a regulated market in the EU to adopt international accounting standards by 2005 once the Accounting Regulatory Committee has endorsed formally the IASB standards. International standards are generally welcomed by firms on 'level playing field' grounds and because they should reduce costs for companies which are listed on different national exchanges. There will be challenges both for the reporting companies and users of accounts to manage the transition effectively and for the UK standard setter to ensure that the 'true and fair' approach of principles-based accounting is retained as an important influence in the development of international standards. Among the individual standards to be adopted, two that raise particular issues, especially for financial institutions, are IAS 32 and IAS 39, the standards for disclosure and measurement of financial instruments.

UK banks are concerned that the detailed conditions for hedge accounting in IAS 39, designed to prevent abuses, could create disincentives for hedging some kinds of risks. Some banks believe that the proposed new rules for loan provisioning ('impairment') could be difficult to apply, and that the option to measure any instrument at fair value could lead to cherry picking. There are also concerns about consistency between the disclosures required by IAS 32 and under Pillar 3 of the new Basel Accord.

Company law

On 16 July 2002, the DTI published a White Paper on 'Modernising Company Law'²², which set out proposals for implementing many of the recommendations of the extensive UK Company Law Review²³ (the section below on registration of company charges also relates to the Company Law

Review). There are a number of measures that impinge on the area of financial reporting. Under the White Paper's proposals, auditors will for the first time have a statutory right to ask for company information from employees and certain contractors, and directors will be obliged to volunteer information (on a positive basis, rather than in reaction to auditors' requests) to auditors. Failure to provide honest information, or any attempt deliberately to conceal the true state of a company's financial affairs from auditors, will incur penalties of up to two years in jail and unlimited fines. The White Paper also proposes that an Operating and Financial Review should become mandatory for 'economically significant' companies²⁴.

Law and financial regulation

a) Legal underpinning of transactions

EU Collateral Directive

The Directive clarifies which country's law governs rights to securities held indirectly as collateral. This is important if the securities are held through one or more financial intermediaries or clearing systems located in different jurisdictions. It also removes legal uncertainties in relation to collateral provided through the outright transfer of title to securities, such as repos (which are already recognised under English law).

The Directive was published on 27 June 2002, and Member States have 18 months to implement it in national law. The provisions of the Directive apply to dealings between all entities except individuals, although Member States will be able, if they wish, to restrict the scope of application to dealings between financial institutions.

Changes to registration of charges

A Law Commission consultation paper has proposed a change to the system of registration of charges in England and Wales. It would involve an electronic 'notice filing' system (similar to that used in the United States) to replace the existing register. At the same time, the scope of registration would be extended to a variety of 'quasi security interests', including, for example, those underpinning factoring and discounting, leasing and hire purchase arrangements.

21: At present, the Panel looks only at the accounts of public and large private companies that are brought to its attention by third parties (including the media).

22: www.dti.gov.uk/companiesbill/whitepaper.htm.

23: www.dti.gov.uk/cld/final_report/prelims.pdf.

24: That is, firms that meet two out of three of the following criteria: private companies: turnover more than £500 million, balance sheet more than £250 million, or more than 5,000 employees; public companies: turnover more than £50 million, balance sheet more than £25 million, or more than 500 employees.

The proposal potentially offers an increase in transparency that could improve the process of credit assessment, particularly in relation to smaller firms, which are the main users of secured credit.

UK corporate insolvency regime

The Enterprise Bill received Royal Assent on 7 November 2002. Its provisions changing the corporate insolvency regime are expected to come into effect between April and June 2003. The right to appoint an administrative receiver will in most cases be withdrawn for floating charges taken after the implementation of the provisions and a court-led administration will become the normal corporate insolvency procedure. The aim of the legislation is to encourage the continuation of businesses as going concerns and to ensure that the rights of all creditors (secured and unsecured) are better taken into account in the insolvency procedure. Crown preference will be abolished when the new legislation commences. The legislation introduces deadlines for the administrator to complete the various stages of the administration. Whilst the proposals have been modified in various ways to meet concerns of lenders and insolvency practitioners, there is still some uncertainty about their impact. In particular, it is not yet clear whether the removal of the right to appoint a receiver will affect the willingness of banks to lend on the basis of floating charge security.

Establishment of the Financial Markets Law Committee²⁵

The Financial Markets Law Committee, set up after the winding up of the Financial Law Panel, became fully operational in June 2002. Its role is to identify issues of legal uncertainty, or misunderstanding, both current and prospective, in wholesale financial markets, which might give rise to material risks, and to consider how such issues should be addressed. It will also act as a bridge to the judiciary to help UK courts remain up-to-date with developments in financial markets' practice. The Committee, which is sponsored by the Bank, relies heavily in its work on input from financial and professional firms, and trade bodies.

b) Financial regulation of banks

FSA proposals on Tier 1 capital

In October 2002, the FSA issued a consultation paper setting out proposed changes to their requirements

for Tier 1 capital. Prompted by increased industry pressure on the boundary between core and innovative Tier 1 capital, the changes introduce a minimum required holding of the highest quality Tier 1 capital (eg ordinary shares and reserves), and clarify the basis on which new instruments will be assessed. The changes are likely to have little immediate effect on banks; they may have an impact on future capital issuance and the composition of the UK banking sector capital base in the longer term. If they are agreed, the proposals will be implemented in 2003 H1.

c) Insurance regulation

On 28 June 2002, the FSA announced an amendment to the resilience test for insurers, on the grounds that it was insufficiently sensitive to the effect of past changes in equity market prices. The test requires insurers to make prudent provision against the effects of possible future changes in the value of their assets, including a fall in equity prices of up to 25%. The amendment adopted by the FSA allows insurers to take account of the extent to which current price levels already lie below their average over the past three months.

The FSA is undertaking a comprehensive review of insurance regulation. On 1 October 2002, it published a progress report entitled 'The future regulation of insurance'²⁶.

The proposed changes fall into three key areas:

Adequacy of financial resources

In this area, as elsewhere, the FSA intends to introduce a more risk-sensitive approach. Proposals include a higher minimum capital test, firm-specific capital adequacy standards and alignment of the valuation rules for all firms to international accounting standards. Further details of these are expected to be published by mid-2003. The FSA has already issued proposals covering two specific areas: limiting counterparty concentration risk on reinsurance exposures; and taking account, in life insurers' capital requirements, of additional amounts required to fund a fair level of discretionary bonuses in with-profits funds.

25: Those wishing to receive any general communications made by the Committee may be added to the e-mail distribution list by contacting martin.thomas@bankofengland.co.uk.

26: www.fsa.gov.uk/pubs/policy/bnr_progress3.pdf.

Sound management

A key element of the FSA's approach to regulation is to make clear the responsibility of a firm's governing body and senior management for compliance with regulatory requirements. The FSA has proposed changes in the role of actuaries in the governance of life insurers (to underline the responsibilities of the governing body); changes in the governance framework for with-profits funds; new guidance on how firms should manage financial engineering and additional guidance on systems and controls and on operational risk.

Risk-based approach to supervision

The FSA has begun to assess insurance firms using the ARROW risk assessment framework already used for banks. The aim is to focus proportionately more supervisory resources on higher impact firms while limiting the amount of supervisory resources spent on firms assessed as low impact. ('Impact' is determined in terms both of the FSA's statutory objectives and the probability of the risks materialising.)

The FSA work forms part of broader international efforts to establish an appropriate regulatory regime for insurance. In March 2002, two new EU Directives were issued amending insurers' solvency requirements (page 99 of the June 2002 *Review*) and work is continuing in the EU on more comprehensive reforms. The IASB has begun work on a standard for insurance contracts (page 98 of the June 2002 *Review*).

d) Securities regulation and standards

CPSS/IOSCO

Recommendations for the design and operation of securities settlement systems (SSSs), developed by the Basel Committee on Payment and Settlement Systems (CPSS) and IOSCO, were published in 2001²⁷. The CPSS/IOSCO assessment method, which will enable authorities to assess whether markets meet the recommendations, and where necessary to develop action plans for implementation, was published on 13 November 2002²⁸.

ESCB/CESR

In parallel, a joint Working Group of the European System of Central Banks (ESCB) and the Committee of European Securities Regulators (CESR) is considering whether the CPSS/IOSCO recommendations can be strengthened and adapted in the context of European markets. It plans to undertake a public consultation in 2003.

e) Other regulatory developments

EU regulatory structures

On 3 December 2002, the Ecofin Council endorsed a new architecture for EU financial services regulatory committees²⁹. Full implementation is expected in 2004.

The aim is to speed up discussion and adoption of legislation for banking, insurance and conglomerates (following on from the Lamfalussy approach already agreed for securities market legislation). As such, the arrangements are expected to facilitate implementation of the Commission's Financial Services Action Plan, which is intended to promote the establishment of a single market in financial services within the EU. They should also contribute to financial stability by enabling a more timely legislative response to emerging developments and through deeper consultation with market participants.

The Lamfalussy approach is based on four levels. Level 1 is the co-decision procedure between the European Commission, European Parliament and Council of Ministers. It will determine legislative broad framework principles. Technical implementing measures will be adopted by the Commission, on the basis of the procedures of the sectoral Level 2 regulatory committees³⁰. The sectoral Level 3 committees³¹ will advise the Commission, in particular on its preparation of draft Level 2 measures; promote consistent implementation of EU directives, supervisory convergence and best practices in Member States; and provide an effective operational network to enhance day-to-day supervision, including exchange of

27: Bank for International Settlements and International Organisation of Securities Commissions (2001), 'Recommendations for Securities Settlement Systems: A report of the Committee on Payment and Settlement Systems and the Technical Committee of the International Organisation of Securities Commissions', November.

28: www.bis.org/publ/cpss51.htm.

29: ue.eu.int/Newsroom/loadbook.asp?BID=93&LANG=1.

30: There are to be Level 2 committees for banking, securities, insurance, and conglomerates, reflecting the range of directives.

31: There are to be Level 3 committees for banking and insurance; the existing Committee of European Securities Regulators will become the Level 3 committee for securities.

supervisory information in normal times and at times of stress. Level 4 is enforcement by the Commission.

In addition, the Financial Services Policy Group is to be reconfigured and renamed (as the Financial Services Committee) to provide advice and oversight on financial market issues for the benefit of the Ecofin Council and the Commission.

The European Parliament is seeking guarantees, notably through amendment to the EU Treaty, on its ability to modify legislation in the future.

Box 3: Other developments in the financial infrastructure

Initiative	Progress	Significance
US straight-through processing initiative	Announced on 18 July 2002. The US Securities Industry Association replaced the earlier target of shortening the US equity settlement cycle to T+1 with a new set of straight-through processing (STP) goals, to be achieved by 2004 ¹ . There had been growing concern among both market participants and authorities over the feasibility and desirability of moving to T+1. STP is the automation of the process by which a trade moves from execution to final settlement. It enables different infrastructure providers to handle different aspects of the process without the need for rekeying or reformatting of the original trade data. This change in priorities was also adopted in Canada by the Canadian Capital Markets Association ² .	The STP goals are intended to increase business efficiency, without increasing operational risks. An inadequately prepared move to T+1 could have increased the proportion of failed trades and therefore the credit and liquidity risks of unsettled trades.
EU Prospectus Directive	Text agreed by the Ecofin Council on 5 November 2002. The EU Prospectus Directive is intended, through the harmonisation of requirements for the drawing up, approval and distribution of a prospectus, to provide a single passport for issuers. Once a prospectus has been approved in one Member State, the same prospectus will be accepted across the EU. The text agreed by Ecofin acknowledged the importance of distinguishing between different types of investors and securities and the need to ensure that unnecessary burdens are not placed on firms, particularly small companies, through excessive reporting requirements. It included, on the other hand, a number of provisions – for example relating to ‘home country’ approval – which the UK regarded as unnecessarily restrictive.	The overall objective is to reduce the cost to firms of raising capital and to provide adequate protection for investors.
Future of the TARGET system	Decision taken on 24 October 2002. The ECB Governing Council has reached agreement on a long-term strategy for the evolution of TARGET (Trans-European Automated Real-time Gross settlement Express Transfer system), the pan-EU RTGS system. It will move from the current structure of fully decentralised payment processing to a system (TARGET2) where central banks may share a platform. It has also been decided that the right – but not the obligation – to connect to the existing TARGET system will be extended to accession countries when they join the EU. This will allow accession country banks to settle cross-border payments in euro on an RTGS basis.	Consolidation of IT infrastructure should reduce development and operating costs over time. A connection to TARGET will allow accession country banks to eliminate the settlement risk inherent in existing correspondent banking arrangements for euro payments.
Group of Thirty (G30) Steering Committee on Global Clearing and Settlement	Report to be published early in 2003. In 2000, the G30, an international body of public and private sector representatives, established a Working Group, chaired by Sir Andrew Large, on Global Clearing and Settlement. Its forthcoming report will set out a vision for the international clearing and settlement environment and provide detailed recommendations on how this might be best achieved.	The recommendations are likely to focus on both efficiency and stability improvements in the settlement of international securities transactions.
Higgs review on non-executive directors	Report to be published early in 2003. A general examination of the role and effectiveness of non-executive directors (NEDs) is being undertaken by Derek Higgs for the DTI. The review is expected to make recommendations to strengthen the independence and effectiveness of NEDs, particularly in relation to areas where executive directors are likely to face conflicts of interest, such as nomination, remuneration and audit.	Failures in these areas have been identified as contributing significantly to the collapse of large companies in the United States in the past year.

1: www.sia.com/press/html/pr_stp_solo.html.

2: www.ccma-acmc.ca.

Annex: Oversight of payment systems

In November 2000, the Bank published a paper setting out its role and objectives in overseeing payment systems. The June 2002 *Review* summarised the work the Bank had been carrying out on this aspect of its financial stability responsibilities since the publication of that paper. This annex describes the Bank's oversight work since the June *Review*, covering both the continuing assessment of the principal payment systems used in the UK and two generic issues – outsourcing and reliance on major firms – which are relevant to the robustness of payment systems.

CHAPS

As the UK high value payment system for sterling and euro transactions, CHAPS is a systemically important payment system and therefore of central interest to the Bank. The Bank uses the 'Core Principles',¹ developed by the G10 Committee on Payment and Settlement Systems to assess such systems, as the framework for its analysis of CHAPS. Our assessment is that CHAPS now meets the nine relevant Core Principles. Any system, however, can improve. We are discussing with CHAPS the consequences of its changed governance arrangements; ways of improving contingency arrangements; and potential modelling of the efficiency of liquidity use.

CHAPS is a technologically sophisticated system; much effort has gone into addressing financial, legal and operational risks in its design and operation. Since the June 2002 *Review*, changes aimed at separating CHAPSCO's responsibility for the operation and development of the CHAPS system from the industry-wide role played by the Association for Payment Clearing Services (APACS), have improved the clarity of CHAPS's governance and membership application processes. (Those changes have also benefited the Cheque & Credit Clearing and BACS.)

Work is under way to strengthen the financial risk management controls that would be applied if CHAPS had to use its 'RTGS by-pass mode' – a last-resort contingency measure which could be used if the central RTGS system were unavailable (ie neither the primary nor the secondary site was operational). 'By-pass' has never been invoked, but if used it would create liquidity and credit risks for members and controls are being developed to contain them.

In CHAPS, as in other RTGS systems, a settlement bank's ability to make its payments depends in part on the behaviour of other banks in the system, and on the degree of co-operation between members in making payments. The more frequently liquidity is recycled, the less the value of securities each bank will need in order to obtain intraday credit from the central bank to support a given level of payments. Efficient recycling and members' queue management increase the efficiency of collateral usage, and reduce the risk that inadequate liquidity will prevent members from making payments or will result in the system as a whole experiencing gridlock. So, from both a risk and an efficiency perspective, the Bank has an interest in understanding the degree of co-operation within the system, and where necessary promoting such co-operation, perhaps through influencing the evolution and future design of the system. Research into liquidity usage and bank behaviour is continuing; preliminary findings suggest that CHAPS Sterling is a relatively efficient system with a high frequency of liquidity recycling, indicating a reasonable degree of co-operation between participants.

BACS and C&CC

BACS, the UK automated clearing house for processing direct credits and direct debits, and the Cheque and Credit Clearing (C&CC) do not process a sufficiently high value of payments to be regarded as systemically important for the purposes of the Core Principles but they do still process an average £9 billion and £5 billion daily respectively and are important to the workings of the economy.

The Bank has been encouraging the work undertaken by or on behalf of BACS and the C&CC to clarify and complete their rules for dealing with a default by a member of either clearing. That project is making progress. A formal contract will be put in place shortly between the systems and their members which will underpin the legal soundness of each system's netting arrangements. The Bank has stressed the need for similar progress to be made on the arrangements which will provide for liquidity support to enable settlement to complete in the event of a default, and on procedures to determine how any losses incurred are shared among surviving members; that work is under way.

1: 'Core Principles for Systemically Important Payment Systems', Bank for International Settlements, January 2001 (www.bis.org).

The Bank has also endorsed the need for improvements to BACS's network technology. Again, a work programme is in place to address this issue. The development of the central part of a new communications network, BACSTEL IP, is now complete. Individual banks are migrating to the new network on a schedule agreed with BACS. Migration is due to be completed in September 2003.

BACS, in common with other member-owned systems, including LINK, is taking steps to separate the governance of its 'scheme' (the collective arrangements which determine the clearing rules) from that of its infrastructure (which provides IT processing). The aim is to simplify and clarify decision-taking on the long-term development of payment products and of the technology which delivers them. The Bank supports clarity in this area; good governance underpins good risk management and efficiency.

CREST, CMO and LCH

Many securities settlement systems contain 'embedded' payment systems. The daily settlement values can be substantial – those in CREST are already similar to those in CHAPS, and the values will increase further when CMO is integrated into CREST next year. LCH also has payment arrangements involving large sums. The Bank therefore reviews these payment arrangements as well as considering broader systemic risk issues. The Bank works closely with the FSA, which is responsible for the supervision of CREST and LCH as 'recognised clearing houses'.

On 23 September 2002, CREST merged with Euroclear (as described in the main text of this article). A key oversight issue concerns the payment model to be developed by the new enlarged Euroclear group and in particular the availability and use of central bank money for settlement. The Bank is discussing how this might best be achieved with the other interested central banks. In addition, central banks and regulators are considering the regulatory and oversight arrangements that need to be in place for the enlarged cross-border entity.

CREST's sterling and euro settlement arrangements, which provide for real-time settlement between CREST settlement banks across accounts at the Bank of England (commonly referred to as 'full' DvP), are highly robust. Settlement of US dollar transactions continues to take place on an 'assured payment' basis

between CREST settlement banks, with final settlement of the US payments after the close of CREST settlement. But this currently accounts for less than 1% of total turnover in CREST.

As mentioned in the June 2002 *Review*, important work is under way to facilitate dematerialisation of MMIs and integrate them into CREST during 2003, thus eliminating the daylight credit exposures that are a feature of CMO settlement. The main text of this article provides more detail, and in particular refers to HM Treasury's consultation document on the necessary legislative changes.

LCH is central to the management of risk in many derivative and cash securities markets. The Bank, working with the FSA, focuses particularly on LCH's robustness in the face of extreme market movements and on the payments arrangements. LCH has decided recently to move towards secured lending of all but a small proportion of its cash resources. It has also enhanced its stress testing model for assessing the adequacy of the financial resources available in event of a member default.

A separate article in this *Review* discusses a range of academic studies that model the risks faced by clearing houses and which consider how margins and other default resources might be set.

CLS

The importance of the introduction of CLS for financial stability is discussed in the main article. The Bank contributes to central bank oversight of CLS. CLSB, which provides the CLS service, started live operations on 9 September 2002. It is a US chartered bank and as such is regulated by the Fed. The Fed consults those central banks, including the Bank of England, whose currencies settle or may settle in CLS.

As part of its formal process for approving CLSB, the Fed wrote to each of the six other central banks whose currencies would be settled at the start of CLS's live operations to seek their approval for their currency settling in CLS. After having assessed the relevant issues for sterling (including the impact on market liquidity and on the Bank's Open Market Operations), and consulted UK-based CLS settlement members and user groups, the Bank concluded that the challenges to sterling market participants – primarily in the area of liquidity management – were

manageable. The Bank therefore informed the Fed in July 2002 that it was content for sterling to be one of CLS's settled currencies.

The Bank is the authority for assessing applications from payment systems for designation under the Regulations implementing the EU Settlement Finality Directive. Designation can promote financial stability by providing protection for a system's default rules from insolvency laws in European Economic Area countries in the event of the default of a system member. (CHAPS Sterling and CHAPS Euro were designated in May 2000.) The operating rules of the CLS system are governed by English law although CLSB itself is incorporated in the USA. The Bank designated CLS in July 2002, with the designation becoming effective at the start of CLSB's live operations.

SWIFT

The Society for Worldwide Interbank Financial Telecommunications (SWIFT) is the primary provider of secure global financial messaging, delivering services to 7,400 financial institutions in almost 200 countries. Many of the world's major payment systems and other market infrastructures use SWIFT's services, including CHAPS and CREST. SWIFT is not a payment system but its unique position has resulted in the establishment of an oversight arrangement for SWIFT provided collectively by the G10 central banks, led by the National Bank of Belgium². The Bank of England plays an active role in this oversight process, the UK being the world's second largest sender of SWIFT messages.

Both SWIFT and the overseers have paid particular attention, in the wake of the events of 11 September 2001, to operational risk management and business continuity planning. Following those events, SWIFT instituted its 'Four Pillars II' programme to re-assess its service continuity, security, people and crisis management. As part of that programme, SWIFT established a Resilience Advisory Council, comprising representatives of its user community, to provide advice to SWIFT regarding the degree of resilience required for its messaging services in possible extreme scenarios. The overseers are monitoring progress; the first step is for SWIFT and its users to clarify their business requirements in this crucial area.

Card schemes

Card schemes are unlikely to be of systemic importance and, although widely used, have close substitutes in other payment products and so face strong business incentives to provide an efficient and reliable service. Nevertheless, the Bank seeks to understand their business and the technical mechanics of their operations. This enables the Bank to identify any financial stability concerns; to inform our assessment of the payments industry; and to be capable of responding to significant disruption in the industry. For example, the Bank involved the card schemes in its work in co-ordinating financial sector preparations for the millennium date-change and would do so again with other unusual or extreme events.

In August 2002, agreement was finalised between the Switch Card Scheme and MasterCard Europe (formerly Europay) for a phased migration of Switch transaction processing to MasterCard's processing platform and for the re-branding of the Switch debit card to Maestro. From an oversight perspective, the Bank has stressed to both schemes the particular importance of ensuring the continued robustness of the settlement arrangements for the combined schemes.

The Bank has been working with Visa to improve its understanding of Visa's operational practices. The Bank has already developed an understanding of the LINK mechanism (which connects the Automated Teller Machines of its members). The Bank has no significant current issues in its oversight of LINK.

Outsourcing

Outsourcing arrangements are becoming increasingly common amongst users and operators of payments systems, and indeed amongst financial institutions more generally. Recent and current examples in the payments sphere include CLS's use of IBM to develop and operate its system, SWIFT's use of Global Crossing to operate and develop its networks and C&CC members' use of specialist firms to process cheques and credits. In such cases, the system operator and members retain responsibility for avoiding interruption to services. In SWIFT's case, the resilience of a single vendor network became untenable once parts of Global Crossing filed for Chapter 11 protection in the USA. SWIFT had made

2: The National Bank of Belgium described the oversight arrangements on page 92 of the 2002 *National Bank of Belgium Financial Stability Review*.

provision to terminate the outsourcing arrangements and has subsequently announced arrangements for its new internet protocol network which uses multiple suppliers of services.

Reliance on major firms

One of the insights from the events of 11 September 2001 was the fragility that can result from a high degree of reliance on a small number of commercial providers of key services, such as correspondent banking or securities clearing. Where such concentrations of activity are very high, the providers of such services have many of the qualities of market 'infrastructure'. A number of central banks are trying to assess the policy implications of such concentrations of financial and operational risk. As a first step, in the EU, the European Central Bank and non-euro-area EU central banks are conducting a review aimed at establishing more accurately the degree of concentration amongst providers of euro and sterling correspondent banking in the EU.

Bank capital: Basel II developments

Patricia Jackson, Head, Financial Industry and Regulation Division, Bank of England

The Basel Committee on Banking Supervision (BCBS) is in the process of establishing a new Accord ('Basel II') to increase the risk sensitivity of minimum capital requirements for internationally active banks. This will replace the first Basel Accord agreed in 1988. In January 2001, the Committee set out its proposals in a detailed consultation paper (CP2)¹. But work has continued since then to ensure that the new rules reflect the risk profiles of different areas of business and achieve the Committee's broad objectives. This has led to a number of revisions to the 2001 proposals.

ON 1 OCTOBER 2002², the Committee set out the latest version of its proposals and launched a major exercise (the third Quantitative Impact Study, QIS 3) to assess the likely effects on the minimum capital requirements for banks worldwide. The Committee is planning to release a final consultation paper in the second quarter of next year and to agree the new Accord by end-2003, with full implementation in the G10 by end-2006. Banks that propose to adopt the more advanced approaches recognised under the new Accord will calculate the new requirements in parallel with the current Accord during 2006. These advanced approaches are the internal ratings based approach for credit risk, or IRB, and the advanced measurement approach for operational risk.

This article discusses the issues raised following CP2 and describes the adjustments made to the proposals as a result. The timetable is shown in Table 1 and the main elements of the new Accord are summarised in Box 1.

Table 1:
Timetable

First Consultation Paper (CP1)	June 1999
QIS 1	July 2000
Second Consultation Paper (CP2)	January 2001
QIS 2	April 2001
QIS 2.5	November 2001
QIS 3	October 2002
Third Consultation Paper (CP3)	Spring 2003
Finalisation of the Accord	End 2003
Parallel running of sophisticated approaches with current Accord	2006
Implementation	End 2006

Issues identified in response to CP2

Assessing the implications of the introduction of more sophisticated risk-based capital requirements for the banking system is complex. The outcomes for individual banks depend on their risk profiles and portfolios. Although there will be differences from bank to bank, the Committee's objective has been to ensure that on average, across all internationally active banks in the G10, minimum capital requirements should be left broadly unchanged by the introduction of the new Accord.

While developing the new proposals, the Committee has used quantitative impact studies to calculate the effect on minimum capital of all the proposed approaches – the more straightforward approach based on external ratings (the standardised) and the IRB approaches based on banks' own ratings. In these studies, a large number of banks from a range of different countries have provided data to estimate the capital that the new Accord would require against their current portfolios. This approach does not of course capture the effects that could stem from behavioural changes induced by the Accord.

The first Quantitative Impact Study (QIS 1) was carried out in the fourth quarter of 2000, before the proposals for the second consultation paper were finalised. As might be expected, the results indicated that there were substantial differences in the impact across banks. But there were many data problems

1: Basel Committee on Banking Supervision (2001) 'The New Basel Capital Accord: Consultative Package', BIS January; see also Jackson, P D 'Bank Capital Standards: the New Basel Accord', *Bank of England Quarterly Bulletin* Spring 2001.

2: Basel Committee on Banking Supervision (2002) Quantitative Impact Study 3 Technical Guidance. www.bis.org/bcbis/qis/index.htm

Box 1: The main elements of the new Accord

The Accord will consist of three pillars: Pillar 1, setting minimum capital requirements for credit and operational risk; Pillar 2, requiring banks to assess their capital requirements in relation to their risks, including an outlier approach to interest rate risk embedded in the banking book, and supervisors to take action if risks are too high; and Pillar 3, establishing core disclosure by banks to improve market discipline. Much of the work of the Committee since January 2001 has been focused on refining the Pillar 1 charges, but Pillar 3 has been substantially streamlined to require core areas of disclosure.

Pillar 1 credit risk requirements

The Committee has agreed two broad approaches to setting the risk weights (which, as in the current Accord, are percentages of the core 8% risk asset ratio).

(1) The standardised approach

Risk sensitivity in this approach for corporate, sovereign and interbank exposures comes from the recognition of external ratings. Banks will slot exposures into bands according to whether they are rated by a recognised rating agency or unrated (Table A). There are two options for interbank exposures: option 1, where loans are slotted according to the rating of the sovereign (according to the place of incorporation); and option 2, where they are slotted according to the banks' own rating. For the latter approach exposures of less than three-month maturity will receive preferential treatment.

For retail exposures the weights are set by type of exposure. The latest proposal is for residential mortgages to carry a 40% weight and other retail exposures a 75% weight.

(2) An internal ratings based approach (IRB)

Under this approach banks would assign probabilities of default (PDs) to borrowers and the capital requirements for those PDs would be determined according to a formula set by the Committee. The final capital requirement is the charge from the function multiplied by the loss given default (LGD).

Table A:
Percentage risk weights

	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to BB-	B+ to B-	Below B- and defaulted	Unrated
Sovereigns	0	20	50	100	100	150	100
Banks 1	20	50	100	100	100	150	100
Banks 2							
<three months	20	20	20	50	50	150	20
>three months	20	50	50	100	100	150	50
Corporates	20	50	100	100	150	150	100

Where banks have commitments, these are included according to the likely exposure at default (or EAD). There are two variants within the IRB. The IRB foundation, where the bank sets the PD but the Committee lays down the LGD and EAD to be used, and the advanced IRB where the bank sets all three parameters. Retail exposures will be covered by an advanced approach for all IRB banks. The basic risk-weight functions are the same for the two variants. The formula for a curve is as follows¹:

$$\text{Capital Requirement} = \text{LGD} \times N \left(\frac{N^{-1}(\text{PD}) + \rho^{\frac{1}{2}} N^{-1}(C)}{\sqrt{1-\rho}} \right) \times \text{EAD}$$

Four inputs are needed:

- the LGD and EAD for the exposure – set by the Committee for foundation IRB
- the PD of the obligor – set by the bank
- ρ (the asset correlation) – set by the Committee
- C (the confidence level) – set by the Committee.

The Committee distinguishes between the risks of different exposure types by setting different ρ s (the higher the correlation the higher the unexpected loss for a given PD).

The correlations proposed by the Committee are as follows:

corporate, sovereign, interbank –

$$\rho(\text{PD}) = 12\% \times \left(\frac{1 - e^{-50 \times \text{PD}}}{1 - e^{-50}} \right) + 24\% \times \left(1 - \frac{1 - e^{-50 \times \text{PD}}}{1 - e^{-50}} \right)$$

¹ This is derived from a one factor version of CreditMetrics under the assumption of infinite granularity (see 'A Risk-factor Model Foundation for Ratings-based Bank Capital Rules' by Michael Gordy (2001) – website <http://mgordy.tripod.com>).

SMEs with turnover €T million –

$$\rho(PD) = \text{As above} - 4\% \times \left(1 - \frac{(T-5)}{45}\right)$$

retail mortgages:

$$\rho(PD) = 15\%$$

revolving retail credit:

$$\rho(PD) = 2\% \times \left(\frac{1 - e^{-50 \times PD}}{1 - e^{-50}}\right) + 15\% \times \left(1 - \frac{1 - e^{-50 \times PD}}{1 - e^{-50}}\right)$$

other retail:

$$\rho(PD) = 2\% \times \left(\frac{1 - e^{-35 \times PD}}{1 - e^{-35}}\right) + 17\% \times \left(1 - \frac{1 - e^{-35 \times PD}}{1 - e^{-35}}\right)$$

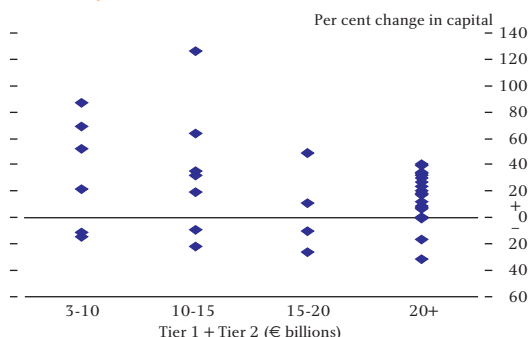
In the case of revolving retail credit, the capital charge is reduced by 90% of the expected loss on the exposure.

The only other difference between the approaches is that for the corporate, sovereign and interbank curve, the charges are adjusted for maturity. National supervisors can choose between assuming a 2.5 year maturity or an explicit maturity function in IRB foundation. In IRB advanced, for all exposures to firms with annual turnover of over €500 million, an explicit maturity function is compulsory.

with this initial study, severely limiting the effective sample size.

Following the release of CP2 a more extensive exercise, QIS 2, was carried out to look in detail at the effects. This involved 138 banks in 25 countries. This study again showed substantial variation across banks in the effects of both the standardised and IRB approaches but with a much wider range for the IRB approach³. Chart 1 shows that for the QIS 2 sample of banks the largest expected increase in minimum capital under the IRB was around 125% (ie minimum capital for that bank would have been more than double that under the current Accord) and the biggest reduction for any bank was over 30%.

Chart 1:
QIS 2 – overall change in capital requirements, under the foundation IRB, for a sample of G10 banks with Tier 1 capital of at least €3 billion



Source: QIS data.

QIS 2, with a larger sample of banks than QIS 1, demonstrated that the proposals set out in CP2 led to higher overall minimum capital levels than the Committee was targetting. On average the banks in the sample would have had an 18% increase in minimum required capital under the standardised approach and 24% under IRB foundation. A few banks (22) were able to complete the IRB advanced approach, where the bank can set its own figures for the loss given default (LGD) and exposure at default (EAD). The results indicated that this approach came closer to achieving the Committee's objective, with just a 5% overall increase in capital. All these figures included lower capital requirements to cover operational risk than proposed in CP2 – 12% of minimum regulatory capital for the standardised approach and 10% for the IRB approaches – following a decision by the Committee to reduce the operational risk requirement.

Many banks felt that too much capital was required under the IRB approach for higher risk corporate loans. The retail lending weights, which were very provisional, were also thought to be significantly higher than warranted by risk. All of this led to some rethinking of the risk weights proposed in CP2.

Cyclicality

Another issue that the Committee considered was the potential for IRB capital requirements to increase sharply in recessions. Greater variability in capital

3: Basel Committee on Banking Supervision, 'Results of the Second Quantitative Impact Study – November 2001' www.bis.org/bcbis/qis/index.htm

requirements is inherent in any risk-based capital regime (such as that proposed by Basel II) because capital requirements will increase as the assessed risks rise. The extent of the variability does, however, depend upon at least two elements – one being the rate of increase in capital requirements for a given change in the probability of default (PD), the other the extent to which banks take into account the possibility that economic conditions will change when setting their internal ratings. For example, banks that assign ratings in booms on the assumption that economic conditions will continue unchanged will experience much more volatility in ratings (and therefore capital requirements) in recessions than those that consider the effects of a possible future downturn when assigning ratings.

The Committee has proposed new flatter risk-weight curves⁴ (ie risk weights that rise less steeply with PD) but the way that ratings are set remains an issue. Research in the Bank of England⁵ indicates that, even with a significant reduction in the steepness of the curves, some rating systems would still lead to significant increases in capital requirements when economic conditions deteriorate. The research is based on a hypothetical corporate loan portfolio with a quality distribution constructed to represent an average G10 bank. The rating distributions were shocked using a recession transition matrix (calculated for the period December 1990 to December 1992) for Moody's ratings and also a transition matrix for PDs estimated using a Merton type model. The deterioration in the quality of the portfolio led to an increase in capital requirements (using the CP2 curves) of 22% for the Moody's ratings and 59% for Merton. The flatter corporate curve set out in the October 2002 QIS 3 technical guidance reduces these increases to 16% and 36% but the increase under the Merton approach remains high. Moody's ratings are designed to be more stable through different economic climates, with different scenarios being taken into account when the rating is assigned. Estimates of PD from Merton type models use the current share price, which takes into account forward looking information, but also depends on current liabilities, which are not forward looking.

This highlights the importance of banks considering how volatile their ratings may be with fluctuating economic activity and the possible effect on required capital. The Committee has now changed the guidance on ratings by stating that although the time horizon used in PD estimation is one year, banks using the IRB approaches must use a longer time horizon in assigning ratings. A borrower rating must represent the bank's assessment of the borrower's ability and willingness to meet commitments despite adverse economic conditions or the occurrence of unexpected events. A bank can satisfy the requirement by basing rating assignments on stress scenarios or by taking into account borrower characteristics that render it vulnerable to adverse economic conditions. In addition, given that there is still likely to be some volatility in bank capital requirements, banks must stress test required capital to consider the effect of, at least, a mild recession on the risk assessments that underpin the capital calculations (PD, LGD and EAD).

Another cyclical element in the CP2 proposal was that it potentially generated a large requirement on defaulted assets, even where a bank had provided against them. A sizeable capital charge was required on the written down asset exposure (the exposure less the specific provision) even though the provision might actually have covered much of the risk. The Committee has now changed the treatment of defaulted assets under the IRB approaches to reduce this effect. Under the new proposals the capital requirement on a defaulted asset will be calculated on the gross exposure and specific provisions will be offset against these requirements. No capital requirement will arise on defaulted assets where a bank has fully provided against the loss.

Simplification

A common theme in comments on CP2 was the need to simplify the proposals, but at the same time there was a view that the requirements needed to reflect more closely the actual risks in different areas of business. Areas for simplification were found. For example, the treatment of residual risks in credit risk mitigation techniques will now be at the discretion of the banks' supervisors. Also banks able to set PDs for specialised (project finance) loans will be able to treat

4: This was partly achieved by construction. The CP2 curves had been calibrated with a 99.5% confidence level and a scaling factor was included to cover measurement errors in PD and the lower loss-absorbing capacity of subordinated debt. Part of the flattening was achieved by using a higher confidence level (99.9%) rather than a scaling factor. But the main element has been changing the correlations.

5: Catarineu-Rabell, E, Jackson, P and Tsomocos, D 'Procyclicality and the New Basel Accord – Banks' Choice of Loan Rating System', forthcoming Bank of England working paper.

these in the same way as corporate loans, rather than having to use a stand-alone specialised lending treatment – unless the loan relates to highly volatile commercial real estate, where there is a compulsory treatment with higher risk weights. The implementation has also been simplified by allowing banks using the IRB approaches to delay introducing it for overseas subsidiaries, where market data may be less readily accessible or less satisfactory.

On the other hand, some additional options and approaches have been added to calibrate the proposed capital requirements more accurately with the risks involved.

Adjustments in the proposals since CP2 and QIS 2

Corporate requirements

A number of concerns were expressed that the corporate risk weight curve rose too steeply with rising PD. In particular there was some evidence that the correlation amongst losses was less for smaller companies – which tend to dominate the higher PD bands – than for large companies⁶. Defaults seem to be less concentrated in economic downturns than is the case with larger corporates, reducing the unexpected losses that are realised in any year. To deal with this issue, changes were made to the correlations underlying the curves. Rather than being constant, the correlation gradually falls from 24% for high quality corporates to 12% for lower quality ones. In addition, for small companies, with annual turnover of less than €50 million, there is a size adjustment that reduces the capital requirements by 10% on average and by 20% for the smallest companies. Chart 2 shows the original corporate curve in CP2 and the new proposed corporate curve (October 2002) with the lower SME curve for the smallest companies.

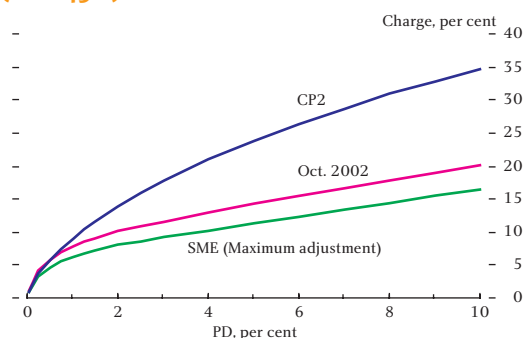
Retail requirements

The Committee's proposed requirements for retail lending exposures set out in CP2 were only indicative. Work continued on the retail distributions following CP2 using large quantities of data from the banks. In order to align the capital requirements with the risks in different portfolios, three different curves were needed.

One is a mortgage curve with a relatively high correlation among loan losses (15%) to reflect the

long maturities and the strong cyclical effects on losses. Banks tend to make sizeable losses on mortgage books only when higher unemployment coincides with a downturn in house prices. This correlation delivers, for a given LGD, a relatively high basic risk-weight curve but when taken together with actual LGD numbers, which are very low (25% or so), it produces low overall capital requirements.

Chart 2:
Capital charges for corporate and SME exposures (LGD 45%)



Sources: BCBS and Bank calculations.

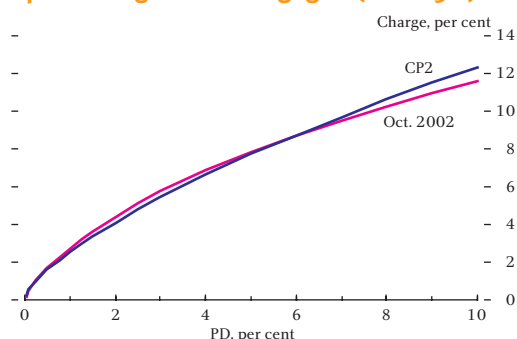
A second is a curve for general non-mortgage retail exposures where, as in the case of corporates, losses on exposures to lower quality borrowers seem to be less dependent on the cycle. (To reflect this, the loan loss correlations fall from 17% for good quality exposures to 2% for low quality ones.) The LGDs for these exposures tend to be much higher than mortgages at around 85%.

There was also evidence that for some revolving exposures, like credit cards, the high margins compared with expected loss cover much of the risk. A third and lower curve has been included, which allows 90% of expected loss to be covered by future margin income and has slightly different loan loss correlations – 15% falling to 2%. All the other risk-weight curves cover expected loss as well as a measure of unexpected loss.

Chart 3 shows the original mortgage curve set out in CP2 (with an assumed 25% LGD) against the latest proposed curve. Chart 4 shows the original CP2 non-mortgage retail curve (with an assumed 85% LGD) against the new curve and the lower curve for revolving credits.

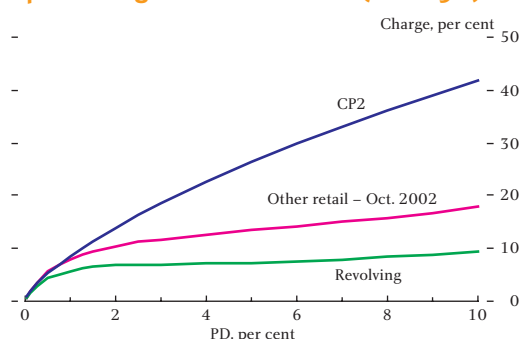
6: Lopez, J A (2002) 'The Relationship between Average Asset Correlation, Firm Probability of Default and Asset Size'. Federal Reserve Bank of San Francisco, Working Paper Series 2002-05.

Chart 3:
Capital charges for mortgages (LGD 25%)



Sources: BCBS and Bank calculations.

Chart 4:
Capital charges for other retail (LGD 85%)



Sources: BCBS and Bank calculations.

The evidence on the riskiness of retail exposures has also been used to adjust the standardised approach. The risk weights for mortgages have been reduced from 50% to 40% and those for other retail loans from 100% to 75%.

Small and medium-sized enterprises

Lending to SMEs will benefit from the lower correlations for high PD corporate loans and the reduction in requirements for smaller firms. It will also benefit from the inclusion of very small corporates in the lower retail curves – loans to SMEs of up to €1 million can be included in the retail portfolios as long as they are managed as retail credits and meet certain other criteria. In the standardised approach, where a bank's total exposure to a small business amounts to €1 million or less, it can be counted as a retail exposure.

Collateral

One feature of the QIS 2 results was the large difference between the IRB foundation and advanced approaches for corporate portfolios. Under the advanced approach banks were generally using lower

LGDs than required under the IRB foundation approach; in particular, giving more recognition to collateral. To deal with this the Committee has lowered the majority of the supervisory LGDs in the foundation approach by five percentage points (for example the LGD on senior unsecured exposures was lowered from 50% to 45%) and has recognised more forms of collateral. Receivables and other collateral (eg, plant and machinery and inventory) have been added to the financial collateral and commercial real estate recognised in CP2 for IRB foundation.

Maturity

Another factor behind the difference between advanced and foundation approach results was that the banks, in their advanced calculations, were using separate maturities for individual loans which gave a lower overall average maturity for their corporate portfolios – closer to 2.5 years than the 3 years assumed in the foundation calibration. The foundation maturity assumption has now been reduced to 2.5 years. At national discretion, banks may also be given the option of using an explicit maturity adjustment in the foundation approach. In the advanced approach they have to use an explicit adjustment for all exposures to larger borrowers.

Definition of default

Some banks were concerned that the Committee's five-part definition of default set out in CP2 might not reflect the actual conditions in some markets – triggering the allocation of exposures to the defaulted assets band even where a default was unlikely. By reducing the number of triggers to (a) unlikely to pay in full or (b) more than 90 days overdue, this has been avoided.

Operational risk

A number of changes have been made to the operational risk framework. Overall the target amount of capital to be delivered by the operational risk charge has been reduced since CP2 from 20% of the requirements under the current Accord to 12% or even less. In addition an advanced approach has been introduced, which will enable the banks to model or otherwise assess their operational risk requirements, and there will be no floor under this approach.

Securitisation

The Committee has set out full proposals for the treatments of securitised assets. These cover assets securitised by a bank, where an interest has been

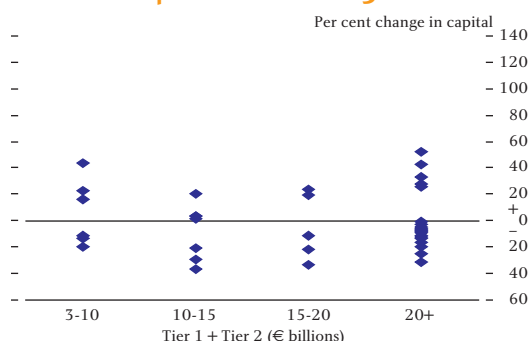
retained, and securitised assets where the bank is the investor. Under Basel I, the Committee had advised that first-loss positions should be deducted from capital. This will continue and will include first loss provided on securitisations originated by other banks. In addition, in certain circumstances, second loss and other subordinated positions must also be deducted. For other positions (including liquidity facilities) two possible approaches are set out for IRB banks. Under one approach (the supervisory formula), a bank must assess the capital that would have been held against the underlying loans under the IRB and the charges are based on this. Under a ratings based approach, banks holding rated securitised assets can use a table of set charges. Similarly, banks using the standardised approach derive capital charges for securitisation positions from external ratings.

This assessment was, however, limited in scope. It did not encompass the full proposals nor a wide selection of banks. In contrast, QIS 3 will be very broad, including as many as 200 banks across 40 countries and encompassing all the elements of the new proposals. It is also hoped that a much larger number of banks will calculate the IRB advanced requirements giving a better estimate of the incentives for adopting the different approaches – standardised, IRB foundation and IRB advanced. The more complete information from QIS 3 will enable the calibration of the proposals to be finalised in the course of next year.

Testing the latest proposals

The effect of the flatter risk-weight curves on the IRB foundation results (but not the revolving credit curve nor the SME size adjustments) was tested in a limited Quantitative Impact Study (QIS 2.5)⁷ in the fourth quarter of last year. Overall this study indicated that these curves would deliver results much closer to the Committee's overall goal of broadly unchanged capital. Requirements for the 38 banks included in the study were 2% up on average, relative to current requirements, with 24 of the 38 exhibiting a reduction. The dispersion in results was also reduced (Chart 5).

Chart 5:
QIS 2.5 – overall change in capital requirements, under the foundation IRB, for a sample of G10 banks with Tier 1 capital of at least €3 billion



Source: QIS data.

7: Basel Committee on Banking Supervision, 'Results of Quantitative Impact Study 2.5' – www.bis.org/bcbis/qis/index.htm

The impact of the new Basel Accord

on the supply of capital to emerging market economies

Simon Hayes and Victoria Saporta, International Finance Division, and David Lodge, Financial Industry and Regulation Division, Bank of England

The proposed new Basel Accord aims to ensure that international banks' regulatory capital reflects more closely the credit quality of their loan portfolios. Some commentators are concerned that this might provoke a sharp increase in borrowing costs for debtors domiciled in emerging markets. But the regulatory capital charge will not rise (and may indeed fall) for lending to several emerging markets. And because banks' loan pricing already reflects the borrower's creditworthiness, it seems unlikely that there will be a marked contraction in the supply of loans, even for low credit quality emerging market borrowers.

THE NEW BASEL ACCORD aims to ensure that international banks' regulatory capital reflects more closely the credit quality of their loan portfolios. This means that capital charges will be higher for lending to low credit quality borrowers. Some have argued that this increased risk sensitivity will lead to a curtailment in the supply of capital to emerging market economies (EMEs). This article discusses the extent to which this concern is justified¹.

There are several reasons to think that the impact of the new Accord is unlikely to be as dramatic as some commentators have suggested². Foremost among them is that previous analyses have assumed that banks price their loans on the basis of the regulatory capital charge³. But in reality the link between regulatory capital and loan pricing is far from direct. Banks themselves have an interest in maintaining a prudent stock of capital to guard against unexpected losses, and this 'economic' capital is consequently linked to the credit quality of the bank's assets. Loan pricing

reflects the level and the cost of economic capital, and these are not automatically affected by a change in regulatory capital – indeed the new Accord is intended precisely to align regulatory capital more closely with economic capital.

Key changes in the Basel Accord

Two features of the new Accord are likely to have a particular bearing on the pricing of loans to EMEs. First, the new Accord links the capital charge for credit risk to explicit indicators of credit quality, either measured externally (the standardised approach⁴) or internally (the internal ratings based approach, or IRB). This stands in contrast to the current Accord, under which capital charges against sovereign and inter-bank loans are based on whether the borrower is domiciled in the Organisation for Economic Co-operation and Development (OECD). For example, lending to an OECD sovereign attracts a 0% capital charge, whereas lending to a non-OECD sovereign generally carries a charge of 8%. There is

1: There are other Basel-related concerns about emerging markets which are not considered here – in particular how the new Accord can be implemented in EMEs and whether it is appropriate for EMEs – see, for example, Powell (2002).

2: For instance, Griffith-Jones and Spratt (2001) argue that “the outcome of these changes [to the Basel Accord] is likely to be a significant reduction of bank lending to the developing world and/or a sharp increase in the cost of international borrowing for much of the developing world”. In a similar vein, Reisen (2001) concludes that “...speculative-grade borrowers, the bulk of emerging and developing countries, will suffer from a dramatic rise in debt costs...”.

3: See, for example, Reisen (2001) and Powell (2002).

4: Note that aside from using external ratings, supervisors may recognise the country risk scores assigned by Export Credit Agencies (ECAs) for assigning regulatory capital against sovereign exposures. To qualify, an ECA must publish its risk scores and subscribe to the OECD agreed methodology. See Basel Committee on Banking Supervision (2002), page 7.

no clear link between OECD membership and a country's ability to service its debt: for example, Turkey, which is rated B-, is an OECD member, and therefore its debt attracts a lower regulatory capital charge than the debt of Chile, which is rated A- but is not an OECD member. The removal of this distinction under the new Accord seems to be generally welcomed.

Second, under the current Accord, lending to a non-OECD country *bank* carries a charge of 8% if the maturity of the loan is greater than one year, compared with a charge of 1.6% for shorter-term claims. This sharp step-up in capital requirements for longer-term lending is viewed by some as having encouraged an increase in short-term lending to Asian banks in the mid-1990s. Although there are good reasons why shorter-term lending would attract a lower capital charge, a smoother transition along the maturity spectrum – which the new Accord delivers – may help to avoid distortions in lending patterns.

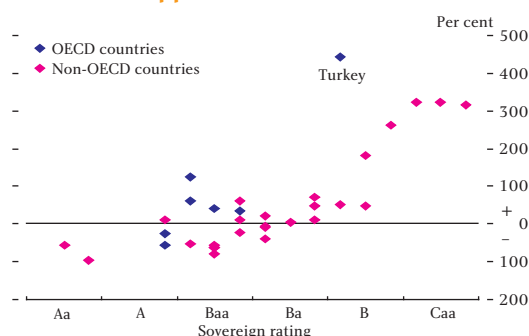
The new Accord could potentially affect lending to and within emerging markets through two channels. First, it could affect cross-border flows to EMEs. For this type of lending the key issue is how the new Accord will affect international banks. Second, the new rules could affect flows of credit within EMEs. The impact of the Accord here will depend on the treatment of domestic banks, and subsidiaries and branches of internationally active banks located in EMEs. These two channels are considered in turn.

Credit to EMEs from international banks

Most international banks are likely to adopt the IRB approach, which sets minimum capital as a function of their assessment of the probability of default of the borrower, and, for banks using the advanced approach, an estimate of loss given default (see, for example, Jackson (2001) and the article by Patricia Jackson in this *Review*). Chart 1 presents estimates of the change in the average minimum capital charge between the current Accord and that under the IRB foundation approach for a portfolio of claims on banks, corporates and sovereigns in a sample of 33 EMEs. The OECD effect is clear – capital requirements on lending to OECD member borrowers with relatively low credit standing, for example Turkey, could increase markedly. Aside from the OECD effect, there is a clear relationship between credit quality and regulatory capital. The average

regulatory charge for lending to EMEs that have a relatively high credit standing (ie around or above the investment grade boundary, eg countries such as Chile, South Africa and Malaysia) will generally be reduced. There can therefore be few concerns regarding the impact of the new Accord on loan supply to these countries. On the other hand, the average regulatory minima for lending to lower credit quality countries will generally increase.

Chart 1:
Percentage change in minimum regulatory capital requirements^(a) under Current Accord^(b) and IRB foundation^(c) approach for a selection of EME



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

(a) Average change in minimum regulatory capital requirements for all corporates, banks and sovereigns rated by Moody's in a selection of EMEs (weighted using consolidated claims from BIS-reporting banks to each sector).

(b) Current Accord assumes all claims on non-OECD banks are long-term (ie 100% risk weight).

(c) Calculations under the IRB foundation approach assume a maturity of three years and a loss given default of 45%. Probabilities of default for ratings taken from Standard & Poor's default data – see Perraudin (2001). IRB figures include a charge of 10% for operational risk.

For countries where the regulatory requirements may increase, the key question is whether the new regulatory minima will substantially exceed the economic capital that banks would otherwise hold – in which case a rise in loan prices might ensue. Such an assessment is not straightforward, however, since the findings will be sensitive to the method used to calculate economic capital, the precise make-up of the lender's portfolio and a host of other factors that determine a bank's loan pricing. An illustrative comparison of the relative magnitudes of economic capital as generated by a credit risk model and regulatory capital under the new Accord is set out in Box 1. The results of this exercise are consistent with the view that regulatory capital is unlikely to be significantly higher than economic capital. But although it is difficult to generalise, it is certainly the case that banks' loan pricing takes into account credit risk. Chart 2 shows the average spreads on

Box 1: Regulatory capital versus economic capital: an illustrative comparison

As an indication of whether the regulatory minima under the new Accord are likely to exceed banks' economic capital, the following exercise was undertaken. A credit risk model was used to estimate the economic capital that a bank specialising in EME lending might choose to hold against a portfolio of EME sovereign exposures. These estimates were then compared to the capital charge implied by the IRB foundation proposals¹.

The calculations were performed on the basis of an artificial portfolio of 500 equally sized exposures to the sovereign sectors of 33 EMEs. The exposures were divided between the 33 EMEs to match the observed distribution of BIS banks' exposures to the sovereign sectors of these countries. Table A shows the quality distribution of the portfolio.

Table A:
Emerging market sovereign portfolio – ratings and exposures

Rating ^(a)	BIS banks' exposures (US\$ billions) ^(b)	Percentage of portfolio
Aa	4.1	4
A	11.0	10
Baa	42.0	37
Ba	19.1	17
B	29.0	26
Caa	6.8	6
Total	112.2	100

Sources: Moody's Investors Service, BIS and Bank calculations.

(a) Sovereign rating, Mar. 2002 – see Moody's (2002).

(b) Consolidated claims of BIS reporting banks on countries in portfolio, Mar. 2002.

Each exposure was assumed to be a 3-year zero coupon, pure discount sovereign bond of one US dollar, with a pay-off at the end of three years of one US dollar plus the risk-free rate and a spread. The spreads were taken from the average spread derived from the prices of sets of similarly rated 3-year bonds, using Bloomberg data. The loss given default (LGD) was fixed at 45%, the same as the Basel Committee's assumption for unsecured exposures. Typically, defaulting sovereigns cease to make payments for some time – in some cases for several years – before re-emerging from their default state and resuming

payments. This might suggest a lower loss rate for claims on sovereigns than for similar claims on corporates, which often do not re-emerge from default. On the other hand, creditors with claims on sovereigns are less able than other types of creditor, to recover monies by liquidating assets which suggests a higher rate.

The appropriate rating transition matrix for sovereign exposures may well be different from the transition matrix for corporates. The nature of sovereign default (with sovereigns typically re-entering capital markets some years after default) is likely to imply different volatilities in rating transitions. But few sovereigns have rating histories longer than ten years, so a transition matrix based on S&P rating histories for all borrowers was used.

Economic capital estimates were calculated on a one-year horizon. The one-year horizon was chosen because it is the period most banks use in their credit risk models, and in order to match the assumption employed in calibrating the IRB approach. In setting parameters for their economic capital models, banks tend to target a solvency rate that is consistent with their current external rating. A solvency target of 99.5% was assumed here, corresponding roughly to a rating of BBB-, which seems plausible for a bank specialising in EME lending.

One of the most important determinants of economic capital in ratings-based credit risk models is the relative weight assigned to 'systematic' risk factors (that is, common factors that determine the risk of all exposures, such as the macroeconomic environment) versus idiosyncratic factors. The lower the sensitivity of a portfolio with a large number of exposures to systematic factors, the better diversified the portfolio will be and the lower the economic capital necessary to achieve a given solvency standard. For the purpose of this exercise a weight of 80% was assigned to the systematic factor, although a higher weight may be appropriate for sovereign exposures² –

1: The credit risk model employed is Perraudin's (2001) 'Credit Explorer', which is similar in structure to the Creditmetrics (JP Morgan 1997) ratings-based model, but has certain aspects specifically designed for emerging market credit risk. IRB capital charges have also been derived from a general credit risk model under certain restrictive assumptions (eg perfect diversification or so-called infinite granularity) that economic capital models such as the one employed here do not make.

2: See Perraudin (2001), Credit Explorer Manual, September, page 61.

in which case the calculation will tend to understate economic capital.

Table B shows the results of this exercise. Economic capital is above the total regulatory minimum requirements under the proposed Accord, which in turn are higher than the requirements under the current Accord³.

For a given confidence level, the marginal economic capital allocated against an EME portfolio by an internationally active bank with globally diversified exposures will be lower than for a bank specialising in EME lending, suggesting a lower economic capital figure for such banks. On the other hand, the fact that globally-active international banks tend to

target solvency standards corresponding to ratings of A or above (for a rating distribution of internationally-active banks see Jackson et al (2002)) may well offset this.

Table B:
Economic capital and regulatory capital charges^(a) for EME sovereign portfolio

Economic capital required to target a 99.5% solvency standard (per cent)	Regulatory requirements for credit risk under new proposal ^(b) (per cent)	Regulatory requirements under current Accord (per cent)
10.2	8.8	5.1

Sources: Moody's Investors Service, Standard & Poor's, BIS, Credit Explorer and Bank calculations.

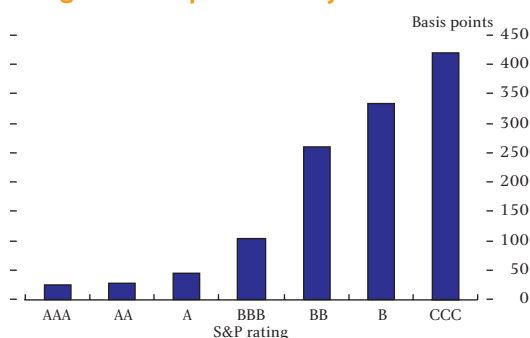
(a) Capital amounts as a percentage of total exposures.

(b) Calculated using the IRB risk weight curve in BCBS (2002), page 49, for exposures of three-year maturity, and loss given default of 45%.

3: As is the case currently, under the new rules banks would only be required to hold half of the 8.8% as Tier 1 (equity) capital: the concept often associated with economic capital. In practice, however, a number of banks choose to hold a higher proportion of their total capital as Tier 1 capital. For evidence on UK banks, for example, see Chart 148 in the June 2002 *Review*, page 85.

international syndicated loans from January to September 2002. Actual loan pricing clearly varies positively with credit risk. The new Accord may therefore serve simply to bring regulatory requirements more in line with actual bank behaviour.

Chart 2:
Average LIBOR spreads on syndicated loans



Sources: Dealogic and Bank calculations.

Credit within emerging markets

Foreign banks have in recent years increased their activity in EME banking markets through the

purchase of subsidiaries and establishment of branches⁵. In Mexico and Poland, for instance, more than 70% of national banking system assets are owned by foreign banks. In addition, foreign bank participation in certain EMEs appears to be concentrated in a few internationally active banking groups, which are sufficiently sophisticated to qualify for adoption of the IRB approach. It is not yet clear which standard will be applied to the branches and subsidiaries of such groups⁶. If local operations of foreign banks are treated under the IRB approach, the question again arises whether the new minimum capital charges would bite, which depends again on how far these banks price loans on the basis of economic – rather than regulatory – capital.

Most domestically owned banks in EMEs are likely to adopt the standardised approach, under which minimum capital charges for EME lending seem unlikely to change much. The majority of corporate exposures in emerging markets are likely to fall into the 'unrated' category which retains the 8% charge⁷. And while the new Accord has introduced an

5: Box 6 in the June 2002 issue of the *Review*, page 58, documents the marked increase in foreign bank participation in EME banking sectors.

6: One concern raised by some commentators is that the domestic EME banks operating on the standardised approach will be at a competitive disadvantage to foreign banks on the IRB approach. This outcome seems unlikely because foreign banks on the IRB approach will be facing higher capital charges for low credit quality business than domestic banks operating on the standardised approach.

7: Ferri et al (2001) provide evidence on the geographic distribution of ratings. They find that in the second half of 1999, the number of firms rated by S&P in all upper/middle-income and low-income countries around the world averaged 300 and 173 respectively, the majority of which were banks.

additional charge for operational risk and a higher charge for non-performing loans, the lower risk charge for retail business may offset these. Moreover, national supervisors can opt to allow banks under their jurisdiction to assign a low risk weight to holdings of government debt denominated in local currency, and to assign a risk weight to interbank exposures that is one category lower (ie a higher risk weight) than the risk weight on sovereign claims.

Conclusion

On the evidence presented above, the new Basel Accord seems unlikely to have a significant impact on banks' willingness to supply credit to emerging markets. Moreover, it is important to bear in mind that the new Accord applies only to a subset of banks'

claims on EMEs. Trading book assets – eg marketable exposures such as certain bonds and equities – will not be affected. More generally, finance is available to emerging markets through non-bank channels such as foreign direct investment and purchases of bonds and equities by non-bank foreign and domestic investors, which will again be unaffected by the new Accord⁸. Moreover, even if the new Accord did have the effect of raising the cost or constraining the availability of finance for certain EMEs, through a more accurate reflection of risk, it is not obvious that the appropriate response would be to amend the Accord. Other policy instruments may well be more appropriate, if the intention were to provide finance on more favourable terms.

8: According to the Institute of International Finance (2002), commercial bank lending has accounted, on average, for around 11% of total net external flows to EMEs over the past 10 years, although in recent years banks' contribution has been negative.

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Fallacies about the effects of market risk management systems

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This paper^{1,2} takes another look at allegations that risk management systems contribute to increased volatility in financial markets, in particular during the summer of 1998. The analysis starts with a review of the literature on the effect of financial engineering on financial markets. The evidence is that financial innovations reduce volatility in financial markets but seem to be systematically blamed for the opposite effect. The paper also provides new evidence on the potential effect of VaR-based market risk charges for commercial banks under the Basel Accord. I show that VaR-based regulatory capital charges cannot plausibly be blamed for the volatility of 1998, due to their very slow response to market movements.

RECENT DECADES HAVE WITNESSED a revolution in financial risk management. Quantitative techniques such as option pricing, portfolio insurance, and Value at Risk (VaR) have become essential tools of portfolio management. The concepts of portfolio insurance and dynamic hedging were developed in the late 1970s. VaR was first mentioned in 1993, although the concept goes back to Markowitz (1959). VaR is an aggregate measure of downside risk, defined as the maximum loss over a target horizon such that there is a low, pre-specified probability that the actual loss will be larger.

The generalized use of these techniques, however, has raised concerns that they could actually make financial markets less safe than before, by causing higher volatility. Such concerns have taken added urgency as regulators are now turning to capital adequacy requirements that reflect the financial risks of regulated institutions. Since year-end 1997, in particular, commercial banks have been allowed to use their internal VaR models to compute their market risk charge (MRC), which should be covered by a minimum amount of capital³.

Coincidentally, the VaR-based market risk charge came into existence in 1998, a year of considerable

turbulence in financial markets, which started with the Russian default and culminated in the near-bankruptcy of Long-Term Capital Management (LTCM).

This episode led to a backlash against risk management techniques. Some observers noted that actual losses suffered by financial institutions did exceed VaR measures, sometimes by large amounts. In fact, this simply reflects well-known limitations of VaR⁴. Perhaps users were lulled into a false sense of security, which is somewhat astonishing since VaR numbers should be exceeded with some regularity, with a frequency inversely related to the confidence level.

More worrisome is the charge that the use of VaR limits led to a 'vicious cycle' of position cutting by traders, which put additional downward pressures on prices. Such a claim has been advanced by Dunbar (2000) in his book on LTCM, by Persaud (2000), and has been echoed in the press. The argument is that some shock in volatility, say due to the Russian default, increases the VaR of outstanding positions. In 1999, the *Economist* argued that, as VaR goes up, a "bank is then faced with two choices: put in extra capital or reduce its positions, whatever and wherever

1: Thanks are due to seminar participants at the Bank of England. I also acknowledge useful discussions with Suleyman Basak, Jeremy Berkowitz, Jim O'Brien, and Victoria Saporta.

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3: The Basel Committee on Banking Supervision (BCBS) amended the original 1988 Basel Accord to add a capital charge for market risks. See BCBS (1996).

4: See the first edition of Jorion's (2000) book on VaR.

they may be. This is what happened last autumn⁵.” As the argument goes, several banks could sell the same asset at the same time, creating higher volatility and correlations, which exacerbates the initial effect, forcing additional sales. The purpose of this paper is to assess whether such statements have any foundation in reality.

This line of argument should be a serious source of concern given the generalized trend toward risk-sensitive capital adequacy requirements. The current revision of the Basel credit risk charges, dubbed ‘Basel II’, also goes in the direction of more sensitive risk charges⁶. The worry is that the design of such capital adequacy requirements might destabilize the financial system, by inducing banks to tighten credit as credit risk increases, precisely at the wrong time in a recession. This prospect of ‘procyclicality’ is perhaps the most important issue facing bank regulation today⁷.

It is beyond the scope of this paper to discuss procyclicality of credit risk rules. The ‘vicious circle’ argument for market risk charges, however, is being generalized to credit risk as a criticism of any risk-sensitive capital requirements⁸. We should also note, however, that such criticisms fail to offer plausible alternatives. The history of failures in banking systems and enormous costs on the economy provides a powerful rationale for regulation⁹. Having no capital requirement at all is not realistic. Alternatively, capital requirements that are not market-sensitive, such as the original Basel 1988 Accord, are open invitations to regulatory arbitrage and can perversely induce banks to increase their risks.

This paper will show that capital requirements should be constructed so as to be reasonably ‘smooth’ over time, be they for market or credit risk. This fact has escaped most of the literature on Value-at-Risk, where

the focus has been near-exclusively on developing accurate 1-day volatility forecasts. One notable exception is Christoffersen and Diebold (2000), who show that there is scant evidence of predictability of volatility at horizons longer than ten days. Other important objectives, beyond accuracy, are the average level of capital as well as fluctuations in capital requirements.

The purpose of this paper is to examine systematically whether market risk charges have had a destabilizing effect, particularly during 1998. The paper summarizes the literature on topics such as the effect of risk management tools and provides new empirical evidence on the actual behavior of market risk charges. It also draws lessons for the choice of volatility models and smoothing of capital charges.

We analyze three related issues, which are classified into ‘fallacies.’ Critics of financial engineering usually start with the observation that financial markets have recently become more volatile, concurrently with the widespread use of risk management techniques. This is what we call ‘Fallacy 1: The age of financial instability’, which is analyzed in Section 1. Section 2 then turns to a review of theoretical and empirical evidence on ‘Fallacy 2: The role of financial engineering’. Section 3 takes a detailed look at ‘Fallacy 3: The role of VaR’. The last section contains some concluding observations.

Fallacy 1: The age of financial instability

Criticisms of modern risk management systems usually start with the casual observation that financial markets have lately become more volatile^{10 11}. After all, there would be less reason for concern if this were not the case.

Each financial crisis seems to generate a period of intense reflection as to the cause of the latest crisis,

5: As quoted in the *Economist*, June 12 1999. See also the string of *Economist* articles (October 17, 1998), (November 14, 1998) on the same theme. This line of argument is even recognized by central bankers – see Clementi (2001).

6: See BCBS (2001).

7: See for instance Ervin and Wilde (2001) and Borio *et al.* (2001).

8: See Danielsson *et al.* (2001), ‘An Academic Response to Basel II.’

9: See for instance Caprio and Klingebiel (1999). Hogarth and Saporta (2001), for instance, estimate that typical losses from banking crises cost an average of 15–20% of annual GDP.

10: See ‘The Age of Financial Instability,’ Financial Times, 13 June 2001.

11: It could be argued that greater volatility in financial markets is actually beneficial if it dampens volatility in the real economy. Consider, for example, the choice between a flexible exchange rate and a fixed rate, including the extreme case of a common currency. A common currency transmits shocks across economies and may create greater volatility in output and employment. Perhaps it is better for risks to appear in financial markets, where they can be hedged and diversified, rather than being shifted to the real economy.

as well as a flurry of remarks that such crises are becoming more frequent. On the other hand, there is no such rush to explain why markets have become lately so placid.

Given the assertion that (1) financial markets have become recently unstable, and that (2) risk management methods have been developed recently, this association is extended to causation. In other words, risk management techniques are said to lead to higher volatility. Let us first examine the premise of the 'age of financial instability' argument.

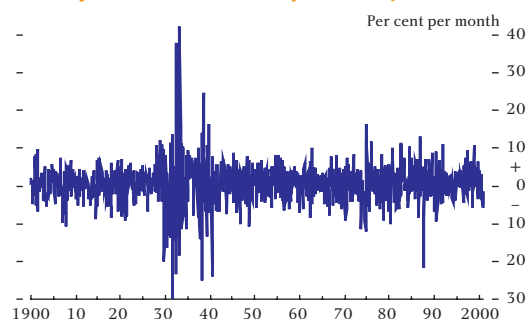
Emerging markets have experienced multiple recent financial crises. Even so, it is not clear that financial markets or risk management techniques should be blamed. Movements in financial markets inevitably accompany financial liberalization. The flip side of volatility is access to outside capital, which is a substantial benefit if it induces higher long-term economic growth. In addition, one could argue that the recent volatility in emerging markets is due to unsustainable government policies¹².

More fundamentally, emerging markets are the wrong place to look for the effect of risk management techniques, which are certainly more established in so-called 'developed' markets. So, the question should be: is there any evidence that major financial markets have become more volatile in recent times?

To shed some light on this issue, Chart 1 plots the monthly volatility for US equities over the last century. The graph does not give any support to the theory of higher recent risk. Volatility appears to be remarkably stable over these last hundred years. In fact, the largest price moves occurred during the depression of the 1930s. The crash of 1987 was a large loss, but certainly not out of line with other episodes during this century.

Table 1 gives another perspective, counting occurrences of monthly losses greater than 5% on US stocks by decade. Moves greater than 5% are also reported for gold and the DM/\$ exchange rate. The table gives no indication that these markets have recently become more volatile. Instead, the 1990s

Chart 1:
Monthly returns on US equities: 1900–2000



Source: Cowles, Standard and Poor's.

experienced about half the occurrences of large losses of the 1980s. Volatility in these markets seems to be going down, not up.

We can also examine the frequency of financial crises during this century. Bordo et al (2001) provide a list of currency and banking crises since 1880 for a fixed sample of 21 countries¹³. Chart 2 displays the number of crises per decade. As these authors indicate, "crises were chronic problems not just of the 1990s but in the preceding years as well".

Table 1:
Occurrences of large monthly market movements

Decade	Losses > five per cent S&P	Moves > five per cent Gold	Moves > five per cent DM/\$
1900s	14		
1910s	10		
1920s	9		
1930s	35		
1940s	11		
1950s	5		
1960s	10		
1970s	14	40	8
1980s	9	41	21
1990s	5	18	12

Source: P Jorion's calculations.

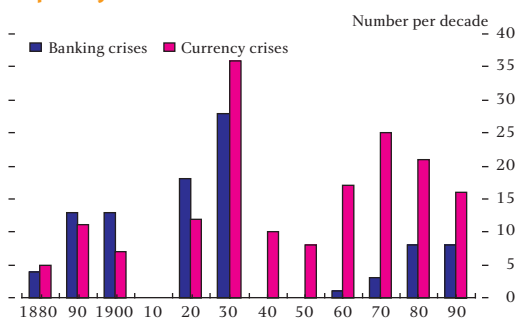
This evidence is supported by long-term histories of other markets. Anderson and Breedon (2000), for example, examine 50 years of asset price volatility in the United Kingdom. They report that the volatility of stocks and interest rates went up in the early 1970s, which was a period of high inflation, but have been on a downward trend thereafter. Turning to causes of price volatility, they find no evidence of any link to

12: The late Fischer Black (1995) even argued that governments are responsible for creating systemic risk. He includes as examples interference with business, with the enforcement of contracts, as well the creation of debt guarantees. Indeed, banking systems that go bankrupt are nearly always due to governments.

13: A 'currency crisis' is defined from either a change in parity value, or large jump in a combination of the spot rate, interest rate, or level of reserves. A 'banking crisis' is identified with the erosion of most of the capital of the banking system. The countries are Argentina, Australia, Belgium, Brazil, Canada, Chile, Denmark, Finland, France, Germany, Greece, Italy, Japan, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK and USA.

financial innovation or regulation. Instead, asset price volatility seems strongly influenced by inflation risk, output growth risk and macroeconomic policy regimes. In other words, asset price volatility is mainly driven by fundamentals. Even so, recent volatility has been lower than average.

Chart 2:
Frequency of financial crises^(a)



Source: Bordo *et al.* (2001).

(a) 21 country sample.

Thus, the argument of ‘the age of financial instability’ seems to be flawed, as financial markets have been no more unstable recently than over the past century.

Fallacy 2: The role of financial engineering

The second major fallacy consists of blaming modern financial engineering, such as portfolio insurance or VaR systems, for creating excess volatility in financial markets.

The role of portfolio insurance

Portfolio insurance aims at achieving payoff patterns similar to long option positions. As is well known, a long position in a put can be replicated by holding a fraction, Δ of the asset with some borrowing or lending B . The put is replicated by

$$p = \Delta S + B. \quad (1)$$

For instance, with $S = \text{US\$}100$ and 26% annual volatility, a 1-year at-the-money put could be replicated by a position of $\Delta = -0.47$ in the asset plus lending out $B = \text{US\$}57$, for a total outlay of $p = \text{US\$}10$.

A key insight of the Black-Scholes (1973) option pricing model, is that, for long option positions, the hedge ratio is an increasing function of the spot price. If S drops to say $\text{US\$}90$, Δ goes to -0.62 , which

requires selling 0.15 units of the asset. This leads to a pattern of trading where falls in S create lower (negative) deltas, and hence more selling. Long option positions can be dynamically replicated by selling in falling markets¹⁴. Absent any other effect, this could be thought of as increasing volatility.

Indeed, portfolio insurance has been widely blamed for aggravating the crash of 1987. The so-called ‘Brady Report’¹⁵ took the position that portfolio insurance was the central cause of the 1987 crash. This view is widely disputed, however.

Miller (1991) argued that the crash of 1987 was due to a breakdown in market structures, ie the additional uncertainty due to the inability of the New York Stock Exchange (NYSE) to handle abnormal trading volumes. In fact, one of the few recommendations of the Brady report was to institute trading halts, which hopefully should give enough time to prepare for markets to clear.

On the theoretical front, the latest work is that of Basak (2002), who considers a general-equilibrium model of the economy with portfolio insurance. Such models are useful, as they consider total allocation effects in a multiple-period framework.

His conclusion is that market volatility actually declines when more investors behave as portfolio insurers. The intuition is that portfolio insurers, who are more risk averse than others, can shift consumption from good states of the world to bad ones, increasing the value of the market in bad states of the world. On the other hand, adding ‘trend-chasers’ has an ambiguous effect on market volatility.

One drawback of theoretical models is that it is sometimes difficult to tell whether their implications depend heavily on their assumptions, which can be subject to differences of opinion. Still, theoretical models provide little support for the view that portfolio insurance increases market risks.

As for the empirical evidence, the challenge is to design tests that separate out the effect of risk management tools from other effects. One such paper is that of Roll (1988), who examines the crash of 1987 across the world. He concludes that portfolio

14: See Rubinstein (1985) for alternative paths to portfolio insurance.

15: Formally, by the Presidential Task Force on Market Mechanisms (1988).

insurance should not be blamed as the average decline in the five markets in which it was used was less than the average decline of the 18 markets in which it was not used.

The role of other automatic trading rules

Even so, many other trading rules, long established before portfolio insurance or modern risk management techniques, can also contribute to a practice of selling in a falling market.

- **Technical trading rules:** Trend-following systems also sell after price drops.
- **Margin calls:** Leveraged investments can lead to margin calls for long positions after prices have fallen, leading to forced liquidation if investors cannot come up with the required additional margin.
- **Rebalancing with leverage:** Schinasi and Smith (2000) demonstrate that the practice of rebalancing to fixed weights with leverage also creates similar trading patterns. This has nothing to do with margin calls but instead is due to the fact that, after a price fall, total wealth drops faster than the price, necessitating a decrease in the risky position¹⁶.
- **Stop-losses:** The practice of cutting losses after a fall in the price may be prudent but also involves selling an asset after its price has fallen.

Each of these rules could be 'blamed' for increasing risk. Margins for individual investors, for instance, have long been considered with suspicion. Indeed there was a widely held view that the crash of October 1929 was 'caused' by the financial liquidation of shares in response to margin calls. As a result, the Securities and Exchange Act of 1934 transferred margin-setting authority to the Federal Reserve System.

Since then, however, this view has been discredited¹⁷. Hsieh and Miller (1990) examine the presumed line of causation from lower margins to higher volatility. They

find no empirical evidence to support this. Instead, they show that higher margin credit volume (or more borrowing) is related to lower volatility. Since lower margins lead to higher margin credit volume, the line of causation is actually opposite to the common view: lower margins create more speculation, more liquidity and actually lower volatility.

Similar suspicions seem to surround any financial innovation. After equity options were introduced on the Chicago Board Options Exchange in 1973, the Securities and Exchange Commission (SEC) imposed a moratorium that suspended the introduction of new options. The fear was that these new instruments could destabilize markets. In fact, subsequent academic research has found that the introduction of options is actually associated with lower volatility of underlying stocks¹⁸.

In a special category are contingent requirements. These involve securities with clauses that give investors apparent protection in case the borrower's credit rating or stock price deteriorates. For example, investors sometimes have an option giving them the right to sell their stock or bonds to the firm in exchange for a fixed amount of cash. Another example is 'ratings triggers', which create additional requirements for the borrower should its credit rating decline. While some are benign, such as the obligation to increase coupon payments, others can require full repayment of the debt. Such clauses are popular with borrowers, who can lower their costs, and investors, who believe that such securities are safer than otherwise.

Contingent requirements can cause serious trouble. They create calls on liquidity precisely in states of the world where the company is faring badly, putting further pressures on the company's liquidity. Indeed, triggers in some of Enron's securities forced the company to make large cash payments and propelled it into bankruptcy. Rather than offering protection, these clauses can trigger bankruptcy, affecting all creditors adversely. While these clauses are highly inadvisable, they are in a special category because they create direct claims on a company's liquidity.

16: Consider for instance a position of US\$100 invested as 200% in a risky asset worth US\$100 and -100% in cash. If the price falls to US\$80, the portfolio is now worth US\$60, or US\$160 in the asset and -US\$100 in cash. Rebalancing to fixed weights, we have US\$120 in the asset and -US\$60 in cash. Hence, this involves selling the asset after the price fell.

17: See the review by Kupiec (1998).

18: See Detemple and Jorion (1990) for evidence on US stocks. Similar results were found for Canadian and UK stocks. As options involve high leverage and the equivalence of short-selling, these results can be interpreted in terms of mitigation of short-sales constraints.

Because the clauses are borrower-specific, however, they do not create systemic risk.

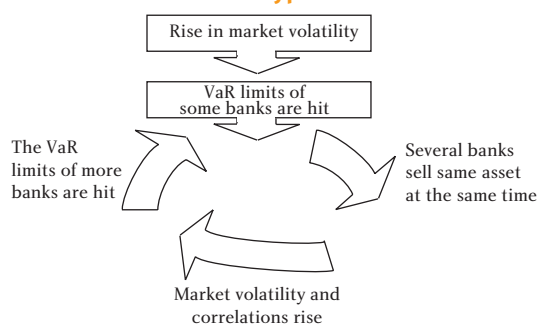
Otherwise, all these rules generate patterns of trading similar to portfolio insurance, but have been in existence for much longer. The latest innovation is that of risk-sensitive capital requirements, such as those based on VaR.

Fallacy 3: The role of VaR

As explained in the introduction, VaR has been blamed for causing increased volatility during Summer 1998. The argument is that some exogenous volatility shock, ie the Russian default, led to an increase in VaR measures. With commercial banks subject to VaR-based capital adequacy requirements, an increase in VaR, assuming it is binding, should lead to a requirement to raise additional capital or to cut positions so as to decrease VaR¹⁹. Since raising capital is not feasible in a hurry, commercial banks presumably cut positions, provoking sales that further increased volatility.

This VaR 'vicious circle' hypothesis, due to Persaud (2000), is described in Figure 1²⁰. The troubling conclusion is that VaR tools increase volatility and are inherently dangerous.

Figure 1:
The VaR vicious circle hypothesis



Source: Persaud (2000).

This story, however, has several flaws. First, it assumes that all VaR-constrained traders have the same positions. Otherwise, they could simply cross their trades with little effect on prices. Ultimately, positions

cannot be directly compared as these data are proprietary and jealously guarded. Berkowitz and O'Brien (2002) indirectly address this issue by looking at correlations of daily trading revenues for a group of six US commercial banks. The average correlation for P&L is 0.12 only, over the period January 1998 to March 2000. This provides no support for the hypothesis that these commercial banks had nearly identical positions.

Second, the Basel risk charges only apply at the highest level of commercial banks. Other financial institutions such as investment banks or hedge funds do not have such regulatory requirements. Even for commercial banks, actual capital ratios were far in excess of regulatory requirements, so that market risk charges were not binding. The fact that VaR-based market risk charges were introduced in 1998 and that markets experienced a crisis in 1998 is pure coincidence.

Third, as we will show below, capital adequacy requirements move so slowly that they could not have possibly caused panic selling. To prove this, we need to review the structure of the Basel VaR approach.

The Basel VaR

To use the internal model approach, banks have to satisfy various qualitative requirements first. The bank must demonstrate that it has a sound risk management system, which must be integrated into management decisions. Notably, the bank has to use the regulatory VaR forecast directly for management decisions. This point is important, as it forces commercial banks to use the same parameters as dictated by the Basel rules.

When this is satisfied, the market risk charge is based on the following quantitative parameters for VaR: (i) a horizon of ten trading days, or two calendar weeks, (ii) a 99% confidence interval, (iii) an observation period based on at least a year of historical data and updated at least once a quarter. In practice, banks are allowed to compute their 10-day VaR by scaling up their 1-day VaR by the square root of 10.

19: There could be some feedback effect due to marking-to-market losses on capital. Many banks did suffer trading losses in 1998, which could lead to position cutting. This has nothing to do with VaR, or any risk-sensitive risk measure, however. Any rule based on, say, the ratio of notional to capital would give the same results.

20: Persaud (2000) also references work on 'herding' by Morris and Shin (1999). The problem with the theoretical literature on herding is that these models are very sensitive to the assumptions. Heinemann (2000), for example, has shown that the conclusions of Morris and Shin (1998), which are the basis for their more recent paper, can be overturned in a more general model. Bikhchandani and Sharma (2001) provide a useful review of the literature on herding in financial markets.

The Market Risk Charge is then computed as the higher of the previous day's VaR, or the average VaR over the last 60 business days, times a 'multiplicative' factor k :

$$MRC_t = \text{Max}(k \frac{1}{60} \sum_{i=1}^{60} VaR_{t-i}, VaR_{t-1}) \quad (2)$$

where k is to be determined by local regulators, subject to an absolute floor of 3²¹.

Apparently, the effect of these rules on the MRC has not been fully appreciated. This is the first paper, to our knowledge, that specifically analyzes the time-series behavior of the market risk charges. By now, there is an enormous literature on VaR, derived from statistical time-series techniques that narrowly focus on 1-day VaR accuracy issues²².

Here, two smoothing mechanisms are involved. The first is the requirement that the model be based on at least a year of historical data. More precisely, the 'average life' of weights on past observations must be at least six months. This requirement can be traced to the observation of Jackson et al (1997) that short windows can lead to inaccurate VaR. But, as we will show, this requirement also has the effect of creating VaR measures that are very stable over time. The second mechanism consists of taking the average VaR over 60 days.

Modelling daily VaR

Let us examine first the requirement of a minimum window for computing daily VaR numbers. With the historical-simulation method, the window must be at least one year. Requiring at least 250 days seems reasonable as this would yield an expected 2.5 observations in the left tail. But then, as shown by Pritsker (2001), the VaR risk forecast will not be very responsive to changes in recent volatility, due to the fact that each observation in the 250-day window has a relatively small weight of 1/250. We need to have several observations below the previous quantile to start moving VaR measures.

Alternatively, consider parametric VaR models based on the standard deviation. Such models can

accommodate time-variation in risk more easily. More recent models mix historical simulations with parametric volatility modeling²³. Consider, for instance, a simple RiskMetrics-type Exponentially Weighted Moving Average (EWMA) forecast. The conditional variance forecast is:

$$h_t = \lambda h_{t-1} + (1 - \lambda) r_{t-1}^2 \quad (3)$$

where λ is the decay factor and r the rate of return on the asset.

With a dollar position of W_{t-1} , VaR can be computed as $VaR = W_{t-1} \times 2.33 \sqrt{h_t}$, at the 99% level assuming a conditional normal distribution. This could be extended to other parametric distributions, however, with a different multiplication factor.

Replacing recursively, this yields geometrically declining weights

$$h_t = (1 - \lambda) [r_{t-1}^2 + \lambda r_{t-2}^2 + \lambda^2 r_{t-3}^2 \dots] \quad (4)$$

The average life is the weighted sum of number of days

$$\sum_{i=1}^{\infty} i \times [(1 - \lambda) \lambda^{i-1}] = 1 / (1 - \lambda) \quad (5)$$

For example, the average life of the RiskMetrics model with $\lambda=0.94$ is 16.7 days, or 0.067 years, assuming a 250-day year. This is not allowed under the Basel rules, however. We need λ to be at least 0.992 to achieve an average life of half a year. Alternatively, banks could use a moving average over one year, with equal weights within the window

$$h_t = \frac{1}{250} \sum_{i=1}^{250} r_{t-i}^2 \quad (6)$$

Chart 3 and Chart 4 compare the evolution of daily VaR models for the DM/US\$ rate since 1980. First, note that the historical-simulation model generally yields a higher 99% VaR than the other models. This reflects the well-known observation that daily financial series have tails fatter than the normal²⁴.

In Chart 3, the EWMA with $\lambda=0.94$ is indeed very volatile, due to the higher weight on recent data. This

21: Ignoring the specific risk charge, which is explained in more detail in the Basel Amendment (1996).

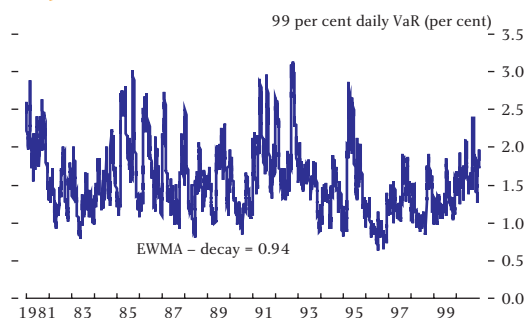
22: See Hendricks (1996), Jackson et al (1997), Christoffersen (1998), Lopez (1999), among others.

23: See for instance Boudoukh et al (1998) and Hull and White (1998).

24: See Hendricks (1996).

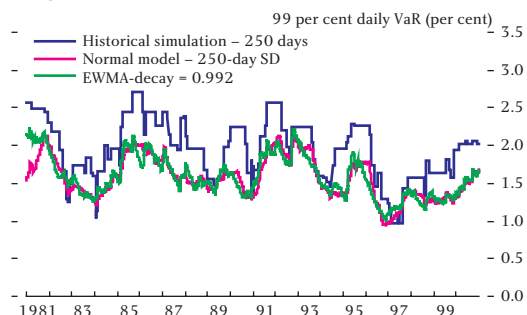
is not relevant, however, since such fast-moving models are not allowed under the Basel rules. Chart 4 shows that the normal-MA model based on a moving window of 250 days is much smoother. The historical-simulation method is more volatile, but still much smoother than the EWMA model with decay of 0.94. Finally, the EWMA with $\lambda=0.992$, which is the minimum decay allowed under Basel rules, is nearly as smooth as the normal model.

Chart 3:
Comparison of VaR models: DM/\$ rate



Source: P Jorion's calculations.

Chart 4:
Comparison of VaR models: DM/\$ rate



Source: P Jorion's calculations.

The fact that banks are constrained to use slow-moving VaR forecasts explains the finding by Berkowitz and O'Brien (2002) that banks' VaR forecasts can be beaten by a simple GARCH model applied to the history of P&L. At first sight, these findings are surprising since GARCH models have no information on changing positions. One interpretation is that "these results may reflect substantial computational difficulties in constructing large-scale structural models of trading risks for large, complex portfolios". Another interpretation, however, is that the banks' structural models are simply hamstrung by the Basel requirements. And, this may be a rational outcome since the purpose of these VaR

models is to produce a smooth capital requirement and not necessarily to measure next day's risk with utmost accuracy.

Which VaR is binding?

The market risk charge is composed of the maximum of two terms. Which of these terms in Equation (2) will be binding? The first term, which is three times the 60-day average, will in general be higher than yesterday's VaR, and thus will be binding. The bank would have to experience an enormous increase in the previous day's VaR for it to become the dominant factor.

To see this point, assume that VaR is stable at VaR_0 for the last 60-day period, except for a spike on the last day. The second term in Equation (2) will be binding when

$$VaR_{t-1} > 3 \frac{1}{60} [VaR_{t-1} + 59VaR_0] \quad (7)$$

which implies

$$VaR_{t-1} > (3 \times 59 / 57) \times VaR_0 = 3.11 \times VaR_0 \quad (8)$$

This could happen in one of two ways. Assuming stable risk factors, this could be achieved if the exposure W_{t-1} , or size of positions, is multiplied by a factor greater than 3.1. Alternatively, with constant exposures, this could also be achieved by an increase in the volatility of risk factors $\sqrt{h_t}$. The latter is much less likely, however.

Table 2 displays the required latest return, expressed in terms of volatility, such that the second term is binding, for various values of the decay parameter for the EWMA model, as well as the 250-day MA. Lower values for λ imply greater weight on the last observation. Hence, a smaller movement is required for the latest observation to be binding.

Table 2:
Required return for last VaR term to be binding

Model	EWMA, Decay (λ)					MA
Parameters	0.92	0.94	0.96	0.98	0.992	250 days
Required return	10.4 σ	12.0 σ	14.7 σ	20.8 σ	32.9 σ	46.5 σ

Source: P Jorion's calculations.

The table shows, for instance, that with $\lambda=0.94$ we require a shock twelve times the daily standard deviation. This happened only once in our equity and currency sample, during the crash of October 19, 1987.

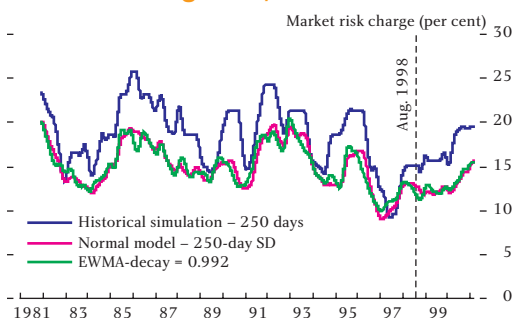
With the lowest decay allowed, $\lambda=0.992$, we need a movement of 32.9 times the standard deviation for the latest VaR to be binding. With a simple moving average over the last year, the required move implies a factor of 46.5. It is highly unlikely that an exogenous shock to volatility could induce yesterday's VaR to be binding. Therefore, in what follows, we will assume that the market risk charge is driven by three times the average VaR. This is not to say, however, that the second term in the market risk charge is useless. It serves to catch banks that suddenly increase their positions.

Evaluation of the Basel market risk charge

The contention is that VaR-based capital requirements experienced sharp increases during Summer 1998, leading to forced position cutting. The question is: how did the increased volatility of financial markets affect the Basel capital requirements?

Chart 5 displays movements in the market risk charge for a fixed position in the exchange rate between the dollar and the DM (now the euro). Note how smooth the lines are compared to those in the previous graph. This is due to the averaging over the last 60 days. The figure does not include the normal-EWMA model with decay of 0.94 since it is not allowed. The graph shows no evidence of sharply higher market risk charge during 1998. The fluctuations in market risk charges in 1998 are actually lower than over the rest of the sample period.

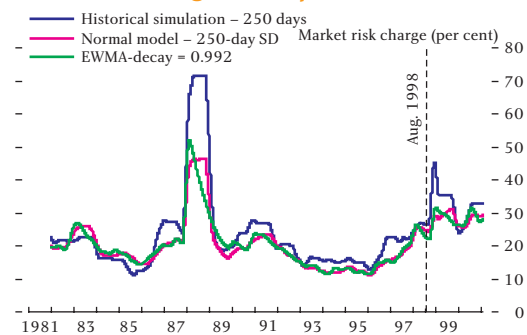
Chart 5:
Market risk charge: DM/\$ rate



Source: P Jorion's calculations.

One could argue that volatility was confined to other markets, however. So, we turn to US equities. Chart 6 plots the MRC for a fixed position in US stocks. There is some evidence of an increase in the MRC during 1998, but not out of line with the history of the last 20 years.

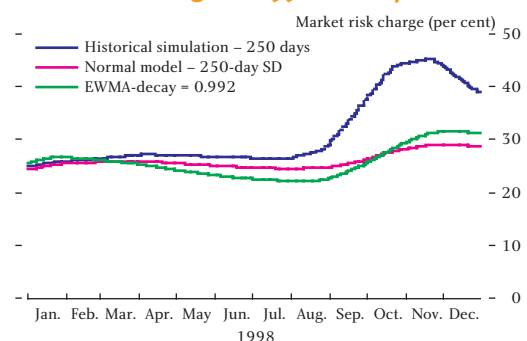
Chart 6:
Market risk charge: US equities



Source: P Jorion's calculations.

Chart 7 gives more detail for 1998. The graph shows that the increase in the MRC was very slow. It was barely noticeable for the normal model with a 250-day MA and for the EWMA with decay of 0.992. There is a greater increase for the historical simulation method, but due to the averaging process, the MRC only reaches a peak by the end of November, by which time the crisis was over.

Chart 7:
Market risk charge in 1998: US equities



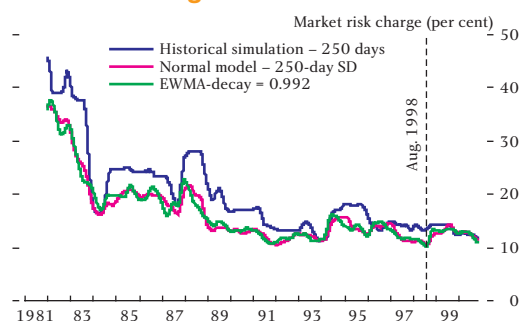
Source: P Jorion's calculations.

Finally, Chart 8 plots the MRC for a short position in 10-year Treasury notes. Again, there is no evidence of sharp movements in the MRC for the HS and MA models. While the 1980s were much more volatile than the 1990s for Treasuries, 1998 was certainly not an eventful year in terms of the Basel market risk charge. In conclusion, it seems inappropriate to blame increases in VaR models for position cutting.

Objective functions for VaR models

The previous section indicates that smoothness in the VaR-based capital charge is a desirable property. This has been largely ignored in the VaR literature, which has focused on purely statistical issues such as bias and bunching.

Chart 8:
Market risk charge: US Treasuries



Source: P Jorion's calculations.

'Bias' indicates the extent to which the quantile is well calibrated. It is measured with the percentage of exceptions, or losses worse than the 99% VaR. Normally, this should be 1%. Whether deviations are significant can be tested, for instance, with a t-statistic.

'Bunching' indicates the extent to which exceptions are grouped in time. Ideally, deviations should be uniformly spread over time. This can be measured, for instance, by the Ljung-Box Q-statistic of autocorrelations in exceptions, which is distributed as a chi-square statistic. With 15 lags, we cannot reject if the number is less than 25 at the 95% confidence level.

The quest for low bunching has led to more responsive VaR measures, such as GARCH or EWMA models.

These statistical measures, however, do not consider the effect on capital charges. All else equal, a bank would want low and stable capital charges. The problem is that these economic goals are in direct conflict with the statistical objectives.

Lower charges could be achieved at the cost of more exceptions. There is no question, however, that a VaR system should be as unbiased as possible. This is why the Basel Committee has established a backtesting framework with penalties for banks that incur too many exceptions.

Similarly, less variable capital charges could be achieved at the expense of more bunching. Less variability is economically beneficial. If capital cannot be raised quickly, or positions adjusted quickly, more variable capital charges imply that the institution has to hold more spare capital to absorb peaks in the capital charge. Whether bunching is intrinsically bad, however, is not so obvious.

These tradeoffs are illustrated in Table 3, which compares the performance of five VaR models in

Table 3:
Comparison of performance of VaR models

VaR Model	Bias		Bunching		One-day VaR		Capital (60-day)		
	Exceptions Per cent	T-test	Ljung-Box	Average	Standard deviation level	Standard deviation change	Average	Standard deviation level	Standard deviation change
US equities									
Normal	1.52	3.74*	84.06*	2.243	0.830	0.029	2.236	0.814	0.007
Student	1.11	0.78	73.31*	2.503	0.936	0.036	2.495	0.915	0.008
Historical simulation	1.17	1.20	68.67*	2.593	1.310	0.072	2.583	1.274	0.013
EWMA+N	1.74	5.30*	36.72*	2.170	1.058	0.168	2.167	0.903	0.019
EWMA+HS	0.97	-0.22	18.99	2.749	1.563	0.247	2.742	1.330	0.029
US bonds									
Normal	1.66	4.68*	47.50*	1.680	0.586	0.012	1.694	0.607	0.003
Student	1.08	0.56	46.84*	1.877	0.651	0.019	1.892	0.675	0.003
Historical simulation	0.78	-1.57	39.28*	2.020	0.787	0.033	2.037	0.809	0.005
EWMA+N	1.98	6.95*	28.88*	1.584	0.617	0.094	1.600	0.597	0.010
EWMA+HS	1.02	0.13	12.02	1.977	0.755	0.126	1.990	0.697	0.013
DM/US\$ rate									
Normal	1.90	6.46*	21.91	1.564	0.265	0.009	1.566	0.265	0.002
Student	1.21	1.53	27.93*	1.762	0.277	0.017	1.765	0.276	0.002
Historical simulation	0.92	-0.58	36.08*	1.926	0.372	0.030	1.930	0.361	0.004
EWMA+N	2.07	7.72*	17.83	1.516	0.419	0.080	1.519	0.343	0.009
EWMA+HS	0.80	-1.42	23.88	1.915	0.627	0.119	1.920	0.517	0.013

Notes: The table compares the performance of various VaR models in terms of various objective functions. Rejection at the 95% significance level denoted by *. 'Bias' is measured as the percentage of exceptions, or losses worse than the 99% VaR; the t-statistic tests whether the actual percentage is significantly different from 1.00. 'Bunching' is measured by the Ljung-Box Q-statistic of autocorrelations in exceptions with 15 lags; the chi-square-statistic tests whether the deviations are independent over time, and cannot reject if the number is less than 25 at the 95% confidence level. The 'One-day VaR' columns give the average and standard deviation of the VaR forecast. The standard deviation is reported for the level of VaR and the one-day change. The 'Capital' columns give the average and standard deviation of the Market Risk Charge using the average of the VaRs over the last 60 days. Daily data are used from 1980 to 2001, which represents about 5,050 *ex post* observations. All models are based on the last 250 days of data. The 'normal' and 'student' model are based on the standard deviation and the deviate, eg 2.33 for normal data, and the corresponding number from the student distribution, with degrees of freedom estimated from matching the kurtosis over the last year. 'historical simulation' is a bootstrap method using the empirical 99% quantile. The 'Exponentially Weighted Moving Average' (EWMA) methods use a conditional forecast of the variance with decay λ the same as RiskMetrics. The 'EWMA+N' method assumes a conditional normal distribution. The 'EWMA+HS' method bootstraps the scaled residuals.

terms of various objective functions. The table reports bias, bunching, as well as the average and standard deviation of the 1-day 99% VaR forecast and the capital charge based on the 60-day average.

The simulations use daily data from 1980 to 2001, for US stocks, US bonds (represented by a short position in 10-year Treasury notes), and the DM/US\$ rate. This represents about 5,050 *ex post* observations. All models are purely anticipative, based on the last 250 days of data.

The 'normal' and 'student' models are based on the historical standard deviation and the appropriate deviate, eg 2.33 for normal data, and the corresponding number from the student distribution, with degrees of freedom estimated from matching the kurtosis over the last year. The EWMA methods use a decay $\lambda=0.94$. 'EWMA+N' assumes a conditional normal distribution; 'EWMA+HS' bootstraps the scaled residuals²⁵.

The left columns display bias for each model and market. The 'normal' model substantially understates tail probabilities and appears badly biased in all markets. The tail percentage ranges from 1.52% to 1.90%, which is significantly higher than the expected 1.00%. This reflects the well-known observation that financial series have fatter tails than the normal distribution. More unexpected is the observation that the EWMA+N model has even worse bias for these three markets. The other models, the 'student', HS, and EWMA+HS are much better calibrated.

The next column shows that the first three, unconditional, models all have too much bunching. The statistics reject the hypothesis of no bunching. The EWMA models generally deal well with heteroskedasticity.

The next columns display the average and standard deviation of the 1-day VaR and of the 60-day average. Focusing first on the average, the table shows that models that have high bias have low average VaR, and vice versa. A greater percentage of exceptions leads to low average capital charges. This is why backtesting is needed.

Standard deviations are reported for VaR measures in levels, ie relative to the long-term average, and in daily changes. The latter measure gives a better indication of short-term fluctuations in VaR. The table reveals a number of interesting relationships. First, fluctuations for the normal and student models are systematically less than those based on historical simulations. This is due to sampling variability in the HS estimator²⁶. Second, fluctuations for the EWMA models are systematically greater than those based on unconditional distributions. Third, as previously noted, fluctuations in the 60-day average are much smaller than those in the 1-day VaR, by a factor of 5 to 10. Table 3 also demonstrates the intrinsic conflict between low bunching and stable capital charges. The EWMA models have lower bunching than the others but much more variable capital charges.

Overall, the best model across these conflicting objectives seems to be the 'student' model. It offers low bias, relatively low average capital and low volatility in the capital charge.

Conclusions

This paper has taken another look at allegations that risk management systems contribute to increased volatility in financial markets, in particular during the Summer of 1998. We started by showing that major financial markets have been no more volatile in recent years, which have witnessed many financial innovations.

The debate about the role of financial engineering bears an eerie resemblance to discussions of portfolio insurance, which has been widely blamed for the crash of October 1987. There is still considerable controversy, however, about the actual effect of portfolio insurance. The same rush to judgment was also observed with margins during the crash of 1929 and when futures and options were introduced. Instead, the empirical evidence suggests that financial innovations provide a stabilizing influence.

This paper provides new evidence that VaR-based regulatory capital charges for commercial banks cannot plausibly be blamed for the volatility of 1998. Market risk charges move very slowly in response to

25: This has been used, for instance, by Hull and White (1998).

26: As Jorion (1996) has argued, methods based on the sample standard deviation are more robust as this statistic uses the whole distribution. The historical simulation method uses the 1% quantile, which is much more imprecisely estimated, especially in a sample as short as 250 days.

changing market conditions, due to the averaging over the last 60 days and slow updating imposed by the Basel rules.

A new insight of this analysis is that risk-sensitive systems should incorporate smoothing mechanisms. The quest for accuracy in VaR measures, which would dictate fast-moving systems such as GARCH, should take second place to stability in the market risk charge.

This is not to say, however, that VaR systems should be viewed as a panacea. They provide no guarantee that large losses will not occur. In addition, traders could wilfully attempt to 'game' their VaR by altering the distribution of P&L to satisfy a fixed VaR

at the expense of a small probability of large losses. Such possibilities have been analyzed by Ju and Pearson (1999), but are more likely at the level of traders' desks than the whole institution. Artzner et al. (1999) propose instead a 'tail loss measure', which is the expectation of the loss once VaR is exceeded. Such measures could usefully supplement VaR numbers²⁷. This explains why the industry and regulators emphasize the importance of stress tests, which precisely examine the effect of unusual market movements.

Overall, it is fair to conclude that there is no evidence to support the assertion that VaR-based risk management systems destabilize the financial system.

27: Basak and Shapiro (2001) examine the effect of this gaming at the level of the institution on financial markets. They show that strict VaR limits could induce banks to take on more risk in bad states of the world, ie after VaR limits have been breached, which could cause higher volatility in financial markets. The authors show that these shortcomings are remedied by tail loss measures.

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Dynamic provisioning:

issues and application

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This article – a companion to the quantitative analysis of provisioning by UK banks published in the June *Review* – looks at the pros and cons of ‘dynamic’ provisioning. In that approach, banks would make provisions based on the losses expected when loans are originated. This would deliver a rising stock of provisions when actual loan losses were unusually low, which would help to protect banks in periods when actual losses were high. In addition, banks’ income statements would be less distorted in periods when actual losses were significantly higher or lower than the long-run expected level.

THERE IS CURRENTLY A LOT OF DISCUSSION about how to value financial instruments in companies’ and – specifically in this context – banks’ financial statements. Some advocate a move to full fair-value accounting; others promote so-called ‘dynamic provisioning’. An article in the June 2000 *Review* set out some of the issues in relation to the former²; this article looks at the latter.

It first describes current practice with regard to bank loan provisioning and outlines how dynamic provisioning might work. It goes on to discuss the issues that would be involved in implementing dynamic provisioning, illustrating them with an example of a simple loan portfolio. These issues include how expectations of future losses might be set and whether dynamic provisioning could be used to smooth profits between accounting periods.

Bank lending and the current approach to bank provisioning

Under historic cost accounting, provisions are made for losses recognised at the balance sheet date. In relation to *specific* provisions, the UK Statement of Recommended Accounting Practice (SORP) on Advances³ states that:

“A loan is impaired when, based on current information and events, the bank considers that the creditworthiness of a borrower has undergone a

deterioration such that it no longer expects to recover the advance in full”.

Regarding *general* provisions, the SORP says that:

“Experience shows that portfolios of advances often contain advances which are in fact impaired at the balance sheet date, but which will not be specifically identified as such until some time in the future...To cover the impaired advances which will only be identified as such in the future, a general provision should be made”.

The distinction between the two is largely one of practical implementation: in both cases provisions are made only in respect of impairment believed to exist at the balance sheet date. The approach under US and international accounting standards is similar (Box 1).

This accounting approach is rather different from the one implicit in banks’ approach to lending. Banks expect that a proportion of their loan portfolios will be lost each year, as some borrowers will not be able to repay the loans. These are ‘expected losses’, but actual losses may clearly be different from what a bank expects *ex ante*. Such unexpected losses could arise, for example, because of an unusually severe economic downturn. When calculating the unexpected loss, banks increasingly think in terms of a confidence interval around the expected loss figure,

1: We would like to thank Alastair Clark and Patricia Jackson for many useful comments and suggestions.

2: Jackson and Lodge (2000).

3: The SORP is contained in British Bankers’ Association (2001).

Box 1: Accounting rules for provisions¹

United Kingdom

There are few formal rules governing provisioning by UK banks. The British Bankers' Association's (BBA) Statement of Recommended Practice (SORP) on advances² suggests that (paragraphs 11–18):

- The amount of the specific provision should be the bank's estimate of the amount needed to reduce the carrying value to the expected ultimate net realisable value.
- There is no specific trigger – it is often a default event but provisions should be made whenever information suggests impairment.
- General provisions should be for advances already impaired but not yet identified as such. The assessment for general provisioning is 'inevitably subjective' but it should take into account past experience and current economic conditions.

While in practice some banks have established provisioning policies with forward-looking elements that attempt to cover some expected losses over the life of a loan, general provisions are only a relatively small part of total provisions. This is probably in part because general provisions are not tax deductible, and the Basel Capital Accord (1988) limited the inclusion of general provisions in regulatory capital to 1.25% of risk-weighted assets.

United States

The US follows a similar system to the UK whereby provisions only cover loan losses already in the portfolio. Financial Accounting Standards Board (FASB) Statement 5³, 'Accounting for Contingencies', states that an accrual for losses should be made when it is probable that an asset has been impaired or a liability has been incurred and the amount of the loss can be reasonably estimated.

FASB staff have recently noted that, under US Generally Accepted Accounting Practices (GAAP), "Losses should not be recognised before it is probable that they have been incurred, even though it may be probable based on past experience that losses will be incurred in the future"⁴.

For banks, the US arrangements include an Allowance for Loan and Lease Losses (ALLL) to absorb estimated existing credit losses⁵. It is the responsibility of the board of directors and management of each institution to maintain the ALLL at an adequate level, though it is recognised that determining this level requires a substantial degree of judgement. To ensure the ALLL is reasonable, bank examiners look at the quality of a bank's credit risk measurement and management systems, and also carry out quantitative analyses of the ALLL, as part of a comprehensive assessment of the loan portfolio and the factors affecting its collectibility. When examiners conclude that a bank's ALLL falls short of an appropriate level, the bank would be expected to increase its provisions.

International Accounting Standards

Publicly listed EU companies must implement International Accounting Standard (IAS) standards⁶ by 2005. IAS 39 covers recognition and measurement of financial instruments, including impairment of financial assets. IAS 39 considers a loan impaired if, on the basis of objective evidence, it is partly or wholly uncollectable, so that its carrying amount is greater than its estimated recoverable amount. Objective evidence in this context includes: 1) significant financial difficulty of the issuer; 2) actual breach of contract; and 3) a high probability of bankruptcy. Another criterion is a historical pattern of collections of accounts receivable that indicates that the entire face amount of a portfolio of accounts receivable will not be collected – this is a concept closer to forward-looking expected loss.

1: Beattie et al (1995) provide a detailed discussion of the accounting, tax and regulatory treatment of loan loss provisioning internationally.

2: See British Bankers' Association (2001).

3: FASB (1975).

4: FASB (1999).

5: Federal Reserve Board et al (1993).

6: International Accounting Standards are set out in IASB (2002).

that will not be exceeded in more than a specified proportion of time periods.

In pricing loans, banks will in principle set interest margins to cover both expected losses and to remunerate the capital held to cover unexpected losses. This margin typically contributes to income over the life of a loan. By contrast, actual losses do not arise smoothly, because they are influenced by a wide variety of often unpredictable factors.

The present accounting treatment does not raise problems for loan valuation if the margin charged fully covers the expected loss, but it can create distortions, at least in terms of timing, in measuring banks' income. It can lead to large profits during booms (when actual losses are typically low), and large losses in recession (when actual losses are high), even if over the whole period margin income exactly offsets expected losses. This volatility in measured income may impart volatility to the wider economy. This could arise, for instance, if higher conventionally measured profits and rising capital encouraged banks to expand their lending procyclically. Concerns about the implications of the treatment of banks' margin income and expected losses are not new – they were raised, for example, by the Bank in the mid-1990s⁴.

Dynamic provisioning, bank income and bank capital

One alternative approach to the current method of measuring bank loan losses and income is 'dynamic provisioning'. The fundamental principle underpinning dynamic provisioning is that provisions are set against loans outstanding in each accounting time period in line with an estimate of long-run, expected loss. Generally, the level of provisioning on this basis would be less subject to sharp swings stemming from the strength of economic activity than the current approach. Loan losses would impinge on banks' profit and loss accounts and balance sheets more smoothly than at present, because of the primacy of expected, rather than actual, losses in a dynamic provisioning approach.

There is no single, agreed specification of how dynamic provisioning might be implemented in

practice. This article therefore discusses the main principles with the aid of a simple example that illustrates the key features. In broad terms, dynamic provisioning would build up a buffer (reserve) to cover expected loss from the time a loan is taken on. The reserve would build up in any year in which actual losses fell short of expected losses, while in years in which losses exceeded the expected level, the reserve would be drawn down. Some major international banks already set provisions on this basis for internal management accounting purposes.

An important issue would be precisely which losses would impinge on banks' profit and loss accounts in a given accounting period. The basic principle behind dynamic provisioning indicates that banks' income would no longer be measured net of actual losses, but net of contributions to the expected loss provision. Actual losses would be set against the expected loss provisions, including expected loss provisions accumulated in past years. However, if a bank made a loss that was greater than the accumulated dynamic provision, then it would probably be appropriate for the excess to feed through directly into the profit and loss account.

The actual losses that could be set against the expected loss reserve could in principle encompass both loan impairments against which specific provisions are made and write-offs. In the discussion and examples below, actual losses are represented solely by specific provisions. Write-offs (which remove loans from a portfolio entirely) would only have an additional impact on a bank's income to the extent that they had not already been provided for through appropriate specific provisions.

In theory, banks' equity capital⁵ should be used purely to cover unexpected loss, with expected losses – ie those anticipated at the outset – covered by lending margins. However, as noted above, in most countries at present there is no systematic mechanism for ensuring that a reserve to cover expected losses is established. The proposed new Basel Capital Accord⁶ sets regulatory capital requirements to cover both expected and unexpected losses. Were dynamic provisioning to

4: Bank of England (1995). The Bank noted that "Banks tend to expand their loan books in an economic upturn and take all the income from the new lending into profit, even though part of the lending margin was charged to cover expected future credit losses".

5: Equity capital (shareholders' funds) is available to absorb losses while a bank remains a going concern. Some classes of capital which qualify for regulatory capital purposes (for example subordinated debt) help to protect more senior creditors of a bank but do not provide a buffer against insolvency.

6: For a summary of the design of the new Basel Accord, see Jackson (2001) and the article in this *Review* on 'Bank Capital: Basel II Developments'.

become established practice, however, it would be relatively straightforward to recalibrate the Accord to take this into account⁷. Another issue in relation to the Accord is that bank regulatory capital is defined to include general provisions, up to a ceiling⁸. This definition was set when the existing Basel Accord was agreed in 1988. If the Accord were recalibrated to cover just unexpected losses, then to the extent that general provisions are thought to cover an element of (forward-looking) *expected* losses, the definition of regulatory capital would need to be changed to exclude general provisions.

Implementation of alternative approaches to provisioning

A simple numerical example is used below to compare the present, historic cost approach to provisioning with a 'dynamic' approach. The example taken is a loan portfolio of 100 units (for example, 100 individual loans each of 1 unit). The loans are assumed to be of 5 years' maturity; with a fixed interest rate of 6% and funding costs of 4%, implying net interest income of 2%; expected losses of 1% per annum; and actual (percentage) loan impairments – for which specific provisions are made – of zero in the first two years, and 1%, 3% and 1% in years 3–5 respectively⁹.

Historic cost accounting

This is the current approach.

Table 1:

Historic cost accounting

	Year 1	Year 2	Year 3	Year 4	Year 5
Balance sheet					
Loans balance sheet value	100	100	100	100	100
Stock of specific provisions (end-year value)	0	0	1	4	5
Loans balance sheet value net of provisions (end-year value)	100	100	99	96	95
Income statement					
Net interest income	2	2	2	2	2
Specific provision charge	0	0	1	3	1
Total P&L	2	2	1	(1)	1

This example illustrates the volatility which historic cost provisioning can produce: the P&L account swings from a positive balance of 2% of asset value in years 1 and 2 to a loss of 1% in year 4.

Dynamic provisioning

Dynamic provisioning recognises that in practice the year-to-year patterns of expected and actual losses are likely to differ. A forward-looking provision, based on long-run expected annual losses, is made each year.

In the balance sheet, actual losses (specific provisions) would be deducted from the accumulated expected-loss provisions as and when they occur. In every year in which actual losses are less than the expected loss charge, the stock of expected-loss provisions would increase; similarly, it would fall if actual losses in a period exceeded the expected level. In the P&L account, expected losses would be charged against the current year's P&L. Any 'unused' expected loss provision would be unwound if and when the relevant portfolio matured.

It should be emphasised again that there are a range of ways in which the principle of dynamic provisioning could be implemented: a number of implementation issues are discussed below. Table 2 shows the mechanics for our simple example; this is intended to do no more than highlight the broad properties of a dynamic approach.

The table shows how dynamic provisioning might, in principle, be reflected in the bank's balance sheet and

Table 2:

Dynamic provisioning

	Year 1	Year 2	Year 3	Year 4	Year 5
Balance sheet					
Loans balance sheet value	100	100	100	100	100
Stock of specific provisions (end-year value)	0	0	1	4	5
Stock of expected loss provisions (end-year value)	1	2	2	0	0
Stock of total provisions (end-year value)	1	2	3	4	5
Loans balance sheet value net of provisions (end-year value)	99	98	97	96	95
Income statement					
Net interest income	2	2	2	2	2
Expected loss provision charge	1	1	1	1	1
Total P&L	1	1	1	1	1

income statement. In the balance sheet, a stock of expected loss provisions builds up in the early years when actual losses are low, but is then run down as actual losses materialise. In the income statement,

7: Though a complication would arise if not all countries adopted dynamic provisioning, or if different countries used different provisioning schemes.

8: General provisions count as part of 'Tier 2' capital, up to a ceiling of 1.25% of risk-weighted assets (and subject to the requirement that the total of Tier 2 cannot exceed Tier 1; the latter is primarily shareholders' funds).

9: In this example, for clarity of exposition, net interest income is not reduced in the light of loan impairment. If, for example, it were reduced in line with the ratio of the stock of specific provisions to the total portfolio at the end of the previous year, it would be marginally lower in years 4 and 5 (at 1.94 and 1.76, respectively).

expected losses are set against net interest income. There would only be a need to make a further charge in respect of specific provisions if it was not possible to cover these in a given year from the accumulated expected loss reserve¹⁰; that is not the case in this example. The profile for the bank's reported income is much more stable in this example than under historic cost accounting.

It was argued above that dynamic provisioning along the lines of the example might better capture the economic substance of bank lending than current accounting rules. This is broadly the approach adopted since 2000 in Spain – described in Box 2.

The greater stability of the bank's income under dynamic provisioning is dependent on actual losses fluctuating through time. In the unlikely event of actual losses being smooth, and fairly closely in line with expected loss, the results of the current and dynamic approaches to provisioning would not differ greatly.

Greater stability of bank income would also require dynamic provisions to be built up ahead of any downturn – which would not be possible if a dynamic approach were introduced when an economy was in recession. In addition, it depends on banks being able to estimate long-run expected losses reasonably accurately.

Issues in the implementation of dynamic provisioning

A range of issues would need to be resolved before dynamic provisioning could be implemented in practice, including those discussed below.

Would banks be able to form reliable estimates of long-run expected loss? Banks must form some view of likely future losses in order to price loans. Furthermore, banks aspiring to use the internal ratings approach in the new Basel Accord will need to make estimates of this kind¹¹. These will typically be based on data relating to past losses, though banks do need to take into account factors which might cause losses to behave differently in future.

While the authorities could prescribe standard assumptions, it would seem preferable for banks to estimate expected losses using their own information, because uniform assumptions would not necessarily reflect the situation of individual institutions.

Should there be a single dynamic provisioning reserve?

It might be preferable for separate reserves to be established for different portfolios (eg corporate lending, retail lending etc) rather than a single reserve being put in place. Separate reserves would reduce the scope for an exceptionally large loss in one part of a bank's business to be set against an expected loss reserve built up to cover losses in the bank as a whole. It might mislead users of financial statements if a large loss on, say, a single project-finance exposure caused by factors specific to that project could be offset against a bank-wide reserve, thereby perhaps preventing the loss having any immediate impact on P&L. If there were separate reserves for different portfolios, large losses could be set only against the reserve for the relevant portfolio.

Accommodating changes in expected loss and interest margin income. In general it would be expected that banks would set margins to cover expected losses, so that dynamic provisions would be made out of margin income. However, even if the margin on a loan is initially set to reflect the expected loss, over the lifetime of the loan the two may diverge so that margin income falls short of expected loss. This could reflect changes in expected loss or a change in margin because, for example, fixed-rate lending is financed by floating-rate funding. In implementing any new approach to provisioning, it would be necessary to decide whether provisions should be made against any such divergence between expected loss and margin. However, that would entail taking account, *inter alia*, of interest rate risk in accounting for bank loans, which would amount to moving closer to full fair-value accounting, and would raise complex issues¹².

How frequently should estimates of expected loss be updated in the light of new information? One possibility would be for expected loss estimates to be

10: Inclusive of contributions to the stock of expected loss provisions in the current year.

11: Banks on the 'foundation' IRB approach to determining regulatory capital will estimate probability-of-default (PD), with loss-given-default (LGD) being as specified in the Basel Accord; banks on the 'advanced' IRB approach will estimate both PDs and LGDs. Loss-given-default is the variable which takes account of the fact that even if a borrower defaults, often only part of the value of a loan is lost, reflecting factors such as collateral and guarantees taken by the bank.

12: See, for example, Jackson and Lodge, op. cit.

Box 2: The Spanish provisioning system

The favourable economic environment in Spain over recent years has led to an improvement in banks' asset quality and, in most cases, this has resulted in a reduction in loan loss provisions. The Bank of Spain was concerned that as banks' loan portfolios continued to expand, partly because of a low interest rate environment, loan loss provisions were not keeping pace with potential credit losses latent in new lending. Consequently, the Bank of Spain introduced a new 'statistical' provisioning method which came into effect in July 2000¹.

The idea behind the new arrangements is to recognise (expected) losses reflected in interest margins on loans as an accounting expense over the loans' lifetime, so that this is matched with the recognition of interest income in the P&L account. A 'statistical provision' has been introduced (as part of the general provision²) that is built up in good times and drawn on in bad times. The provision is 'dynamic' because it increases when specific provisions (ie actual losses) for a year are lower than expected credit losses, and it is used to set against specific provisions in years when specific provisions are higher than expected credit losses.

The statistical provision is subject to an upper limit of three times the level of annual provisioning and is not tax deductible. Generic provisions (some of which are tax deductible) are a fixed percentage of outstanding amounts³. The statistical and generic provisions are not included in banks' regulatory capital.

The statistical provision may be calculated using a bank's own internal models or by a standard method. The former uses a bank's own loss experience to determine the provision using historical data and a bank's assessment of future changes in credit risk. The regulator must verify that the models used represent a proper system of credit risk measurement

and management. There is also a standard method that divides loans into six categories, varying from 'without risk' to 'high risk'. Each category is allocated a risk weight (Table A) by the Bank of Spain that reflects the average net specific provision over the economic cycle based on experience during the period 1986–98. The credit exposure is multiplied by the relevant risk weight to derive the provision for expected credit losses in the period. Currently, the standard method is the one most widely used by Spanish banks. Spanish banks are required to disclose in the notes to their accounts the level and movement of the different classes of provision, and to set out the methods used for calculation of the provisions.

Table A:
Risk weighting of loans

Credit risk	Risk weighting per cent
Without risk	0.0
Low risk	0.1
Medium/low risk	0.4
Medium risk	0.6
High/medium risk	1.0
High risk	1.5

Source: Fernández de Lis et al (2000).

Once the expected credit losses have been calculated, they are charged against income on a quarterly basis. The charge is the difference between expected credit losses (as measured by the statistical provision) and the actual net charge for specific provisions in the quarter. If net specific provisions exceed expected losses, then an amount will be deducted from the accumulated statistical provision fund, as long as there is an available balance. Therefore, the charge for specific provisions that arises when loan impairment occurs is made against the provision for expected credit losses that year and – if necessary – the statistical fund established in previous years. This reduces year-to-year fluctuations in a bank's profit, with the provisioning charge reflecting average expected loss experience, not just current experience.

1: See, for example, Fernández de Lis et al (2000) and Fitch Ratings (2000).

2: General provisions are defined as the generic provision (see below) plus the statistical provision.

3: The percentages are zero for public sector and credit institution exposures; 0.5% for most mortgages; and 1% for other risks.

reconsidered at the same time as loans are routinely reviewed for impairment, that is on an annual, semi-annual or quarterly basis. But it would be important that such a review did not undermine the principle that expected loss estimates should be forward-looking over the horizon to maturity of the loans in question. If expected loss estimates for each period largely reflected actual loss experience at that time, a dynamic provisioning approach would not be very different from historic cost accounting.

One challenge for banks would be to distinguish fluctuations in actual loss experience caused by either macroeconomic conditions or idiosyncratic factors from structural shifts that could have implications for the appropriate level of expected loss provisioning.

Should estimates of expected loss be formed for individual loans or for portfolios of loans? In estimating expected losses for pools of fairly homogeneous loans, such as retail facilities, a portfolio approach might be more appropriate, although even then it might be helpful to break a retail book down into behaviourally similar items, such as mortgages. For larger, more idiosyncratic loans, it might be necessary to consider them individually in order to build up a view of expected loss.

How should commitments to lend be treated?

Banks' books comprise not only loans already advanced but also irrevocable commitments, such as traditional committed facilities for bank and corporate counterparties as well as back-up facilities for commercial paper programmes. For UK banks, total committed lines are equivalent to some 25% of their on-balance-sheet assets. It could be argued that commitments should not be taken into account, because they may not be drawn, and until they are they do not produce an interest income stream to be 'matched' against expected losses¹³. On the other hand, commitments are particularly likely to lead to losses in a downturn, as firms experiencing liquidity difficulties or other forms of financial stress are especially likely to draw down on bank lines. This could suggest establishing dynamic provisions against commitments. It might be possible to treat

commitments in a framework that recognised that they are an option on borrowing¹⁴, but a more straightforward approach might be for banks to use a framework similar to the Exposure at Default (EAD) methodology in the IRB approach in the new Basel Accord. This requires banks to estimate what proportion of a facility would actually be drawn at the time a loss is incurred.

What should be the treatment of general provisions? the treatment of tax? and what might be the implications of implementation by accounting standard setters, or by regulators alone? Given that general provisions are often described as being made against losses already present in the book *but not yet specifically identified*, these would seem to be included in the concept of expected loss. 'General provisioning' would therefore be absorbed into dynamic, expected loss provisioning.

In most countries, *specific* provisions are tax deductible (though in the US, deduction can be made only at the charge-off stage). But in some countries, for example the UK, general provisions are not tax deductible. Were it to be agreed that banks' income is more appropriately measured net of expected losses, then in principle that measure could be considered for use in calculating taxable income. This would involve a material change to tax rules in some countries, and the tax authorities would need to be assured that it did not open up scope for banks to manipulate their tax liabilities.

If accounting standard setters were reluctant to adopt dynamic provisioning in bank financial statements, it would nevertheless be open to bank regulators to adopt it unilaterally. In essence, this would involve a supervisory buffer for expected losses being established in addition to required regulatory capital. If that were done, there would be a case in the interests of transparency for banks to publish financial reports that included the regulatory view as well as data drawn up according to the accounting standards¹⁵.

Profit smoothing

It is possible that dynamic provisioning could render banks' accounts – and especially their loss experience

13: Although they do produce a stream of commitment fees.

14: Strictly, an option for a borrower to put a loan to the bank.

15: In banks' published financial statements, contributions to the dynamic provisioning buffer could be presented as an appropriation of retained earnings to a non-distributable balance sheet reserve.

– less transparent, because banks' income would for the most part be measured net of expected, rather than actual, losses. In the extreme, expected loss estimates could be manipulated to smooth profits between years, for example by increasing estimated expected losses during periods when income was especially high. Any such manipulation of profits would make it harder for investors and depositors to assess a bank's financial condition, and would also be a concern for the tax authorities.

It would, however, be possible to build a number of checks and balances into a dynamic provisioning approach. These could be in line with standards set out in the new Basel Accord for banks' use of data on probability of default and expected loss¹⁶. The key requirement would be that such estimates of expected loss should reflect relevant historical experience and empirical evidence, although, as in the Accord, the standards could also address issues such as the use of models, documentation and data maintenance, and – importantly – the overall corporate governance arrangements within which estimates are formed, assessed and modified. Furthermore, as Pillar 3 of the new Accord envisages in the context of regulatory capital calculations, it would also be possible to require disclosure of *ex ante* estimates of expected loss and *ex post* loss outturns. This would provide insight into the reliability of expected loss estimates used by banks.

In addition, within banks' financial statements, it would be possible to require that details of entries for expected losses, in addition to actual losses, be shown explicitly on the face of the balance sheet and income statement. This would deliver a high level of transparency regarding the impact of dynamic provisioning on banks' financial results.

Conclusions

There would be merits in considering the introduction of dynamic provisioning for banks generally. Doing so might reduce the artificial volatility in banks' income which can arise from a timing mismatch between margin income being earned to cover expected losses and losses actually crystallising.

The aim would not be profit smoothing – to which accounting standard setters and securities regulators rightly object. On the contrary, genuine volatility in a bank's business would continue to be recorded as

such, for instance arising from large *unexpected* credit losses. Determining long-run expected losses for different loans/portfolios does involve elements of subjective judgement, but that is unavoidably true of other aspects of accounting standards, including current provisioning standards.

A crucial factor in the success of any system would be the reliability of banks' estimates of longer-term expected losses, which has not yet been systematically tested. Banks' experience in preparing for the introduction of the new Basel Accord may provide the authorities with evidence on the accuracy of banks' expected loss estimates and how these might translate into a dynamic, expected-loss provisioning system.

16: The latest draft of the detailed standards is BCBS (2002).

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Renewing confidence

in the markets

Sir David Tweedie, Chairman, International Accounting Standards Board

Enron, WorldCom, and other prominent corporate and accounting disasters demonstrate the devastating effects that diminished investor confidence can have on capital markets and provide proof that the financial reporting system needs improvement. Markets punish uncertainty, and sustained investor fears regarding the quality of financial reporting and corporate governance will have damaging long-term economic effects – in terms of economic growth, job creation, and personal wealth.

ALREADY, INDIVIDUAL INVESTORS, who through the 1990s had put increasing faith in equities, have lost large portions of their savings. Corporations are finding it more difficult and costlier to go to the markets for capital. With economic performance weak, governments have a reduced tax base and are facing budget constraints to pursue fiscal priorities. While it would be incorrect to suggest that the corporate failures in the United States are the only causes of the bear market, it is also clear accounting and corporate scandals played a role in exacerbating the current fragile economic situation, and diminished confidence in the capital markets imposes one of the major impediments to economic recovery.

US symptoms, global stakes

Many government officials and market participants in Europe and elsewhere have drawn some comfort that there has not been the volume or scale of scandals that have beset the United States. My experience as a practising auditor and as a professional standard setter over the last two decades leads me to believe that the collapse in confidence in corporate reporting is not exclusively a US issue. Companies today are global players, compete against each other for the same pool of capital and face the same business pressures. Most multinationals, US-based and otherwise, must set performance objectives, observe each other's activities, and implement similar practices to ensure that their competitor does not have a competitive advantage. And in many areas outside the United States, the accounting literature remains incomplete or insufficient to address the complexities of the modern market. For example, currently there is no national standard in Europe that addresses accounting for financial instruments in a

comprehensive fashion, even as the use of derivatives proliferates among all corporate sectors. Therefore, it would be unwise for countries outside the United States to ignore the need to improve accounting practices.

We are at a critical phase in the development of global capital markets in which many countries have invested significant efforts and have large economic interests at stake. Instead of shrinking from the current challenge and tough decisions required, developed economies must now practise what they have preached, or risk damaging the credibility of capitalism. One should remember in the aftermath of the Asian financial crisis, the developed economies and international institutions argued that the affected economies would not have been so vulnerable if they had tougher accounting standards, bolstered by effective corporate governance and auditing in place. If needed reforms in major capital markets do not occur, we will only strengthen the case of those questioning the acceptability of global financial markets. Governments responsible for emerging and transition economies may be tempted to use the recent US scandals as an excuse to put off the difficult reforms necessary to implement a strong financial reporting structure. Now there exists a clear impetus to improve financial reporting systems, as an essential element of ensuring the effective functioning of global capital markets and the economy at large.

The pillars of financial reporting

Good financial reporting rests on three pillars:

1) accounting standards that are consistent, comprehensive, and based on clear principles to

enable financial reports to reflect underlying economic reality; 2) accounting and auditing practices and policies that are able to translate those standards into accurate, understandable and timely reports by individual public companies; and 3) a legislative and regulatory framework capable of ensuring that the principles as laid out by the accounting standards are followed.

In the midst of an unprecedented economic boom the United States saw the erosion of all three pillars. US corporate scandals demonstrated that in certain respects, US generally accepted accounting principles (GAAP) were not infallible, the audit firms became less accountable to the investing public, and the US Securities and Exchange Commission (SEC) was overwhelmed by the broad deterioration of corporate and audit discipline – which to some extent was fuelled by perverse compensation incentives and a corporate culture that increasingly saw wealth as an entitlement, whatever the costs. The situation is similar in other jurisdictions.

Because of my role at the International Accounting Standards Board (IASB), this article focuses solely on the issue of accounting standards. But good standards alone are not sufficient. They must be supported by audit integrity and strong enforcement.

It is clear now that many of the accounting problems have resulted because certain companies acted outside the existing accounting standards and, sadly, their auditors have been deceived or forgotten that their client is the investor, not the CEO. However, when the regulations are bent or manipulated repeatedly, standard setters must ask whether there are lessons to learn and whether the standards are sufficiently tough to discourage abuse.

This is not the first time we have witnessed a collapse in confidence in corporate reporting. There are clear parallels between today's crisis and the one faced by the United Kingdom in the early 1990s. Companies such as Coloroll and Polly Peck suddenly collapsed. To restore confidence in the quality of financial reporting, the UK Accounting Standards Board (ASB) was established. The ASB believed that the only way to deal with the accounting scandals was to set the highest quality standards. In the process ASB brought long-hidden liabilities back onto balance sheets. It stopped manipulation of the income statement by abolishing 'acquisition' and 'big bath' provisions. The

so-called 'extraordinary' item used to massage earnings per share was banned. These changes were introduced in the face of significant opposition from some in industry and the accounting firms. The easy thing would have been to compromise on the most controversial issues of the day – making incremental changes at the expense of quality in order to please various interested parties. The ASB did not, and the UK markets recovered. The only way to win back the faith of the markets is to avoid shocks – full transparency not obfuscation is the answer to lack of confidence in accounting.

Standard setters must show a willingness to listen and change positions when arguments warrant change. Moreover, the governments who have placed their confidence in independent, private-sector standard setting must be willing to back the proposals and withstand pressure from the many interests who undoubtedly will oppose change on the basis of self-interest alone. There are always many interests at stake, and proposals will necessarily be unpopular, particularly in the absence of any unified voice to represent the individual investor. Recent events demonstrate what can happen when standard setters are unable to stand by their convictions and are forced to compromise on political grounds. During the 1990s, the US Financial Accounting Standards Board (FASB) proposed to expense employee stock options. Armed with large funds and political connections, the opponents succeeded in getting the US Congress to stop the FASB from requiring companies to count employee stock options as expense. The result was the proliferation of a practice that many now believe provided an incentive for management to manipulate earnings for personal gain. Standard setters are not always right, but creating accounting standards to reflect political pressures rather than economic reality will nearly always provide the markets with an inferior result.

Accounting standard setters themselves can eliminate some of the opportunities for manipulation if they craft standards based on clearly articulated principles and avoid overly detailed guidance. Accounting standards that rely upon detailed guidance encourage a rulebook mentality of "where does it say I can't do this?" This attitude is counter-productive and helps those who are intent on finding ways around standards more than it helps those seeking to apply standards in a way that gives useful information. Put simply, adding the detailed guidance may obscure,

rather than highlight, the underlying principle. The emphasis tends to be on compliance with the letter of the rule rather than on the spirit of the accounting standard.

There has been much debate on the topic of principles-based standards among standard setters and in the media recently. A growing consensus has emerged on the need to move toward a principles-based approach, without defining what this approach would be, both in the United States and internationally at the IASB, which I now chair. Therefore, the IASB has determined that it will draft standards that are conceptually-based and grounded on robustly identified principles.

Ultimately, businesses and auditors will get the standards that they deserve. Accounting principles are meant to guide the presentation of underlying economic reality of a company's performance. If companies and auditors use the principles-based approach as a way to skew reality, are unwilling to use judgment or demand greater detailed application rules to avoid lawyers second guessing auditors in court, then standard setters are compelled to respond, inevitably by creating additional rules. One should remember that US GAAP is based on principles, but also incorporates significant guidance. This is a product of the environment in which US standards are set. Simply put, US accounting standards are detailed and specific because the FASB's constituents have constantly asked for detailed and specific standards.

A way forward

There is a clear need to continue to modernise the existing accounting model. As technology advances, business practices change, and lessons are learned from experience, accounting standards must evolve – all in the hope of providing investors with more accurate and useful financial information. In recent years, accounting has failed to keep up with the pace of change of the global economy. This is partly due to the fact that accounting has only gradually moved away from the traditional cost-based model developed for the economy of the post-Industrial Revolution era to one relying more on real-time market values, more appropriate for a modern service-based economy. Another problem is that capital flows freely across borders but accounting rules still vary largely by national jurisdiction. This reduces the comparability of financial statements. The likely result is that

investors fail to allocate their capital in the most efficient manner.

All this is changing, and the current crisis affords us the opportunity to create modern accounting rules that can be applied globally. The IASB, which was reconstituted in 2001, has that precise mandate. I believe the current crisis only reinforces the basic mission of the IASB – to create a single set of high-quality, enforceable global accounting rules for use by the world's capital markets.

In the aftermath of the US accounting crisis, support among US regulators, policymakers, and businesses has mounted for a process of international convergence of accounting standards. This is a significant and positive development, culminating in a historic agreement between the FASB and IASB to remove differences between the two sets of standards. The FASB recognises that no individual standard setter has a monopoly on the best solutions to accounting problems. Taken as a whole, US GAAP may be the most detailed and comprehensive in the world. However, that does not mean that every individual US standard is the best. For that reason, the IASB, FASB, and other national standard setters are working together. Our joint aim is convergence to the highest quality solution among existing standards as the global standard.

Working together, standard setters will be able to move towards an appropriate set of accounting principles for a modern, globalised economy. In the short term, that means the IASB is working with national standard setters throughout the world to eliminate differences in existing standards by agreeing the highest quality approach to the particular accounting issue addressed. Through this convergence project, the IASB and national standard setters will resolve many relatively minor differences in standards that may lead to rather different financial results for similar economic transactions. The short-term convergence program should give us a common base from which to proceed.

At the same time, the IASB and partner standard setters are tackling some of the fundamental challenges facing accounting today in order to make the accounting model relevant. For too long, some accountants have sought to provide results as they wanted them to be, not as they are. In this light, earnings have been smoothed in an effort to show investors a steady upward trajectory of profits. While

this approach provides a simple and understandable model, it is simply not consistent with reality. Publicly traded companies are complex entities, engaged in a wide range of activities and subject to different market pressures and fluctuations. Accounting should reflect these fluctuations and risks. The focus on providing a steady stream of earnings only distorts the picture and encourages practices that run counter to the aims of providing investors with accurate information.

The current direction we are taking will be what I like to call, 'tell it like it is' accounting. This means an increasing reliance on fair values, when these values can be determined accurately. Financial results therefore may become more volatile. However, hiding the truth from investors will only make the shocks that markets receive more severe.

The implication of this transformation in accounting is great. Assets and liabilities, when obligations exist, will be brought back on the balance sheet. The last 20 years have seen a number of attempts by companies to remove assets and liabilities from balance sheets through transactions that may obscure the economic substance of the company's financial position. This is particularly the case in four areas that warrant mention, each of which has the potential to hide the extent of a company's financial position. Companies can use all or any of the following: leases, securitisations, unconsolidated entities (special purpose entities), and pensions. These all represent legitimate operating practices, but it is also the case that in most cases the risk entailed is not recognised fully on the balance sheet of the company. When an obligation must then be met, investors can be caught by surprise.

No case can be potentially more damaging in the long run to the health of the economy than the existing treatment of pensions. Under existing standards in many jurisdictions (including existing international standards) a company's obligation to a defined benefit pension plan is reported on the company's balance sheet. However, the amount reported is not the current obligation, based on current information and assumptions, but instead represents the result of a series of devices designed to spread changes over several years.

While I was chairman of the ASB it introduced a new standard on pensions (FRS 17) that provides an

example of how accounting standard setters might deal with the issue. This standard requires the change in the pension deficit or surplus to be reflected in the statement of recognised gains and losses annually, removing all smoothing mechanisms. The basic premise is that the pension surplus or deficit should be shown in the balance sheet for investors, employees, and management to see. In this manner, management has the opportunity to explain whether they can meet their pension obligations and those employees dependent on this guarantee can see whether it will exist upon retirement. I believe this is an example of the direction in which accounting must move.

Standard setters will seek to recognise all expenses in financial statements, because disclosure is no substitute for good accounting. Failing to recognise expenses that clearly exist distorts the financial picture of corporations, and makes decision-making difficult for investors. One example of this is the case of share-based payments. Under existing accounting standards in some jurisdictions, a company that pays for goods and services through the use of its own stock, options on its stock or instruments tied to the value of its stock may not record any cost for those goods and services. The most common form of this share-based transaction is the employee stock option. As mentioned earlier, the FASB was forced to accept a disclosure-based solution for stock-based employee compensation to bring closure to the divisive debate on this issue – not because it believes that solution is the best way to improve financial accounting and reporting. Most jurisdictions do not have any standard on accounting for share-based payments, and the use of this technique has been growing outside the United States. The use of share-based payments has varied widely across industry sectors and countries. A recent report by Bear Stearns estimates that because share options go unreported, in 2001, companies in the US Standards & Poor's 500 Index overstated profits by 12% and US application software firms overstated profits by 101%. It is not surprising that capital rushed to technology firms in the late 1990s. The proliferation of share options makes decision-making difficult for investors and those concerned with the management of the economy, and can lead to the misallocation of capital toward sectors that overestimate profits.

The IASB, therefore, recently released an exposure draft that requires the expensing of all share-based

payments. We do not make a judgment whether share-based payments are good or bad. That is a choice for investors and management. What we do wish, however, is to provide investors and management with the ability to assess fairly the decision to use these forms of payment. We are now seeking comment as to how to measure share-based payments accurately, but we are convinced that financial reporting will be greatly enhanced if this form of payment is recognised.

Finally, this shift in the accounting model means the current focus on the bottom line earnings figure is misplaced. Financial reports should reflect the complexity of a company's financial performance, including the volatility introduced by return assets and liabilities to balance sheets and by the move to market values. Companies have increasingly turned to *pro forma* reporting to convey information. For many, the use of *pro forma* accounts is a way to obscure results produced by accounts prepared according to accounting standards. However, this development reflects the fact that investors find different types of information useful and that the existing income statement is not sufficient. Investors are looking for information regarding a company's operating performance in core businesses, as well as the effect of the firm's changing capital structure on a company's financial position. The IASB and the FASB are therefore working together to develop a new statement of financial performance that would provide consistent rules to display operating and financial performance, while displaying fluctuations introduced by market values in a useful fashion.

Navigating the challenges ahead

It is not surprising that any systemic change generates much controversy with the many interests at stake. The IASB will carefully consider all views on every issue. However, too often in the past, threats and political interference have sought to stop standard setters implementing their conclusions made after a deliberative process.

There are reasons to be optimistic about our chances for success at the IASB. For the first time, the IASB has the official backing of national governments of major economies throughout the world. The European Union has announced that it will require the great majority of publicly-traded companies in the Union to use international standards for their consolidated accounts by 1 January 2005, and the

remaining publicly-traded companies by 2007. Australia and many of the Central Asian republics have recently followed with similar announcements. The US SEC recently announced its strong support of the IASB and FASB's agreement on convergence and has signalled that it may reconsider the reconciliation requirement for companies that implement the improved international standards properly.

Success will not be easy and will require the IASB to listen to the variety of opinions expressed throughout the world. The IASB has established internal processes to ensure that we receive the best thinking. This includes meeting with a 49-member advisory council, creating issue-specific advisory groups, and adhering to procedures that require public comment on proposals.

Keenly aware that the market needs assurance and not compromise on ill-considered solutions, the IASB and national standard setters should and will proceed with what we believe is right. If we succeed, capital markets will have a single set of global accounting standards in which they can trust. Confidence will be enhanced and the opportunities for rational global investment decision-making and growth increased. This is the opportunity of a lifetime to select the best of the national standards and make them the world's standards. Accounting is the foundation stone of the market economy. We must ensure that the global market's view of companies throughout the world is founded on a single, solid base.

Is there still magic in corporate earnings?

Fabio Cortes and Ian W Marsh, G10 Financial Surveillance Division, and Michael Lyon, Domestic Finance Division, Bank of England¹

This article surveys different earnings measures from the perspective of equity market valuations in the UK and the USA. It reviews three commonly used financial accounting definitions: reported, operating and *pro forma* earnings. These measures are then compared with national accounts-based measures of aggregate corporate earnings. The strengths and weaknesses of each measure are considered together with their implications for equity market valuations.

THE RELIABILITY OF ACCOUNTING MEASURES of corporate performance was widely questioned after the Enron bankruptcy in December 2001; indeed, the recent decline in equity values has been attributed partly to this factor. As investors perceived an increase in accounting-related information risk, they demanded higher rates of return in compensation. This article provides an overview of earnings definitions and measurement from the perspective of equity market valuation. It does not delve deeply into valuation methods but relies on one of the simplest and most commonly used measures of equity value, the price/earnings ratio. Vila Wetherilt and Weeken (2002) provide a discussion of this and other valuation metrics.

The use of earnings in equity valuation

Black (1980) wrote provocatively of the ‘magic in earnings’². Economists, he claimed, argued that earnings should be related to the change in the value of a company. Sir John Hicks (1939), for example, considered economic earnings to be the amount that can be consumed (ie distributed to owners) without leaving a company worse off. Black argued that security analysts wanted an earnings figure they could multiply by a standard price/earnings (P/E) ratio to give an estimate of value. Even though accountants had not formally recognised the goal of having an earnings figure that measured value, they had done a good job in achieving this. His evidence was the fact that the variability of book value³ to price ratios was

greater than the variability of earnings to price ratios, both across stocks and over time. This suggests that earnings, while a flow measure, when multiplied by the right ratio could provide analysts with a better estimation of a firm’s value than book value; and that is ‘the magic in earnings’ (Box 1).

An alternative approach to equity valuation is to discount expected future cash flows. Indeed, in this Review we make use of one variant, the discounted dividend model, in assessing the level of equity markets. To be useful in valuing a stock, then, the earnings figure must ideally incorporate all currently known information about the level of future cash flows. This would allow the analyst either to discount the predicted stream of future cash flows by the appropriate interest rate, or to multiply current earnings by the appropriate P/E multiple to obtain a stock’s valuation⁴. The key issue is to identify the measure of current earnings that best represents the stream of expected future cash flows.

The convergence of accountants’ and economists’ views on earnings is reflected in the (limited) moves to include gains and losses due to changes in asset prices (marking-to-market) in the earnings statement in the period in which they occur. Unfortunately for security analysts, this makes official earnings figures an erratic and noisy signal of future cash flows. Managers have more freedom when preparing unofficial earnings numbers. The judicious use of

1: The authors would like to thank members of the Editorial Committee, Hugh Aldous, Peter Gibbard, Seamus MacGorain, David Wall, Olaf Weeken and Stephen Wright for contributions and comments.

2: Hence the title of this article.

3: Book value of a firm’s equity capital stock, ie the difference between the firm’s assets and liabilities measured at historical cost.

4: The uncertainty of future cash flows would be reflected in the discount rate or P/E multiple.

Box 1: The magic in earnings

We update the work by Stickells (1980) that led Fischer Black to write of the magic in earnings. For the years 1991 through 2001 we collect the stock price, book value of equity capital, Standard & Poor's (S&P) core earnings and reported earnings for the 387 companies currently in the S&P 500 with data available for the entire period. Since both book value and earnings may be either small or negative, we calculate (core and reported) earnings to price ratios and book value of equity capital to price ratios for each firm. For each calendar year we divide each of the three ratios into quartiles. We call the dividing lines between quartiles 'the lower hinge', 'the median' and 'the upper hinge'. We define the standardised hinge spread to be the ratio of the upper hinge minus the lower hinge to the median. This standardised hinge spread is a measure of the cross-section variability of the various ratios, and is similar in spirit to the coefficient of variation (standard deviation divided by mean).

Our results are given in the above table. In Stickell's original study, for each of the years between 1967 and 1978 the standardised hinge spread of the earnings to price ratios was less than that of the book to price ratios. This is no longer true. Both at the

Table A:
Standardised hinge spreads

Year	Book-price	Core E-P	Reported E-P
1991	0.886	0.966	1.046
1992	0.842	0.718	0.946
1993	0.845	0.744	0.856
1994	0.865	0.645	0.728
1995	0.817	0.613	0.735
1996	0.825	0.599	0.645
1997	0.813	0.644	0.643
1998	1.103	0.922	0.913
1999	1.190	1.235	1.199
2000	1.063	0.963	0.960
2001	0.916	1.291	1.184

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

start of the 1990s and at the end of our sample, standardised hinge spreads of core and particularly reported earnings to price ratios were close to or exceeded that of the book value to price ratios¹. Interestingly, a similar exercise for 100 selected UK companies reaches the opposite conclusion. The standardised hinge spread for reported earnings to price ratios is lower than that of the book to price ratios in each year between 1991 and 2001.

These results are supportive of the studies cited elsewhere in this article that find US equity prices are now less closely associated with reported earnings. Maybe the magic has gone from US earnings.

1: Lie and Lie (2002) also find that the market price to book value of assets ratios for US corporates generated less biased estimates than their earnings multiples during the 1998 fiscal year.

exclusions and exceptions can transform official earnings into a measure that is a good proxy for the stream of future cash flows⁵. The rest of this article describes alternative measures of corporate earnings with a view to their use in assessing the value of equity markets.

Financial accountants' measures of earnings

Much of the debate about earnings measures has focused on three widely used alternatives: reported, operating and *pro forma* earnings.

Reported earnings

'Reported earnings' are arrived at net of all charges, in accordance with generally accepted accounting principles (GAAP). It is also the broadest measure of

earnings, since it includes earnings from both operating and non-operating items. Table 1 shows a typical preparation scheme for reported earnings.

Table 1:
Reported earnings

Operating revenues
Less cost of goods sold
Less selling, general and administrative expenses
Less depreciation expense
<i>Equals earnings before interest and taxes (EBIT)</i>
Less net interest expense
Less amortisation expense
Less net pension expense
Plus net dividend income
Plus net royalty income
<i>Equals income before taxes</i>
Less taxes
<i>Equals reported earnings or reported net income</i>

5: Statistical smoothing techniques such as the use of long trailing averages provide an alternative way of reducing the (cyclical) volatility of earnings. However, they risk contaminating recent information with outdated data.

The reported earnings figure is the traditional measure of earnings and has long been used by company analysts. However, it is sometimes viewed as unstable and not representative of the core operating performance of the company. Reported earnings can include gains or losses arising from asset sales and several special charges, including write-downs on continuing operations, that need not necessarily relate to current period earnings. For example, an impairment of intangible assets may be reported in the period in which it is recognised, but the economic reality may be that such an impairment accrued over several preceding periods.

Management reaction to earnings volatility

Equity prices react significantly and rapidly to earnings announcements since they are a signal, noisy or otherwise, of future earnings. Managers realise that even small negative earnings surprises can result in large negative stock returns, and earnings management techniques have evolved to combat this volatility. The most basic technique is to manipulate the actual earnings figures where accounting standards give sufficient discretion to management and auditors. While international accounting statements define principles as to what can and cannot go into official profit and loss accounts, there remains considerable scope for judgement as to the actual figures⁶. More recently, earnings management has expanded into the management of the perception of earnings. This takes two main forms – the management of expectations and the management of the earnings number on which investors focus. In the USA the release of earnings figures not produced according to GAAP, and presented as being more representative of the true position of the company, is now a pervasive technique. From the late 1980s there has been a marked increase in the number of US firms identifying significant portions of their expenses as non-recurring, in the exclusion of certain expenses from the earnings numbers reported by tracking services used by analysts (eg I/B/E/S or First Call), and in the disparity between earnings under US GAAP and the (non-GAAP) version of earnings followed by analysts⁷. A task force constituted in October 1999 by then SEC Chairman Arthur Levitt supported these moves, concluding that US GAAP-based disclosures did not provide adequate

information to assess company value, particularly in dynamic, high-growth industries.

Reported earnings and market values

The benchmark of a good measure of earnings considered above was that it should contain all information relevant for forecasting future cash flows and hence for valuation. Several academic studies have noted a decline in the closeness of the statistical relationship between reported earnings and equity prices, which may be interpreted as a fall in the 'value relevance' of this earnings measure. Collins, Maydew and Weiss (1997) report that while the value relevance of reported earnings has fallen over the past forty years for US companies, the combined relevance of reported earnings and book values has slightly increased. Brief and Zarowin (2002) compare the value relevance of book value and reported earnings with book value and dividends. Overall, they find that the pairing of book value and reported earnings has a slightly higher explanatory power than book value and dividends, suggesting that reported earnings are (marginally) more correlated with future cash flows than are dividends. More recent research, however, has pointed to increased value relevance of non-audited measures, suggesting that managers have successfully refocused investors' attention on modified earnings measures.

Operating earnings

'Operating earnings' are one such measure and are usually calculated as reported earnings, but without the deduction of some 'non-recurring' or 'non-cash' charges. As such this measure could be a useful aid to the valuation of a company, and companies generally defend their definitions of operating earnings as providing better measures of future prospects. Such adjustments can be very significant. For example, AT&T reported 2001 Q4 operating earnings which excluded restructuring charges, asset impairment charges, losses on the sale of businesses and assets, goodwill amortisation and losses on equity-method investments. This turned US GAAP-based losses of 39 cents per share into operating profits of five cents per share (so that AT&T beat the consensus estimate by one cent). A *Wall Street Journal* study (21 August 2001) suggested that for every dollar of operating earnings reported by S&P 500 companies in the

6: For example, the choice of period over which an asset should be depreciated is in the hands of the company accountants. Beattie, Fearnley and Brandt (2002) discuss the practice of audit in the UK.

7: More than 300 companies in the S&P 500 exclude some expenses defined as ordinary under US GAAP from the earnings numbers they supply to investors and analysts (*Wall Street Journal*, 21 August 2001).

preceding three months, 60 cents represented costs deemed to be expenses under US GAAP which had been excluded from the operating profit calculation. Since it is a concept not governed by accounting standards, operating earnings are not comparable across companies (or time) and the calculation is open to abuse.

Pro forma earnings

Some of the more questionable versions of operating earnings have been described as '*pro forma*'. Originally *pro forma* financial statements were used to allow for comparisons of results when an extraordinary event such as a merger had occurred between reporting periods. The *pro forma* numbers would allow analysts to look at the performance of companies 'as if' they had been operating together for several years when assessing likely future performance⁸. More recently, however, some companies' *pro forma* earnings have been calculated 'as if' certain proper expenses need not have been charged against earnings. It is rare for corresponding revenues associated with non-cash transactions to be similarly excluded. *Pro forma* earnings have been nicknamed EBS ('earnings before bad stuff') by Lynn Turner, formerly Chief Accountant of the SEC.

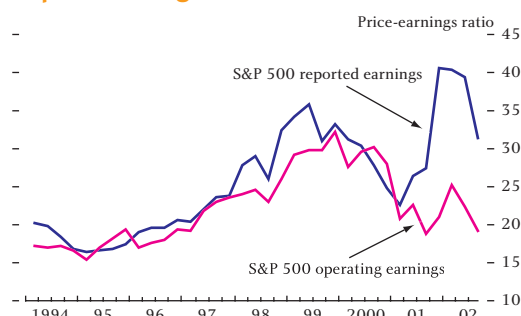
Some further observations

Adjusted numbers presented as improvements on the reported earnings numbers can therefore be considered to lie on a spectrum. At one end, the adjustments may properly remove the effect of items such as one-off events that are not helpful in estimating the likely future earnings of the company. At the other extreme, the adjustments may induce systematic and misleading biases to earnings measures. Such abuses have prompted action from regulators and US Congress. Despite supporting the disclosure of non-US GAAP earnings figures following the conclusions of its task force, on 4 December 2001 the SEC issued cautionary advice to companies and investors regarding the use of *pro forma* financial information. The New York Stock Exchange proposed on 6 June 2002, among other reforms, that the SEC require companies to report complete US GAAP-based financial information before any reference to *pro forma* information. Finally the Sarbanes-Oxley Act makes full reconciliation of *pro forma* financial figures to US GAAP compulsory.

Implications for equity market valuations

These adjustments can be significant from a valuation perspective. The P/E ratio is a commonly used benchmark for assessing the value of equities and is based on the assumption that it tends to revert to an equilibrium level that is captured by an historical average. Chart 1 plots P/E ratios for the S&P 500 using both reported and operating earnings as the denominator.

Chart 1:
US price-earnings ratios^{(a)(b)}



Source: Thomson Financial Datastream.

(a) Reported earnings as produced by Standard & Poor's.

(b) Operating earnings are the I/B/E/S estimate of net income from continuing operations and refer to the last reported annual earnings.

The difference between P/E ratios using reported and operating earnings is marked for the S&P 500. At the end of September 2002, the operating P/E ratio – using S&P data – stood at 19.2 while the reported earnings-based P/E was 31.4.

It should also be noted that even when using the same concept of earnings, different data suppliers can provide significantly different earnings numbers. For example, in July 2001 the Financial Accounting Standards Board (FASB) issued Rule 142 relating to how goodwill is valued. Firms are no longer required to amortise the value of goodwill. Instead, they must review annually whether goodwill has decreased in value or become impaired and, if so, write it down to its fair value. Post FAS 142, neither Datastream nor Standard & Poor's deduct the impairment of goodwill in computing reported earnings, since they do not consider it a cost expended in the creation of revenues. However, while Datastream provide a reported earnings figure before goodwill amortisation, Standard & Poor's still includes any amortisation of goodwill left after the impairment

8: This use is consistent with, for example, UK listing rules. Rule 12.29 requires companies to present information about the impact of a merger 'by illustrating how that transaction might have affected financial information presented in the document, had the transaction been undertaken at the commencement of the period being reported on'.

charge in their measure of reported earnings. Hence, post FAS 142, the Standard & Poor's measure of reported earnings fell quite sharply relative to Datastream's measure. More significantly, Datastream, unlike Standard & Poor's, does not include negative earnings from individual companies in their calculation of earnings aggregated across companies. Both factors make aggregate reported earnings from Datastream higher than the Standard & Poor's figure (the latter are used throughout this article). The end-September P/E ratio using Datastream reported earnings data was 21.0.

Excluded expenses and future cash flows

As already indicated, from a valuation perspective the exclusion of non-recurring items in calculating operating earnings may in principle be valid and helpful. The intention of the definition of operating earnings is to represent the sustainable earnings of the company. Management might believe that they have the best understanding of the company and, if allowed the freedom to include or exclude items in preparing non-standard accounts, should be able to give their own best estimate of sustainable earnings. However, since the interests of managers, on the one hand, and of the analysts and investors trying to value the company, on the other, are rarely aligned, this benign outcome is by no means guaranteed.

Management's judgement about what is and what is not relevant to the core performance of a company has been empirically tested. A study by Doyle, Lundholm and Soliman (2002) indicates that in fact the items excluded from *pro forma* earnings by US companies can be important and recurring. Based on data from 1988 to 1999, the study suggests that each dollar of exclusions (ie items included according to GAAP but excluded from *pro forma* earnings) is associated with US\$1.33 of cumulated free cash flows over the next three years, as against US\$3.71 for each dollar of *pro forma* earnings. Therefore, while the part of reported earnings not included in *pro forma* earnings is a weaker indicator of future free cash flows of the company, it is not insignificant.

Excluded expenses and market valuations

Of course, even if operating or *pro forma* earnings are highlighted in the official earnings statement, the audited reported earnings will also be included, albeit often rather less prominently⁹. A discerning capital

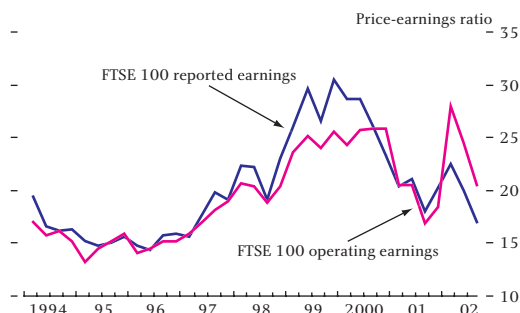
market might be expected to see through this veil and fully anticipate the effects of *pro forma* exclusions. Indeed, the same study finds that, should two similar companies report the same level of *pro forma* earnings per share, the company with higher exclusions will generate lower returns. This suggests that the stock market recognises the importance of the excluded items. However, Doyle, Lundholm and Soliman present evidence that the market does not fully incorporate their effect in the short run. Over the three years following the announcement, the firm with higher exclusions will yield cumulated returns that are up to 55% lower than for the firm with fewer excluded items. The results of this and other similar studies suggest that in the short run prices respond more to operating earnings than reported earnings, but that the market takes several years to realise the importance of the exclusions for firm value.

UK experience

Use of *pro forma* information is not restricted to the USA, but neither is it so prevalent elsewhere. According to www.companyreporting.com, just one in five FTSE 100 companies publish *pro forma* information (including balance sheets and profit and loss accounts). The most popular reasons for *pro forma* accounts being published are (i) alternative accounting methods and (ii) changes in group composition. Chart 2 plots P/E ratios for the FTSE 100, using reported and operating earnings measures. The divergence between the two is much smaller than in the USA. Moreover, operating earnings have recently been lower than reported earnings.

Chart 2:

UK price-earnings ratios^{(a)(b)}



Source: Thomson Financial Datastream.

(a) Reported earnings as produced by Thomson Financial Datastream.

(b) Operating earnings are the I/B/E/S estimate of net income from continuing operations and refer to the last reported annual earnings.

⁹: Non-audited earnings numbers are, however, often pre-released in press notices.

Since 1993, UK financial reporting has been governed by FRS3 'Reporting Financial Performance.' This has much reduced the freedom to remove extraordinary items from earnings figures, has required a distinction between continuing and discontinued operations, and has introduced a new primary financial reporting statement, the 'statement of total recognised gains and losses' (STRGL). The STRGL, together with the profit and loss account and the balance sheet, enables the resolution of the change in net equity between earnings and other gains and losses not recorded as earnings. Where *pro forma* financial reports are provided, there is often auditor involvement. Analysis by www.companyreporting.com suggests that almost half of FTSE 100 *pro formas* are either included within the scope of the auditors' report or reviewed separately. This is consistent with the stated preference of the UK Accounting Standards Board which favours an 'information set' approach that relies on the entirety of financial reporting information rather than a focus on a single figure, such as earnings. This approach of providing more and fully reconciled information perhaps partially explains the lower levels of abuse of operating earnings figures in the UK. The International Accounting Standards Board (IASB), whose standards are to be adopted for all EU-listed corporates from 2005, currently requires a reconciliation of changes in equity to gains and losses. The IASB is further co-ordinating the development of proposals to introduce an expanded income-type statement that would fully articulate with the balance sheet and changes in net equity.

Sectoral issues

In some industries, earnings, whether reported or operating, are not regarded as the best basis for valuing securities. In a PricewaterhouseCoopers survey¹⁰ of institutional investors and sell-side analysts, while earnings ranked as the most important measure in making sound investment decisions overall, managers and analysts in high-tech industries respectively ranked earnings eighth and fifth¹¹. Francis, Schipper and Vincent (2002) examine S&P Industry Reports and identify nine industries

where reported earnings are not the preferred valuation metrics¹². They generally find that the alternative metrics contain significant incremental information over earnings in explaining stock returns, but that, if limited to a single metric, earnings would still be the preferred measure in each industry. Their results support the SEC task force's view that information beyond reported earnings is valuable, but still leaves earnings as the most useful single piece of information.

National accounts-based measures of earnings

A second source of earnings information is available for the valuation of a national stock market (as opposed to a specific company). National income accounts contain estimates of the earnings of the corporate sector as a whole, usually defined as the income earned from current production by corporations. There are several differences between the construction of national accounts-type measures of earnings and earnings derived from corporate accounts. These reflect differences in purpose, definitions and method:

- National accounts figures are based on data from (almost) all publicly traded and privately held incorporated businesses, rather than just the largest companies whose shares are contained in the stock market index¹³. There is no reason to believe that the earnings of small and medium-sized enterprises should track those of the largest companies.
- The industry composition of any market index may not be representative of the economy as a whole because (a) the index can only include public companies, so that for example, construction and legal and medical services are often underrepresented, and (b) the index composition is based on market values, meaning that strong sectors are often overweight relative to the economy.
- The national accounts figures typically adopt somewhat different conventions from those which apply to published accounts. Differences in the timing of receipts and expenses and even in their

10: See Eccles, Herz, Keegan and Phillips (2001).

11: High-tech sector investors still ranked earnings first.

12: For example, they find that earnings before interest, depreciation and amortisation (EBITDA) is preferred in the Reports for valuing telecommunications companies. Cash from operations is preferred in the chemicals sector.

13: In 1998, for example, the NIPA earnings estimate was based on tax returns from 4.8 million corporates. The Inland Revenue corporation tax returns form the basis of the Gross Operating Surplus earnings estimates, covering 35,000 of the largest UK companies and one in ten of the rest (200,000 companies in total).

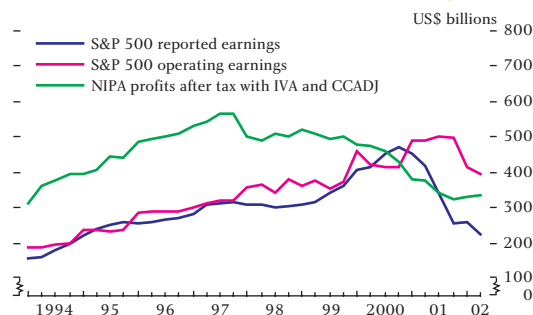
definition can arise. These can result in large short-run divergences between national accounts and financial accounts-based earnings measures.

- Differences of purpose can lead to long-term discrepancies. For example, national accounts regard debt interest as a transfer rather than a consumption of resources. In effect, then, debt interest is not included in the national accounts earnings calculations, which can be problematic.
- National accounts are often residence-based, and so include domestic output of foreign-owned companies and exclude foreign output of domestically-owned companies. Financial accounts-based earnings include all earnings generated, whether domestically or overseas, by a domestically-listed firm.
- Reported earnings are and will continue to be subject to potentially significant methodological changes from period to period as discussed above. National accounts methodologies are more stable, and when changes do occur systematic restatement of back data is provided. This is not the case with financial accounts-based measures.

Given these differences, it is not surprising that national accounts and aggregated company-level earnings can behave very differently. Chart 3 plots reported and operating earnings for S&P 500 companies together with national accounts earnings (NIPA). NIPA profits are defined as the profits of US residents and so conform to the listing-based financial accounting concept¹⁴. US national accounts-based measures of earnings should really be compared with operating earnings (since both exclude net income from financial transactions) rather than reported earnings. However Chart 3 shows that US national income-based earnings measures behave very differently from the sum of the earnings of companies in the market index, whether on an operating earnings basis or according to GAAP.

Chart 4 plots reported earnings for the FTSE 100 companies together with two estimates of private non-financial corporations' (PNFC) earnings from

Chart 3:
Reported earnings of S&P 500, operating earnings of S&P 500 and national accounts earnings^{(a)(b)(c)}



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

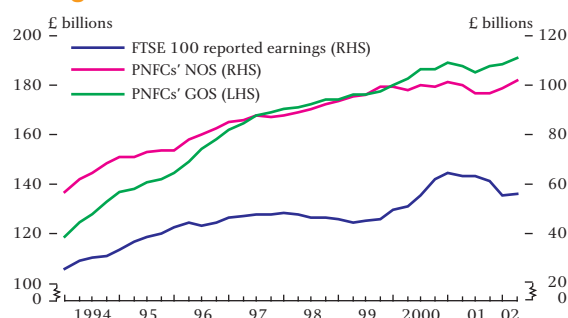
(a) Reported earnings as produced by Standard & Poor's.

(b) Operating earnings are the I/B/E/S estimate of net income from continuing operations and refer to the last reported annual earnings.

(c) NIPA profits of US corporations after tax with adjustments to inventory valuation and capital consumption. The capital consumption adjustment excludes the impact of the Job Creation and Worker Assistance Act.

UK national accounts data. The gross operating surplus (GOS) is defined as gross trading profits plus income from buildings rental, less inventory holding gains. It does not include income from investments and is calculated before interest, tax and dividends. As such, it is a macro-economic concept closest in spirit to earnings before interest, tax, depreciation and amortisation (or EBITDA, see Box 2). The net operating surplus (NOS) is the GOS minus taxes and depreciation and so is closer to an earnings figure¹⁵.

Chart 4:
Reported earnings of FTSE 100 and national accounts earnings^{(a)(b)(c)}



Sources: Thomson Financial Datastream, ONS and Bank calculations.

(a) Reported earnings as produced by Thomson Financial Datastream.

(b) GOS is gross operating surplus of private non-financial corporations.

(c) NOS is GOS minus tax and depreciation.

14: The NIPA accounts report profits after tax from domestic operations, corresponding to the UK measure. However, these can be adjusted to include income from foreign corporations to US corporations and exclude payments from the US corporations to the rest of the world. Adjustments to inventory valuation (IVA) and capital consumption (CCADJ) are also necessary to move NIPA earnings figures closer to an economic definition. See Wright (2002) for further details.

15: We limit the analysis to private non-financial companies since depreciation figures are not available for private financial companies.

Box 2: Some official and unofficial accounting terms¹

Operating earnings are also known as *pro forma*, **core income**, **economic earnings**, **ongoing earnings**, or **earnings excluding special items**.

None of these terms have defined meanings under GAAP. These are earnings figures presented by companies 'as if' certain ordinary expenses (and occasionally revenues) did not exist.

Operating income is defined under GAAP as revenue less cost of goods sold and related operating expenses stemming from a company's normal business activities. It excludes, for example, interest income and expenses, dividend income, taxes and extraordinary items.

Income from continuing operations is defined under GAAP to include revenues and expenses from a company's ongoing operations and only excludes discontinued operations, cumulative effects in changes in accounting principles and extraordinary items.

Extraordinary items are items deemed both unusual in nature and infrequent in occurrence. These are defined by GAAP.

Special charges are also known as **one-time**, **unusual** or **exceptional** charges. These are items that do not meet the criteria laid down by GAAP to count as extraordinary items, but that companies want investors to exclude when valuing their equity. They are not defined under GAAP.

Cash flow is a GAAP-defined term meaning cash receipts minus cash disbursements during a given period.

EBITDA is earnings before interest, taxes, depreciation and amortisation. Sometimes, other expenses are also excluded (eg new venture start-up costs) as this term is not always precisely defined under national generally acceptable accounting principles. EBITDA remains popular for non-valuation uses. For example, it is widely used in banking covenants since it is a reasonably approximation to cash earnings (ie it excludes the finance and tax imposts and excludes the relatively more judgmental depreciation and amortisation components).

1: As defined by US accounting standards. These definitions are broadly equivalent to those under international accounting standards.

Both the level and profile of FTSE reported earnings and PNFCs' NOS are noticeably different. As noted above, since national accounts reflect UK activity, earnings due to and from abroad are not included in GOS or NOS. This is particularly important since historically only around one half of earnings from FTSE-listed firms have been generated in the UK. Similarly, financial companies form a large proportion of the FTSE 100 but are not included in the NOS figure.

Issues relating to national accounts earnings

National accounts-based measures of earnings are themselves not free from distortion. In many countries estimates of corporate earnings, though derived from tax return-based profit measures, have to be extrapolated using financial accounting-based measures. The necessary period of extrapolation can be significant. In the USA, for example, preliminary

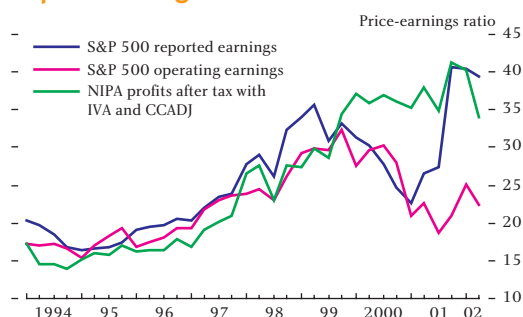
tax return-based tabulations for a given year become available about two years later while final tabulations take a further year. This means that national accounts-based earnings measures suffer from some of the same problems as financial accounts.

Further, even national accounts-based earnings sometimes need adjustment to account for non-recurring items. The capital account adjustment (CCADJ) to NIPA earnings replaces tax-based depreciation figures (computed on an historic basis) with a replacement cost valuation figure, moving it more in line with economic earnings. However, the Job Creation and Worker Assistance Act of 2002 includes various tax breaks related to the 11 September terrorist attacks that temporarily but significantly increased the CCADJ¹⁶.

16: The CCADJ increased by \$53.9 billion in 2001 and \$76.7 billion in the first half of 2002.

Nevertheless, national accounts-based earnings measures can provide a useful cross-check on valuations derived from financial accounts. Chart 5 plots the NIPA-based P/E ratio of the US corporate sector together with reported and operating earnings-based P/E ratios of the S&P 500. The NIPA P/E ratio tracked both operating and reported P/E ratios until 1999. Since then it has remained stable and high, unlike the operating earnings-based ratio, which has fallen rapidly, or the reported earnings-based ratio which fell as the stock market declined and subsequently rose as reported earnings collapsed.

Chart 5:
US price-earnings ratios^{(a)(b)(c)}



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

(a) Reported earnings as produced by Standard & Poor's.

(b) Operating earnings are the I/B/E/S estimate of net income from continuing operations and refer to the last reported annual earnings.

(c) NIPA profits of US corporations after tax with adjustments to inventory valuation and capital consumption. The capital consumption adjustment excludes the impact of the Job Creation and Worker Assistance Act. The numerator of the price-earnings ratio is the total equity holdings at market value of US corporates (Table L.213 of the 'Flow of Funds Accounts of the United States').

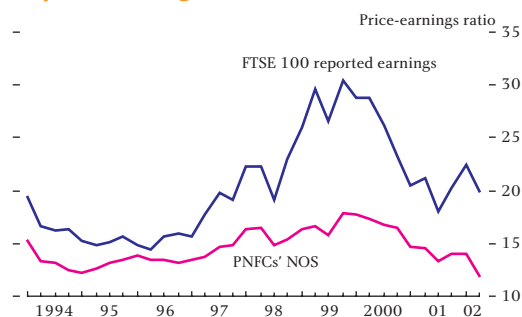
While the levels of the ratios are obviously different, UK P/E ratios based on company-level and national accounts measures follow broadly similar trends, notwithstanding the dissimilarities in earnings shown in Chart 4.

Accounting principles

Table 2 summarises some of the differences between the various measures of earnings discussed. Although each measure has its merits, it is not obvious which one is to be preferred from a valuation perspective.

There are a number of specific accounting issues relating to earnings which should be noted. For example, the treatment of stock options expenses is less than ideal in both reported and national income measures of earnings. According to US tax accounting

Chart 6:
UK price-earnings ratios^{(a)(b)}



Sources: Thomson Financial Datastream, ONS and Bank calculations.

(a) Reported earnings as produced by Thomson Financial Datastream.

(b) NOS is gross operating surplus minus tax and depreciation. The numerator of the price-earnings ratio is the net financial valuation of UK PNFCs, calculated as the difference between total financial liabilities and total financial assets.

and hence national income accounting standards, stock options are deducted from profits when exercised. FASB Statement 123 governs financial account reporting of stock option expenses in the US (Box 3). Most companies have in the past chosen not to expense employee stock options in their reported earnings, let alone operating earnings.

Table 2:
Differences between selected earnings measures^(a)

	National Accounts	Reported	Operating	S&P Core
Gains/losses on asset sales	No	Yes	?	No
Write downs from on-going operations	No	Yes	?	Yes
Impairment of goodwill	No	Yes	?	No
Realised stock option costs	Yes	No	Usually no	No
Estimated stock option costs	No	Usually no	Usually no	Yes
Cross-holdings adjustment	Yes	No	No	No

(a) Based on Smithers and Wright (2002) and authors' assessments.

Similarly, goodwill impairment is not an expense for the purpose of tax accounting but must be deducted from US reported earnings according to FAS 142. Since the amortisation of goodwill is not considered to be a cost expended in the creation of revenues, including impairment charges could be thought to distort the operating performance of the company.

National accounts earnings exclude capital gains and losses whereas, for example, in the US gains in the value of defined-benefit pension plans can be included in corporate earnings. Furthermore, national income accounts exclude the cost of write downs from ongoing operations and include the costs of severance pay for discontinued operations,

Box 3: The Standard & Poor's definition of 'core earnings'

In an attempt to eliminate the abuse of operating earnings, Standard & Poor's recently suggested a standardised definition that it calls 'core earnings'. It is designed to capture the after-tax earnings generated from a company's principal businesses. It begins with reported earnings excluding expenses relating to discontinued operations, the effect of cumulative accounting changes and extraordinary items as defined by GAAP, and then excludes some costs and benefits that arise in non-core parts of the business. The following table details the adjustments.

Table A:
Core earnings

Reported net income or reported earnings
<i>Excluding discontinued operations</i>
<i>Excluding effects of cumulative accounting changes</i>
<i>Excluding extraordinary items</i>
Equals net income
<i>Including employee stock option grant expenses</i>
<i>Including restructuring charges from ongoing operations</i>
<i>Including write-downs of depreciable or amortisable operating assets</i>
<i>Including pension costs</i>
<i>Including purchased R&D expenses</i>
<i>Excluding goodwill impairment charges</i>
<i>Excluding gains/losses from asset sales</i>
<i>Excluding pension gains</i>
<i>Excluding unrealised gains/losses from hedging activities</i>
<i>Excluding M&A related expenses</i>
<i>Excluding litigation or insurance settlements/proceeds</i>
Equals core earnings

Including restructuring charges, write-downs of depreciable assets, pension costs and purchased R&D expenses are justified by S&P on the grounds that they all form part of the costs of running the core business of the company. The same reason is used to justify the inclusion of employee stock option (ESO) plans. Stock options are part of the compensation package of employees and therefore form a legitimate business cost. In the USA, employee

stock option reporting is subject to Financial Accounting Standards Board (FASB) Statement 123. This gives companies the choice of whether to report employee stock options expenses annually in the income statement or as an footnote in the annual report. The route of expensing ESO costs was followed by just two companies in the S&P 500 when S&P released their proposals, although as at December 2002, 67 companies do so.

Several items are excluded from core earnings, mainly on the grounds that they do not represent revenues or costs that are due to the core operations of the company. Goodwill impairment charges are included in this list and have been large in comparison with earnings. For example, AOL Time Warner's US\$54 billion goodwill write-down in 2002 Q1 accounted for 21% of reported earnings for the S&P 500.

Although the adjustments have individually been quite large, for the Compustat universe of actively traded companies, the difference between reported and core earnings has historically been rather small. This is largely because the exclusion of goodwill impairment charges partially offset the inclusion of ESO costs. However, according to recently released figures for the twelve months ended in June 2002, core earnings for the S&P 500 were \$18.48 per share, compared with reported earnings of \$26.74. Stock options expenses account for \$5.21 per share and net pension adjustments subtract a further \$6.54. The June 2002 P/E ratio based on reported earnings was 37.1 while the P/E based on core earnings was 53.6.

both of which move the earnings estimate away from the core operating performance of the corporate sector.

S&P concept of core earnings discussed in Box 3 comes close to measuring the true operating performance of individual companies. However, particularly in an accounting system based on rules rather than principles, the ability of managers to distort earnings figures, for example in order to meet market expectations, will remain. No amount of mechanical inclusion or exclusion of certain expenses

or revenues will correct for earnings that are based on misstated reported earnings. Further, aggregating any measure of individual companies' earnings to arrive at market or economy-wide earnings suffers from the problem of double-counting: only national accounts measures can adequately remove the effect of cross-holdings of equities.

Conclusions

Accountants provide several measures of corporate earnings that are used for many different purposes. One use of earnings estimates is equity valuation.

Particularly in the past few years, non-standard measures of earnings have received prominence in corporate press releases explicitly because they are supposedly a better basis for equity valuation than audited reported earnings. However, these measures, usually termed operating or *pro forma* earnings, have at times been abused in the US. Rather than being a good proxy for the stream of likely future cash flows, *pro forma* earnings have systematically excluded expenses that are far from unimportant or non-recurring. Significantly, the US stock market does not seem to have been able in the recent past to look through the accounting numbers to the true measure of earnings on which valuation calculations should be based. P/E ratios based on reported earnings of the S&P 500 companies rose to record heights at the end of 2001-early 2002, while ratios based on operating earnings were falling towards the historical average level.

The increased focus on the issue by the press and SEC has brought about greater awareness of the problem. Proposed accounting and disclosure reforms in the USA should increase the clarity of earnings information, in particular by providing full reconciliation between alternative earnings measures.

The experience of the UK, where the difference between aggregate reported and operating earnings has been less extreme, suggests that an approach on the part of managers that relies on the entirety of reconciled financial reporting information (rather than emphasising a single headline earnings figure) can help reduce a company's ability to mislead investors. Private sector initiatives such as the Standard & Poor's core earnings measure provide a useful though not perfect cross-check on operating earnings figures disclosed by companies.

Similarly, national income-based earnings provide a measure of aggregate earnings independent from financial reporting-based measures. They cast further doubt on the recent behaviour of US operating earnings since they also suggest very high P/E ratios for the US corporate sector. However, they are not a substitute for financial accounts-based numbers because of important differences in method and coverage between national and company accounting¹⁷. Rather, the full set of earnings information from official accounts, unofficial earnings releases and national accounts should be considered when making judgements about the valuation of equity markets.

17: Further, there are significant delays in producing national income-based earnings figures.

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The economics of insolvency law: conference summary

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Insolvency and bankruptcy¹ law affect both financial stability and the efficiency of the financial system². *Ex ante*, bankruptcy law affects entrepreneurs' incentives to take risk – and so can affect productivity – and the terms on which lenders will lend. *Ex post*, it provides the framework in which bankruptcies, whether localised or potentially systemic, are resolved. On 27 September 2002, the Bank of England held a conference entitled *The Economics of Insolvency Law: Effects on Debtors, Creditors and Enterprise*, which addressed these two themes. The conference also discussed public bankruptcy policy, in the light of the publication this year of the Government's Enterprise Act, which includes a number of proposals for UK policy changes in this area. Although the focus of the conference was on corporate and personal bankruptcy, many of the themes discussed are relevant also to sovereign debt workouts, where much work is currently being done in international forums on appropriate policies for crisis resolution³.

WHETHER A BANKRUPTCY REGIME achieves economic efficiency depends in part on the incentives it creates *ex-ante* for both debtors and creditors. Michelle J. White presented empirical evidence to show that the level of entrepreneurial activity and the cost of credit in different states of the USA depend on the personal bankruptcy law in those states⁴. Each state sets a threshold value of a bankrupt's home, up to which the home is exempt from surrender to creditors in bankruptcy: the homestead exemption level. In her work with Wei Fan, White found that families who are homeowners are around one-third more likely to own businesses if they live in states with a high or unlimited, rather than low, homestead exemption – that is, when they face a less strict law – and are approximately one-quarter more likely to start a business. She found with Jeremy Berkowitz that small businesses are more likely to be denied credit if they are located in states with high, rather than low, homestead exemptions; and that, if they are accepted for credit, these businesses receive smaller loans at a higher rate of interest.

This illustrates the trade-off inherent in a bankruptcy framework. If the law is too 'hard', entrepreneurs may

be deterred from setting up in business because the consequences of failure are high: productivity, and growth, are likely to be lower as a result. But if the law is too 'soft', lenders will be unwilling to lend (at least at prevailing prices), since it is unlikely they will be repaid fully if the entrepreneur defaults: credit is more expensive, if available, and again productivity may be lower.

Paolo di Martino also considered this trade-off, noting that the resulting law must as well be able to select between 'good' and 'fraudulent' debtors. He found from a historical comparison of Italy and England that the relatively more strict personal bankruptcy law in the former resulted in some cases in a longer bankruptcy procedure than under English law, with lower repayment for creditors. He also found that there was a lower incidence of corruption in England, even though Italian law was relatively more strict.

So one aim of policy makers is to achieve an efficient balance between 'hardness' and 'softness' in bankruptcy law. Such a balance will facilitate growth, but deter fraudulent entrepreneurs. In a democracy, the law is decided by the political party or parties

1: In England and Wales, bankruptcy is the term used for personal insolvency proceedings, as opposed to corporate insolvency proceedings. For the rest of this article, we will use bankruptcy to refer to insolvency proceedings for both individuals and companies.

2: Maintaining the stability of the financial system and seeking to ensure the effectiveness of the UK's financial services are the Bank of England's second and third core purposes.

3: See David Clementi's speech on 'Debt Workouts for Corporates, Banks and Countries: Some Common Themes', in the December 2001 *Financial Stability Review*.

4: Owners of small firms may come under the jurisdiction of personal bankruptcy law if the firm is unincorporated, or in the common case where the owner has personally guaranteed a loan made to the firm.

that have a majority of votes in parliament, and indirectly, therefore, by the pivotal voters in that country. Bruno Biais examined what type of bankruptcy law might emerge in a political economy dependent on the wealth of these pivotal voters, and the consequent incentives facing them.

Biais suggested that a hard law might emerge in countries where the pivotal voters are potentially entrepreneurial, with average incomes, as they would then find it easier to borrow. In contrast, if the party in power represents low-income voters, who are unlikely to be able to access credit regardless of the type of law, a softer law might emerge, its aim being to protect employment by maintaining distressed firms as going concerns rather than upholding *ex-ante* contracts. In fact, Biais noted that, in a less wealthy country, a hard law may be necessary to avoid a poverty trap: if the law is too soft for potential entrepreneurs to be able to borrow, then their ability to create wealth is limited.

In this context, White noted possible historical explanations for the wide variety of homestead exemption levels that has emerged across US states: these range from zero to unlimited. The unlimited exemption in Texas, it has been suggested, may derive from the mid-19th century, when Texas was looking for volunteer troops to fight in the war with Mexico. One way to attract people to the state was a bankruptcy law that allowed debtors some shelter from their creditors. As debtors and potential entrepreneurs moved to Texas, so neighbouring states responded with higher homestead exemption levels too in a bid to keep them.

How distress is handled

A widely-quoted rationale for bankruptcy laws, over and above standard contract law, is to avoid creditors racing to be the first to recover their debts when, in bankruptcy, a firm's assets do not cover its liabilities. Such a race might lead to the firm's assets being dismantled and sold at fire-sale prices, with a consequent loss of value for all creditors. One objective of bankruptcy law is that a failed firm's assets be disposed of in an orderly manner.

Oliver Hart suggested three goals of a good bankruptcy law, each of which is aimed at making this

process efficient. According to his Goal 1, a good bankruptcy law should maximise the total value (in money terms) available to be divided amongst the firm's stakeholders. It should also (Goal 2) adequately penalise incumbent management and shareholders, and (Goal 3) observe in bankruptcy the absolute priority of contracts negotiated *ex-ante*.

The question then is how to design a bankruptcy law to achieve these goals. Hart outlined a number of suggestions. But he noted that it was difficult for economists to derive an optimal bankruptcy procedure from first principles, because they do not at this point have a satisfactory theory of why parties cannot design their own bankruptcy procedures, that is, why contracts are incomplete.

Each of Hart's procedures for firms in distress begins with an automatic debt-equity swap for all existing creditors of the bankrupt firm. This replaces multi-layered creditor classes, each bargaining with different objectives, with a homogeneous group of shareholders. The swap is structured such that creditors receive equity in keeping with the pre-bankruptcy priority of their claims; Goal 3 is achieved and pre-bankruptcy contracts are upheld.

These new shareholders must then decide on the firm's future, specifically whether the firm should continue as a going concern or be closed down. This decision might be taken by vote, or through standard corporate governance procedures (that is, a new board of directors is first elected by the new equity holders). But the key is that the new shareholders, or their representatives, make the decision. Goals 1 and 2 are achieved: each new shareholder has the incentive to vote for the option that he believes maximises the value of the firm, since this will make it more likely that he will get his money back. And existing management are penalised if the new shareholders reject their proposals for the future of the firm and dismiss them⁵.

For bankruptcy law in general, Hart noted that it is unlikely that one procedure will fit all cases, and that there is a whole class of efficient bankruptcy models. Hence a country might provide a menu of bankruptcy procedures. Parties could choose from the menu when writing their initial contract and firms and

5: A potential problem is that lenders might have horizons that are shorter term than the time necessary to turn the firm around. Equally, lenders might not want to take on equity exposure in certain situations: where the stock is illiquid, for example, or where the company is not listed, both making it difficult to on-sell the equity. Hart noted that these problems are not peculiar to his procedures; the suggested procedures may do better, and certainly no worse, than existing ones.

creditors who thought it more efficient could utilise the option of writing their own bankruptcy terms. Biais' analysis suggested, however, that this might not be optimal where social costs, for example to employment, are imposed by liquidating firms. In this case, a country may prefer a bankruptcy law that allows contracts made *ex ante* to be explicitly violated *ex post*. (And di Martino noted that a system designed to promote bonding to contracts might run the risk of producing the opposite effect if it is highly penal: adherence to the contract is reduced if creditors actually get less back in bankruptcy. At the extreme, how can debtors repay a contract from prison?)

Either way, the state-provided bankruptcy policy has important incentives for pre-bankruptcy restructurings, since it is the 'default' procedure to which the firm will be subject if the pre-bankruptcy restructuring is not agreed, and if private contracts do not mandate any other procedures. The Bank of England has an interest here, through the London Approach principles underlying pre-bankruptcy workouts in the UK⁶.

Hart's goals and procedures are designed to provide efficient *ex-ante* incentives and good crisis resolution *ex post*. Another benchmark of *ex-post* efficiency is whether resources are being allocated appropriately in the economy. A good bankruptcy law should ensure that non-viable firms are rapidly and cheaply eliminated from the market, whilst firms that are still viable, but facing short-term liquidity problems, are maintained as going concerns. In his study with Oren Sussman, Julian Franks examined how banks restructure distressed firms in the UK, and found mixed evidence for efficient outcomes.

In the small- to medium-sized distressed firms that Franks examined, the equity structure was such that liquidation and control rights in the event of bankruptcy were concentrated with the firm's main bank, as the senior lender, typically holding a fixed or floating charge (or both) over all or part of the firm's assets. Probably as a result of this, Franks found that the bankruptcy process was not characterised by creditor races. Also, there was some evidence of sophisticated monitoring by banks: over 85% of the firms came out of distress as going concerns, after a rescue process lasting on average 7.5 months.

But the data also suggested that banks had used their control rights to increase their recovery rates at the expense of other creditors. In particular, the banks appeared to have timed bankruptcy so that the value of unsecured creditors' claims was largely eroded, and hence the value of the firm in bankruptcy was not maximised. The practical problem lenders face in seeking an efficient outcome in a period of economic downturn was noted. With an increasing number of defaulting debtors, banks may have insufficient resources to consider restructuring every company in distress; some viable but liquidity constrained firms may be liquidated as a result. Nonetheless, on average, banks in Franks' dataset had recovery rates of close to 100%, whilst for trade creditors it was close to zero.

Restricting the control rights of single creditors in bankruptcy is one of the aims of the bankruptcy reforms contained in the Government's Enterprise Bill that was published in Parliament on 26 March this year, and after receiving Royal Assent became the Enterprise Act on 7 November. Vicky Pryce (Chief Economic Adviser at the Department of Trade and Industry) concluded the conference with a discussion on the Bill. The reforms seek to achieve this aim by restricting the use of administrative receivership for bankrupt firms – where a single secured creditor has effective control – and shifting the balance in favour of administration, which takes account of the interests of all creditors (both secured and unsecured). At the same time, reforms to personal bankruptcy law are designed to give a second chance to entrepreneurs who fail through no fault of their own, while subjecting reckless or culpable bankrupts to a more stringent regime. That is, the proposals seek to make more efficient both crisis resolution and entrepreneurs' incentives.

All the papers presented at the conference are available on the Bank's website:
<http://www.bankofengland.co.uk/conferences/conf0209>.

6: Details of the London Approach can be found by clicking on Business and Household Finance on the financial stability part of the Bank's website at www.bankofengland.co.uk.

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- 1: Berkowitz, J and White, M J (2002), 'Bankruptcy and Small Firms' Access to Credit', NBER Working Paper Number 9010.
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- 3: Di Martino, P (2002), 'Approaching Disaster: A Comparison between Personal Bankruptcy Legislation in Italy and England (1880–1930)', University of Bristol.
- 4: Fan, W and White, M J (2002), 'Personal Bankruptcy and the Level of Entrepreneurial Activity', NBER Working Paper Number 9340.
- 5: Franks, J and Sussman, O (2002), 'Financial Distress and Bank Restructuring of Small to Medium Size UK Companies', London Business School and Saïd Business School.
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Fixing financial crises

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On 23–24 July 2002, the Bank of England hosted a conference on ‘The Role of the Official and Private Sectors in Resolving International Financial Crises’. The papers from that conference are available at www.bankofengland.co.uk. This short article summarises some of the key themes.

SINCE THE MEXICAN CRISIS in the mid-1990s, there have been at least a further dozen systemic international financial crises in emerging market economies. These crises have afflicted all of the major emerging market regions – for example, in south-east Asia, Russia, Brazil, Argentina, and Turkey. And the costs of these crises have been heavy.

Unlike their predecessors in the 1970s and early 1980s, recent crises have been manifest in the capital rather than the current account of the balance of payments. Crises of this type pose fresh challenges to the official community – in particular the International Monetary Fund (IMF) – because potential swings in private capital flows dwarf available official resources. So there has been a recurrent focus on ways of harnessing private capital flows in resolving international financial crises – so-called private sector involvement (PSI).

But the best means of resolving crises in general, and of securing PSI in particular, remain areas of heated debate. There has been no shortage of big ideas, including proposals for an international lender of last resort (Fischer (1999)) and international bankruptcy court (or sovereign debt restructuring mechanism (SDRM), Krueger (2001, 2002)). Alongside these big ideas are several more modest ones – for example, placing stricter constraints on official sector lending in combination with payments suspensions by the debtor (Kenen (2002), Haldane and Kruger (2001)), or introducing collective action clauses (CACs) into sovereign bonds (Eichengreen and Portes (1995), Taylor (2002)).

All of these proposals would involve some changes to the *status quo*. Indeed some, such as the SDRM, would require statutory reform in a large number of jurisdictions. These proposals also carry different

implications for official and private sector creditors. Some would involve the provision of potentially large-scale official sector loans – so-called ‘bail-outs’. Others foresee private sector creditors bearing more of the burden when crises strike – so-called ‘bail-ins’. These differences help explain why private sector attitudes towards these various proposals have been mixed, ranging from the positive (for example, on CACs) to the hostile (for example, on SDRM).

Against that backdrop, the Bank of England hosted a two-day conference in July 2002 to explore and debate these issues further. The conference brought together policymakers, academics and private sector participants from both developed and emerging markets. It was organised in five sessions, which are discussed in turn below¹.

Why involve the private sector?

Many reasons have been suggested for needing to reform the international financial architecture and to buttress PSI. Among them are the potentially negative effects of large-scale IMF bail-outs on incentives – debtor country incentives to undertake structural reform and private creditor incentives to undertake effective risk assessment. Michael Mussa (Institute for International Economics and formerly Chief Economist at the IMF) explored this so-called ‘moral hazard’ problem. Mussa argued that it was much exaggerated and quantitatively unimportant provided the IMF acted in accordance with its Articles of Agreement. This followed from the fact that the IMF offered loans, rather than grants, and was typically repaid in full. So the subsidy implied by IMF intervention was not quantitatively large enough to have a significant bearing on creditor and debtor risk choices, given the scale of losses each potentially faced at times of crisis. There were, Mussa cautioned, two exceptions to this principle however: IMF loans

1: Copies of the comments made by discussants on each of the papers are available on the Bank of England's website. These comments are not reviewed here.

made for geo-political purposes; and IMF loans made to governments which were not acting in the best interests of their citizens. Mussa argued that some recent IMF programmes may have fallen into one or both of these categories.

William Cline (Institute for International Economics and formerly Chief Economist at the Institute for International Finance) argued that IMF intervention needed to balance moral hazard concerns against the need to avoid the deadweight losses of sovereign default. The latter, Cline argued, were very substantial. This carried important implications for the design of PSI policies. These should be as voluntary as possible, given the circumstances. In particular, the IMF should err towards official sector lending, rather than private sector debt work-outs, for countries where it was difficult to assess whether the problem arose from lack of liquidity or from an unsustainable burden of debt (the sovereign analogue of corporate insolvency). And policies that had the effect of bringing forward the date of default – such as the SDRM – were potentially misplaced. There was considerable option value in delaying default and hoping for a reversal of fortunes for the debtor. Cline also provided a taxonomy of different PSI types, and an empirical evaluation of the extent of PSI in dealing with past crises, which he argued had often been substantial.

How to involve the private sector?

Accepting that some degree of PSI may be desirable, how is this best secured? Nouriel Roubini (New York University) explored this issue. Conceptually, there was a case for separating out ‘liquidity’ and ‘solvency’ problems facing countries. In practice, it was difficult to make such a hard and fast distinction, especially for sovereign debtors. There was a spectrum of possibilities with insolvency at one end and illiquidity at the other. But it was clear that solvency judgments needed to be made because this had important implications for the efficacy of different policy instruments.

For liquidity crises, Roubini identified a disjunction between academic and official sector views. Theoretical work pointed towards corner solutions (full bail-in or full bail-outs) in dealing with liquidity crises, whereas policy practice involved intermediate solutions (partial bail-outs and accompanying partial bail-ins). Roubini argued that appropriately devised middle-ground solutions could work – and indeed had worked in the past. For solvency crises, Roubini

provided an analytical evaluation of the competing proposals – for example, CACs and SDRM. Some of the differences between these proposals were, he argued, more apparent than real.

The solvency/liquidity nexus was also explored in a paper by Andrew Haldane, Simon Hayes, Adrian Penalver, Victoria Saporta (all Bank of England) and Hyun Song Shin (London School of Economics). This developed a model of ‘grey zone’ crises, in which there was a two-way interaction between solvency and liquidity problems. This meant the official sector needed a plurality of tools: orderly payments suspensions for helping cope with liquidity problems, and CACs or bankruptcy procedures for dealing with solvency situations. Far from being substitutes, these tools were mutually reinforcing. Both were necessary and neither one individually sufficient.

To date, Haldane *et al* argued, the official sector had devoted too little time and attention to developing tools to cope with liquidity crises. Moreover, the options currently being debated for dealing with solvency crises – CACs and the most recent proposal for the SDRM – were both potentially deficient. They tackled one potential externality – intra-creditor co-ordination failures. But they did not address the potential co-ordination problems between the debtor and its myriad (official and private sector) creditors. If the latter set of co-ordination problems were acute, a centrally imposed solution (such as an international bankruptcy court) could be preferable, to a decentralised negotiated one (such as CACs or SDRM).

Collective action clauses

Two papers – one practical, the other theoretical – explored in greater depth some of the issues surrounding the use of CACs in international bond restructurings. Both papers concluded that contractual provisions may be adequate to mitigate the inefficiencies associated with sovereign debt restructuring, without the need for recourse to a centralised bankruptcy agency. Lee Buchheit (Clearly, Gottlieb, Steen and Hamilton) and Mitu Gulati (Georgetown University) drew an analogy with the debate at the end of the 19th century over optimal corporate restructuring mechanisms in the UK and the USA. In a corporate context, the UK had gone down one route – CACs – and the USA another – Chapter 11 bankruptcy law. The sovereign debt debate was currently at the same cross-roads.

Buchheit and Gulati argued that, used creatively, CAC provisions could replicate most, if not all, of the desirable features of a bankruptcy procedure or SDRM, including creditor cram-down (majority action provisions), stays on litigation and super-priority of new financing for the debtor during a workout. Aggregation across classes of creditors had been put forward as a rationale for preferring the SDRM over CACs. But Buchheit and Gulati argued that a potentially high degree of creditor homogenisation was possible using existing class action procedures in US courts.

The issue of aggregation under CACs was also explored by Kenneth Kletzer (University of California at Santa Cruz). He developed a theoretical model of sovereign debt renegotiation and showed that unanimity provisions in sovereign bonds gave rise to restructuring inefficiencies – delays and stand-offs between debtors and creditors. Those inefficiencies derived from the rent-seeking behaviour of creditors, which unanimity provisions in bonds served to amplify. CACs neutered this rent-seeking behaviour, thereby allowing efficient renegotiation of debt contracts. Kletzer went further and argued that, provided CAC contracts were complete and information was perfect, the aggregation problems potentially associated with multiple bonds would be resolved by private agents acting self-interestedly. In a world of multiple bond issues, it would be optimal for creditors to appoint a private trustee to act collectively on their behalf. No supra-national agency would be required to resolve aggregation problems, as Krueger (2002) had suggested. How far this conclusion remained valid in a world of incomplete contracts and imperfect information was, however, an open issue.

SDRM

These issues of incompleteness in contracts or in information were broached in two papers on international bankruptcy procedures. Jonathan Eaton (New York University) identified several issues that might justify the creation of a supra-national agency – for example, its greater enforcement powers, its capacity to correct the effects of socially inefficient contracts, and its potentially superior information. In practice, however, these potential roles were heavily circumscribed in a sovereign context. Enforcement of decisions over sovereigns would always be much more problematic than in a corporate context – though an international court may be in a better position to levy appropriate sanctions on misbehaving sovereigns.

Private contracts may be inefficient, generating incentives for creditor runs. An international court could defuse such incentives by imposing payments suspensions. But the cost of doing so may be great – through a higher cost of borrowing for the country – in particular if the court did not have superior information over private creditors on the nature of the underlying payments problem. Eaton proposed one means of overcoming the enforcement problem over sovereigns, by requiring that some of the proceeds of any loan to the sovereign be held in an escrow account, which could be remitted back to the creditor in the event of a standstill. This would offer some collateral to back sovereign lending and mitigate the effects of payments standstills on the cost of sovereign borrowing.

Marcus Miller and Sayantan Ghosal (both University of Warwick) developed an analytical model of sovereign debt crises embodying two frictions: coordination failures among creditors and a moral hazard problem for debtors. Moreover, these two frictions potentially traded-off: resolving co-ordination failures reduced the cost of crises but risked heightening debtor incentives to default capriciously. One solution, Miller and Ghosal argued, was a formal bankruptcy procedure for sovereigns. Among other things, these procedures would offer legal protection against dissident creditors – thereby forestalling creditor co-ordination problems; and they could additionally help ensure that debtors put in sufficient policy adjustment effort – thereby mitigating potential problems of moral hazard. In a similar spirit to the Haldane *et al* model, however, these bankruptcy procedures would need to differ in important ways from the SDRM ideas currently on the table. They called for a neutral arbiter and enforcer at the centre of the system.

The road ahead

A final panel session of the conference considered concrete next steps in improving the crisis resolution framework. Matthew Fisher (IMF) outlined several areas in which the IMF was hoping to make substantive progress in the months ahead. These included: IMF access policy, in particular clarifying the criteria that would justify access beyond normal limits and the accompanying procedural hurdles that would need to be jumped; IMF policy on lending-into-arrears, focusing on a reassessment of the ‘good faith’ provision to ensure it had sufficient clarity and precision to guide the actions of debtors and creditors;

CACs, in particular their precise specification in different instruments and official and market-based means of encouraging debtors to include them in these instruments; and the SDRM, specifically the appropriate scope of the debt to be included in the mechanism and the role of a central dispute resolution agency to oversee the work-out.

Lorenzo Bini-Smaghi (Italian Treasury) reviewed the progress made by the official sector since the Cologne Report by G7 Finance Ministers in 1999. On standards and codes and transparency, the record was good. Some progress had been made on strengthening macroeconomic policies – though inadequate attention was still paid to foreign currency mismatches and the appropriate pace of capital liberalisation. Nor had developed countries fully taken on board potential supervisory failings at home, including the role of offshore financial centres and highly-leveraged institutions. On crisis prevention and resolution, the SDRM and CAC debates had moved things forward. But these measures would not have prevented the Argentine crisis. What was needed instead, Bini-Smaghi argued, were some more transparent procedures for handling work-outs. These would condition the expectations and decisions of market participants, debtors and the official sector. They would be analogous to the procedures that existed for monetary policy operation. And clarity should begin at home. That meant greater transparency regarding the IMF's sustainability analysis and stronger presumptions about abiding by normal access limits for IMF lending.

Richard Clarida (US Treasury) outlined the progress made since the G7 Action Plan, agreed in April 2002. A key element of this was the inclusion of CACs in international bonds. Good progress had been made by a G10 working group in devising model clauses;

and key sets of private sector institutions had reacted positively and were working on clause specifications. Clarida argued that default would always be painful for debtors and creditors. But more orderly sovereign restructuring procedures could help prevent the official sector needing to resort to large bail-outs too frequently. They would also help resolve some of the uncertainty – as distinct from risk – that currently surrounded workouts. There might, Clarida argued, be a case for greater use of contractual provisions facilitating payments suspensions by the debtor, as another tool for helping deal with payments problems.

Jacob Frenkel (Merrill Lynch) noted that while the details of international financial crises had changed over the years, the underlying issues had not: designing a system which did not eliminate crises – that was both unrealistic and undesirable – but which at least mitigated their adverse consequences. Efficient crisis resolution was multi-faceted. It included good investor relation programmes that allowed countries to differentiate themselves. There had been significant progress on that front over the past 20 years. In today's capital markets, liquidity and solvency were inextricably inter-linked because expectations played such a crucial role. That was apparent, for example, in the choice of exchange rate regime. Open capital markets meant that the fault lines in fixed exchange rate regimes would be exposed sooner than in the past. Impeding capital flows was not a sensible means of deferring exchange rate adjustment. It was disappointing that the IMF had drawn back from revising its Articles to have a formal commitment to capital account liberalisation. In Chinese, Frenkel noted, the word 'crisis' comprised two syllables meaning 'danger' but also 'opportunity'. Efficient crisis resolution meant balancing those twin objectives.

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Modelling risk in central counterparty clearing houses:

a review

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Central counterparty clearing houses (CCPs) form a core part of the financial market infrastructure in most developed economies. CCPs were established originally to protect market participants from counterparty risk in exchange-traded derivatives markets, but they now also have an important presence in cash and over-the-counter (OTC) derivatives markets. By interposing themselves in transactions, CCPs help to manage counterparty risk for market participants and facilitate the netting of positions. In performing this role, however, CCPs are themselves exposed to various risks. To protect themselves, they have developed various procedures, amongst which the margining of members' positions plays a central role. This article discusses a range of academic studies which attempt to model the risks faced by CCPs, and which consider how margins and the level of other default resources might be set. It notes that margins alone, calculated to cover losses from typical price movements over one or more days, may not be sufficient to protect CCPs from rare but plausible events. CCPs need to assess the losses they could face on occasions when margin proves insufficient, and ensure that they can meet these losses from extreme events by other means¹.

CENTRAL COUNTERPARTY CLEARING HOUSES first developed in futures markets to help market participants manage the risk of non-performance by their counterparties. Because there is often a lag of some months between the initiation and final settlement of a futures transaction, large unsettled exposures may build up between market participants. If the losing counterparty defaults in the presettlement period, gains accrued by the winning counterparty may be lost.

In order to reduce the risk of non-performance for market participants, futures and other exchange-traded derivatives contracts are typically guaranteed against counterparty failure by a post-trade central counterparty clearing house (CCP), operated either by the exchange or as a service provided to it by an independent company. In essence, the CCP interposes itself in transactions by becoming the buyer to every seller and the seller to

every buyer. The original bilateral contracts between market participants are extinguished and replaced by new contracts with the CCP². As a result, bilateral counterparty risks (of variable quality) are replaced with a (high quality) counterparty risk against the CCP. Diagrams 1a and 1b show how bilateral contracts are substituted by new contracts with the CCP. Diagram 1c illustrates how this allows clearing members to net down their original obligations multilaterally.

In addition to exchange-traded derivatives markets, the risks associated with non-performance arise in many other markets, including some with a much shorter settlement cycle. In equity markets where an electronic order book is employed to match trades, participants may not be able to manage counterparty risk through their choice of counterparty. As a result, central counterparty services have recently emerged in a variety of cash markets where they deliver other

1: We would like to thank Giovanni Barone-Adesi, Jon Danielsson, Brian Eales, James Moser, Mark Tomsett and colleagues at the Bank of England for helpful comments on an earlier draft of this article. Any remaining errors or omissions are, of course, the responsibility of the authors.

2: Not all clearing houses act as central counterparties. Clearing, defined as the matching, confirming and settling of trades, can be carried out without the clearing house becoming a principal to transactions, in which case the clearing house simply plays an agency role. This type of clearing house is not exposed to counterparty risk in the same way as a CCP, since the members remain exposed to their original counterparties. In what follows, the focus will be on CCPs, and the terms CCP and clearing house will be used interchangeably. This follows usage in the academic literature which concentrates on the clearing arrangements typical of major US and European markets.

Diagram 1a:

Positions with bilateral clearing

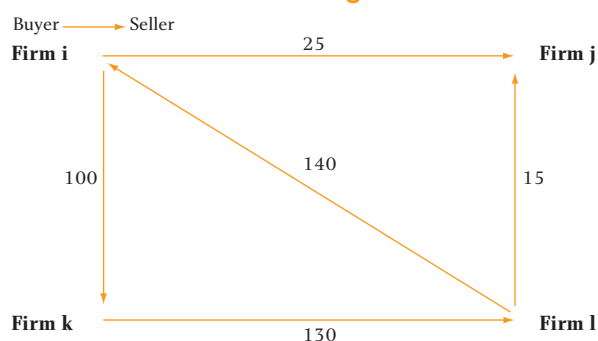


Diagram 1b:

Gross positions with CCP

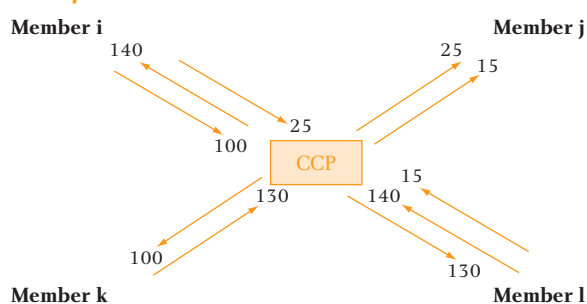
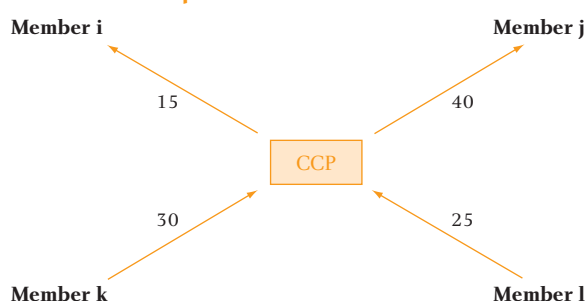


Diagram 1c:

Multilateral net positions with CCP



valuable benefits such as post-trade anonymity, netting, and the reduction of operational risk. Meanwhile, CCPs have also extended the range of their services to derivatives markets, with a number of CCPs now clearing a range of OTC contracts. In practice, CCPs generally provide these services directly to only a limited range of *clearing members*, but other market participants can benefit indirectly, as clients of members.

In assuming responsibility for contract performance, CCPs themselves become exposed to the risk of a

clearing member default. To reduce the risk of a default, and ensure that if one does occur it can be absorbed with the minimum loss, CCPs have evolved a variety of risk management procedures. The primary protection is provided by *initial margin*, a deposit which clearing members are required to place in an account with the CCP. This is intended to protect the CCP against the risk of non-performance. CCPs may also make margin calls to ensure that they remain protected over time as prices change. They usually also have access to additional default resources, such as mutual guarantee funds or insurance cover, and require clearing members to fulfil financial requirements to reduce the likelihood of default.

By helping to manage counterparty risk and by providing netting services, CCPs can allow market participants to economise on collateral, compared to what they would otherwise need to hold to ensure equivalent protection in bilaterally cleared markets. Regulators may also recognise the reduction in counterparty risk by allowing clearing members to hold less capital than if they were exposed directly to other market participants. Clearing members may also reduce the resources spent on monitoring individual counterparties, insofar as their actual counterparty is the CCP.

To protect themselves and the clearing house against client defaults, members are generally required to set a minimum level of margin for their clients according to rules set down by the clearing house. One of two methods is usually used to determine the proportion of margin passed on to the CCP. Under *net margining*, clearing members are permitted to net together the long and short positions of different clients and post margin on aggregate net positions. Under *gross margining*, members are required to deposit margin with the CCP sufficient to cover the gross positions of their clients. In either case, the members must collect the same minimum amount of margin from their clients³.

The systemic importance of CCPs

Although CCPs reduce counterparty risk for individual market participants, the funnelling of market activity through one institution concentrates risk, and the responsibility for risk management, in

3: The main difference lies in the proportion of client margin that they are required to pass through to the CCP. From the CCP's perspective, gross margining has the advantage that if a clearing member defaults as a result of a client default, then all the client margin the member has passed through to the CCP is available to protect the CCP against loss. Gross margining systems, however, reduce the earnings of clearing members on client margin funds, and it is sometimes argued that this makes clearing members more vulnerable to bankruptcy, and more likely to raise clearing fees. In practice, net margining systems predominate.

the CCP. Furthermore, with lower counterparty risk, market participants using a CCP may be encouraged to trade more and establish larger positions, increasing the potential risks to the CCP.

Were a CCP to fail, activities in a wide range of markets might face disruption with the CCP acting as a channel of contagion. Even without outright failure, problems in one market can be transmitted to others via a CCP. For example, if market prices change abruptly, CCPs will typically make margin calls requiring members to put up additional funds which match the price change, to ensure that protection is maintained against member default. But if members have to meet unexpected margin calls in one market, they may be forced to sell assets in a second market, driving down prices there⁴. This may lead to margin calls against positions in the second market. Furthermore, margin payments made to the CCP from 'losing' members must usually be received before disbursements can be made to 'winning' members. If large margin payments are delayed for some reason, this can create severe liquidity pressures for members.

Many CCPs have close financial connections with a range of settlement banks which receive and return margin payments on behalf of members. In a liquidity crisis, where members may be temporarily unable to meet margin calls, banks may be forced to choose between extending additional credit or seeing members' positions declared in default and liquidated by the CCP. Bernanke (1990) discusses this in the context of the 1987 fall in equity markets. In either case, the banks may have to put their own funds at risk. In effect, the CCP may redistribute part of its risk to liquidity providers such as banks. *In extremis*, these financial links create the potential for contagion to spread beyond the immediate membership of the CCP.

Fortunately, CCP failures have been extremely rare, though the examples of Paris in 1973, Kuala Lumpur in 1983, and Hong Kong in 1987 demonstrate that they can, and do, occur⁵. Because of the increasing scale and scope of the business of some CCPs, both in Europe and elsewhere, the potential impact of a CCP failure has grown.

Central banks and regulators have, therefore, taken a keen interest in CCP risk management and in developments concerning CCPs more generally, and so too have academics. The objective of this article is to review the academic literature and address three key questions: (i) How can the core financial risks faced by CCPs be characterised? (ii) What insights does the academic literature provide into the risk management problems faced by CCPs? (iii) What further issues concerning core risks remain to be addressed?

Main features of CCP risk management

Core risk faced by CCPs

CCPs require clearing members to post initial margin sufficient to cover all but the most extreme price movements which may occur over a specified time horizon (usually a single day)⁶. A very large single-day price move, nevertheless, has the potential to reduce the value of a member's positions by more than the initial margin. If the 'losing' member were to default under these circumstances, it could leave the CCP with uncovered obligations towards 'winning' members. This is usually called *replacement cost risk* in the CCP literature, and this article follows the same practice. The potential replacement cost exposure for a CCP, however, is limited significantly by the process of daily marking-to-market, by adjusting initial margin requirements, by making intraday margin calls when necessary, and by holding additional default resources.

CCPs usually mark-to-market members' positions at the end of each day, and calculate gains and losses accrued since the last mark-to-market. The actual procedure for settling daily gains and losses may differ to some extent between CCPs. Some directly adjust members' margin account balances to reflect the gains and losses on members' positions. If the funds in a member's margin account balance fall below a specified level, known as the *maintenance margin*, the member receives a margin call. This instructs the member to increase the funds in its margin account back to the level of initial margin within a specified grace period. Other CCPs follow a different model where, following the mark-to-market, they call automatically for additional *variation margin* from 'losing' members and credit these funds directly

4: The impact on market prices will of course depend on the size of positions sold in relation to the liquidity of that market.

5: See Hills, Rule, Parkinson and Young (1999) for further details.

6: In practice, the time horizon used by CCPs for setting initial margin varies depending on the market.

Box 1: Margin calls and replacement cost risk

Clearing member A buys a single futures contract from B, at a futures price of £100. The contract is for 200 bushels of wheat and is due for delivery in three months time. When member A and B register their contracts with the CCP, they are required to deposit £5 margin per bushel. Each member therefore provides the CCP with £1,000 of initial margin.

Suppose the futures price were to fall from £100 at the end of the first day to £99 by the end of the following day. At mark-to-market, the CCP would require £200 from member A, and would transfer £200 to member B.

Suppose at the end of the month, the futures price returns to £100, before plummeting to an end-of-day price of £90 after a large single-day price fall. For the purposes of illustration, we will assume that there is no intraday margin call. At the end-of-day mark-to-market, the CCP is required to credit £2,000 to member B, and must receive an equivalent amount of funds from member A. Since A only has £1,000 in posted margin, the CCP faces a replacement cost risk exposure of £1,000, which becomes realised if member A fails to meet an end-of-day margin call and defaults. If this occurs, the CCP would close-out A's position, but be left with a shortfall of £1,000 which it would have to meet through its own default resources.

to 'winning' members. In either case, the daily settlement of gains and losses ensures that exposures cannot build up excessively over time.

Under either approach, the failure to meet a margin call will result in the member being declared in default and its positions being closed out. The quicker the CCP is able to close out a defaulter's positions, the less likely it is that prices will move further against the defaulter, and result in a replacement cost risk exposure for the CCP.

In addition, well-designed CCPs monitor members' positions intraday and may make margin calls if large intraday price moves threaten to exhaust the funds in a clearing member's margin account. As with end-of-day calls, the member must meet the margin call within a certain grace period or see their positions closed out. Box 1 illustrates the process of calling margin.

As a further layer of protection, CCPs will also usually have access to additional default resources, which may be used if margin proves insufficient to meet losses. Many CCPs maintain a mutual guarantee or default fund, to which members make an initial contribution when joining the CCP. Insurance policies may provide further cover, and some CCPs have the power to assess members for funds if other default resources prove insufficient.

CCPs may also be exposed to *liquidity risk*, if members do not meet margin calls in a timely fashion. Although no member may formally be declared in default, a

failure to pay margin calls promptly would leave a CCP with liabilities to members who hold the opposite positions and whose margin accounts must be credited. If the CCP has insufficient liquidity to meet these demands, it may have to delay making repayments. The Crash of 1987 and its impact on some US clearing houses provides a case study of the problems that can arise from such a liquidity squeeze (Brady, 1988).

Additional important risks

CCPs are also potentially exposed to a range of other important risks. Where the legal status of a CCP's netting arrangement is not protected by national law, or where it clears cross-border trades, it may be exposed to significant *legal risks*. Like other institutions, CCPs are also vulnerable to *operational risks*.

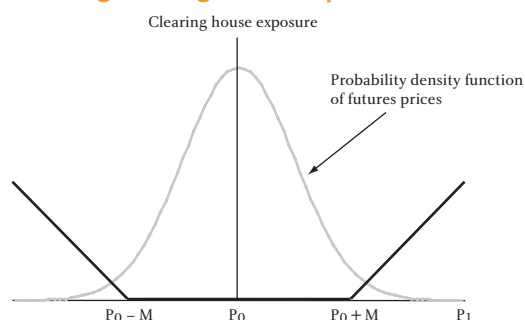
The failure of institutions outside the immediate clearing membership may also create risks for a CCP. Many CCPs use a network of private banks to make fund transfers to and from members and may therefore be exposed to *settlement bank risk*. If margins (and other default resources) are invested in the market by the CCP they may also face *investment risk*. In the remainder of this article, we will concentrate on *replacement cost risk*, but readers are referred to Bank for International Settlements (1997) for further details on these other categories of risk and how they can be mitigated.

Determining CCP margin requirements

Diagram 2 illustrates the potential exposure for a stylised CCP clearing a single futures contract. If the

initial price of the contract is P_0 , the subsequent price is P_1 , and posted margin per contract is denoted by M , margin will be exceeded when $|P_1 - P_0| > M$. In other words, the CCP is exposed when the change in the contract's price exceeds the required margin per contract. In this section, the main approaches that have been developed to characterise this exposure are described.

Diagram 2:
Modelling clearing house exposure^(a)



(a) P_0 and P_1 are the initial and subsequent prices, respectively. M is the margin per contract.

In theory, if the opportunity costs to traders of posting margin were zero, clearing houses could set margin requirements high enough to cover any conceivable market move. In practice, however, the cost is not zero. The challenge faced by CCPs is to set initial margin at a level sufficient to provide protection against all but the most extreme price moves, but not so high as to damage market liquidity or discourage use of the CCP.

Telser (1981), in an early study, noted the potential effect on liquidity. Although this seems intuitively reasonable, Anderson (1981) has questioned whether a reduction in trading activity would occur, noting that the opportunity costs for traders may be low because margin can be posted in the form of interest-earning T-bills. In addition, Anderson suggested that margin would have little effect on market liquidity because intraday trading is not constrained by margin requirements. Kalavathi and Shanker (1991), however, argued that there is in fact a significant opportunity cost to posting margin in the form of liquid assets, in terms of the yield forgone.

Empirical evidence generally supports the view that high margins have a detrimental effect on market activity. Using data on futures contracts traded at the Chicago Mercantile Exchange (CME) and the Chicago Board of Trade (CBOT) between 1977 and 1981, Hartzmark (1986) compared open interest and

trading volumes before and after an initial margin change. In general, he found that open interest declined after an initial margin increase, but there was only a weak effect on volumes. Hardouvelis and Kim (1995) found clearer evidence of an effect on both volumes and open interest. By examining 500 initial margin changes on eight metals futures contracts on the New York Commodity and Mercantile Exchanges and the CBOT, they found that a 10% increase in initial margins reduced average volumes traded by 1.4%.

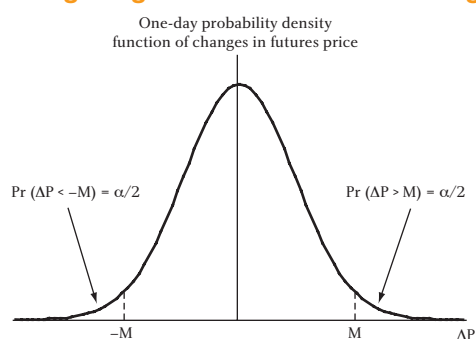
In principle, since CCPs mark-to-market positions daily, they should be exposed only to the extent that a one-day price movement exhausts all of a clearing member's initial margin. In practice, CCPs may be exposed over a longer period as it may take time to decide whether a member should be declared in default, and then to close-out positions. A wide range of studies have therefore attempted to quantify the potential exposure of clearing houses over one or more days. These studies adopt modelling approaches which are of three main types (a) statistical models, (b) optimisation models, and (c) option pricing models. Each of these approaches is described, in turn, below.

(a) Statistical models

Studies taking a statistical approach usually assume that initial margin should be set at a level that produces a prespecified and acceptably small probability of exhaustion, over a time horizon which reflects the period of potential exposure for the CCP. Diagram 3 shows how initial margin might be set so that the probability of non-coverage (ie of a price change exceeding initial margin) is equal to a prespecified level, α . Statistical coverage approaches typically assume a simple model of asset price dynamics (eg geometric Brownian motion) which can be used to derive the probability that initial margin will be exhausted within a specified time horizon.

Figlewski (1984) estimated the degree of coverage provided by a range of different rates of initial and maintenance margin on stock and stock index futures. For contracts which required an initial margin of 6% of the underlying asset and a maintenance margin of 2%, Figlewski calculated that maintenance margin would be breached and a margin call made within three days on approximately 1% of contracts. In the event of a margin call, the probability of maintenance margin being exceeded over the following day (the usual grace period) was around 3%.

Diagram 3:
Setting margin under a statistical coverage approach^(a)



(a) M is initial margin per contract which is set so that the total probability of non-coverage = α . ΔP is the price change over one day.

Gay, Hunter and Kolb (1986) constructed a similar model of futures prices, and evaluated the coverage provided by initial margin. Applying their model to commodities traded at the Chicago Board of Trade between 1979 and 1983, they estimated the probabilities of price movements exceeding initial margin. Whilst these probabilities generally remained consistent across time for futures contracts, they varied significantly between some closely related contracts such as gold and silver⁷.

(b) Optimisation models

As explained above, a dilemma for clearing houses in setting margins is how to balance prudence against the higher costs to members. Lodging high-quality assets with the clearing house as margin represents an opportunity cost to traders. Marking positions to market and settling gains or losses, on either a daily or more frequent basis, also entails costs. To arrive at an optimal margin level the clearing house must balance these costs against the potential losses resulting from a default⁸.

Fenn and Kupiec (1993) developed a model that aimed to minimise the total sum of margin, settlement costs and the cost of settlement failure. Unlike the statistical models described above which prespecify acceptable coverage levels, appropriate coverage emerges endogenously in their model. Overall costs were minimised when the ratio of margin to price volatility was held constant. Fenn and Kupiec applied their model to the margining of the Standard & Poor's (S&P) 500 futures contract before and after the Crash of 1987. The results suggested that CCPs were

generally less active in altering margins in response to changing market conditions than might have been expected on the basis of their cost-minimising model, particularly before the Crash. Fenn and Kupiec suggested that this indicated inefficiencies in the margin setting process, although they noted three possible alternative explanations: (i) there were significant costs to changing margins that were not recognised in their model, (ii) given other safeguards, eg membership standards, the costs of over- or under-margining were not sufficient to require fine-tuning of margin levels, or (iii) regulatory pressures may have already led to some degree of over-margining.

Baer, France and Moser (1996) developed a margining model for a market which sought to minimise the costs of contracting, again by trading off the opportunity costs of posting margin against the potential costs following a counterparty default. By theoretical modelling, they arrived at the conclusion that margin should be set so that the probability of non-coverage is equal to a ratio representing the opportunity cost of margin divided by the cost of recontracting (ie finding a new counterparty at the prevailing market price) following a member default.

(c) Option pricing approaches

Diagram 2 offers a graphical characterisation of the CCP's exposure to a member holding a single futures contract. This simple characterisation ignores many other types of protection that a CCP typically employs, but it nevertheless offers a useful starting point for developing a theoretical model of the core risks that CCPs face. The exposure profile is equivalent to the payoff of a strangle – a trading position created by the combination of a call and a put option. In theory, a buying clearing member might choose to default strategically if the reduction in the value of the contract is greater than their posted margin, ie $P_0 - P_1 > M$. Similarly, the selling member might default when $P_1 - P_0 > M$.

Kupiec (1997) argued that since the clearing house does not charge counterparties for this default option, margins should be set high enough to ensure that it is effectively valueless. Several studies have developed

7: In the wake of the Crash, the Presidential Task Force on Market Mechanisms (Brady, 1988) recommended that margin levels in different markets should be set consistently, so that clearing houses have equivalent protection from adverse price movements in different markets.

8: This notion of 'optimal' takes into account the opportunity costs of margin, daily settlement costs and the potential costs of default, but not beneficial effects on markets as a whole which are harder to quantify, eg enhanced anonymity and liquidity.

this intuition into theoretical models for setting prudent margin levels, notably Day and Lewis (1999).

Day and Lewis modelled margined futures positions as barrier options⁹ and used their model to estimate prudent margin levels for New York Mercantile Exchange (NYMEX) crude oil futures between 1986 and 1991, a period which included Iraq's invasion of Kuwait. Thirty changes in initial margin requirements took place during this period, 19 of them prior to the invasion. On average, historical NYMEX margins were found to be significantly above the levels implied by the model. In the period immediately following the invasion of Kuwait, however, margins were occasionally below the model values, particularly for short futures positions.

In practice, however, well-managed CCPs employ a range of additional safeguards (eg intraday margin calling, netting and assessments of member creditworthiness) that make such option to default models generally rather unrealistic. The price of a contract would also have to change by substantially more than $|P_0 - P_1|$ before a clearing member would in fact have incentives to default strategically. This arises in part because a clearing member's winning positions would be available to offset some of its losing positions, and in part because there are clear economic benefits, in terms of reduced collateral costs and reduced credit risk, from remaining a clearing member.

Limitations of modelling approaches

A number of more general limitations, common to all the classes of model can be noted. Each modelling approach makes certain strong assumptions about the distribution of asset prices, and all focus on the margining of single assets, usually futures, rather than on a portfolio of assets. Little consideration is given in the literature to margining non-linear instruments, such as options.

Equally important, none of these techniques provide any guidance on how large potential losses could be following a margin-exhausting price move, and whether a clearing house would have sufficient resources to cope in the event of a default. These general limitations are discussed in more detail in the following sections.

The shape of the underlying distribution

As noted above, statistical models often make assumptions about the distribution of price movements which limit the conclusions that can be drawn from them. Figlewski (1984) and Gay, Hunter and Kolb (1986), for example, make the assumption that either returns or price changes are normally distributed. Considerable evidence, however, indicates that return distributions, particularly in futures markets, exhibit fatter tails, indicating a greater probability of extreme price moves (Cornew, Town and Crowson (1984); Cotter and McKillop (2000); Venkateswaran, Brorsen and Hall (1993)).

The potential inaccuracy of assuming a normal distribution was illustrated by Warshawsky (1989), who calculated the maintenance margin level required to produce a given level of protection against further price moves on S&P 500 index contracts. Warshawsky compared the margin levels implied by the parametric model of Figlewski, which assumes a log-normal distribution of prices, with levels derived directly from the empirical distribution. Whilst at a modest coverage level of 95%, the parametric approach predicted equivalent levels of margin, at a more stringent coverage level of 99% the margin requirements derived from the empirical distribution of prices were found to be consistently higher.

Portfolio margining

The models described so far have focused on the margining of positions, in individual, usually single futures, contracts. Whilst the single asset approach provides important insights into the complexities of computing optimal margins, it does not take account of the additional benefits and risks associated with the margining of portfolios.

A well-constructed portfolio may provide significant diversification benefits to both the member and the CCP. These are recognised to an extent in practical margining approaches, such as the Federal Reserve Board's Regulation T, which governs the margining of portfolios of equities and equity options in the USA, and Systematic Portfolio Analysis of Risk (SPAN), a methodology employed by US futures clearing houses and by the London Clearing House. In each case, the ability to offset long and short positions reduces overall margin levels. Further details on how SPAN calculates margin are given in Box 2.

9: An option with a payoff determined by whether the path of the underlying asset has reached a predetermined level – the barrier.

Box 2: Margining under SPAN

SPAN is a margining system, introduced by the CME in 1988, which is used by a wide range of clearing houses (including the London Clearing House) to set margin for portfolios of contracts. It was originally designed for margining portfolios of futures and options on futures, but it can also be applied to the margining of other types of option. SPAN is not, however, a true global portfolio margining system. Rather it sets a margin for a contract family defined as a group of contracts (eg options, futures etc) all sharing the same underlying commodity or security.

How SPAN calculates margin

To arrive at a margin level, SPAN simulates the possible change in value for the contract family using a series of scenarios representing potential changes in the underlying security's price and volatility. Potential price movements are defined in terms of *scanning ranges* which are derived from historical data. Typically, the scanning range would represent a price range which would cover 99% of historical one-day price movements observed within the data window. Some adjustment may also be made to take into account historical market moves not captured in the data window but that may be repeated, and the potential effects of anticipated future events.

For each contract within the contract family, prices and volatilities are separately and independently varied along their scanning ranges to produce a matrix of possible outcomes. Using this matrix, the predicted losses across contracts are aggregated to find the scenario that generates the worst-case loss for the contract family as a whole. This is then used to determine the margin requirement. Since the portfolio may contain non-linear instruments such as

options, the worst-case scenario for the contract family as a whole need not be the scenario which results from the largest price movement for the underlying security.

Valuing non-linear instruments

Implementations of SPAN usually rely on a full valuation method such as Black's (1976) pricing model to calculate price changes for options. Where a portfolio contains short options positions, a minimum short option charge is also applied. Since options pricing models sometimes underestimate the risk of deep out-of-the-money short options, the minimum short option charge specified by SPAN provides additional protection.

Spread charges

Since SPAN initially makes the simplification that long positions in one month entirely offset short positions in the same contract in another month, a calendar spread charge is applied to recognise the fact that inter-month prices are not perfectly correlated.

Margin offsets

Where holding different contract groups reduces overall portfolio risk, SPAN also allows a limited range of offsets through a system of inter-commodity credits. The range of permissible offsets and the magnitude of credit available is, however, determined by the clearing house. This illustrates an important general characteristic of SPAN. Parameters that determine the overall margin coverage for a portfolio are set at the discretion of the individual CCP's risk managers, and may therefore vary between CCPs.

The protection afforded by portfolio-based margining systems such as SPAN has received relatively little consideration in the research literature. Two exceptions are Kupiec (1994) and Kupiec and White (1996). Kupiec and White considered a range of hypothetical positions constructed from options on stock index futures. They compared margin requirements based on SPAN with those required under Regulation T, which provides for margin offsets only on specific predefined combinations of positions. They found that for the same overall degree

of risk protection, the margin requirements emerging from SPAN were considerably smaller than from Regulation T.

Kupiec (1994) also estimated the historical degree of risk protection provided by SPAN for contracts and contract families based on the S&P 500 futures traded on the CME. For the period considered (December 1988 – December 1992), initial margin provided historical one-day protection levels in excess of 99% for single futures and simple portfolios. The

‘weak-spot’ identified in Kupiec’s analysis was the offsetting of contracts in the same commodity but with different maturities (calendar spread positions). Such positions were found to have protection levels of significantly less than 95%.

SPAN is currently the most widely used margining system¹⁰. As CCPs expand into new markets, however, there is a question about how effectively SPAN can be adapted to deal with the more complex portfolios that result. The approach that SPAN takes of varying risk factors separately, such as prices and volatilities, is tractable for portfolios of futures and options but, as the number of types of instrument in the portfolio expands, and the range of risk factors increases, the approach may become unwieldy (Jorion, 2001).

One possible future development may be more widespread use of margining systems based on value at risk (VaR) techniques. VaR models estimate the maximum loss that a portfolio will suffer over a given time interval, such that there is a low prespecified probability that the actual loss will be larger. The potential advantage of VaR models is that they generally take fuller account of the correlations between the prices of assets in a portfolio, and this may permit more efficient margining. If correlations change, however, there is a risk that VaR models may underestimate losses.

Several recent papers apply new VaR methods to the kind of complex derivatives portfolios typically held by CCPs (Barone-Adesi, Giannopoulos and Vosper (1999, 2002)). These papers pay explicit attention to the fact that traditional models have been poor at estimating VaR losses under extremes. Barone-Adesi et al develop a new simulation approach known as Filtered Historical Simulation which is aimed at addressing this weakness. By sampling standardised returns over multiple days this technique is able to simulate extreme events not present in the historical data, which enables the true tails of the distribution to be more effectively replicated.

Losses in excess of margin

Since margin provides the primary means of financial protection for CCPs, most clearing house studies have naturally focused on the protection which margin

affords. CCPs recognise, however, that under the most extreme market conditions, a defaulter’s margin may still prove insufficient. The majority of CCPs therefore hold additional default resources, which individual members contribute towards, usually according to the scale of their clearing business.

Gemmill (1994) offered one of the few published studies to address the combined adequacy of margin and other default resources. He derived a rough estimate for the size of the default fund of a stylised clearing house assumed to clear three generic contracts – a soft commodity, a metal and a financial contract. Gemmill’s study was practical rather than theoretical, and he was forced to make a number of assumptions to derive an exposure estimate: first, to account for the changes in intermarket correlations commonly observed under extreme market conditions, Gemmill assumed correlations observed at the time of the Crash of 1987; and second, to estimate the scale of potential credit exposure, he assumed the default rate amongst members was exogenous.

Gemmill’s most striking conclusion was that the clearing house derived a substantial diversification benefit from clearing several weakly correlated markets, with clearing risk being at least halved. This conclusion provides an interesting counterpoint to the observation that clearing houses concentrate risk by clearing multiple markets. But Gemmill’s study also highlighted an important problem in estimating potential CCP exposure; namely, how to assess the likelihood of individual member default given a margin-exhausting price move, and what assumptions to make about the extent of correlation between individual defaults.

Recent advances

More recent work on clearing house margining has made progress in addressing some of the problems outlined above. This section considers developments addressing two main areas (i) the shape of the underlying price distribution, and (ii) the potential scale of losses when price movements exceed initial margin.

Modelling the tails of the distribution

In common with risk management work in other areas of finance, recent studies of clearing house margining

10: A smaller number of clearing houses, however, use TIMS (Theoretical Intermarket Margining System), a margining system developed for options by the US Options Clearing Corporation.

have given greater attention to the shape of the underlying distribution of prices, particularly under extreme market conditions when margins are most likely to be exhausted.

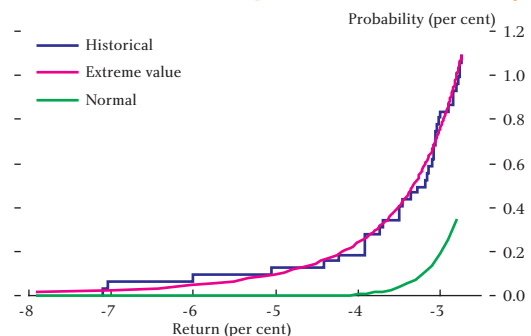
In calculating margin for individual futures positions, clearing houses typically set margin at a level that will provide protection against 95–99% of one-day price movements¹¹. Most clearing houses make an estimate of the appropriate margin level by inspecting the distribution of price movements over recent months. But this will not always provide an adequate estimate of the size of future extreme price moves. To counter such problems, CCPs will usually adjust their empirical estimates using subjective judgements on whether previously observed extreme moves are likely to be repeated, and the potential impact of possible future events. Cotter (2001) notes the potential for inconsistency in this approach, advocating instead a statistical modelling approach based on Extreme Value Theory.

Extreme Value Theory (EVT) provides a way of estimating the potential for extreme market moves which, instead of considering the entire distribution, focuses only on the parts that provide information about extreme behaviour – the tails of the distribution. (See Embrechts et al (1997) for a comprehensive discussion of EVT techniques.) Since margin is only likely to be exceeded under extreme price moves, EVT provides a potentially useful framework for assessing the adequacy of clearing house resources. A variety of recent studies have applied EVT to estimating margin levels for futures contracts (Booth, Broussard, Martikainen and Puttonen (1997); Broussard (2001); Longin (1999)). Dewachter and Gielens (1999) show how these techniques can be incorporated into an optimisation model of margins. Diagram 4 illustrates how EVT is able to provide a more accurate characterisation of fat-tailed behaviour than the normal distribution.

Despite its theoretical appeal, clearing houses may not be convinced that EVT should be used to set initial margins directly. Although it can be applied straightforwardly to single instruments, calculating a portfolio margin reflecting the distributions of a large

number of instruments may present serious practical difficulties. Also, the higher initial margins generally implied by EVT analysis could have adverse effects on market liquidity¹². Nevertheless, EVT analyses may offer a useful source of information to clearing houses when assessing the overall levels of protection provided by the different types of default resource available to them.

Diagram 4:
Modelling the lower tail of the distribution of S&P 500 returns using Extreme Value Theory^{(a)(b)}



Sources: Datastream and Jon Danielsson.

(a) See Danielsson and de Vries (2002) for a description of the methodology.

(b) Daily returns from 1990 to 2000.

Modelling losses conditional on exceeding margin

Irrespective of the way margins are set, there will be a non-zero probability that circumstances arise under which margin is exhausted. CCPs therefore need to be able to make an accurate estimate of their losses in such cases.

Bates and Craine (1999) examined this problem by studying the margins set by the CME before and during the Crash of October 1987. Given the prevailing margin levels, they calculated the expected losses conditional on margin being exceeded for S&P 500 contracts. Potential losses were estimated using historical margin levels and a probability distribution of futures prices which was reparameterised each day¹³. Bates and Craine found that immediately following the Crash, both the probability of margin being exceeded and the expected losses conditional on this occurring increased by more than an order of magnitude. By the end of November, aggressive increases in margin

11: Kupiec (1994) found that margin protection on portfolios cleared through the Chicago Mercantile Exchange often exceeded 99%.

12: A reviewer of this article also noted that in practice some clearing houses prefer to focus their attention on a relatively small sample of historical data consisting of only the most recent N months. This would limit the feasibility of an EVT analysis.

13: Return distributions were estimated from time series and option prices.

levels had successfully reduced the probability of exceeding margin back to pre-Crash levels. Despite these margin increases, however, the expected losses faced by the clearing house, if a margin-exhausting price move were to have occurred, were still an order of magnitude higher than before the Crash.

Bates and Craine's study highlights the fact that it is important to consider other measures of clearing house exposure in addition to the coverage provided by margin. Indeed, their study shows that, when considered alone, margin coverage probabilities may provide a misleadingly comforting picture of clearing house exposure. A given coverage level may, in fact, involve much larger expected losses under extreme market conditions. Finally, the study emphasises the importance of modelling the shape of the tail of the distribution, and taking into account how it may change in extreme market conditions.

Conclusions and implications for future research

Clearing houses have developed risk management procedures that have proved remarkably robust. Nevertheless, as the nature of CCP business becomes more complex, through expansion into new markets, and more centralised through consolidation, the risks to clearing houses are likely to grow. As the systemic importance of CCPs grows in parallel, it will be important for CCP risk management practices to address the changing nature of these risks. Summarised below are some of the main implications for CCP risk management which can be drawn from the research literature discussed in this article.

Estimation of conditional losses

Initial margin protection should be supplemented with sufficient additional default resources to cover the losses that could be incurred if a member (or members) were to default following a margin-exhausting price move. As Bates and Craine showed, setting the margin level to achieve a given level of coverage is likely to be an inadequate response to extreme market volatility. In such conditions, CCPs may face much larger losses if one or more members default after price movements which exhaust their margin. CCPs therefore need to be able to estimate potential losses in order to assess accurately the required scale of default resources.

EVT may have a role in helping CCPs assess the size of expected losses. Academic studies to date, however, have focused more on the application of EVT to

estimating margins. But in either context, EVT techniques may have important practical limitations. Not only is EVT difficult to apply to complex portfolios, it is also still reliant on theoretical extrapolations from historical data, which may fail to take account of structural changes in markets. To assess the scale of margin-exceeding losses in practice, it will be important for CCPs to develop and enhance scenario-based stress-testing procedures which assess the impact of low probability, but nonetheless plausible events, which may have no precedent in the current historical record.

Assessing the optimal balance between margin and other default resources

Setting margins at an optimal level requires striking a balance between prudence and the opportunity costs to clearing members and their clients. High margin levels, sufficient to cover very extreme events, can discourage trading and potentially damage market liquidity. Establishing very high margin levels may also be an inefficient way of ensuring protection – at some point, it may become more efficient to mutualise the residual risks through a default fund or other guarantee arrangement. Ensuring that CCP members maintain some residual exposure to the uncovered losses of the CCP also has an added benefit, as it creates an incentive for clearing members to take an active interest in the overall standard of a CCP's risk management. Further research is needed on the factors that determine the optimal structure and allocation of CCP resources.

Development of more sophisticated portfolio models

Over the last five years, CCPs in Europe have rapidly developed new lines of business. To keep pace with these changes, new margining methodologies have also been introduced. An important goal for CCPs which clear many different markets will be to develop integrated modelling techniques that can provide a sophisticated assessment of the aggregate risks to the CCP. As noted above, there is little published research work which considers the margining of portfolios, and even less which considers other default resources. Longin (1999) suggests applying EVT methods to the margining of spread and hedge positions. Keppo (1997) offers a more general model of portfolio margining that also takes into account the conditional probability of member defaults.

Existing theoretical and empirical techniques provide useful insights and practical tools for CCPs, and for

regulators, as well as for others such as central banks concerned with systemic stability. These techniques can be used to assess, monitor and control the risks CCPs face. But they can be improved upon. A challenge for future research will be to develop models of margining, and more generally models of

default provision, which can estimate accurately the potential for tail events and take into account not only the enhanced patterns of market correlations that often accompany these extreme events, but also the extent of correlation between defaults by members.

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UK interbank exposures: systemic risk implications

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A well-functioning interbank market is essential for efficient financial intermediation. But in exceptional circumstances, interlinkages between banks may provide a channel through which financial difficulties in an individual bank can be propagated to other banks. As part of theoretical efforts to understand these mechanisms, this article explores, in a stylised way, the effect of one type of extreme event – the sudden and unexpected insolvency of a single bank.

INTERLINKAGES BETWEEN financial institutions, and especially between banks, are essential for efficient financial intermediation. Of particular importance is a well-functioning interbank market, which provides an effective means of transferring liquidity from financial institutions with a cash surplus to those with a cash deficit. These transfers often occur through unsecured loans and deposits, which are straightforward and cost-effective.

But in the process of these transactions, banks can acquire significant exposures to each other. During normal market conditions, this poses no problems. But in exceptional circumstances, these interlinkages could be a channel through which problems in one bank spread across the system. Understanding the channels through which financial crises are transmitted is important in seeking to maintain financial stability, and uncovering the direct links between banks is a key element of this.

Links between banks can be of different kinds. Direct exposures mean that the failure of one could cause significant losses to its counterparties – potentially raising questions about their capital adequacy. Spill-overs would also arise if the failure of one bank led to market doubts about the soundness of other banks involved in similar activities.

This article focuses on the direct exposures between banks via the interbank market. In particular, it examines the potential for a sudden insolvency of a

single bank to trigger the failure or weakening of other banks. In reality, of course, problems in individual banks usually evolve over a long period, allowing their counterparties time to reduce their exposure. Furthermore, insolvencies can be triggered by disturbances that have a wider impact, simultaneously affecting more than one financial institution. The event considered in this article – a sudden single bank failure – is, therefore, very unlikely.

Previous studies of foreign banking systems have analysed the scope for these effects by simulating the unexpected failure of a single bank. Sheldon and Maurer (1998) consider the Swiss banking system and find that spill-over effects would mainly arise following the failure of one of the four largest Swiss banks, and then the effects would be severe: very few banks could survive such a shock. Upper and Worms (2002) analyse German banks. They find that an insolvency shock to a single bank usually triggers some additional failures, but the banks affected typically account for less than 1% of total banking system assets. In more extreme cases, however, the failure of a larger bank triggers spill-over affecting banks that account for more than 75% of total banking system assets¹. In contrast, a study of US banks by Furfine (1999) finds that the systemic effect of a major bank failure is small. The failure of the most significant bank typically affects just a few other banks, which account for less than 1% of total banking system assets. But Furfine's study considers only a small subset of total interbank exposure².

1: The average effect is very small relative to the maximum effect. This is, in part, because the German banking system is populated by a large number of small co-operative banks. Should these fail, there is little impact on other banks.

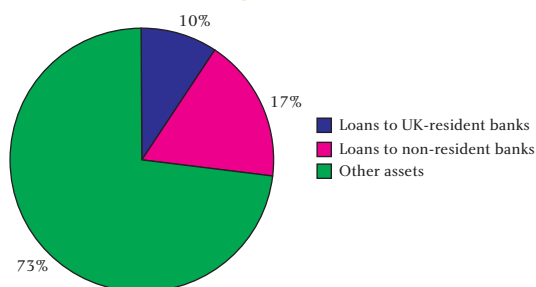
2: Specifically, Furfine (1999) focuses on Federal Funds exposures. These account for around 14% of total interbank exposures and may therefore understate the risk of spill-over.

The UK interbank market

The UK interbank market is highly concentrated: over 70% of total lending between banks operating in the UK is accounted for by only 15 institutions. The market is, therefore, characterised by ‘tiering’, ie a small number of large banks transact with each other and a greater number of smaller institutions, which place excess funds with the larger banks. In principle, this creates a potential for feedback effects between the relatively few dominant institutions and the larger number of small banks. In addition, there are large exposures amongst the biggest banks, which have a central role in the payments system.

London’s position as an international financial centre means that foreign banks have a significant involvement in the UK interbank market. Through branches located in the UK, they account for around half the total lending in the UK interbank market³. Moreover, the amount of lending from banks resident in the UK (ie UK-registered banks and branches of foreign banks situated in the UK) to other UK-resident banks is less than the amount lent to banks situated overseas. Unsecured interbank lending accounts for around 27% of UK-resident banks’ total assets. Of this, only 36% is to other UK-resident banks (Chart 1)⁴.

Chart 1:
UK-resident banks’ unsecured interbank lending as a share of total banking sector assets^{(a)(b)(c)}



Source: Bank of England.

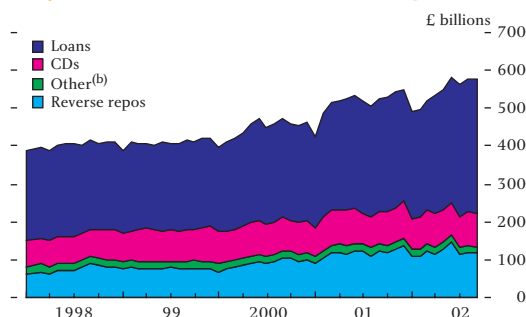
(a) All currencies.

(b) Unconsolidated, unsecured lending by UK-resident banks. Amounts outstanding Sep. 2001.

(c) Amount outstanding = £3,629 billion.

Over time, and particularly since the opening of the gilt repo market in the mid-1990s, there has been a shift from unsecured to secured exposures. To some extent, this has lowered counterparty risks because the loans are fully secured. Likewise, the growing use of collateralisation in swap markets has reduced direct exposures between banks. But much interbank lending remains unsecured (Chart 2). The unsecured interbank market has retained an important role in moving funds within the banking system in a flexible way. Banks with large correspondent bank networks and customer bases can end up with sizeable shortages at end day, which are met by transferring funds from banks in surplus.

Chart 2:
Components of UK interbank lending^(a)



Source: Bank of England.

(a) Lending by UK-resident banks to other UK-resident banks (all currencies).

(b) Commercial paper and bank bills.

Data limitations

The scope for understanding the way in which crises might potentially propagate within this structure is, however, limited by the available data. The extent of any spill-over effects would depend on the precise pattern of interbank exposures⁵. So to understand fully how the failure of one bank can affect the position of others would require a complete matrix of the bilateral exposures, arising from all of the activities of all banks that interact with each other within the global banking system. For the purpose of this article, this would mean observing the bilateral interbank exposures of all UK and foreign banks that either participate directly in the UK market, or interact with other banks that do.

3: The role of foreign banks in the UK interbank market is discussed in Box 11 of the June 2002 *Review*.

4: Total is unconsolidated and a significant element is intra-group lending.

5: A microeconomic model of spill-over in the interbank market, which demonstrates the importance of the exact interlinkages, is proposed in Allen and Gale (2000).

In practice, data are not readily available for banks that do not operate in the UK market directly. So the analysis is restricted to UK-resident banks. Even then, however, it is not possible to observe a complete matrix of bilateral exposures, describing the direct links between each and every bank resident in the UK. Rather, information on bilateral exposures is limited to the coverage of the large exposures data collected by the UK's Financial Services Authority (FSA).

These data are collected on a consolidated basis, ie each bilateral exposure reflects the combined exposure of all the reporting bank's branches and subsidiaries – including those located outside the UK – to all entities in another banking group. They include off-balance sheet as well as on-balance sheet exposures, capturing counterparty exposures under derivative contracts, contingent liabilities like guarantees and commitments, and other undrawn facilities. They do not cover exposures arising intra-day from payment and settlement activity, and for derivative transactions they cover only mark-to-market exposure, not potential future exposures that might arise as market prices change. For UK-owned banks, the data detail the size and counterparty for each of the bank's 20 largest exposures and any other exposures exceeding 10% of its Tier 1 capital. But no equivalent data are available on the large exposures of UK branches of foreign banks. Although useful, therefore, large exposure information falls well short of providing a complete map of the interactions between all banks operating in the UK.

An alternative approach is to start from data on each bank's aggregate exposure to the interbank market, and to try to find some way of estimating a breakdown into bilateral exposures. Data for each bank's total money market lending to (and deposits placed by) the UK interbank market as a whole are collected by the Bank to produce statistics on monetary aggregates and the UK-resident banking system's assets⁶. The coverage, however, differs from that of the large exposures data in a number of

important respects. It is, for example, unconsolidated: it includes only the exposures of the particular bank, not the banking group. Furthermore, focusing entirely on exposure to other banks operating in the UK means that only exposure to local branches and subsidiaries of foreign banks is captured. Moreover, it does not include off-balance sheet exposures and some other types of exposure. Nevertheless, the figures cover more than 75% of unsecured on-balance sheet interbank lending in the London market⁷.

Even though there are differences between the two data sources, the large exposures data may be used in a rather rough and ready way to adjust any estimates of bilateral exposures derived from the aggregate data. Refining the estimates in this way means that they reflect, to some extent, the pattern of activity implied by the large exposure data.

Estimating bilateral exposures

To estimate a matrix of bilateral exposures, the aggregate data are used as follows.

Data for the 24 largest banks are included individually. The remaining UK banks are grouped together, as they account for less than 1% of total interbank lending amongst UK-owned banks. Foreign banks are also grouped together, according to domicile⁸.

A matrix of bilateral exposures between these groups is then estimated under two sets of stylised assumptions about how banks distribute their aggregate interbank lending and borrowing across other individual banks, or groups of banks. Following previous studies in this area (Sheldon and Maurer (1998) and Upper and Worms (2002)), the first set of estimates assumes that banks seek to spread their borrowing and lending as widely as possible across all other banks. In practice, this involves modelling the exposure of bank A to bank B, say, as increasing both with bank A's total interbank lending and bank B's total interbank borrowing⁹. Hence, these exposures reflect the relative importance of each institution in the interbank

6: A comprehensive description of the 'monetary' data can be found in Gracie and Logan (2002).

7: Interbank exposures will also arise in payments, foreign exchange settlement and derivative positions. Data on these are limited and are therefore excluded from the analysis. This potentially ignores important channels of spill-over. On the other hand, the model does not take account of on-balance sheet netting agreements and thus may include exposures that would be netted against other exposures, if an intra-day insolvency occurred. The systemic risk posed by different categories of exposure is discussed in Michael (1998).

8: The groups are: Emerging market, French, German, Japanese, Other developed, Other EU, Swiss and US.

9: The annex describes the estimation method in more detail.

market via the size of its total borrowing and lending. This assumption rules out the possibility of ‘relationship banking’ ie a bank preferring some counterparties to others.

To adjust for this, the second model assumes that concentrations in the interbank market are reflected in the pattern of the large exposures data. The Bank drew on data on these exposures for 21 of the 24 UK-owned banks that enter the model and four of the overseas groups. As the large exposures data are readily available only for a single snapshot, both models are estimated using end-2000 data which, given end-of-year liquidity management, may be unrepresentative.

The propagation mechanism

Given these estimated bilateral exposures, the effect of a failure by an individual institution or group of institutions can be traced through the stylised banking system. If the initial failure leads to the insolvency of other banks, then the implications of these second-round failures can also be examined. For this purpose, it is assumed that the banks take no remedial action (for example, raising extra capital from shareholders); hence, the aim is to trace through *mechanically* the direct effects of exposures.

Each failure is assumed to be idiosyncratic to a particular bank, representing, for example, the effect of fraud. Given some assumption about the proportion of loss that is not recoverable (loss-given-default), any bank that has an exposure to the failing institution that exceeds its holdings of Tier 1 capital¹⁰ is also assumed to be insolvent¹¹. This definition of failure is to some degree arbitrary. In reality, great uncertainty surrounds the level of loss that would push a bank into insolvency. But a formal definition is required for the purpose of this kind of stylised exercise. Algebraically, assuming the insolvency of bank j , bank i also fails if

$$\theta x_{ij} > c_i, \quad (1)$$

where x_{ij} denotes the exposure of bank i to bank j , c_i is bank i 's Tier 1 capital and θ is the loss-given-default ratio. Assuming that the failure of bank j did trigger

the failure of bank i , further effects are examined on a round-by-round basis. In the third round, for example, bank k fails if its combined exposure to banks i and j exceed its Tier 1 capital, ie if

$$\theta(x_{kj} + x_{ki}) > c_k. \quad (2)$$

The loss-given-default ratio, θ , is assumed to be common to all banks. A large bank failure has not happened for many decades in the UK, making it extremely difficult to estimate the loss-given-default. As a guide, a Bank study of recoveries by the UK Deposit Protection Fund in the early 1990s suggests a median loss-given-default of 35% for failed UK banks¹². But the sample contains just 14 banks and individual values vary greatly (from 0% to 100%). Moreover, the sample includes only small banks, and so the estimate may well not be suitable for large banks. Also, these recovery rates are not adjusted for the time taken to achieve them. Therefore a study of this kind needs to consider the possibility of a higher loss-given-default rate. This is because even though a bank might be able to achieve a relatively high recovery rate over the long run, there will almost inevitably be uncertainty about eventual losses so that a bank with much of its capital at risk may be unable to continue to operate. Given this uncertainty, and following Furfine (1999) and Upper & Worms (2002), results are presented for a range of loss-given-default rates.

Results

The results are reported in two stages. First, the incidence of multiple bank failures is reported following each of the idiosyncratic bank insolvencies. This is presented for each of the two models in turn, thereby highlighting the effect of introducing the large exposures data into the estimate of the matrix of bilateral exposures. Second, the capital losses experienced by surviving banks are reported for both models because this indicates the extent of overall weakening of the banking system.

Multiple bank failures: Model I

The model can simulate the knock-on effects of 33 insolvencies¹³. Simulating each insolvency under the assumption that banks spread borrowing and

10: Tier 1 capital is defined under the Basel Accord on bank capital standards. It mainly comprises equity capital and is regarded as a high quality capital buffer.

11: Only the effects on 24 medium to large UK banks are examined, reflecting those institutions for which consolidated Tier 1 capital data are readily available. Second round failures to the remaining small UK-owned banks and foreign banks are not captured.

12: See Jackson (1996) for a review of deposit protection and bank failures in the UK.

13: The insolvency of 24 UK-owned banks, the simultaneous failure of all smaller UK-owned banks, and the failure of each of the eight groups of foreign banks.

lending as widely as possible suggests that, although an idiosyncratic failure of one bank could cause multiple failures of other banks, it is the exception rather than the rule. Even if none of the exposure is recovered (ie the loss-given-default is 100%), the insolvency of a single bank triggers additional failures in only four of the 33 cases (Table 1). With a lower, more realistic, level of loss-given-default, even fewer events lead to the failure of other banks in the stylised system.

Table 1:
Multiple failures in Model I

Loss-given-default (per cent)	Cases of multiple failures ^(a)	Balance sheet assets affected (per cent)	
		Median case ^(b)	Worst case ^(c)
100	4	8.8	25.2
80	4	1.0	6.7
60	3	0.0	6.7
40	2	0.0	0.0
20	0	0.0	0.0

Source: Bank calculations.

(a) Out of a possible 33 cases.

(b) Conditional on multiple failures occurring, the median impact in terms of aggregate balance sheet assets.

(c) The case of multiple failures that gives rise to the largest impact on aggregate balance sheet assets.

To analyse the severity of each case of spill-over, the size of the banks involved is measured by total assets¹⁴. Table 1 shows the percentage of UK-owned banks' balance sheet assets accounted for by the banks that fail due to spill-over effects. In particular, it reports the 'worst' case (ie the case of spill-over that affects the largest proportion of total balance sheet assets) and the 'median' case, which, conditional on multiple failures occurring, shows the median impact in terms of balance sheet assets.

The results are highly dependent on the assumed rate of loss-given-default. But, at all levels of loss-given-default, spill-over only arises following the insolvency of a large bank. Moreover, the failures involve a relatively small percentage of banking assets (9% in the median case of spill-over, even if loss-given-default is 100%), highlighting the small size of the banks failing due to direct exposure. On the other hand, in the worst insolvency case, much larger banks are involved and up to 25% of banking assets could be affected.

In the majority of cases, most knock-on insolvencies occur as a direct result of exposure to the initial

failure. This reflects the fact that, for the most part, only small banks are affected. Only in the more extreme cases do the spill-over effects continue for several rounds.

Multiple bank failures: Model II

A comparison of the exposures estimated in Model I with the reported large exposures suggests that the former understates the exposure of the biggest UK-owned banks to foreign banks. This may be because the data underpinning the Model I estimates do not include the exposure of overseas branches and subsidiaries of UK banks. Nor do they include exposure to non-UK parts of foreign banks, and also exclude derivative exposures. Alternatively, it may also reflect the inappropriateness of the assumption of 'wide' dispersion. In contrast, the reported large exposures between the biggest UK-owned banks are, on average, slightly lower than those estimated in Model I.

Incorporating the pattern of the large exposures into the estimates therefore increases the average exposure of big UK-owned banks to foreign banks and reduces exposures between large UK-owned banks. This shift has some interesting consequences for spill-over. The size of the exposures to foreign banks introduces the possibility of importing financial distress: in contrast to Model I, in Model II it is possible for insolvency in a group of foreign banks to trigger the direct failure of UK-owned banks.

This increases the number of insolvencies that trigger additional failures, although the average size, measured in terms of banking system assets affected, is smaller (Table 2). Under the extreme assumption of 100% loss-given-default, knock-on failures are experienced in nine of the possible 33 cases. But, in terms of size, the 'worst' case is greatly reduced, reflecting lower exposures between large UK-owned banks. And five of the nine cases involve the failure of just one small bank, which is reflected in the median case affecting only 0.1% of total assets. Against this, relative to Model I, more banking system assets are affected in the 'worst' case for loss-given-default rates of between 60% and 90%.

14: 'Total assets' refers to the aggregate consolidated balance sheet assets of the 24 UK-owned banks in the model. Recall that, in the model, only these 24 banks can fail due to direct exposures.

Table 2:
Multiple failures in Model II

Loss-given-default (per cent)	Cases of multiple failures ^(a)	Balance sheet assets affected (per cent)	
		Median case ^(b)	Worst case ^(c)
100	9	0.1	15.7
80	7	0.0	15.7
60	6	0.0	15.7
40	3	0.0	0.0
20	0	0.0	0.0

Source: Bank calculations.

(a) Out of a possible 33 cases.

(b) Conditional on multiple failures occurring, the median impact in terms of aggregate balance sheet assets.

(c) The case of multiple failures that gives rise to the largest impact on aggregate balance sheet assets.

Weakening

As mentioned previously, the definition of knock-on failure used in the preceding analysis is somewhat crude. In reality, a sufficiently large loss might cause a bank to fail, even if it does not completely wipe out its Tier 1 capital. It may prevent the bank from operating normally due to indirect effects such as credit rating downgrades and/or a rush withdrawal of deposits. Therefore, from a financial stability perspective, it is useful to characterise the distribution of losses realised by banks that do not fail but which do suffer a large loss of capital. For each 'worst' case of outright failure, this distribution is shown in Chart 3 for Model I and Chart 4 for Model II.

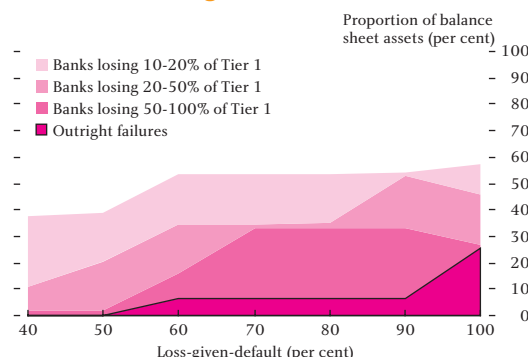
In Model I, the failure of one bank can trigger significant losses even at low levels of loss-given-default. To see this, suppose that loss-given-default is 40%. Chart 3 shows that there is a negligible amount of outright failures and only one or two small banks lose more than half their Tier 1 capital. However, some larger banks lose more than 20% of their Tier 1 capital, and together these banks account for 11% of total banking system assets. Further, banks accounting for 38% of total assets lose more than 10% of Tier 1 capital.

For loss-given-default rates higher than 60%, Model II implies a similar distribution of losses – banks accounting for around 64% of total balance sheet assets lose more than 10% of their Tier 1 capital. For lower levels of loss-given-default, the losses realised by the surviving banks is substantially reduced.

Conclusions

The interbank market, while essential for transferring funds between banks, is a channel through which problems experienced by one bank could have a direct impact on other banks in the system. In the

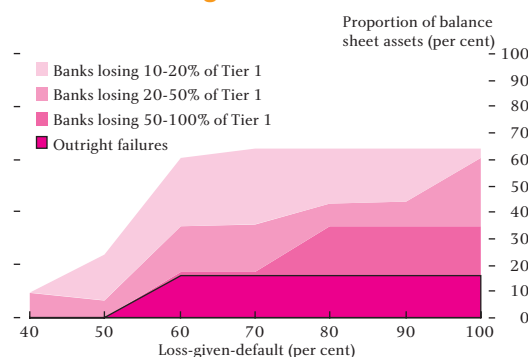
Chart 3:
Model I: Proportion of banking system assets accounted for by failing banks in 'worst' case and losses of surviving banks^(a)



Source: Bank calculations.

(a) The case of multiple failures that gives rise to the largest impact on aggregate balance sheet assets.

Chart 4:
Model II: Proportion of banking system assets accounted for by failing banks in 'worst' case and losses of surviving banks^(a)



Source: Bank calculations.

(a) The case of multiple failures that gives rise to the largest impact on aggregate balance sheet assets.

UK, there is a large interbank market and, in the course of their business, banks can acquire significant exposures to each other.

A complete analysis of the exposures in the interbank market is not feasible due to data limitations. Data on banks' aggregate exposure to the entire UK interbank market are incomplete in terms of the instruments they cover. Bilateral data, on the other hand, cover more instruments but have a different geographical coverage, and only include exposures that exceed a certain threshold.

Within the constraints of the available data, only a stylised model of the interbank market can be set up. One approach, which assumes banks seek to spread exposure as widely as possible, suggests that if a

multiple bank failure were to occur, it would most likely be triggered by the assumed insolvency of a large UK-owned bank. Large UK-owned banks generally have high credit ratings, ie their probability of default is generally low. This suggests that such a shock to the system is very unlikely.

Incorporating concentrations implied by the pattern of the large exposures data opens up the possibility that the insolvency of a large foreign bank could cause multiple bank failures in the UK system. However, when multiple failures do occur, the systemic implications seem to be somewhat less than under the simpler approach.

In the event of the failure of a large bank, there does appear to be the potential for a substantial weakening

in the capital position of a number of other banks. This is important since large banks rely on high credit ratings in order to participate in certain markets. There could therefore be significant spill-over effects by this route, even in the absence of outright failure.

This exercise is subject to important caveats. No account is taken of any remedial action by banks. Nor is any allowance made for netting of exposures, which adds to the uncertainty surrounding the appropriate level of loss-given-default. And analysis has focussed on exposures in the UK interbank market whereas UK banks are active in many financial centres around the world. But exercises such as this help to underline the importance of a sound banking industry to systemic stability and an orderly payments system.

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Annex: Estimating bilateral exposures with incomplete information

The aim is to estimate a complete network of bilateral exposures using each bank's total interbank assets and liabilities. For N banks, the network of exposures can be summarised by an $(N \times N)$ matrix,

$$X = \begin{bmatrix} x_{1,1} & \cdots & x_{1,j} & \cdots & x_{1,N} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ x_{i,1} & \cdots & x_{i,j} & \cdots & x_{i,N} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ x_{N,1} & \cdots & x_{N,j} & \cdots & x_{N,N} \end{bmatrix}$$

$$\text{with } \sum_{j=1}^N x_{ij} = a_i, \quad \sum_{i=1}^N x_{ij} = l_j,$$

where x_{ij} denotes bank i 's exposure to bank j , and a_i and l_j are, respectively, bank i 's interbank assets and liabilities. Without an assumption about the distribution of the bilateral exposures the matrix, X , cannot be identified. In the absence of further information, a sensible approach is to assume that banks seek to maximise the dispersion of their interbank activity¹⁵. In this case, a bank's choice of who to lend to is determined solely by the distribution of borrowing across banks. Similarly, its choice of who to borrow from is determined by the distribution of lending across banks. The source and destination of credit are independent and, following appropriate normalisation, the individual exposures are given by the simple solution $x_{ij} = a_i l_j$.

This simple solution does not make use of all available information. For example, it implies the undesirable result that a bank may have an exposure to itself. Fortunately, it is straightforward to impose additional constraints on the interbank structure. Given a prior estimate, X^0 , of the structure, one can solve a minimisation problem to find a matrix that gets as 'close' as possible to the prior, subject to the row and column adding-up constraints. A suitable measure of 'closeness' is the cross-entropy between

the two matrices¹⁶. The appropriate interbank network is the solution to the problem

$$\min \sum_{i=1}^N \sum_{j=1}^N x_{ij} \ln \left(\frac{x_{ij}}{x_{ij}^0} \right)$$

$$\text{subject to } \sum_{j=1}^N x_{ij} = a_i$$

$$\sum_{i=1}^N x_{ij} = l_j$$

$$x_{ij} \geq 0$$

with the conventions that $x_{ij} = 0$ if, and only if, $x_{ij}^0 = 0$, and $\ln(0/0) = 0$. Problems of this type can be solved using a matrix balancing algorithm known as the RAS algorithm¹⁷.

This article compares two estimates of interbank structure. In the first model, the additional information is simply that banks do not have exposures to themselves: the prior estimate of the interbank structure is given by the maximum dispersion solution, but with appropriate zero entries on the leading diagonal. The second estimate incorporates information from the large exposures data. Algebraically, the initial estimates are given by

$$x_{ij}^{0,I} = \begin{cases} 0, & \text{if } i = j \\ a_i l_j, & \text{otherwise} \end{cases} \quad \text{and}$$

$$x_{ij}^{0,II} = \begin{cases} \frac{E_{ij}}{\sum_{j=1}^N E_{ij}} a_i, & \text{if bank } i \text{ reports large exposures} \\ x_{ij}^{0,I}, & \text{otherwise} \end{cases}$$

where E_{ij} represents the large exposure to bank j reported by bank i .

15: Technically, this involves selecting the distribution that has maximum entropy. To understand why this is a sensible approach, consider the problem of selecting a distribution for the outcome of rolling a dice. Unless one has information that the dice is loaded in some way, the distribution that places equal weight on each outcome should be selected. But this distribution also maximises the uncertainty, or entropy, about the outcome. Therefore, in the absence of information about concentrations in the interbank market, the maximum entropy distribution is chosen.

16: See Fang et al (1997) for more details on entropy and cross-entropy.

17: See Censor and Zenios (1997) for a description of the RAS algorithm. This algorithm is also applied to estimate interbank market structure in Upper and Worms (2002).